Randwick City Council
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# Review of Environmental Factors

## Streetscape Upgrade and New Cycleway: Centennial Park to Kingsford Light Rail Terminus

May 2019

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*"Creating a walkable and cycleable city is an important part of creating a sustainable city*

- *One that is equitable, livable, cost-effective, healthy, environmentally sound and safe."*

*(Extract from Planning Guidelines for walking and cycling, DIPNR, December 2004)*

# *Document Review:*

| Version | Date | Revision Description |
|---|---|---|
| 1.0 | 16/02/18 | Preliminary Draft Issued for Information |
| 2.0 | 03/05/18 | Draft (Rev 2.0) Issued for Review following RCC comments |
| 3.0 | 13/06/18 | Draft (Rev 3.0) Issued for Review |
| 4.0 | 14/09/18 | Draft (Rev 4.0) Issued for Review |
| 5.0 | 04/10/18 | Final (Rev 5.0) Issued for Approval |
| 6.0 | 19/05/19 | Addition of RSA/CPTED/Safety Discussion |

# Executive summary

## The proposal

Randwick City Council has been successful in gaining funding through the NSW Government's Active Transport Program to design and document streetscape improvements and a new cycleway linking Centennial Park to the Kingsford Light Rail Terminus (UNSW) via Doncaster Avenue, Day Avenue, Houston Road, General Bridges Crescent and Sturt Street. The provision of the new cycleway link also provides an opportunity to enhance the streetscape, improve road safety and strengthen the pedestrian experience along the proposed route.

The Centennial Park to Kingsford Light Rail Terminus cycleway begins at the intersection of Alison Road and Doncaster Avenue and comprises an interrupted median bi-directional separated cycleway that runs along the eastern side of Doncaster Avenue, extending to the south to Day Avenue, where it will connect with an existing short section of separated cycleway on the northern side of Day Avenue, between Doncaster Avenue and ANZAC Parade. The cycleway link will continue south along the western side of Houston Road, crossing into the Bayside local government area, where it will circuit Dacey Park along the south-western side of General Bridges Crescent, before crossing Bunnerong Road and connecting into Sturt Street and ending at the Kingsford Light Rail Terminus at ANZAC Parade. At this point, the cycleway will connect to South Coogee via Sturt Street, Avoca Street and Bundock Street, being undertaken as a separate, but concurrent project (for the design phase).

The Centennial Park to Kingsford Light Rail Terminus Cycleway link is an integral part of the wider Inner Sydney Regional Bicycle Network. The 2.8km long section of cycleway will connect with the existing Centennial Park shared path on the northern side of Alison Road, providing a connection to the Sydney CBD. The cycleway contains two different typologies, in response to the varied built form characteristics along the length of the route, as well as parking and civil engineering issues and community / stakeholder engagement.

Key points in relation to the cycleway design include:

- *The first typology (where the route allows this) is for an interrupted median separated bi-directional cycleway. However, a second typology (flush to footpath bi-directional cycleway) has been used where flooding impacts are not as significant, as this typology has the least impact on existing parking spaces;*

- *The design has taken into consideration input from key stakeholders such as the Roads and Maritime Services (RMS), Transport for NSW (TfNSW), the State Transit Authority (STA) and Bayside Council. Input will also be sought from Ausgrid, NSW Police, Sydney Water, Telco companies, the Sydney Coordination Office, UNSW, Australian Turf Club and the Centennial Park & Moore Park Trust during detailed design stage;*

- *Where appropriate, the design has incorporated suggestions from members of the community, local businesses and key user groups;*

- *Some loss of on-street parking has been required in order to accommodate*

*the cycleway within the road reserve and increase safety at existing intersections. However, the overall loss has been minimised through the ability to provide new spaces along the route;*

- *Improved footpaths and pedestrian crossings and additional street tree and landscape embellishment plantings; and*

- *Consideration of improving road safety.*

## Need for the proposal

The *NSW State Plan* and the (now superseded) *City of Cities: Sydney Metropolitan Strategy*, both acknowledged that cycling has a significant role to play in the NSW Government's pursuit of a number of initiatives aimed at decreasing car dependence and improving the environment.

In recognition of this, Randwick City Council, in co-operation with fourteen inner Sydney Council's, prepared the Inner Sydney Regional Bike Plan that proposed a radial and cross-regional cycling network in excess of 284 kilometres stretching from Kogarah to Chatswood and from Rhodes to Watsons Bay. A key objective for the cycling network proposed under the Plan was to provide greater connectivity and segregation (to reduce the risk of 'car dooring') for cyclists between key destinations and along key arterial routes within inner Sydney.

The development of the Inner Sydney Regional Bicycle Network was a major step towards addressing the lack of quality cycling infrastructure across Sydney. The new separated cycleways and shared paths proposed under the Plan provide necessary cross-regional links to the existing fragmented and disjointed bicycle network.

In December 2013, the NSW Government launched the Active Transport Program, an initiative aimed at strengthening cycling infrastructure in Sydney, with a focus on creating connected cycleways within five kilometres of activity centres and public transport interchanges. The overarching goal of this initiative is to make cycling safe, convenient and enjoyable for short trips.

In line with the NSW Government strategy is Randwick City Council's 20 year City Plan objective of implementing a network of safe and convenient walking paths and cycleways linking major land uses and recreational opportunities. In 2015, RCC undertook a significant 6 week consultation period regarding a review of bicycle routes. This served to establish priority bike routes through the City.

The Centennial Park to Kingsford Light Rail Terminus cycleway link was identified as the highest priority route as Randwick City grows and changes. The introduction of Light Rail linking the Eastern Suburbs to Sydney City has accelerated the need to enhance connections to these new nodal points. This has been identified by both Council (*RCC Priority Bike Ro*utes, 2015) and by the NSW State Government (*Sydney's Cycling Future* and the RMS Active Transport Program under which this project is funded).

This section of cycleway between Centennial Park and the Kingsford Light Rail Terminus, will play an important role in meeting one of the key objectives of the Inner Sydney Regional Bike Plan to improve cycling infrastructure and provide necessary cross-regional links to the existing fragmented and disjointed bicycle network, as well as being an important step in working towards the Council's 20 year City Plan objective

for safe and convenient walking paths and cycleways.

## Options considered

Preliminary investigations of the existing conditions along the proposed route by the lead design consultant was undertaken in order to identify potential design responses with regard to cycleway typologies, parking, civil engineering issues and community /stakeholder engagement. These investigations were further informed by flood investigations and intersection analysis undertaken by specialist consultants in order to determine the most appropriate cycleway typologies and intersection treatments.

The lead design consultant undertook a detailed analysis in order to evaluate the most suitable cycleway typologies in a precinct with heavy vehicle use. This analysis included consideration of a dedicated bi-directional cycleway versus an off-road shared path typology.

Based on the findings of this analysis, the proposed scheme is considered to represent the most appropriate outcome, taking into account the existing conditions / constraints and key issues and the issues raised by the community and stakeholders, balanced against the project objectives.

The proposed route, cycleway typologies, pavement treatments and ancillary works for the Centennial Park to Kingsford Light Rail Terminus cycleway have been selected as the preferred option for the following reasons:

- They best meet the project objectives;
- Based on an analysis of identified key issues against criteria of quality, cost, complexity and time, the proposed treatments are considered to be the most appropriate;
- The cycleway and associated works and pavement treatments can be installed / constructed with minimal environmental impacts, subject to the implementation and proper management of appropriate mitigation measures;
- The overall loss of on-street parking along the route is minimised (20 spaces in total);
- On balance, they provide the safest solution of all road safety considerations.

## Statutory and planning framework

Clause 94(a) of State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) applies to the proposed streetscape upgrade works and construction of the cycleway link and allows Randwick City Council, as a public authority, to undertake the streetscape upgrade works and construction of the cycleway without the need to obtain development consent.

Notwithstanding, the streetscape upgrade works and construction of the cycleway is an "activity" within the meaning of Section 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on the basis that subclause 5.1(2)(d) of the EP&A Act defines the *carrying out of a work* as an “activity”. Section 5.5 of the EP&A Act states a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent

possible all matters affecting or likely to affect the environment by reason of that activity.

As such, the development is being assessed under Part 5 of the EP&A Act and a Review of Environmental Factors (REF) has been prepared.

## Community and stakeholder consultation

In 2015, following a review of its bike plan priorities and extensive community consultation, Randwick City Council adopted a Bicycle Route Construction Priority list. The Centennial Park to Kingsford Light Rail Terminus cycleway (referred to as ANZAC Bikeway - North) was identified as the number 1 priority route.

Community consultation of the design plans for the proposed new Centennial Park to Kingsford Light Rail Terminus cycleway and streetscape upgrade works was conducted over a five (5) week period between 25 May and 2 July 2018. The consultation activities included:

(a) a direct mail out of a letter providing a description of the project and timeframe for comments, sent out to directly affected residents and owners along the route;

(b) concept designs were exhibited at Council's Administration Building and at Maroubra Library. The community consultation was also advertised at all other Randwick City Libraries;

(c) a description of the project and timeframe for comments was included on Council's Your Say webpage (www.yoursayrandwick.com.au), including concept designs for each section of the route, Frequently Asked Questions, Question and Answer Forum, as well as options for making a submission and register for future project updates;

(d) details of the project were provided via a dedicated page on Council's website (http://www.randwick.nsw.gov.au/planning-and-building/council-works-and-upgrades/major-projects/pedestrian-cycling-streetscape-improvements);

(e) door knocking of all households along the Centennial Park to Kingsford Light Rail Terminus route to offer an opportunity to discuss the project and inform residents on ways that they could make a submission;

(f) two (2) pop-up stalls with free coffee were set up, one near Centennial Park (Corner ANZAC Parade and Alison Road on the shared path) on Wednesday 13 June 2018, and one on the route (corner of Alison Road and Doncaster Avenue) on Friday 22 June 2018;

(g) advertisements / articles were placed in the Southern Courier, Daily Telegraph on-line, Council's weekly email bulletin and on Facebook; and

(h) an information session was held at Kensington Public School on Thursday 28 June 2018.

There was a significant amount of community interest in the project, with Council documenting the following responses during the public exhibition period:

- 3310 visitors to Your Say Randwick website;
- 2077 pages downloaded;
- 9 questions asked and responded to;
- 396 Have Your Say submissions; and
- 38 email submissions

The majority of the 434 written submissions received for the project were supportive (approximately 70%), with reasons most cited being safety improvements for pedestrians and bike riders along with the tree planting and streetscape improvements.

Approximately 30% of respondents were either neutral or opposed to the project, citing concerns including impacts on traffic and parking, loss of trees, and impacts on driveways.

Wherever possible, the design for the new cycleway has taken into consideration the issues raised by the community.

## Environmental impacts

The main environmental impacts of the proposed streetscape upgrade and cycleway link that are likely during the construction phase include:

- Traffic, parking and access impacts;
- Noise and vibration impacts;
- Air quality impacts;
- Water quality impacts;
- Visual amenity impacts;
- Trees and landscaping impacts;
- Flooding and stormwater drainage impacts;
- Waste management and minimisation impacts; and
- Heritage impacts.

Environmental impacts relating to the project outcome / design include:

- Traffic and parking impacts;
- Accessibility and safety issues; and
- Social and economic issues.

## Justification and conclusion

Independent research by leading economic researcher, AECOM, indicates that the Inner City Regional Bicycle Network will provide access for 1.2 million people in164 suburbs and across 15 (now 11 following the amalgamations) local government areas. AECOM also estimates that the bicycle network is likely to deliver a net economic benefit of $506 million (in today's dollars over a 30 year period) and that every dollar spent on delivering the interconnected cycleway will generate an economic return of $3.88.

The Centennial Park to Kingsford Light Rail Terminus cycleway is an integral part of the network, linking the south-eastern suburbs to the CBD, as well as the existing and other proposed cycle routes throughout the region.

The creation of a comprehensive, co-ordinated and practical cycling network across the local government area, and connecting to cycleways in adjoining local government areas, will benefit both cyclists and the wider community. Benefits include improvements to environmental and health conditions, reductions in traffic congestion and enhanced motorist, cyclist and pedestrian safety.

The cycleway project is consistent with the aims of *Sydney's Cycling Future* as it will improve the safety of and facilities for cyclists across the City.

# Contents

## Appendices

# 1 Introduction

## 1.1 Proposal identification

Randwick City Council has been successful in gaining funding through the NSW Government's Active Transport Program to design and document streetscape improvements and a new cycleway linking Centennial Park to the Kingsford Light Rail Terminus (UNSW) via Doncaster Avenue, Day Avenue, Houston Road, General Bridges Crescent and Sturt Street. The provision of the new cycleway link also provides an opportunity to enhance the streetscape, improve road safety and strengthen the pedestrian experience along the proposed route.

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The Centennial Park to Kingsford Light Rail Terminus Cycleway is an integral part of the wider Inner Sydney Regional Bicycle Network. The 2.8km long section of cycleway will connect with the existing Centennial Park shared path on the northern side of Alison Road, providing a connection to the Sydney CBD. The cycleway contains two different typologies, in response to the varied built form characteristics along the length of the route, as well as parking and civil engineering issues and community / stakeholder engagement.

Key points in relation to the cycleway design include:

- *The first typology is an interrupted median separated bi-directional cycleway. However, a second typology (flush to footpath bi-directional cycleway) has been used where flooding impacts are not as significant, as this typology has the least impact on existing parking spaces;*

- *The design has taken into consideration input from key stakeholders such as the Roads and Maritime Services (RMS), Transport for NSW (TfNSW), the State Transit Authority (STA) and Bayside Council. Input will also be sought from Ausgrid, NSW Police, Sydney Water, Telco companies, the Sydney Coordination Office, UNSW, the Australian Turf Club and the Centennial Park & Moore Park Trust during detailed design phase;*

- *Where appropriate, the design has incorporated suggestions from members of the community, local businesses and key user groups;*

- *Some loss of on-street parking has been required in order to accommodate the cycleway link within the road reserve and increase safety at existing*

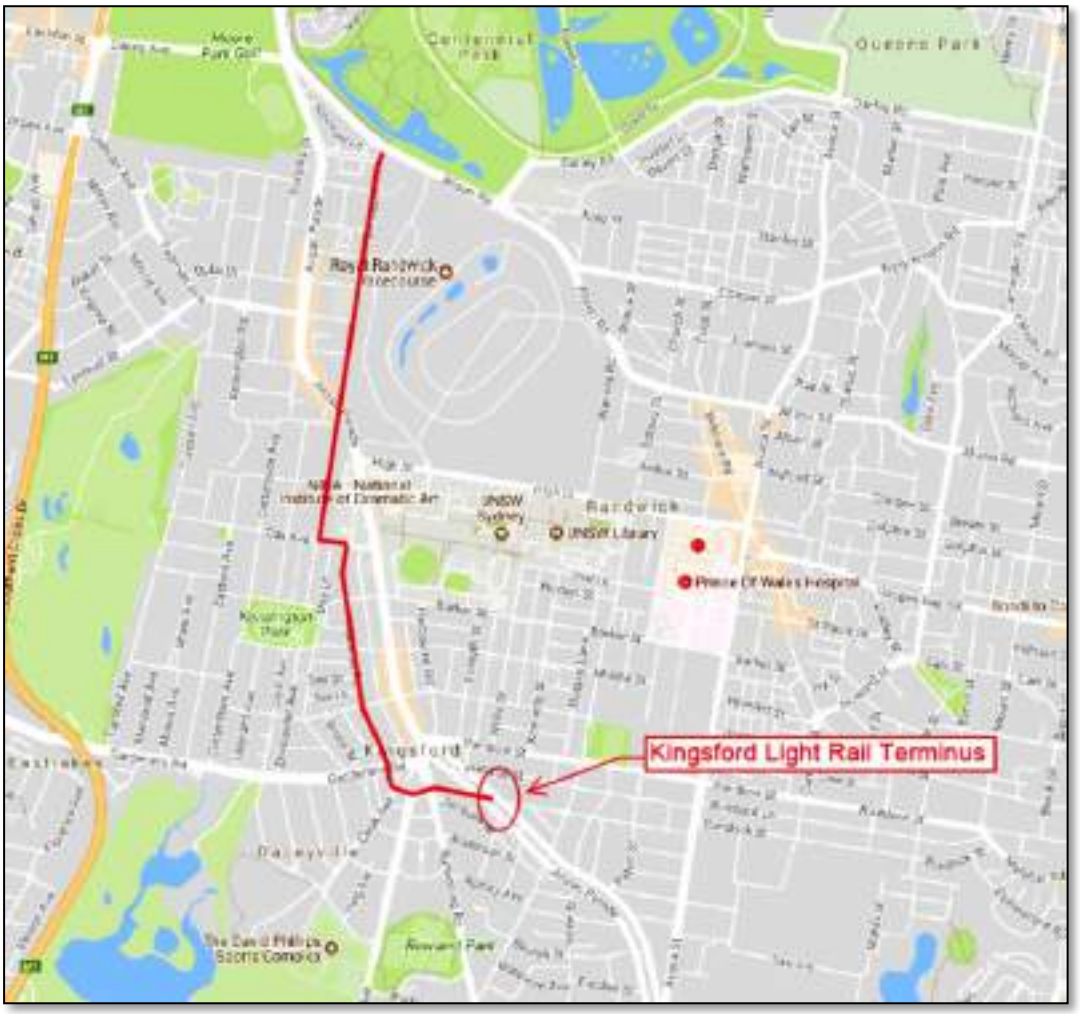
*intersections (20 cars in total along the 2.8km route);*

- *Improved footpaths and pedestrian crossings and additional street tree and landscape embellishment plantings;*

- *Consideration of improving road safety.*

***Figure 1.1*** shows the location of the Centennial Park to Kingsford Light Rail Terminus cycleway.

**Figure 1.1 – Site Location**




*Source: nearmap.com.au*

## 1.2 Purpose of the report

This Review of Environmental Factors (REF) has been prepared by Andrew Robinson Planning Services Pty Ltd on behalf of Randwick City Council, on instruction from the lead Design Consultant, Group GSA.

The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail protective measures to be implemented in order to reduce or avoid potential environmental impacts.

The description of the proposed works and associated environmental impacts have been undertaken in context of the *Environmental Planning and Assessment Act 1979 (*EP&A Act), the *Environmental Planning and Assessment Regulation 2000* (EP&A Regs), applicable environmental planning instruments and other relevant environmental legislation including the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EP&BC Act). In so doing, the REF goes to fulfilling the requirements of Section 5.5 of the EP&A Act, namely that Randwick City Council *examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity*."

## 1.3 Structure of the REF

The REF is divided into the following sections:

- Introduction (Section 1) – introduces the proposal and purpose of the report;
- Need and options considered (Section 2) – provides a description of the need for the project and describes the alternatives considered prior to choosing the preferred route and configuration of the cycleway;
- Description of the proposal (Section 3) – provides a detailed description of the proposal, including the construction and operation of the proposed cycleway;
- Statutory and planning framework (Section 4) – provides information on the statutory and policy requirements for the proposal;
- Stakeholder and community consultation (Section 5) – provides information on the stakeholder consultation undertaken;
- Environmental assessment (Section 6) – describes the existing environment and potential environmental impacts, and identifies the corresponding impact mitigation measures;
- Environmental management (Section 7) – summarises the proposed safeguards and environmental management measures of the proposed cycleway;
- Conclusion (Section 8) – provides justification for the proposal and concluding remarks as to whether the adverse environmental impacts are balanced or outweighed by the beneficial effects of the proposal;
- Certification (Section 9) – certifies that the REF provides a true and fair review of the proposal in relation to its potential effects on the environment;

- References (Section 10) – contains a list of the documents used in the preparation of the REF; and

- Appendices – contains an assessment of the potential environmental impacts of the proposal in the context of Clause 228 of the *Environmental Planning and Assessment Regulation 2000* and the matters of National environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999,* using Randwick City Council's standard template for REFs, as well as copies of the technical/specialist reports that have informed this REF; the Design Drawings for the cycleway; and a summary of issues raised and Council's responses from the community consultation to the Concept Design for the proposed cycleway.

# 2 Need and options considered

## 2.1 Strategic need for the proposal

For several years now, the NSW Government has formally recognised the importance of cycling, together with walking, in the creation of sustainable neighbourhoods and cities. Furthermore, the government has purported the view that urban planning has a valuable role to play in improving cycleability and walkability, as it influences urban form, which sets the scene for cycleability and walkability for decades to come. The underlying foundation of this view is that improving practice in planning for cycling and walking will create more opportunities for people to live in places with easy cycling and walking access to urban services and public transport.

In support of the government's credence, in 2004 the then Department of Infrastructure, Planning and Natural Resources (DIPNR) produced Planning guidelines for walking and cycling, a reference document aimed at supporting NSW councils, communities and the development industry to improve planning for walking and cycling.

In addition, the *NSW State Plan* and the (now superseded) *City of Cities: Sydney Metropolitan Strategy*, both acknowledged that cycling has a significant role to play in the NSW Government's pursuit of a number of initiatives aimed at decreasing car dependence and improving the environment.

In recognition of this, the City of Sydney, in co-operation with fourteen inner Sydney Council's, prepared the Inner Sydney Regional Bike Plan that proposed a radial and cross-regional cycling network in excess of 284 kilometres stretching from Kogarah to Chatswood and from Rhodes to Watsons Bay. A key objective for the cycling network proposed under the Plan was to provide greater connectivity and segregation (to reduce the risk of 'car-dooring') for cyclists between key destinations and along key arterial routes within inner Sydney.

The development of the Inner Sydney Regional Bicycle Network was a major step towards addressing the lack of quality cycling infrastructure across Sydney. The new separated cycleways and shared paths proposed under the Plan provide necessary cross-regional links to the existing fragmented and disjointed bicycle network.

In December 2013, the NSW Government launched the Active Transport Program, an initiative aimed at strengthening cycling infrastructure in Sydney, with a focus on creating connected cycleways within five kilometres of activity centres and public transport interchanges. The overarching goal of this initiative is to make cycling safe, convenient and enjoyable for short trips.

In line with the NSW Government strategy is Randwick City Council's 20 year City Plan objective of implementing a network of safe and convenient walking paths and cycleways linking major land uses and recreational opportunities. In 2008, RCC undertook a significant 6 week consultation period regarding a review of bicycle routes. This served to establish priority bike routes through the City.

The Centennial Park to Kingsford Light Rail Terminus cycleway link was identified as the highest priority route as Randwick City grows and changes. The introduction of Light Rail linking the Eastern Suburbs to Sydney City has accelerated the need to

enhance connections to these new nodal points. This has been identified by both Council (*RCC Priority Bike Ro*utes, 2015) and by the NSW State Government (*Sydney's Cycling Future* and the RMS Active Transport Program under which this project is funded).

***Figure 2.1*** provides an extract from the bicycle route priority consultation, showing the Centennial Park to Kingsford Light Rail Terminus cycleway (referred to as ANZAC Bikeway – North) as the number 1 priority route.

**Figure 2.1: Extract from Randwick City Council's Bicycle Route Construction Priority (April 2015)**


*Source: Randwick City Council*

This section of cycleway between Centennial Park and the Kingsford Light Rail Terminus, will play an important role in meeting one of the key objectives of the Inner Sydney Regional Bike Plan to improve cycling infrastructure and provide necessary cross-regional links to the existing fragmented and disjointed bicycle network, as well as being an important step in working towards the Council's 20 year City Plan objective for safe and convenient walking paths and cycleways.

## 2.2 Proposal objective

The objective of the proposal is to provide a high quality new section of cycleway between Centennial Park and the Kingsford Light Rail Terminus that provides a safe and vibrant cycling and walking route, while also delivering the best experience for all users of the road and pathway networks through the Randwick City area.

## 2.3 Project Background

As noted earlier, with the construction of Light Rail infrastructure in Randwick and in Kingsford now underway, the provision of connecting links to/from surrounding destinations is a priority. The Centennial Park to Kingsford Light Rail Terminus cycleway has been identified as one of these priority connections, and its design and documentation has been granted funding from RMS. The provision of this new cycleway is also an opportunity to enhance the streetscape and strengthen the pedestrian experience through the City of Randwick.

Prior to seeking to engage a consultant team for the design and delivery of the cycleway, a preliminary concept design / feasibility was devised by Randwick City Council. This concept design was indicative only, but was intended to create a foundation for the development of a refined concept, detailed design and documentation of the cycleway link. The concept design / feasibility included some proposed alterations to the traffic signals along the route and these have already received RMS approval. As such, these signal alterations have been adhered to in the current design.

An aerial view of the proposed route of the cycleway is provided in ***Figure 2.1*** below:

**Figure 2.2: Aerial view of the route of the cycleway**


*Source: Randwick City Council*

Following appointment as the lead Design Consultant, Group GSA has undertaken an extensive range of investigations and assessments of a range of existing conditions including road geometry, levels, flooding and drainage, traffic composition and frequency, bus routes, connections, existing parking, services and trees etc in order to determine the preferred location and typologies for the cycleway. These investigations were further informed by flood investigations and intersection analysis undertaken by specialist consultants in order to determine the most appropriate cycleway typologies and intersection treatments.

## 2.4 Alternatives and options considered

Based on The City of Sydney's *Standard Cycleways Treatments Overview* outlines a suite of approaches for the design of cycleways, responding to a range of contextual constraints, Randwick City Council's preferred arrangement / typology for the cycleway was:

1. *Two-step cross section, with a separated cycleway on a distinct level down from the footpath, and separated by a kerb from the roadway;*

2. *At grade bi-directional cycleway, at the same level as the footpath adjacent, but separated by a planting buffer or similar.*

3. *A cycleway separated from the roadway by a physical barrier, such as a wide concrete median strip. This provides the separation required, however car door opening can be a safety hazard for cyclists if parking is located adjacent.*

4. *A cycleway separated from the roadway by an interrupted physical barrier, such as intermittent concrete blocks. This is not preferred as it presents significant pedestrian trip hazards, likely reduced car parking opportunities and long term maintenance issues.*

As described above, preliminary investigations of the existing conditions along the proposed route by the lead design consultant identified the need for different responses in terms of cycleway typologies, parking, civil engineering issues and community /stakeholder engagement, having regard to local conditions.

With reference to the preferred arrangement / typologies above, the lead design consultant undertook a detailed analysis in order to evaluate the most suitable cycleway typologies in a precinct with heavy vehicle use. This analysis included consideration of a dedicated bi-directional cycleway versus an off-road shared path typology.

Based on the findings of this analysis, two typologies were determined as the most appropriate for the route. These were:

- An interrupted median / median separated bi-directional cycleway; and

- A flush to footpath separated bi-directional cycleway.

ACOR Consultants were engaged by Randwick City Council to prepare advice on the impacts to flooding and overland flows as a result of the proposed cycleway (***Appendix D***). The route of the cycleway is within the area covered by the Kensington – Centennial Park Flood Study prepared by WMA Water in 2013. On reviewing the flood study, it became evident to ACOR that sections of Doncaster Avenue are subject to

significant flooding to various depths along the route of the cycleway.

ACOR carried out flood modelling of pre-development and post-development scenarios for the two typologies referred to above at 3 critical (flood affected) points along Doncaster Avenue (Nos. 28-30, No. 102 & No. 142 Doncaster Avenue) using the DRAINS hydraulic modelling software. These results were calibrated and compared to the TUFLOW model outputs provided by the Council. As described on pages 3 and 4 of the ACOR report:

> *Several sections of the site were analysed based upon outcomes of the meeting with Randwick City, Group GSA (Lead consultant for the project) and ACOR Consultants on 6 March 2018. Existing cross sections and road geometry at these locations were obtained using survey provided by Burton and Field (Ref 77155_S2), dated 03/11/2017. These cross sections were selected to represent the critical locations including 1) where neighbouring properties are inundated, 2) where flood levels are typically approaching boundary levels and 3) where flood levels are approaching floor levels of adjacent properties. Only 3 sections in Doncaster were studied with additional sections to be studied later in the project. Flow rates were provided by Council from the TUFLOW models and were used in a pre-development catchment scenario where flow rates were run through the existing cross sections.*
>
> *The cross sections were then altered for the post development scenarios. This includes both median separated cycleway with a median strip (200mm x 400mm located 2.4 m off the gutter invert), and a flush cycleway where the kerbs are relocated 2.8m from existing kerb and footpath levels lifted, in order to model the change in depth of flow/flooding that the construction of the cycleway would introduce. The double stepped cycleway option was not modelled, as it is assumed that the impacts on flooding would be similar, but slightly less than the flush cycleway option.*

The comparison indicated that the flow rates and depths of flow across the 3 cross sections from the DRAINS modelling gave similar results to the TUFLOW model.

The impact of the median separated cycleway typology on the post development model showed an increase in depths of between 0.5 mm and 8.8 mm for the 100 year annual recurrence interval (ARI) events. ACOR considers that these increases are minor and less than the anticipated level of accuracy (modelling tolerance) for flood modelling.

However, the increase in flow depth resulting from a flush cycleway option (raised) would be between 30mm to 40mm and ACOR considers this increase to be significant and would have an observable impact on properties that are at or close to property inundation.

Randwick City Council also identified the area of Houston Road adjacent to No. 121 Houston Road, Sturt Street/Rigney Avenue intersection and at 101 Bundock Street as having flood levels that could be hazardous to properties. However, the analysis determined that as the length of the flood affected area is a 246m stretch, installation of the median strip cycleway option over this length would result in a loss of flood storage of 19.68$m^3$ but result in negligible impact to existing flood conditions.

An interrupted median separated bi-directional cycleway typology has been chosen for the section of the cycleway along Doncaster Avenue between Alison Road and ANZAC

Parade, with a flush to footpath bi-directional cycleway between ANZAC Parade and Day Avenue. However, this will need to be checked by ACOR during detailed design to ensure that this typology will best accommodate the management of stormwater flows within the Doncaster Avenue carriageway.

## 2.5 Preferred option

The preferred cycleway option that is described in Section 3 of this REF has been the subject of detailed analysis and stakeholder consultation since the project inception in 2017 and community consultation undertaken during 2018. The scheme is considered to represent the most appropriate outcome, taking into account the existing conditions / constraints and key issues and the issues raised by the community and stakeholders, balanced against the project objectives.

The issues raised as part of the community consultation process are summarised in ***Appendix C*** of the REF. However, subject to some minor adjustments in response to the community concerns, the proposed scheme is considered to represent an equitable solution and addresses the complex technical and traffic factors at play.

The proposed route, cycleway typology, pavement treatments and ancillary works for the Centennial Park to Kingsford Light Rail Terminus cycleway have been selected as the preferred option for the following reasons:

- They best meet the project objectives;
- Based on an analysis of identified key issues against criteria of quality, cost, complexity and time, the proposed treatments are considered to be the most appropriate;
- The cycleway and associated streetscape upgrade works and pavement treatments can be installed / constructed with minimal environmental impacts, subject to the implementation and proper management of appropriate mitigation measures;
- Most loading areas and accessible parking spaces have been retained;
- The overall loss of on-street parking along the route is minimised;
- On balance, they provide the safest solution of all road safety considerations.

# 3 Description of the proposal

## 3.1 The proposal

The Centennial Park to Kingsford Light Rail Terminus cycleway, between Alison Road and ANZAC Parade, is a key link in the wider cycling network strategy, providing an important north-south connection from Centennial Park, through to the Light Rail Terminus currently under construction on ANZAC Parade at Kingsford. The 2.8km long section of cycleway will connect with the existing cycleway network at Centennial Park and then connect with the Kingsford Light Rail Terminus to South Coogee cycleway link being undertaken concurrently as a separate project. The cycleway will provide a separated bi-directional cycleway (partly median separated and partly flush to footpath) that incorporates a variety of pavement / design treatments, in response to the varied built form characteristics along the length of the route, as well as parking and civil engineering issues and community/stakeholder engagement.

The cycleway has also provided an opportunity to undertake a range of streetscape upgrade works as part of the project scope.

The route for the cycleway link has been divided into three (3) sections and a description of the proposed works is provided below:

**Northern Section** – Doncaster Avenue to ANZAC Parade

Doncaster Avenue is one of the main routes through Randwick City, providing a well-used connection from Alison Road south to ANZAC Parade. The northern 'gateway' to the Avenue is flanked by Randwick Racecourse land to the east, and medium density (four storey) apartments to its west.

Large numbers of cyclists and pedestrians use the Centennial Park shared path network on the northern side of Alison Road to connect to the Sydney CBD.

The urban pattern of Doncaster Avenue is predominantly three-four storey apartment blocks, semi-detached housing and single dwellings. Well-established peppercorn trees provide a significant canopy along its length. The street also features Kensington Public School on its western side, parking along its length and on-road cycle lanes in both directions.

Works in this section of the route include:

- Construction of an interrupted median separated bi-directional cycleway along the eastern side of Doncaster Street, between Alison Road and ANZAC Parade;
- Construction of a 2.8m wide shared pathway within the footpath on the western side of Doncaster Avenue between Carlton Street and Alison Road to provide an alternate cycle connection to Alison Road;
- Installation of 1 new pedestrian crossing, near the intersection of Doncaster Avenue and Darling Street;
- Installation of kerb build-outs at the intersection of Doncaster Avenue and

Carlton Street to improve safety for pedestrians crossing Doncaster Avenue and to provide infrastructure for a pedestrian refuge in the event that RMS approval is received in the future;

- Upgraded treatment of the existing horse crossing at Bowral Street, including linemarking and surface treatment, garden bed 'build-outs' and the potential for flashing warning signs;
- Upgrades to the Kensington Public School Pick-up / Drop-off zone including additional hardstand areas;
- Construction of new garden beds and 'build-outs' at intersections;
- Realignment of the road geometry as required;
- Modification to the traffic signals, including the addition of 'bike lanterns' at the signalised intersections of Doncaster Avenue and Alison Road and Doncaster Avenue and Todman Avenue;
- Removal of 14 trees and planting of 29 new trees within the verge of Doncaster Avenue;
- Loss of 14 on-street parking spaces (loading zones and 4 existing accessible spaces retained), with the provision of 1 new parking space (nett loss of 13 spaces).

***Photograph 1:*** *View looking north along Doncaster Avenue towards Alison Road from the intersection of Ascot Street.*

***Photograph 2:*** *View of the existing Bowral Street 'horse crossing' over Doncaster Avenue.*

**Central Section** – Doncaster Avenue to Day Avenue

South of ANZAC Parade, Doncaster Avenue is characterised by a lower scale of housing, being predominantly one to two storey single dwelling houses. Most houses on the west side of the street have driveways to access off street parking.

Close to the south end of Doncaster Avenue, the proposed route deviates onto Day Avenue. This portion of the road network has an interrupted median separated cycleway along the northern side of Day Avenue between Doncaster Avenue and ANZAC Parade that was recently installed by Randwick City Council.

Works in this section of the route include:

- Construction of a flush to footpath separated bi-directional cycleway along the eastern side of Doncaster Avenue, between ANZAC Parade and Day Avenue;
- Installation of a new pedestrian crossing near the intersection of Doncaster Avenue and Day Avenue;
- Removal of the existing roundabout and replacement with a Priority – Give Way intersection at the intersection of Doncaster Avenue and Day Avenue;
- Construction of new garden beds and 'build-outs' at intersections;
- Realignment of the road geometry as required;
- Modification to the traffic signals, including the addition of 'bike lanterns' at the

signalised intersection of Doncaster Avenue and ANZAC Parade;

- Planting of 7 new trees within the verge of Doncaster and Day Avenues (no loss of existing trees in this section);

- Loss of 2 on-street parking spaces;


***Photograph 3:*** *View looking north along Doncaster Avenue to the intersection with ANZAC Parade.*

***Photograph 4:*** *View of the existing section of bi-directional separated cycleway along Day Avenue between Doncaster Avenue and ANZAC Parade.*

**Southern Section** – Houston Road to Kingsford Light Rail Terminus

The built form along Houston Road is predominantly characterised by three-four storey apartment buildings and rear to kerb parking along most of its eastern length. On-road cycle lanes on both sides are line marked along its full extent.

The new cycleway will cross into the Bayside Council area at Dacey Park, requiring discussions with Bayside Council in order to determine their requirements. This is being facilitated by Randwick City Council and the input from Bayside Council is being considered part of the project delivery.

Works in this section of the route include:

- Construction of a flush to footpath separated bi-directional cycleway along the western side of Houston Road, between Day Avenue and the Kingsford Light Rail Terminus on ANZAC Parade;

- Installation of a new pedestrian crossings near the intersection of Houston Road and Barker Street and Houston Road and Borrodale Street;

- Removal of the existing roundabouts and replacement with Priority – Give Way intersections at the intersections of Houston Road and Barker Street and

Houston Road and Borrodale Street;

- Installation of cyclist priority crossing intersection treatments, including linemarking / surface treatments, pedestrian crossings and garden bed 'build-outs' at the intersections of Houston Road with Barker Street, Strachan Street, SEE Street, Borrodale Street, Cook Avenue and Banks Avenue;

- Installation of shared intersection treatments, including linemarking / surface treatments and garden bed 'build-outs' at the intersections of Houston Road with Barker Lane, Strachan Lane, SEE Lane and Gardeners Lane;

- Realignment of the road geometry as required;

- Modification to the traffic signals, including the addition of 'bike lanterns' at the signalised intersections of Houston Road and Gardeners Road and installation of a partially signalised intersection with 'Bike Lantern' at the intersection of General Bridges Crescent and Bunnerong Road;

- Removal of 7 trees and planting of 53 new trees within the verge;

- Loss of 18 on-street parking spaces, with the provision of 13 new parking space (nett loss of 5 spaces).

***Photograph 5:*** *View looking north along Houston Road.*

***Photograph 6:*** *View looking south along Houston Road towards the intersection with Gardeners Road.*

***Photograph 7:*** *View looking north along General Bridges Crescent towards the intersection of Gardeners Road, with Houston Road beyond.*

***Photograph 8:*** *View looking south-east along General Bridges Crescent.*

**Kingsford Light Rail Terminus** - ANZAC Parade

The new cycleway link will connect with the Light Rail Terminus and Bus Interchange at the intersection of Sturt Street and ANZAC Parade that is currently under construction at Kingsford. The design of the cycleway link has taken into account issues relating to potential areas of congestion associated with the interchange. It is noted that the new Terminus will feature extensive bike storage, making it easy for cycling commuters to connect to alternative transport at this point.

The Kingsford Light Rail Terminus to Coogee cycleway link is also planned to connect to the Terminus from the east and as noted earlier, this cycleway link is being undertaken concurrently, but as a separate project. However, coordination between both projects is an integral component of the project delivery.

Works at the Light Rail Terminus are subject to finalisation of the Terminus design, but are likely to include:

- Construction of a shared pathway within the footpath at the intersection of Sturt Street and ANZAC Parade, including provision of a signalised crossing with pedestrian and 'Bike Lanterns';

- Provision of bike storage facilities (by Transport for NSW).

***Photograph 9:*** *View of the Kingsford Light Rail Terminus construction site on ANZAC Parade.*

In order to maintain vehicular access to all properties along the length of the route, the kerb separator will be broken as necessary and vehicle laybacks and crossings maintained and identified through appropriate surface treatments.

The design details of the works that comprise the streetscape upgrade and new cycleway are documented in the Exhibition Sheets (Sheets 1.0 – 1.8, dated June 2018) prepared by Randwick City Council / Group GSA and provided at ***Appendix B*** of the REF.

## 3.2 Safety and security

In preparing the cycleway design, a number of documents / standards were relied upon in order to ensure that the design of the cycleway is based on best practice road safety standards and will provide a safe and sustainable transport option that encourages and facilitates use of the cycleways by members of the community with a wide range of ages and skill levels. These included:

- City of Sydney – Standard Cycleways Treatments Overview
- Austroads – Cycling Aspects of Austroads Guides

### 3.2.1 Road Safety Audit

GTA Consultants were engaged by Randwick City Council to undertake a Road Safety Audit of the proposed cycleway at concept design stage in order to identify potential safety risks for road users and to ensure that measures to eliminate or reduce the risks are fully considered in the final design.

Austroads (2009) defines a Road Safety Audit as *'a formal examination of a future road or an existing road, in which an independent, qualified team reports on the project's crash potential and safety performance'*.

The Audit was carried out in June 2018, in accordance with the Roads and Maritime *Guidelines for Road Safety Audit Practises (2011)* and the Austroads *Guide to Road Safety Part 6: Road Safety Audit (2009)*. Key elements of the concept design that were examined included:

- Path width
- Kerb ramps and transitions
- Raised thresholds
- Pedestrian crossings
- Pedestrian facilities and protection
- Fixed items adjacent to the roadway, including trees and power poles
- Roadside hazards
- Adjacent land use access points
- Sight distance
- Readability of alignment and intersections
- Intersection layout and geometry
- Landscaping considerations

The Audit identified a number of elements of the concept design that presented a potential safety risk and rated these risks as either high, medium or low, based on the Austroads *Guide to Road Safety Part 6: Road Safety Audit (2009)* Risk Matrix. These are summarised below:

- *There are a number of existing drainage pits (with grates running parallel to the path of travel) along the route that could present hazards for cyclists.*

- *At the intersection of Doncaster Avenue and Carlton Street, the future use of the driveway on eastern side is unclear and is currently provides access to a large property, which part of light rail site. Therefore, frequency of vehicular access unknown and was not assessed as part of this audit.*

- *The low height clearance of existing trees along shared path/ cycleway could potentially be a hazard for cyclists and pedestrians and could restrict sightlines. This is likely to be considered in as the details of the planting/ landscaping plan are developed.*

- *At the intersection of Doncaster Avenue and Todman Avenue, the kerb is built out to minimise traffic queuing around the corner. However, should queuing still occur, traffic would block only one lane of traffic with no passing opportunity.*

- *There appear to be continuous footpath treatments proposed, which are labelled as "shared intersection treatment". Clarification is required on the proposed treatment, since the continuous footpath treatments are required to meet specific warrants.*

- *Kerb ramps do not appear to be provided in some designated crossing locations. Kerbs ramps would be required where cyclists or pedestrians are required to cross carriageways to access off-road facilities.*

The cycleway design has evolved since the concept design stage in order to address issues raised in the Road Safety Audit and it is noted that the Audit will be continuously updated throughout the various stages of the project (i.e. from concept to handover) to ensure that a high level of safety for all road users is achieved.

### 3.2.2 Crime Prevention through Environmental Design

Crime Prevention through Environmental Design (CPTED) is an important inter-agency crime prevention program that reduces crime opportunity through effective planning, urban design and place management. The NSW Police Service program, known as Safer by Design is based on the principles of CPTED.

The Department of Planning & Environment (then PlanningNSW) released guidelines under (the former) Section 79C of the *Environmental Planning and Assessment Act 1979* which were prepared to assist Councils in identifying crime risk and minimise opportunities for crime through appropriate assessment of development proposals.

The Guidelines uses Crime Prevention through Environmental Design (CPTED) which is a crime prevention strategy and focuses on reducing the opportunities for crime through the planning, design and structure of the built environment.

Predatory offenders often make cost-benefit assessment of potential victims and locations before committing crime. CPTED aims to create the reality (or perception) that the costs of committing crime are greater than the likely benefits.

This is achieved through the creation of environmental and social conditions that:

- Maximise the risk to offenders through increasing the likelihood of detection and challenge;
- Maximise the effort require to commit an offence;
- Minimise the actual and perceived benefits of crime (removing, minimising or concealing crime attractors and rewards); and

Minimise the opportunity to facilitate inappropriate behaviour and excuse making opportunities (removing conditions that encourage/facilitate the rationalisation of inappropriate behaviour).

Part B of the Guidelines sets out four principles to be used in the assessment of development applications to minimise the opportunity for crime. Each of the strategies aim to create the perception or reality of 'capable guardianship'. The four (4) principles are discussed below:

<u>Surveillance</u>

People feel safe in public areas when they can see and interact with others, particularly people connected with that space, such as shopkeepers or adjoining residents. Criminals are often deterred from committing crime in places that are well supervised. Providing effective surveillance along the cycleway route can assist in reducing the attractiveness of crime targets. Surveillance of an area can be achieved through both natural and technical means.

Passive surveillance, where people can see what others are doing, creates a sense of safety within an environment and provides opportunities for interaction between

individuals. This, together with high levels of passive surveillance, greatly assist in deterring offenders from committing crime.

Adjacent land uses along the route are predominantly residential. Opportunities exist for casual surveillance along the route by residents, as well as other adjacent land uses and road users. The proposed landscape treatments along the route are cognisant of the need to maintain good levels of passive surveillance and allow safe movement of cyclists / pedestrians along the route, particularly during daylight hours.

Street lighting that satisfies the relevant Australian Standards is currently provided along the length of the route and provides a high degree of lighting for cyclists, drivers and other road users.

Access Control

By clearly defining areas accessible to the public and providing physical and symbolic barriers to attract and channel the movement of people, it will be difficult for offenders to reach victims and opportunity to commit crime will be minimised.

Access control treatments restrict, channel and encourage people into, out of and around the development.

Natural access controls includes the tactical use of design measures including building configuration; formal and informal pathways, landscaping, fencing and gardens. Although not considered necessary for the proposed cycleway, formal or organised access controls can include on-site guardians such as employed security guards.

The cycleway will be clearly identifiable and as a formal pathway, with appropriate linemarkings and threshold / intersection treatments, it will effectively move cyclists along the route, minimising opportunities for interruption during travel, or deviation from the delineated route.

Safety / warning linemarkings and surface treatments, as well as intersection treatments such as cyclist priority crossing intersection treatments and the addition of ‘bike lanterns’ at signalised intersections along the route will provide an appropriate degree of user safety and management between cyclists and motor vehicles.

Territorial Reinforcement

Defining what is public and private territory assists in determining the function of a space and the appropriate behaviour within a space. This definition enhances the informal security presence within and around a site or facility. Territorial reinforcement is achieved through the creation of a "sphere of influence" by utilizing physical designs such as pavement treatments, landscaping and signage that enable users of a public facility such as a cycleway to develop a sense of proprietorship over it.

Community ownership of public space sends positive signals to the community. Places that feel owned and cared for are likely to be used, enjoyed and revisited. People who have guardianship or ownership of areas are more likely to provide effective supervision and to intervene in crime than passing strangers and criminals rarely commit crime in areas where the risk of detection and challenge are high. Effective guardians are often ordinary people who are spatially ‘connected’ to a place and feel an association with, or responsibility for it.

In this regard, the combination of pavement treatments, landscaping and signage

along the cycleway route clearly defines it as a public space that cyclists will take a sense of proprietorship over.

Space Management

Neglected and/or poorly maintained buildings and/or areas are often more susceptible to criminal activities such as vandalism.

Space management involves the formal supervision, control and care of a facility. All space, even well planned and well-designed areas need to be effectively used and maintained to maximise community safety.
Places that are infrequently used are commonly abused. There is a high correlation between urban decay, fear of crime and avoidance behaviour.

Ongoing care and management of the cycleway areas will promote the message that both the community and cyclists / other users respect this environment. Through the appropriate maintenance and care over the cycleway and surrounds, including repairing vandalism as it occurs and retaining and improving when needed, cyclist facilities including lighting, will ensure that the cycleway is appropriately utilised and well cared for.

Randwick City Council will be responsible for the management and maintenance of the cycleway.

## 3.3 Construction activities

### 3.3.1 Work methodology

The work site/s will need to be established by setting up pedestrian and traffic management controls and other environmental controls as required.

Construction activities will vary throughout the construction period and as works progress along the cycleway route. Construction activities will include (but not be limited to):

- Surveying and establishment of any subterranean services;
- Minor excavation and/or pavement grinding;
- Removal of existing kerb and guttering and / or pedestrian pavement;
- Backfilling and compaction;
- Construction of formwork, concrete pouring and/or asphalting;
- Paving works etc associated with shared environment intersection treatments;
- Reconstruction of kerb and guttering and pedestrian pavement;
- Installation of separation kerbing and raised thresholds / crossings;
- Painting and line marking / stencilling;

- Installation of infrastructure (ie signage and lighting etc);
- Alterations to existing traffic signals;
- Alterations / upgrade to street lighting;
- Selected tree removals and replacement / new street tree and garden bed plantings;

### 3.3.2 Plant and equipment

The plant and equipment that will be required for the works will vary throughout the ongoing stages of construction activities. Typical equipment and plant will generally include (but not be limited to) the following:

- Traffic control vehicles;
- Concrete drills;
- Various trucks and cranes;
- Bobcats and/or other excavators;
- Pavement Grinding machine;
- Concrete mixers;
- Jackhammer/s;
- Quick-cut saw / Road saw / Block cutter
- Generator/s;
- Various powered and unpowered hand tools;
- Hand held spray painting gun for line marking and application of green paint to separated cycleway lanes;
- Pedestrian and traffic barriers.

During construction works various forms of environmental control equipment such as silt socks, rubbish skips and temporary traffic control equipment such as temporary fencing, safety cones, traffic signs, pedestrian crossings and bollards, will be required.

### 3.3.3 Earthworks

Minimal earthworks are expected with activities such as demolition and excavation associated with replacement of the existing road pavement and or kerb and gutter. All waste material will need to be disposed of at a licensed waste management facility.

### 3.3.4 Source and quantity of materials

Road base, pavement materials, concrete and other materials of construction are to be sourced locally wherever possible.

### 3.3.5 Traffic management and access

Traffic management measures will need to be put into place prior to the commencement of works in order to provide a safe environment for road users, cyclists and pedestrians, and to manage access to the work site/s. The works will require temporary arrangements for cyclists to use the trafficable lanes for the length of the work site/s and pedestrian diversions, or a narrowing of the useable footpath will also be required.

Traffic management will need to be carried out in accordance with an approved Traffic Management Plan and road opening permits may be required. All changes to the existing traffic, cyclist and pedestrian conditions will need to be accompanied by appropriate signage to notify users of the temporary arrangements.

## 3.4 Access

During construction works there may be some temporary disruption to vehicular access to properties along the route. However, traffic control measures will need to be implemented to ensure that reasonable access is maintained to the affected properties.

## 3.5 Public utility adjustment

Other than the works associated with the relocation of existing overhead power lines, the proposed works associated with the cycleway are unlikely to require substantial adjustment of any public utilities. However, should any potential service conflicts be identified during the detailed design and documentation phase, consultation with the relevant utility service provider will be required.

# 4 Statutory and planning framework

## 4.1 State legislation

### 4.1.1 Environmental Planning & Assessment Act 1979

The *Environmental Planning & Assessment Act, 1979* (EP&A Act) provides the statutory framework for planning and environmental assessment in NSW. It contains two parts that impose requirements for planning approval:

- Part 4 generally provides for the control of local 'development' that requires development consent from local council.

- Part 5 provides for the control of 'activities' that do not require development consent and are undertaken or approved by a determining authority.

The applicable approval process under the *Environmental Planning & Assessment Act, 1979* is generally determined by reference to the relevant environmental planning instruments and other statutory planning instruments and controls. These include *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP), the *Environment Protection and Biodiversity Conservation Act 1999*, other relevant State Environmental Planning Policies (SEPPs) and local environmental plans (LEPs).

Development consent is required to carry out development and/or works unless they fall within Section 4.1 of the *Environmental Planning & Assessment Act, 1979*.

Section 4.1 of the *Environmental Planning & Assessment Act, 1979* states that if an environmental planning instrument provides that specified development may be carried out without the need for development consent, then a person may carry the development out, in accordance with the instrument, on land to which the provisions apply. Environmental assessment of the development may nevertheless be required under Part 5 of the Act.

Further, where an environmental planning instrument species that certain development may be carried out as exempt development (other than development on land that is critical habitat or part of a wilderness area) may be carried out without the need for development consent under Part 4 of the *Environmental Planning & Assessment Act, 1979* or for assessment under Part 5 of the Act.

*State Environmental Planning Policy (Infrastructure) 2007* is the environmental planning instrument under which the proposed works associated with the streetscape upgrade and new cycleway link may be carried out either as *exempt development*, or *development without consent*. Further discussion on the provisions of the Infrastructure SEPP is provided at 4.2 below.

Notwithstanding, although the works do not require development consent, they are considered to be an "activity" within the meaning of Section 5.1 of the *Environmental Planning and Assessment Act 1979* on the basis that subclause 5.1(1)(d) of the *Environmental Planning & Assessment Act, 1979* defines the *carrying out of a work* as an "activity".

Section 5.1 of the *Environmental Planning & Assessment Act, 1979* defines an "activity" as being:

*(a) the use of land, and*
*(b) the subdivision of land, and*
*(c) the erection of a building, and*
*(d) the carrying out of a works, and*
*(e) the demolition of a building or work, and*
*(f) any other act, matter or thing referred to in Section 26 that is prescribed by the regulations for the purposes of this definition,*

*but does not include:*

*(g) any act, matter or thing for which development consent under Part 4 is required or has been obtained, or*
*(h) any act matter or thing that is prohibited under an environmental planning instrument, or*
*(i) exempt development, or*
*(j) development carried out in compliance with an order under Division 2A of Part 6, or*
*(k) any development of a class or description that is prescribed by the regulations for the purposes of this definition.*

The proposal involves the use of land and the carrying out of works and is therefore an "activity" for the purposes of Part 5.

A determining authority is defined in Section 5.1 of the Act as "a Minister or public authority and, in relation to any activity, means the Minister or public authority by or on whose behalf the activity is or is to be carried out or any Minister or public authority whose approval is required in order to enable the activity to be carried out".

The term 'public authority' is defined in Section 4 of the *Environmental Planning & Assessment Act, 1979* as follows:

*(a) a public or local authority constituted by or under an Act;*
*(b) a government Department;*
*(c) a statutory body representing the Crown;*
*(d) a chief executive officer within the meaning of the Public Sector Management Act 1988 (including a Director General);*
*(e) a statutory State owned corporation (and its subsidiaries) within the meaning of the State Owned Corporations Act 1989;*
*(f) a chief executive officer of a corporation or subsidiary referred to in paragraph (e); or*
*(g) a person prescribed by the regulations for the purposes of this definition.*

Randwick City Council is a public authority constituted under the *Local Government Act 1993*. It is understood that the works will be the subject of a public tender. Accordingly, as the works will be undertaken on behalf of the public authority, Council is deemed to be the determining authority for the proposed streetscape upgrade works and construction of the new cycleway in accordance with Part 5 of the Act.

Section 5.5 of the *Environmental Planning & Assessment Act, 1979* states a determining authority in its consideration of an activity shall, notwithstanding any other

provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

In addition, the determining authority must also take into account the matters outlined in Clause 228 of the *Environmental Planning and Assessment Regulation 2000*, which provides as follows:

*(1) For the purposes of Part 5 of the Act, the factors to be taken into account when consideration is being given to the likely impact of an activity on the environment include:*

*(a) for activities of a kind for which specific guidelines are in force under this clause, the factors referred to in those guidelines, or*
*(b) for any other kind of activity:*
*(i) the factors referred to in the general guidelines in force under this clause, or*
*(ii) if no such guidelines are in force, the factors referred to subclause (2).*

*(2) The factors referred to in subclause (1)(b)(ii) are as follows:*

*(a) any environmental impact on a community,*
*(b) any transformation of a locality,*
*(c) any environmental impact on the ecosystems of the locality,*
*(d) any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality,*
*(e) any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations,*
*(f) any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974),*
*(g) any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air,*
*(h) any long-term effects on the environment,*
*(i) any degradation of the quality of the environment,*
*(j) any risk to the safety of the environment,*
*(k) any reduction in the range of beneficial uses of the environment,*
*(l) any pollution of the environment,*
*(m) any environmental problems associated with the disposal of waste,*
*(n) any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply,*
*(o) any cumulative environmental effect with other existing or likely future activities,*
*(p) any impact on coastal processes and coastal hazards, including those under projected climate change conditions.*

*(3) For the purposes of this clause, the Director-General may establish guidelines for the factors to be taken into account when consideration is being given to the likely impact of an activity on the environment, in relation to activities generally or in relation to any particular kind of activity.*

These matters are discussed in ***Appendix A*** of this REF.

A general guideline "Is an EIS Required? – Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979" has been issued by the Secretary of the Department of Planning and Environment. This Review of Environmental Factors has been prepared in accordance with these guidelines to enable Council to assess the environmental impacts of the proposed works associated with the construction of the Centennial Park to Kingsford Light Rail Terminus and to determine whether these activities are likely to have a significant impact on the environment.

As described previously, Section 5.5 of Part 5 of the *Environmental Planning & Assessment Act, 1979* relates to the duty to consider environmental impact and subclause (1) states:

> *(1) For the purpose of attaining the objects of this Act relating to the protection and enhancement of the environment, a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.*

## 4.2 State Environmental Planning Policies

### 4.2.1 State Environmental Planning Policy (Infrastructure) 2007

*State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) aims to facilitate the effective delivery of infrastructure across the State. The provisions of the ISEPP prevail over any provisions within a local environmental plan that relate to the development of infrastructure facilities identified in the ISEPP.

Division 17 of the ISEPP relates to Roads and traffic and Subdivision 1 of Division 17 (clauses 93 to 97) deals with road infrastructure facilities.

Clause 94 of the ISEPP permits development on any land for the purpose of a 'road' or 'road infrastructure facilities' to be carried out by or on behalf of a public authority without consent. Under the definitions at Clause 93 of the ISEPP, 'road infrastructure facilities' include a range of facilities such as *tunnels, ventilation shafts, emergency accessways, vehicle or pedestrian bridges, causeways, road-ferries, retaining walls, toll plazas, toll booths, security systems, bus lanes, transit lanes, transitways, transitway stations, rest areas and road related areas* (within the meaning of the *Road Transport (General) Act 2005*).

The definition of 'road related area' within Section 3 of the *Road Transport (General) Act 2005* includes:

> *....(c) an area that is open to the public and is designated for use by cyclists or animals, or....*

Having regard to the above, cycleways are defined as a *road related area* under the *Road Transport (General) Act 2005* and therefore are defined as a 'road infrastructure facility'.

Clause 97 of the ISEPP identifies various types of development as 'exempt' if it is carried out by or on behalf of a public authority 'in connection with' a 'road' or 'road infrastructure facilities'. Specifically, Clause 97(c)(iv) refers to:

*(iv) pedestrian and cyclist facilities (such as footpaths, street lighting, kerb adjustments and ramps, pedestrian fences, refuges, holding rails and bollards),*

As discussed above, the proposed cycleway link constitutes a 'road infrastructure facility' and Clause 97 relates to development that is carried out 'in connection with' a road infrastructure facility'. The cycleway itself is not exempt development, but development undertaken in conjunction with a cycleway such as footpaths, street lighting, kerb adjustments etc are exempt. Accordingly, the proposed cycleway does not constitute *exempt development* under Clause 97 of the ISEPP.

In addition, Clause 94(2) of the ISEPP states (in part) that development for the purpose of *road infrastructure facilities* includes a reference to *(a) construction works (whether or not in a heritage conservation area), including:*

*(i) temporary buildings or facilities for the management of construction, if they are in or adjacent to a road corridor…….*

if the development is in connection with a *road* or *road infrastructure facilities*.

Therefore, as the proposed works are being carried out in connection with a 'road infrastructure facility' that is to be carried out by Randwick City Council, but is not exempt development, the works may be carried out without development consent.

Notwithstanding, the streetscape upgrade works and construction of the proposed cycleway are considered to be an "activity" within the meaning of Section 5.1 of the EP&A Act on the basis that subclause 5.1(1)(d) of the EP&A Act defines the *carrying out of a work* as an "activity". Section 5.5 of the EP&A Act states a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

As such, the proposed cycleway link and associated streetscape upgrade works are being assessed under Part 5 of the EP&A Act and this Review of Environmental Factors (REF) has been prepared.

Clauses 13 to 17 in Part 2 of the ISEPP contain provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. ***Table 4.1*** below outlines the issues to be considered when determining whether consultation is required, and their applicability to this proposal.

**Table 4.1: Requirements for consultation under the Infrastructure SEPP**

| **Issue** | | **Consultation Required?** |
|---|---|---|
| Clause 13 | | |
| 1(a) | Will the development have a substantial impact on Council stormwater services? | **No.**<br>There will be minimal impact on the existing stormwater drainage services. |
| 1(b) | Is the development likely to generate traffic to an extent that will constrain the capacity of the road system? | **No.**<br>The proposed works will introduce some additional construction vehicles while the |

| | | |
|---|---|---|
| | | works are in progress. However, this will be a short term minor impact.<br><br>Following completion of the works, there will be only minor changes to vehicle conditions and cyclist conditions will be improved. |
| 1(c) | Does the development involve connection to, and a substantial impact on a sewerage system? | **No.** |
| 1(d) | Does the development involve connection to, and use of a substantial volume of water from a council-owned water supply system? | **No.** |
| 1(e) | Does the development involve the installation of a temporary structure on, or the enclosing of, a council- managed/controlled public place that is likely to cause disruption to pedestrian or vehicular traffic that is not minor or inconsequential? | **No.**<br>There will be some minor disruption to pedestrian, bicycle and vehicular traffic movements along the affected sections of the route during construction. However, these will be short term. |
| 1(f) | Does the development involve excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which council is the roads authority? | **No.**<br>Only minor excavation to the road and footpath surfaces will be required. |
| Clause 14 | | |
| 1(a) | Is the development likely to have an impact that is not minor or inconsequential on a local heritage item or a heritage conservation area? | **No.**<br>There are ten (10) properties fronting the affected sections of Doncaster Avenue that are listed as local Heritage Items under Randwick LEP 2012. The Randwick Racecourse site, including the properties along the eastern side of Doncaster Avenue between Alison Road and High Street that adjoin the Racecourse site is also listed as a Heritage Conservation Area (C13) under the LEP.<br><br>In addition, where the proposed route encroaches into the Bayside LGA at General Bridges Crescent, this section of the route is located within the Daceyville Garden Suburb Heritage Conservation Area (C1) under Botany Bay LEP 2013. Within this Heritage Conservation Area, the Dacey Garden Reserve and Substation on the |

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| | | corner of Gardeners Road and Bunnerong Road is listed as a heritage item (I76). The route also traverses the frontage of a group of commercial buildings at Nos. 1-11 General Bridges Crescent that form a local heritage item (I109) under Botany Bay LEP 2013.<br><br>A Heritage Impact Statement was prepared by City Plan Heritage to assess the potential impacts of the cycleway on the heritage items. However, the HIS concluded that the works will not have an adverse impact on the heritage significance of these individual properties, the Heritage Conservation Area, or the Heritage Streetscape Area. |
| Clause 15 | | |
| 2 | Is the development on flood liable land and will it change flood patterns other than to a minor extent? | **No.**<br>Flood modelling at 3 critical intersections on Doncaster Avenue was undertaken and the cycleway typology was selected in order to minimise increase flood risk. |
| Clause 16 | | |
| 2(a) | Is the development adjacent to land reserved under the National Parks and Wildlife Act 1974? | **No.** |
| 2(b) | The development is adjacent to a marine park declared under the Marine Parks Act 1997? | **No.** |
| 2(c) | Is the development adjacent to an aquatic reserve declared under the Fisheries Management Act 1994? | **No.** |
| 2(d) | Is the development within the foreshore area within the meaning of the Sydney Harbour Foreshore Authority Act 1998? | **No.** |
| 2(e) | Does the development comprise a fixed or floating structure in or over navigable waters? | **No.** |
| 2(f) | Is the development for the purposes of an educational establishment, health services facility, correctional centre or group home, or for residential | **No.** |

| | | |
|---|---|---|
| | purposes, in an area that is bush fire prone land? | |

Having regard to the table above, there is no requirement for consultation with local councils and / or other public authorities under the ISEPP. Notwithstanding, it should be noted that Randwick City Council has undertaken a process of continual consultation with RMS and other key authority stakeholders since the inception of the project.

## 4.3 Local Environmental Plans

### 4.3.1 Randwick Local Environmental Plan 2012

The majority of the works are located on land to which *Randwick Local Environmental Plan 2012* applies. The road reserves within which the works are to undertaken are variously zoned R2 Low Density Residential, R3 Medium Density Residential, B2 Local Centre and SP2 Infrastructure under the LEP.

Clause 3.1 of the LEP relates to exempt development and states (in part) that *Development specified in Schedule 2 that meets the standards for the development contained in that Schedule and that complies with the requirements of this Part is exempt development*.

Clause 3.2 of the LEP relates to complying development and states (in part) that *Development specified in Part 1 of Schedule 3 that is carried out in compliance with:*

*(a) the development standards specified in relation to that development, and*

*(b) the requirements of this Part, is complying development.*

The proposed works are not identified as exempt development under Schedule 2, or as complying development under Schedule 3 of the LEP. Therefore, having regard to Clauses 3.1 and 3.2 of the LEP, the works would ordinarily require development consent under *Randwick LEP 2012*.

However, as identified at Clause 1.9 of the LEP, the provisions of the ISEPP override the provisions of Randwick LEP 2012 and pursuant to Division 17, together with Clause 20A and Schedule 1 of the ISEPP, the works may be carried out as either *development without consent* or *exempt development*.

## 4.4 Commonwealth legislation

### 4.4.1 Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of National environmental significance or the environment of Commonwealth land. These matters are considered in ***Appendix A*** of the REF.

An assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of National environmental significance. Accordingly, the proposal does not require referral to the Australian Government

Department of the Environment, Water, Heritage and the Arts (DEWHA).

## 4.5 Confirmation of statutory position

All relevant statutory planning instruments have been examined with respect to the proposal.

The proposed works associated with the streetscape upgrade and new cycleway link has been assessed as being either ***exempt development*** or ***development without consent*** under the relevant environmental planning instrument (ISEPP). This position relies on the operation of the ISEPP to remove the otherwise applicable consent requirements.

The proposal falls within the definition of an 'activity' as defined under Section 5.1 of the *Environmental Planning & Assessment Act, 1979* on the basis that subclause 5.1(1)(d) of the *Environmental Planning & Assessment Act, 1979* defines the *carrying out of a work* as an "activity". Section 5.5 of the *Environmental Planning & Assessment Act, 1979* states a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

Therefore, as the works are proposed by a public authority (Randwick City Council) and they do not require development consent, they are subject to an environmental impact assessment under Part 5 of the *Environmental Planning & Assessment Act, 1979.*

# 5 Stakeholder and community consultation

## 5.1 Consultation strategy & community involvement

In 2015, following a review of its bike plan priorities and extensive community consultation, Randwick City Council adopted a Bicycle Route Construction Priority list.

The Centennial Park to Kingsford Light Rail Terminus cycleway (referred to as ANZAC Bikeway - North) as the number 1 priority route. The route was also identified by the NSW State Government in its 'Sydney's Cycling Future' strategy, and is a significant step to achieving Council's 20 year City Plan objective of providing safe and convenient walking paths and cycleways.

Community consultation of the design plans for the proposed new Centennial Park to Kingsford Light Rail Terminus cycleway and streetscape upgrade works was conducted over a five (5) week period between 25 May and 2 July 2018. The consultation activities included:

(a) a direct mail out of a letter providing a description of the project and timeframe for comments, sent out to directly affected residents and owners along the route;

(b) concept designs were exhibited as Council's Administration Building and at Maroubra Library. The community consultation was advertised at all other Randwick City Council Libraries;

(c) a description of the project and timeframe for comments was included on Council's Your Say webpage (www.yoursayrandwick.com.au), including concept designs for each section of the route, Frequently Asked Questions, Question and Answer Forum, as well as options for making a submission and register for future project updates;

(d) details of the project were provided via a dedicated page on Council's website (http://www.randwick.nsw.gov.au/planning-and-building/council-works-and-upgrades/major-projects/pedestrian-cycling-streetscape-improvements);

(e) door knocking of all households along the Centennial Park to Kingsford Light Rail Terminus route to offer an opportunity to discuss the project and inform residents on ways that they could make a submission;

(f) two (2) pop-up stalls with free coffee were set up, one near Centennial Park (Corner ANZAC Parade and Alison Road on the shared path) on Wednesday 13 June 2018, and one on the route (corner of ANZAC Parade and Doncaster Avenue) on Friday 22 June 2018;

(g) advertisements / articles were placed in the Southern Courier, Daily Telegraph on-line, Council's weekly email bulletin and on Facebook; and

(h) an information session was held at Kensington Public School on Thursday 28 June 2018.

There was a significant amount of community interest in the project, with Council documenting the following responses during the public exhibition period:

- 3310 visitors to Your Say Randwick website;
- 2077 pages downloaded;
- 9 questions asked and responded to;
- 396 Have Your Say submissions; and
- 38 email submissions

The majority of the 434 written submissions received for the project were supportive (approximately 70%), with reasons most cited being safety improvements for pedestrians and bike riders along with the tree planting and streetscape improvements.

Approximately 30% of respondents were either neutral or opposed to the project, citing concerns including impacts on traffic and parking, loss of trees, and impacts on driveways.

Council officers prepared a detailed summary of the issues raised by the community during the community consultation process and these were included in a report to the Ordinary Meeting of Council on 28 August 2018 that provided details of the project and results of the community consultation. A copy of this summary, including the Council's responses to the issues raised is provided at ***Appendix C***.

Wherever possible, the design for the new cycleway has taken into consideration the issues raised by the community.

## 5.2 ISEPP consultation

As identified in Table 4-1 in the previous Section, consultation in accordance with the ISEPP is not required. Notwithstanding, there has been ongoing consultation between RMS, other relevant authorities and Randwick City Council since inception of the project.

## 5.3 Government agency involvement

Under the *Roads Act 1993*, RMS is responsible for approval of the final design of the cycleway link. As mentioned above, RMS has been consulted throughout the process and has given consideration to traffic modelling and a draft Signals Plan in order to confirm the feasibility of the proposed route and grant approval for the design development to proceed.

The State Transit Authority has been consulted with regard to the potential impacts to bus services and further consultation with the STA will be undertaken during the detailed design and documentation phase.

## 5.4 Ongoing or future consultation

Prior to the commencement of works, the owners / building managers and tenants of potentially affected buildings will need to be kept informed of the commencement of /

progress of construction activities. In addition, the affected parties will need to be provided with a contact name and number that they can contact should any complaints wish to be registered.

# 6 Environmental assessment

This section of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of the factors specified in the guideline *Is an EIS required?* (DUAP 1999) as required under clause 228(1)(b) of the *Environmental Planning and Assessment Regulation 2000*. The factors specified in clause 228(2) of the *Environmental Planning and Assessment Regulation 2000* are also considered at ***Appendix A***. Site-specific safeguards are provided to minimise or ameliorate the identified potential impacts.

The proposal has been assessed on both the construction phase and the project outcome / design phase of the project.

**Construction Phase**

## 6.1 Traffic, parking and access

### 6.1.1 Existing environment

The proposed cycleway route is contained within the existing road reserves of Doncaster Avenue, Day Avenue (existing cycleway), Houston Road, General Bridges Crescent and Sturt Street.

Along the route there are a substantial number of both residential and commercial properties that gain vehicular access directly from the abovementioned streets. In addition, there is both parallel and 90 degree on-street parking provided along the length of the route. At Bowral Street, there is an existing horse crossing over Doncaster Avenue into Randwick Racecourse that must be retained and is to be upgraded as part of the proposed works, including linemarking and surface treatment, garden bed 'build-outs' and the potential for installation of a flashing warning sign.

### 6.1.2 Potential impacts

As the proposed works are to occur within the existing roadways there is the potential for impacts to traffic and access to properties.

Impacts would primarily occur during construction works when traffic flows along sections of the route may need to be temporarily disrupted to allow access of construction vehicles and / or equipment. However, the impacts of these disruptions would be minimised through the implementation of traffic control measures in the vicinity of the works. Overall impacts on traffic flows are considered minimal as disruptive works in any one location should not last more than a few hours and traffic flows could be managed and maintained with the help of traffic control measures.

For those properties that obtain vehicular access directly adjacent to the route and will therefore need to cross the cycleway to access their properties, the proposed works have the potential to result in short term impacts on access to these properties. Notwithstanding, these impacts are considered minimal and it is unlikely that access to any one property would be disrupted for any significant period of time. Access to these properties will need to be maintained as much as possible through traffic

management measures and where possible, affected properties should be advised in advance of any expected disruptions to access.

The loss of existing parking spaces will be partially compensated for through the provision of 14 new parking spaces. New signposting will need to be installed to advise motorists of the changed parking conditions. There is also potential for the accessible space to require temporary relocation during the works period and residents with Disability Parking Permits will need to be notified.

### 6.1.3 Safeguards and management measures

- Traffic Control measures will need to be undertaken in accordance with the RMS's Traffic Control at Work Sites Manual 2003, and approved by the RMS prior to implementation.

- Appropriate traffic management measures, including temporary speed restrictions, precautionary signs, illuminated warning devices, manual and/or electronic traffic control and provision of temporary barriers and markers to control the proposed work areas and minimise delays for vehicles, cyclists and pedestrians, will need to be implemented and maintained throughout the construction period.

- Access to businesses and other commercial or residential premises along the construction zone will need to be maintained at all times where possible. This includes horse crossing access to Randwick Racecourse via Bowral Street.

- Affected businesses and the occupants of other commercial and residential premises will need to be notified in relation to any temporary access restrictions or limitations.

- In the event that the four (4) existing accessible parking spaces in Doncaster Avenue require temporary relocation during the works period, local residents with Disability Parking Permits are to be notified of the alternative arrangements in writing.

## 6.2 Noise & vibration

### 6.2.1 Existing environment

The existing noise environment is typical of an established urban area. Background noise is dominated by vehicular traffic and pedestrian and related noise.

### 6.2.2 Potential impacts

There is potential for noise impacts to occur during construction activities. However, the extent of these noise impacts are considered to be minor as most of the work will occur during the daytime (refer to the specified standard working hours below) when the existing background noise levels will assist in ameliorating any significant noise. Noise impacts would also be minimised by the fact that the nature of the proposed works means that works would not be required to remain in any one spot for any considerable length of time and therefore would not impact on any one sensitive receiver for any prolonged period of time.

However, there are some works such as the reconstruction of kerbs, driveways and certain intersection works etc. that may need to be conducted outside the standard

working hours to enable the required construction access as the route is a relatively major north-south traffic / cyclist / pedestrian route through Kensington and Kingsford and significant interruption to traffic flows during the standard working hours would cause an unreasonable impact on traffic flows. If night works are required, the implementation of the safeguards and management measures detailed below will assist in minimising the impacts of night time works on the surrounding commercial and residential premises.

Any works to be undertaken outside the standard working hours require specific approvals from Council's Regulation Unit.

### 6.2.3 Safeguards and management measures

- Work is to be restricted to standard working hours specified below and where possible, noisy work should be undertaken during less sensitive periods where possible.

  Work is to be restricted to the following hours:

  - 7.30am-5.30pm Monday to Friday
  - 7.30am-3.30pm Saturday
  - No work on Sundays or public holidays

- The construction noise levels shall not reach or exceed the exposure levels, including peak exposure (140dB[C]) and daily average (85dB[A]), as detailed in Clause 49 of the OH&S Regulation 2001. Work planning and preparation shall be considered to ensure noisy activities are minimised. The control measures developed shall meet the requirements of AS2436 – 1981 – 'Guide to Noise Control on Construction, Maintenance and Demolition Sites' i.e. localised noise boxes or barriers. Appropriate tools and equipment shall be used to ensure noise levels are reduced and controlled.

- Any works that are required to be undertaken outside standard working hours, are to be undertaken in accordance with the procedures contained in the RMS's Environmental Noise Management Manual, 2001 "Practice Notes vii – Roadworks Outside of Normal Working Hours".

- Prior to any works being undertaken outside the standard working hours approval is to be obtained from Council's Construction Regulation Unit.

- Should works be required to be undertaken outside standard working hours, the procedures contained in the RMS's Environmental Noise Management Manual, 2001 "Practice Notes vii – Roadworks Outside of Normal Working Hours" should be followed.

- Works are to be conducted in accordance with the Interim Construction Noise Guideline (DECC, 2009) to ensure feasible and reasonable mitigation measures are carried out.

- All plant, machinery and noise generating equipment should be maintained in good working order. Where practical / possible, vehicles and machinery should be fitted with exhaust silencers and / or noise reduction devices.

- Plant and machinery will need to be turned off when not in use for prolonged periods of time.

- Affected businesses, other commercial premises and residents are to be notified of any night time works.

## 6.3 Air quality

### 6.3.1 Existing environment

The air quality along the route of the cycleway link is typical of an established urban environment. The main sources of air pollution are vehicle emissions.

### 6.3.2 Potential impacts

Air quality impacts as a result of the proposed works are considered minimal due to the relatively minor nature of the works and the short timeframe in which works would be undertaken. Air quality impacts may result from the equipment and vehicles being used for the construction works.

There is the potential for wind borne dust to migrate beyond the construction site during windy conditions.

### 6.3.3 Safeguards and management measures

- Rehabilitation of disturbed surfaces is to be undertaken as soon as possible.

- Where possible, all construction plant and machinery should be fitted with emission control devices complying with Australian Design Standards.

- Plant and machinery will need to be turned off when not in use.

- Dust generating works should be stopped during periods of high wind.

## 6.4 Water quality

### 6.4.1 Potential impacts

The proposal involves some limited excavation associated with the construction of the cycleway pavement and minor excavation for new tree pits etc. As such, there is the potential for pollutants to be carried into the stormwater drainage system in the event of rain. There is also the possibility for excess concrete to enter the stormwater drainage system if not controlled during concrete pours. Stockpiles will need to be suitably constructed and managed to limit the potential for impacts on water quality and drainage through the mobilisation of stockpiled materials by wind or water.

### 6.4.2 Safeguards and management measures

- Concrete pumping is to be carried out in a controlled manner in order to minimise overspray.

- Erosion and sedimentation controls such as silt bags or sediment traps would be installed at nearby stormwater drains and around stockpiles before the commencement of works to prevent sediment-laden runoff entering the local stormwater system.

- Regular maintenance and checking of the erosion and sedimentation controls would need to be undertaken. Sediment would need to be cleared from behind barriers where required and all controls would need to be managed in order to work effectively at all times.

- Stockpiles would need to be designed, established, operated and decommissioned in a manner that ensures that all materials are adequately contained and not mobilised through wind or water.

## 6.5 Visual amenity

### 6.5.1 Existing environment

The existing visual amenity is typical of an established urban environment comprising a trafficable street, kerbside parking, street trees and lighting and pedestrian footpath flanked by low to medium rise commercial / mixed commercial & low to medium rise residential buildings.

### 6.5.2 Potential impacts

Long term changes to this visual environment include the removal of some existing on-street parking, minor changes to the configuration of the road carriageway and footpaths and the visual impacts associated with the green paint and line marking of the cycleway, the relocation of existing parking spaces, removal of street trees and planting of additional street trees. However, these are not considered negative visual impacts and no safeguards are proposed.

The likely short terms visual impacts associated with construction works include the establishment of construction site/s, the presence of plant and equipment, traffic controllers, the temporary stockpiling of materials and the installation of temporary safety fencing / barriers and traffic management measures around the construction site/s.

### 6.5.3 Safeguards and management measures

- All parts of the construction site/s are to be kept clean and tidy.

## 6.6 Trees and Landscaping

### 6.6.1 Existing environment

The aesthetic quality of the streetscape along the route is significantly enhanced by the variety of street trees that align both sides of the streets along which the cycleway will run. The street trees comprise a range of tree species, sizes, age and condition.

A total of 145 existing street trees are located along the route of the cycleway, of which 36 were initially proposed to be removed to accommodate the cycleway.

In order to assess the condition, useful life expectancy and retention value of the existing street trees to be affected by the cycleway, an Aboricultural Assessment of the existing 145 street trees along the length of Route 1 (Centennial Park to Kingsford Light Rail Terminus) was undertaken by treeiQ and is provided at ***Appendix E***. This assessment concluded that of the 36 street trees originally proposed for removal, 28 were suitable for removal due to their poor health and/or limited useful life expectancy (ULE). The remaining 8 trees were assessed as having reasonable health and should be considered for retention.

Notwithstanding the above, a total of 21 trees along the route are proposed to be removed. These 21 trees are species identified in the treeiQ report as being suitable for removal.

### 6.6.1 Potential impacts

There is the potential for the trees along the route that are to be retained to be damaged during the course of the works.

### 6.6.2 Safeguards and management measures

- All trees within the work site that are to be retained are to be protected at all times during the works in accordance with the Council's Tree Preservation Order and AS4970 – 2009 Protection of Trees on Development Sites.

- The contractor is to take all necessary measures to ensure that trees and the Tree Protection Zones (TPZs) are not impacted by the use of machinery in the vicinity.

## 6.7 Flooding and Stormwater Drainage

### 6.7.1 Existing Environment

The route of the cycleway is within the area covered by the Kensington – Centennial Park Flood Study prepared by WMA Water in 2013. This flood study identifies that Doncaster Avenue is subject to significant flooding to various depths along the route of the cycleway.

### 6.7.2 Potential Impacts

There is potential that the construction of the cycleway would decrease flood storage capacity along the route, thereby increasing the risk of inundation to adjoining properties.

However, detailed flood modelling has been carried out by ACOR Consultants (***Appendix D***) and the design of the cycleway and in particular, the selected typologies, have been selected in order to minimise the potential for increased flood risk.

### 6.7.3 Safeguards and management measures

No environmental safeguards or management measures are considered necessary.

## 6.8 Waste management & minimisation

### 6.8.1 Potential impacts

The streetscape upgrade works and construction of the cycleway is expected to produce a relatively small amount of waste due to the nature and scale of the works. The waste generated is likely to include small quantities of bitumen, road base and concrete, as well as pallets and packing material etc. There will also be general litter generated by construction workers.

### 6.8.2 Safeguards and management measures

- A Waste Management Plan will need to be prepared to detail the procedures for waste minimisation and management, including the likely waste generation, method of on-site collection and storage and details of the intended method of recycling or disposal.

- All areas of the construction site/s will need to be kept free of rubbish and cleaned at the end of each work day.

- The resource management hierarchy principles of the Waste Avoidance and Resource Recovery Act 2001(WARR Act) should be adopted as follows:
  – Avoid unnecessary resource consumption as a priority.
  – Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling, and energy recovery).
  – Disposal is undertaken as a last resort.

## 6.9 Heritage

### 6.9.1 Existing environment

There are ten (10) properties having a frontage to the cycleway route along Doncaster Avenue / ANZAC Parade that are listed as local Heritage Items under Randwick LEP 2012. Randwick Racecourse is also listed as a heritage item under the LEP. In addition, the commercial building group at Nos. 1-11 General Bridges Crescent and Dacey Garden Reserve and substation are listed as local Heritage Items under Botany Bay LEP 2013. The above items are also within the Daceyville Garden Suburb Heritage Conservation Area listed under Botany Bay LEP 2013.

There are also a number of sandstone gutters and sandstone stormwater drains along the route, as well as a late 19th Century sewerage vent in the footpath outside No. 126 Doncaster Avenue.

### 6.9.2 Potential impacts

The proposed works associated with the construction of the cycleway are contained within the existing road reserve and include (but are not limited to) construction of the cycleway and sections of shared path, removal of four (4) roundabouts; re-alignment of road geometry (as required) and re-construction of sections of the footpath, the installation of planted kerb extensions/build-outs, upgrades to the Kensington Public School Pick-up / Drop-off zone, tree removal and new plantings, street/surface markings, treatment of several ‘shared environment’ intersections and three (3) new pedestrian crossings and modification to traffic signals to include ‘bike lanterns’.

As such, there is the potential for the works to have an impact on the heritage significance of the heritage items and heritage conservation areas that adjoin the route. In order to assess the potential for adverse heritage impacts, a Heritage Constraints & Opportunities Assessment was prepared by City Plan Heritage *(**Appendix G**).*

The Heritage Constraints & Opportunities Assessment provided a detailed assessment of the heritage context and concludes that in principle, the proposed works are acceptable from a heritage perspective. However, to further inform the design, some

additional studies should be undertaken. These are detailed in the recommended safeguards and management measures below:

### 6.9.3 Safeguards and management measures

- Consideration is to be given to the engagement of an archaeologist to undertake an archaeological assessment of the proposed route and advise on the potential for archaeology. The report is to include a survey showing the location of all sandstone kerbs, gutters, other early material and potential archaeological sites.
- Consideration is to be given to the engagement of a landscape heritage specialist to advise on the appropriateness of the landscape works proposed. In addition, the landscape heritage specialist is also to advise if there are any significant trees along the route that require retention and what species of new trees will have a limited impact on heritage fabric located in proximity;
- Retention of sandstone kerbs, gutters and other early material in situ is the desired heritage outcome, however, it may be possible to salvage and reinstate these in some areas. Further investigation is to be undertaken following completion of the aforementioned survey;
- The removal of any sandstone kerb and guttering or sandstone stormwater drains is to be carried out under the supervision of a built heritage specialist. Sandstone that can be salvaged and not reinstated is to be stored in the care of Randwick City Council;
- Prior to the removal of any sandstone kerb and guttering or sandstone stormwater drains, an archival recording should be prepared and submitted to Randwick City Council. The recording shall be in accordance with the NSW Heritage Office 2006 Guidelines for Photographic Recording of Heritage Items using Film or Digital capture. Two copies of the endorsed recording are to be presented to Council, one of which is to be placed in the Local History Collection of Randwick City Library.

## 6.10 Community enquiries and complaints

### 6.10.1 Potential impacts

During the course of construction of the cycleway and streetscape improvement works it is likely that affected businesses, residents or other members of the community will wish to make enquiries or complaints in relation to the works. As such, an enquiry / complaint management system needs to be implemented and affected members of the community advised of the protocol for handling enquiries and/or complaints.

### 6.10.2 Safeguards and management measures

- Randwick City Council's Project Manager is to be contactable and available to respond to enquiries and address complaints or other issues during the construction period.

## 6.11 Summary of construction phase adverse effects

The main adverse effects of the proposed cycleway likely to occur during the construction phase include:

- Traffic, parking and access impacts;

- Noise and vibration impacts;
- Air quality impacts;
- Water quality impacts;
- Flooding and stormwater drainage impacts;
- Visual amenity impacts;
- Tree impacts;
- Heritage impacts.
- Waste management and minimisation impacts;

**Project Outcome / Operational Phase**

## 6.12 Traffic, Parking and Access

### 6.12.1 Existing environment

There is currently both parallel and 90 degree on-street parking provided along the length of the route. In addition, the majority of properties that adjoin the route gain vehicular access directly from the public streets and drivers/vehicles will be required to cross the cycleway to access and egress from these properties.

### 6.12.2 Potential impacts

The design for the cycleway proposes to remove a total of 34 parking spaces along the length of the route between Centennial Park and the Kingsford Light Rail Terminus. However, due to changes to the road design, including intersection treatments, crossing build-outs and upgrades, kerb extensions and garden bed build-outs and removal of a roundabout at the intersection of Houston Road and Barker Street, 14 new parking spaces are proposed. This represents a nett loss of 20 spaces along the length of the route.

The loss of on-street parking has been kept to a minimum and the existing loading zones and accessible parking spaces have been retained.

Notwithstanding the nett loss of 20 on-street parking spaces in the locality, it is considered that the current proposal represents a good outcome and acceptable balance between the concerns and desires of the community and the Council's desire to provide a safe and functional cycleway link.

As noted above, in order to gain vehicular access to properties along the route, drivers/vehicles will be required to cross the cycleway in order to access and egress from these properties. Green paint, or other appropriate surface treatments, will be used to delineate each driveway crossing along the cycleway and drivers will be required to watch out for cyclists when using their driveways, as per current conditions.

The cycleway crosses several roads and laneways along the length of the route. At the major intersections of Doncaster Avenue and ANZAC Parade and Houston Road

and Gardeners Road, the traffic signal will be altered to include 'bike lanterns' to align with pedestrian movements. At other major intersections, the traffic conditions are being altered, through the removal of roundabouts and construction of a 'bend-out' intersection treatment, to provide for a priority cycle crossing (cars always give way to cyclists and pedestrians). At the intersections of Houston Road and Barker Lane, Strachan Lane, SEE Lane and Gardeners Lane, a shared intersection treatment is to be applied such that drivers, cyclists and pedestrians will need to be aware of each other and no priority is given.

It is anticipated that the provision of a well-designed and safe cycleway is likely to reduce the dependency on personal vehicles in an area and serve to relieve congestion on roads and enhance the street spaces of the area. Notwithstanding, in order to ascertain the potential impacts the addition of a dedicated cycleway might have on the performance of each of the intersections along the route, GTA Consultants were engaged to carry out SIDRA Analysis to measure and compare the existing and likely level of service at each intersection along the route. The commonly used measure of intersection performance, as defined by the RMS, is vehicle delay. SIDRA INTERSECTION is a computer based modelling package that calculates intersection performance by determining the average delay that vehicles encounter, which in turns, provides a measure of the level of service (LoS). A LoS of A & B represents a good level of service; a LoS of C or D represents a satisfactory LoS that is nearing capacity. A LoS of E or F means that an intersection is at capacity or is in need of extra capacity in order to reduce delays.

The SIDRA Analysis was initially conducted using traffic volumes extracted from an AIMSUN model previously prepared by GTA Consultants for the operational phase of the Sydney Light Rail anticipated to commence in 2021. Using the AIMSUN model, the results of the SIRDA Analysis indicated that all of the intersections along the route are currently operating at a LoS of A or B. The results from modelling of operating conditions with the proposed cycleway, indicated that there would be a minor impact on intersection performance. However, the LoS at each intersection would remain at A or B. This modelling was based on the preferred treatment of three (3) of the existing intersections, where the roundabout is removed and the intersections operate as Cyclist Priority – Give Way intersections (as shown in the design drawings).

However, GTA Consultants noted that the traffic figures for some of the intersection under the AIMSUN model were lower than those derived from 2016 traffic survey data. Accordingly, SIDRA Analysis was also run using the 2016 survey data. However, this concluded that the intersections of Houston Road & Barker Street and Houston Road & Borrodale Road would perform at an unsatisfactory level of service (LoS F) when tested with the 2016 survey results.

Additional sensitivity tests using 50% and 75% sensitivity volumes between the AIMSUN and 2016 traffic survey counts were undertaken using traffic volumes greater than those forecasted in the AIMSUN model but lower than observed in the 2016 surveys. Those showed overall satisfactory operations at the intersection of Houston Road & Borrodale Road. The intersection of Houston Road & Barker Street operated at a satisfactory level of service at 50% sensitivity, but at an unsatisfactory level of service (LoS F) in the 75% sensitivity test. This was due to the volume of traffic on Barker Street.

However, given that construction of the Light Rail is well progressed, it is anticipated that the forecast reduction in traffic volumes once the Light Rail is operational will occur. This will allow the intersection of Houston Road & Barker Street to operate at a satisfactory (LoS) as a priority-controlled intersection.

### 6.12.3 Safeguards and management measures

The loss of on-street parking has been kept to a minimum.

Notwithstanding the net loss of 20 on-street parking spaces in the locality, it is considered that the current proposal represents a good outcome and acceptable balance between the concerns and desires of the community and the Council's desire to provide a safe and functional cycleway.

No environmental safeguards or management measures are considered necessary.

## 6.13 Accessibility and safety

### 6.13.1 Existing environment

With the exception of the small section of separated cycleway along Day Avenue, the lack of a dedicated cycleway along the length of the route means that cyclists currently have to travel with the vehicular traffic, which presents safety issues and acts as a major disincentive to encouraging cycling as an alternate mode of transport.

Although there has been a nett loss of 20 parking spaces along the route, the 4 existing accessible spaces in Doncaster Avenue have been retained. All vehicular access to properties along the route has also been retained and will be delineated with appropriate surface treatments.

### 6.13.2 Potential impacts

The likely beneficial impacts are an improved level of accessibility for cyclists, pedestrians and other road users. The dedication of a bi-directional cycleway separated from the other road users will substantially improve the safety and amenity for cyclists and will act as an incentive to higher bicycle usage along this regional route.

The negative impacts such as the loss of on-street parking has been kept to a minimum and where possible.

### 6.13.3 Safeguards and management measures

No environmental safeguards or management measures are considered necessary.

## 6.14 Social and economic

### 6.14.1 Potential impacts

The operational phase of the cycleway will have a generally positive socio-economic impact and the safety and amenity for cyclists will be improved with this north-south link from Kingsford towards the City. This is likely to encourage the wider use of the facility by cyclists, which in turn, has a beneficial impact on the health of users of the cycling facilities.

### 6.14.2 Safeguards and management measures

No environmental safeguards or management measures are proposed.

## 6.15 Summary of operational phase adverse effects

The main adverse effects of the proposed cycleway likely to occur during the operational phase include:

- Traffic, parking and access impacts;
- Accessibility and safety;
- Social and economic.

## 6.16 Summary of operational phase beneficial effects

The main benefits of the proposed streetscape upgrade and cycleway include:

- Provision of a safe and well-marked north-south cycleway that links to the existing and proposed future local and cross-regional bicycle network;
- Improved safety and 'journey ambience' for cyclists through the provision of a separate dedicated cycleway, removing them from the current mixed traffic environment;
- The associated health and lifestyle benefits attributed to cycling as an alternate transport mode;
- Environmental benefits associated with reduced vehicle emissions and noise pollution;
- A reduction in car demand and the associated flow on effects of improvements to traffic flows;
- Improved pedestrian amenity by providing pedestrian crossings and reducing the likelihood of cyclists using the footpath.

# 7 Environmental management

## 7.1 Environmental management plans

Environmental safeguards and management measures outlined in ***Table 7-1*** below will minimise the identified potential adverse environmental impacts of the proposal on the surrounding environment.

A construction environmental management plan (CEMP) has not been prepared for the Centennial Park to Kingsford Light Rail Terminus cycleway project. However, a CEMP will need to be prepared prior to the commencement of works. The CEMP will need to incorporate all of the safeguards and management measures described in the REF. The environmental management of this proposal will need to be in accordance with this plan. The CEMP should be prepared in accordance with (or with reference to) the specifications set out in the RMS's (formerly RTA) Environmental Protection (Management Plan) – QA Specification 36.

## 7.2 Summary of safeguards and management measures

The environmental safeguards outlined in this document would be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal. These safeguards are aimed at minimising any potential adverse impacts on the surrounding environment arising from the proposed works. All safeguards described in the REF will also be incorporated into the CEMP. These are summarised in Table 7-1.

**Table 7-1: Summary of site specific environmental safeguards**

| No. | Impact | Environmental safeguards |
|---|---|---|
| 1 | Traffic, parking and access | • Traffic Control measures will need to be undertaken in accordance with the RMS's Traffic Control at Work Sites Manual 2003, and approved by RMS prior to implementation.<br>• Appropriate traffic management measures, including temporary speed restrictions, precautionary signs, illuminated warning devices, manual and/or electronic traffic control and provision of temporary barriers and markers to control the proposed work areas and minimise delays for vehicles, cyclists and pedestrians, will need to be implemented and maintained throughout the construction period.<br>• Access to businesses and other commercial or residential premises along the construction zone will need to be maintained at all times where possible. This includes horse crossing access to Randwick Racecourse via Bowral Street.<br>• Affected businesses and the occupants of other commercial and residential premises will need to be |

| No. | Impact | Environmental safeguards |
|---|---|---|
| | | notified in relation to any temporary access restrictions or limitations.<br><br>• In the event that the four (4) existing accessible parking spaces in Doncaster Avenue require temporary relocation during the works period, local residents with Disability Parking Permits are to be notified of the alternative arrangements in writing. |
| 2 | Noise & Vibration | • Work is to be restricted to standard working hours specified below and where possible, noisy work should be undertaken during less sensitive periods where possible.<br><br>Work is to be restricted to the following hours:<br><br>- 7.30am-5.30pm Monday to Friday<br>- 7.30am-3.30pm Saturday<br>- No work on Sundays or public holidays<br><br>• The construction noise levels shall not reach or exceed the exposure levels, including peak exposure (140dB[C]) and daily average (85dB[A]), as detailed in Clause 49 of the OH&S Regulation 2001. Work planning and preparation shall be considered to ensure noisy activities are minimised. The control measures developed shall meet the requirements of *AS2436 – 1981 – 'Guide to Noise Control on Construction, Maintenance and Demolition Sites'* i.e. localised noise boxes or barriers. Appropriate tools and equipment shall be used to ensure noise levels are reduced and controlled.<br><br>• Any works that are required to be undertaken outside standard working hours are to be undertaken in accordance with the procedures contained in the RMS's Environmental Noise Management Manual, 2001 "Practice Notes vii – Roadworks Outside of Normal Working Hours".<br><br>• Prior to any works being undertaken outside the standard working hours approval is to be obtained from Council's Regulation Unit.<br><br>• Should works be required to be undertaken outside standard working hours, the procedures contained in the RMS's Environmental Noise Management Manual, 2001 "Practice Notes vii – Roadworks Outside of Normal Working Hours" should be followed. |

| No. | Impact | Environmental safeguards |
|---|---|---|
| | | • Works are to be conducted in accordance with the Interim Construction Noise Guideline (DECC, 2009) to ensure feasible and reasonable mitigation measures are carried out.<br><br>• All plant, machinery and noise generating equipment should be maintained in good working order. Where practical / possible, vehicles and machinery should be fitted with exhaust silencers and / or noise reduction devices.<br><br>• Plant and machinery will need to be turned off when not in use for prolonged periods of time.<br><br>• Affected businesses and other commercial premises and residents are to be notified of night time works. |
| 3 | Air Quality | • Rehabilitation of disturbed surfaces is to be undertaken as soon as possible.<br><br>• Where possible, all construction plant and machinery should be fitted with emission control devices complying with Australian Design Standards.<br><br>• Plant and machinery will need to be turned off when not in use.<br><br>• Dust generating works should be stopped during periods of high wind. |
| 4 | Water Quality | • Concrete pumping is to be carried out in a controlled manner in order to minimise overspray.<br><br>• Erosion and sedimentation controls such as silt fences / bags, sediment traps, diversion drains, berms, sumps etc will need to be installed at nearby stormwater drains and around stockpiles before the commencement of works to prevent sediment-laden runoff entering the local stormwater system.<br><br>• Regular inspection and maintenance of the erosion and sedimentation controls is to be undertaken.<br><br>• Sediment is to be cleared from behind barriers where required and all controls would need to be managed in order to work effectively at all times.<br><br>• Stockpiles would need to be designed, established, operated and decommissioned in a manner that ensures that all materials are adequately contained |

| No. | Impact | Environmental safeguards |
|---|---|---|
| | | and not mobilised through wind or water. |
| 5 | Visual Amenity | • All parts of the construction site/s are to be kept clean and tidy. |
| 6 | Trees and Landscaping | • All trees within the work site that are to be retained are to be protected at all times during the works in accordance with the Council's Tree Preservation Order and AS4970 – 2009 Protection of Trees on Development Sites.<br>• The contractor is to take all necessary measures to ensure that trees and the Tree Protection Zones (TPZs) are not impacted by the use of machinery in the vicinity. |
| 7 | Flooding and Stormwater Drainage | No environmental safeguards or management measures are considered necessary. |
| 8 | Waste Minimisation and Management | • A Waste Management Plan will need to be prepared to detail the procedures for waste minimisation and management, including the likely waste generation, method of on-site collection and storage and details of the intended method of recycling or disposal.<br>• All areas of the construction site/s will need to be kept free of rubbish and cleaned at the end of each work day.<br>• The resource management hierarchy principles of the Waste Avoidance and Resource Recovery Act 2001(WARR Act) should be adopted as follows:<br>– Avoid unnecessary resource consumption as a priority.<br>– Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling, and energy recovery).<br>– Disposal is undertaken as a last resort. |
| 9 | Heritage | • Consideration is to be given to the engagement of an archaeologist to undertake an archaeological assessment of the proposed route and advise on the potential for archaeology. The report is to include a survey showing the location of all sandstone kerbs, gutters, other early material and potential archaeological sites.<br>• Consideration is to be given to the engagement of a landscape heritage specialist to advise on the |

| No. | Impact | Environmental safeguards |
|---|---|---|
| | | appropriateness of the landscape works proposed. In addition, the landscape heritage specialist is also to advise if there are any significant trees along the route that require retention and what species of new trees will have a limited impact on heritage fabric located in proximity;<br>• Retention of sandstone kerbs, gutters and other early material in situ is the desired heritage outcome, however, it may be possible to salvage and reinstate these in some areas. Further investigation is to be undertaken following completion of the aforementioned survey;<br>• The removal of any sandstone kerb and guttering or sandstone stormwater drains is to be carried out under the supervision of a built heritage specialist. Sandstone that can be salvaged and not reinstated is to be stored in the care of Randwick City Council;<br>• Prior to the removal of any sandstone kerb and guttering or sandstone stormwater drains, an archival recording should be prepared and submitted to Randwick City Council. The recording shall be in accordance with the NSW Heritage Office 2006 Guidelines for Photographic Recording of Heritage Items using Film or Digital capture. Two copies of the endorsed recording are to be presented to Council, one of which is to be placed in the Local History Collection of Randwick City Library. |
| 10 | Community enquiries and complaints | • Randwick City Council's Project Manager should be contactable and available to respond to enquiries and address complaints or other issues during the construction period. |

# 8 Conclusion

## 8.1 Justification

Based on independent research undertaken by leading economic researcher, AECOM, the Inner City Regional Bicycle Network will provide access for 1.2 million people in 164 suburbs and across 15 (11 following the amalgamations) local government areas. AECOM estimates that the bicycle network is likely to deliver a net economic benefit of $506 million (in today's dollars over a 30 year period), and that every dollar spent on delivering the interconnected cycleway, the network will generate an economic return of $3.88.

**Figure 8.1 – The Inner City Regional Bicycle Network Routes**


*Source: City of Sydney*

The Centennial Park to Kingsford Light Rail Terminus cycleway link is an integral part of the network, linking the south-eastern suburbs to the CBD, as well as the existing and other proposed cycle routes throughout the region.

The creation of a comprehensive, co-ordinated and practical cycling network across the local government area, and connecting to cycleways in adjoining local government areas, will benefit both cyclists and the wider community. Benefits include improvements to environmental and health conditions, reductions in traffic congestion and enhanced motorist, cyclist and pedestrian safety.

The cycleway project is consistent with the aims of *Sydney's Cycling Future* as it will improve the safety of and facilities for cyclists across the City.

On balance the proposal is considered justified.

The environmental impacts of the proposal are not likely to be significant and therefore it is not necessary for approval to be sought for the proposal under Part 4 of the *Environmental Planning & Assessment, Act 1979*. The proposal will not have a substantial impact on any matters of national environmental significance.

## 8.2 Objects of the Environmental Planning & Assessment Act, 1979

Decisions made under the *Environmental Planning & Assessment Act, 1979* must have regard to the objects of the Act, as set out in Section 1.3. The relevant objects are:

*(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,*

*(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,*

*(c) to promote the orderly and economic use and development of land,*

*(d) to promote the delivery and maintenance of affordable housing,*

*(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,*

*(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),*

*(g) to promote good design and amenity of the built environment,*

*(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,*

*(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,*

*(j) to provide increased opportunity for community participation in environmental planning and assessment.*

The proposed works associated with the new cycleway and streetscape improvement works between Centennial Park and the Kingsford Light Rail Terminus are consistent with the objects of the Act, in as much as they are of relevance to the proposed works. In particular, the outcome following completion of the works represents the proper management of the public domain and promotes the social and welfare of the community by providing safe, convenient and healthy transport options and streetscape enhancements to improve the traffic, cycling and walking environment and connections across the local streets and between popular destinations.

Further, the implementation of the recommended safeguards and mitigation measures outlined in this REF will ensure the project is undertaken in such a way that it protects the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.

## 8.3 Ecologically sustainable development

The National Strategy for Ecologically Sustainable Development (NSESD) has been formulated to ensure ESD is accounted for in all proposals. There are three core objectives:

- Enhance the well-being and welfare of individuals and the community by following a path of economic development that safeguards the welfare of future generations;
- Provide for equity within and between generations;
- Protect biological diversity and maintain essential ecological processes and life-support systems.

The EP&A Act acknowledges that ecologically sustainable development (ESD) should be considered in the assessment and approval of proposed development.

The proposed cycleway has been assessed against the following four principles of ecologically sustainable development (ESD) listed in the *Protection of the Environment Administration Act 1991*:

- *The precautionary principle;*
- *The principle of intergenerational equity;*
- *The principle of biological diversity and ecological integrity; and*
- *The principle of improved valuation of environmental resources.*

A discussion on the degree to which the proposed cycleway complies with these principles is provided below.

### 8.3.1 Precautionary principle

The precautionary principle states that:

*if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

*In the application of the precautionary principle, public and private decisions should be guided by:*

*(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*

*(ii) an assessment of the risk weighted consequences of various options*

A range of investigations have been undertaken during the preparation of this REF to ensure that the potential environmental impacts are able to be understood with a high degree of certainty. The proposal has evolved to avoid environmental impact where possible and mitigation measures have been recommended to minimise adverse impacts. No mitigation measures have been deferred due to a lack of scientific certainty. The proposal is therefore considered to be consistent with the precautionary principle.

### 8.3.2 Intergenerational equity

The principle of intergenerational equity states that:

> *the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*

The proposed cycleway will not result in any impacts that are likely to adversely impact on the health, diversity or productivity of the environment for the future generation. Instead, the cycleway will realise a number of positive impacts for the benefit present and future generations including:

- The potential for reduced traffic congestion and necessary vehicle trips;
- Improved health and lifestyle benefits afforded by the provision of a safe and dedicated cycleway route;
- The potential for environmental savings through reductions in vehicle emissions and noise pollution;
- Improved safety and 'journey ambience' for cyclists through the provision of a separate dedicated cycleway, removing them from the current mixed traffic environment;
- The potential for savings in government transport infrastructure building and operating costs;
- Improved pedestrian amenity through the provision of pedestrian crossings and reduced likelihood of cyclists riding on the footpath through the provision of a separate cycleway.

### 8.3.3 Conservation of biological diversity and ecological integrity

The principle of biological diversity and ecological integrity states that:

> *conservation of biological diversity and ecological integrity should be a fundamental consideration.*

The proposed cycleway is unlikely to have an impact on biological diversity and ecological integrity. The cycleway is to be built in a highly urbanised area where the potential for adverse impacts on flora and fauna are considered minimal. Any flora and fauna that may be present in the vicinity of the proposed cycleway route is reflective of and has adapted to, this highly modified urban environment and is unlikely to be adversely affected.

### 8.3.4 Improved valuation, pricing and incentive mechanisms

The principle of improved valuation of environmental resources states that:

> *environmental factors should be included in the valuation of assets and services, such as:*
>
> *(i) polluter pays – that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*
>
> *(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
>
> *(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

The cost of environmental resources includes those costs that are incurred in order to protect the environment. In this way, any environmental safeguards that are imposed in order to minimise adverse impacts result in economic costs to the construction and operation of the project. This indicates that the valuation of environmental resources has been assigned.

As described in this REF, the construction methodology for the cycleway will be designed to minimise adverse impacts on the environment by confining works to defined areas and implementing appropriate mitigation measures where environmental impacts are expected.

## 8.4 Conclusion

The proposed works associated with the cycleway and streetscape improvement works are subject to assessment under Part 5 of the *Environmental Planning & Assessment Act 1979*. The REF has examined and taken into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the proposed activity. The proposed works, as described in the REF, will meet the project objectives but will still result in some minor impacts during construction with respect to traffic and access, noise and air quality, water quality and stormwater management, visual amenity and waste storage and disposal. Notwithstanding, the implementation

and effective management of the safeguards and mitigation measures that are detailed in this REF will ameliorate or minimise these expected impacts, such that they will have no more than a minor impact.

The proposal will also realise a number of positive impacts, including an upgraded streetscape, improved conditions and safety for motorists, cyclists and pedestrians, opportunities for improved health benefits, reductions in traffic congestion and vehicle emissions etc.

On balance the proposal is considered justified.

Having regard to the matters which have been identified as potentially affecting or likely to affect the environment by reason of the proposed activity and the statutory and planning framework, it is concluded that:

a) The environmental impacts of the proposal are not likely to be significant and therefore it is not necessary for approval to be sought for the proposal under Part 4 of the *Environmental Planning & Assessment Act 1979*.

b) The proposal will not impact on any matters of national environmental significance; and

c) Having regard to the above, it is concluded that the proposal is not likely to significantly affect the environment within the meaning of Section 5.7 of the *Environmental Planning & Assessment Act 1979*.

# 9 Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Andrew Robinson MPIA
Director
**Andrew Robinson Planning Services Pty Ltd**
Date: 19 May 2019

I have examined this review of environmental factors and the certification by Andrew Robinson Planning Services Pty Ltd and accept the review of environmental factors on behalf of Randwick City Council.

Signature:

Name:

Position:

Date:

# 10 References

The following publications and documents have been used in the preparation of this REF:

AECOM 2010*, Inner Sydney Regional Bicycle Network, Demand Assessment and Economic Appraisal*

Department of Planning & Infrastructure (then DIPNR) 2004, *Planning guidelines for walking and cycling*

GTA Consultants 2018, *Randwick Cycleways Concept Design Stage, Centennial Park to Kingsford Light Rail Terminus Road Safety Audit*

NSW Government, 2013, *Sydney's Cycling Future, Cycling for everyday transport*

Randwick City Council website – www.randwick.nsw.gov.au

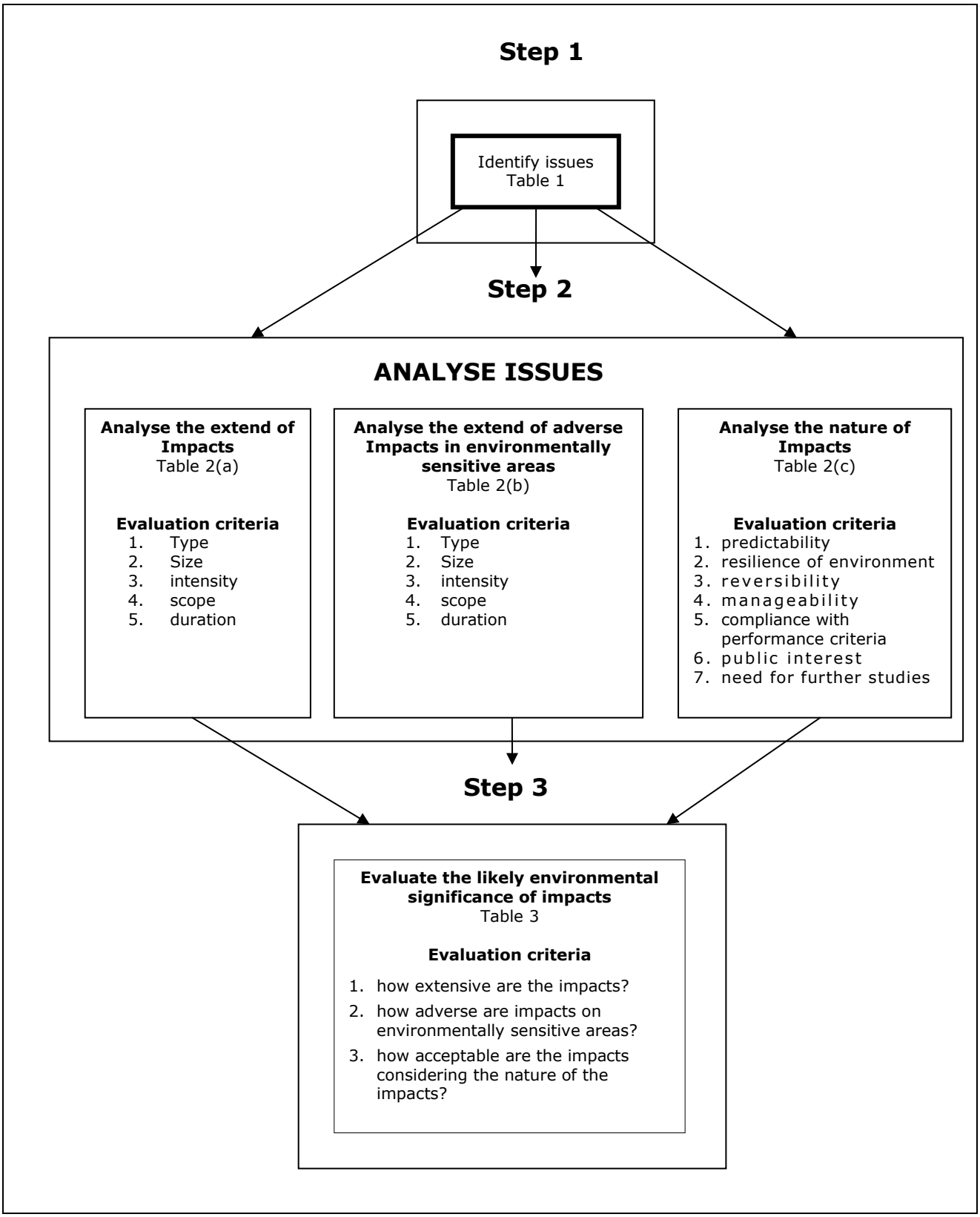
# Appendix A

## Randwick City Council – Review of Environmental Factors

Randwick City Council
a sense of community

# Review of Environmental Factors

# The Evaluation Framework



# STEP 1:

## Identify the Issues

1. Identify the characteristics of the activity that are likely to result in environmental impacts
2. Determine whether the activity is likely to affect environmentally sensitive areas.

## Description of Proposed Activity

| | |
|---|---|
| **Activity** | **Streetscape Upgrade and New Cycleway: Centennial Park to Kingsford Light Rail Terminus**<br><br>Randwick City Council is committed to providing safe and healthy transport options to improve our streets and make them easier and nicer to walk and cycle.<br><br>The Centennial Park to Kingsford Light Rail Station cycleway project is identified as a high priority under Council's adopted Cycle Strategy (Bicycle Route Construction Priority – April 2015).<br><br>Council has been successful in gaining funding through the NSW Government's Active Transport Program to design and document streetscape improvements and a new cycleway linking Centennial Park to the Kingsford Light Rail Terminus (UNSW) via Doncaster Avenue, Day Lane, Houston Road, General Bridges Crescent and Sturt Street. The provision of the new cycleway link also provides an opportunity to enhance the streetscape, improve road safety and strengthen the pedestrian experience along the proposed route. |
| **Objectives** | The objective of the proposal is to provide a high quality new section of cycleway between Centennial Park and the Kingsford Light Rail Terminus that provides a safe and vibrant cycling and walking route, while also delivering the best experience for all users of the road and pathway networks through the Randwick City area. |
| **Major elements** including any environmental impact mitigation measures | The Centennial Park to Kingsford Light Rail Terminus cycleway, between Alison Road and ANZAC Parade, is a key link in the wider cycling network strategy, providing an important north-south connection from Centennial Park, through to the Light Rail Terminus currently under construction on ANZAC Parade at Kingsford. The 2.6km long section of cycleway will connect with the existing cycleway network at Centennial Park and then connect with the Kingsford Light Rail Terminus to South Coogee cycleway link being undertaken concurrently as a separate project. The cycleway will provide a separated bi-directional cycleway that incorporates a variety of pavement / design treatments, in response to the varied built form characteristics along the length of the route, as well as parking and civil engineering issues and community/stakeholder |

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| | engagement.<br><br>The cycleway has also provided an opportunity to undertake a range of streetscape upgrade works as part of the project scope.<br><br>Works along the length of the cycleway route include:<br><br>• Construction of an interrupted median separated bi-directional cycleway along the eastern side of Doncaster Avenue, between Alison Road and ANZAC Parade;<br><br>• Construction of a 2.8m wide shared pathway within the footpath on the western side of Doncaster Avenue between Carlton Street and Alison Road to provide an alternate cycle connection to Alison Road;<br><br>• Construction of a flush to footpath separated bi-directional cycleway along the eastern side of Doncaster Avenue, between ANZAC Parade and Day Avenue, along the western side of Houston Road, between Day Avenue, around General Bridges Crescent and along Sturt Street to the Kingsford Light Rail Terminus on ANZAC Parade;<br><br>• Installation of new pedestrian crossings near the intersections of Doncaster Avenue and Darling Street, Doncaster Avenue and Day Avenue, Houston Road and Barker Street and Houston Road and Borrodale Street;<br><br>• Installation of kerb build-outs at the intersection of Doncaster Avenue and Carlton Street to improve safety for pedestrians crossing Doncaster Avenue and to provide infrastructure for a pedestrian refuge in the event that RMS approval is received in the future;<br><br>• Installation of cyclist priority crossing intersection treatments, including linemarking / surface treatments, pedestrian crossings and garden bed 'build-outs' at the intersections of Houston Road with Barker Street, Strachan Street, SEE Street, Borrodale Street, Cook Avenue and Banks Avenue;<br><br>• Installation of shared intersection treatments, including linemarking / surface treatments and garden bed 'build-outs' at the intersections of Houston Road with Barker Lane, Strachan Lane, SEE Lane and Gardeners Lane;<br><br>• Removal of the existing roundabouts and replacement with Priority – Give Way intersections at the intersections of Doncaster Avenue and Day Avenue, Houston Road and Barker Street and Houston Road and Borrodale Street;<br><br>• Upgraded treatment of the existing horse crossing at Bowral Street, including linemarking and surface treatment, garden bed 'build-outs' and the potential for flashing warning signs;<br><br>• Upgrades to the Kensington Public School Pick-up / Drop-off zone including additional hardstand areas; |

| | |
|---|---|
| | • Construction of new garden beds and 'build-outs' at intersections;<br>• Realignment of the road geometry as required;<br>• Modification to the traffic signals, including the addition of 'bike lanterns' at the signalised intersections of Doncaster Avenue and Alison Road, Doncaster Avenue and Todman Avenue, Houston Road and Gardeners Road and installation of a partially signalised intersection with 'Bike Lantern' at the intersection of General Bridges Crescent and Bunnerong Road;<br>• Removal of 21 existing trees and planting of 89 new trees (nett gain of 68 trees);<br>• Loss of 34 existing on-street parking spaces (loading zones and 4 existing accessible spaces retained), with the provision of 14 new parking space (nett loss of 20 spaces);<br>• Construction of a shared pathway within the footpath at the intersection of Sturt Street and ANZAC Parade, including provision of a signalised crossing with pedestrian and 'Bike Lanterns';<br>• Provision of bike storage facilities near the Kingsford Light Rail Terminus (by Transport for NSW). |
| **Any ancillary works** | Nil |
| **Outline of construction methods** | Prior to the commencement of any work, 'construction zones' will need to be established along the route. The final details of the construction methodology are still under consideration and therefore were not available at the time of preparation of this Review of Environmental Factors. However, prior to any works commencing, the pedestrian and traffic management controls and other environmental controls recommended in this Review of Environmental Factors will need to be implemented.<br><br>Construction activities will vary throughout the works period, however are anticipated to include (but not be limited to):<br>• Surveying and establishment of any subterranean services;<br>• Minor excavation and/or pavement grinding;<br>• Removal of existing kerb and guttering and / or pedestrian pavement;<br>• Backfilling and compaction; |

| | |
|---|---|
| | • Construction of formwork, concrete pouring and/or asphalting;<br>• Paving works etc associated with shared environment intersection treatments;<br>• Reconstruction of kerb and guttering and pedestrian pavement;<br>• Installation of separation kerbing and raised thresholds / crossings;<br>• Painting and line marking / stencilling;<br>• Installation of infrastructure (ie signage and lighting etc);<br>• Alterations to existing traffic signals;<br>• Alterations / upgrade to street lighting;<br>• Selected tree removals and replacement / new street tree and garden bed plantings;<br><br>The plant and equipment that will be required for the works will vary throughout the ongoing stages of the work activities. Typical equipment and plant will generally include (but not be limited to) the following:<br><br>• Traffic control vehicles;<br>• Excavator and/or earthmoving equipment including bobcats, rollers etc;<br>• Various trucks and trade vehicles;<br>• Pavement Grinding machine;<br>• Concrete mixers;<br>• Jackhammers;<br>• Quick cut saw / Road saw / Block cutter;<br>• Various powered and unpowered hand tools;<br>• Hand held spray painting guns for linemarking / application of surface treatments etc;<br>• Pedestrian and traffic barriers.<br><br>During the course of the works various forms of environmental control equipment such as silt fences / socks, rubbish skips and temporary traffic control equipment such as temporary fencing, safety cones, traffic signs, pedestrian crossings and bollards etc will be required. |

| | |
|---|---|
| **Outline of operations** | The works that are the subject of this Review of Environmental Factors include streetscape improvement works and the construction of a new cycleway linking the existing shared path / cycleway at Centennial Park to the Kingsford Light Rail Terminus.<br><br>The project includes safer pedestrian crossings, new trees and plants, enhanced streetscapes, improved lighting, traffic calming and a cycleway separated from moving traffic. This will create a safe and convenient transport option for local residents, parents and kids, students and commuters for a range of local activities.<br><br>The design development phase of the project is being funded by the NSW Government as part of the RMS Active Transport Program. |
| **Location(s)** | The Centennial Park to Kingsford Light Rail Terminus cycleway begins at the intersection of Alison Road and Doncaster Avenue and comprises a 2-step bi-directional separated cycleway that runs along the eastern side of Doncaster Avenue, extending to the south to Day Avenue, where it will connect with an existing short section of separated cycleway on the northern side of Day Avenue, between Doncaster Avenue and ANZAC Parade. The cycleway link will continue south along the western side of Houston Road, crossing into the Bayside local government area, where it will circuit Dacey Park along the south-western side of General Bridges Crescent, before crossing Bunnerong Road and connecting into Sturt Street and ending at the Kingsford Light Rail Terminus at ANZAC Parade. |
| **Time frame** | Construction of the cycleway is anticipated to be undertaken in future years, subject to funding allocation from the NSW Government. |

| TABLE 1<br>IDENTIFY THE ISSUES | | |
|---|---|---|
| | **Characteristics of the Activity (during construction & operation)** | **Potential Issues** |
| | **How is the proposal likely to affect the physical aspects of the environment or introduces pollution or safety risk factors?** | |
| 1. | disturbs the topography or above or below ground features including filling, excavation, dredging, tunnelling; eg landforming, site preparation, quarrying, reclamation, creation of islands, waterbodies, etc; involves the disposal of large quantities of spoil | Minor: There will be minimal change to the topography along the route. Minor demolition / excavation of existing footpaths / verges will be required. However, appropriate safeguards / mitigation measures will be implemented to minimise any potential adverse impacts. |
| 2. | affects a natural waterbody, wetland or groundwater aquifer or the natural water drainage pattern; affects the quality or quantity of water in the systems | Nil |
| 3. | uses groundwater or surface water from a natural 1, waterbody, stores water in a darn or artificial waterbody | Nil |
| 4. | changes the flood or tidal regimes or be affected by the flooding or tides | Nil |
| 5. | uses, stores, disposes or transports hazardous substances (flammable, explosive, toxic, radioactive, carcinogenic or mutagenic substances); uses or generates pesticides, herbicides, fertilisers or other chemicals which may build up residues in the environment | Nil |
| 6. | generates or disposes of gaseous, liquid or solid waste (industrial, medical or domestic waste, sewage, sludge or effluent, spoil or overburden); generates greenhouse gas emissions or releases chemicals which affect the ozone layer or are precursors to photochemical smog; generates or disposes of hazardous waste | Nil |

| TABLE 1<br>IDENTIFY THE ISSUES | | |
|---|---|---|
| | **Characteristics of the Activity (during construction & operation)** | **Potential Issues** |
| 7. | emits dust, odours, noise, vibrations, blasts, electromagnetic fields or radiation in the proximity of residential areas or landuses likely to be affected. | Negligible: The works may generate small amounts of dust and noise during the course of works. However, it is considered that through the implementation of appropriate mitigation measures, the impact to |
| 8. | any other matters. | Nil |
| | **How is the proposal likely to affect the biological aspects of the environment?** | |
| 1. | clears or modifies (including by modifying the drainage) native vegetation (including trees, shrubs, grasses, herbs or aquatic species) | Nil |
| 2. | displaces or disturbs fauna (terrestrial or aquatic)1 or creates a barrier to fauna movement; clears remnant vegetation or wildlife corridors | Nil |
| 3. | introduces noxious weeds, vermin, feral species or disease or releases genetically modified organisms | Nil |
| 4. | undertakes activity which affects revegetation or replenishment of native species following a disturbance | Nil |
| 5. | introduces high bushfire risk factors or change the fire regime | Nil |
| 6. | any other issues. | Nil |
| | **How is the proposal likely to affect natural or community resources?** | |
| 1. | uses or results in the use of community services or infrastructure including roads, power, water, drainage, waste management, education ,medial, social services | Negligible: The new cycleway and streetscape improvement works will utilise existing road infrastructure. However, once completed, it will benefit the community, including pedestrians, cyclists and drivers. |

| TABLE 1<br>IDENTIFY THE ISSUES | | |
|---|---|---|
| | **Characteristics of the Activity (during construction & operation)** | **Potential Issues** |
| 2. | uses or results in the use of natural resources including water (ground or surface), fuels, timber, extractive material, minerals, prime agricultural land, etc | Nil |
| 3. | affects future potential of commercial deposits of minerals or extractive material or areas important for fishing, agriculture or forestry | Nil |
| 4. | changes the demographics of an area | Nil |
| 5. | changes in the transport requirements of an area | Positive: The new cycleway will provide a high priority north connection to the existing cycleway in Centennial Park and link to a new east-west connection to South Coogee. |
| 6. | creates a new route alignment for the provision of infrastructure (eg rail, roads, power, etc) | Nil |
| 7. | any other issues. | Nil |
| | **How is the proposal likely to affect the community?** | |
| 1. | generates population movements including influx or departure of the workforce; | Nil |
| 2. | changes the workforce or industry structure of the area/region; affects employment opportunities | Nil |
| 3. | affects areas of high population densities or established development patterns | Nil |

| TABLE 1<br>IDENTIFY THE ISSUES | | |
|---|---|---|
| | **Characteristics of the Activity (during construction & operation)** | **Potential Issues** |
| 4. | affects or affecting access to an area, building or items of aesthetic, anthropological, archaeological, architectural, cultural, historical,<br>scientific, recreational, aesthetic or social significance or other special value for present or future generations | Nil |
| 5. | affects the visual or scenic landscape (including major cuts/fills, towers, projects on escarpments etc) | Positive: Once completed, the new cycleway will have a positive impact on the visual quality of the locality. |
| 6. | affects sunlight or views of another | Nil |
| 7. | affects the amenity of publicly owned land (particularly recreational areas, national parks or reserves) | Positive: The new cycleway will improve the aesthetic quality of the locality and provide high quality cycleway separated from vehicular traffic for use by the local and wider community. |
| 8. | changes land use from the surrounding uses as a direct or indirect result of the activity; forms a barrier to movement within the community or access to existing properties; leads to a loss of housing | Nil |
| 9. | generates significant volume of traffic (road, rail, air, pedestrian etc) | Positive: The new cycleway is likely to encourage a higher volumes of cyclists through the provision of a dedicated bi-directional cycleway in a safer environment than the existing on-road shared environment. This may result in a minor change in local vehicular traffic if people are encouraged to cycle instead of driving. |

| TABLE 1<br>IDENTIFY THE ISSUES | | |
|---|---|---|
| | **Characteristics of the Activity (during construction & operation)** | **Potential Issues** |
| 10. | generates nuisance or health or safety risks including air pollution, odour, noise or vibration, blasting, electromagnetic fields or radiation or releases disease or genetically modified organisms or change the bush fire regime | Minor: There will be some short term environmental impacts during the construction of the cycleway and streetscape improvement works. However, these impacts can be appropriately managed / minimised through the implementation of safeguards / mitigation measures. |
| 11. | any other issues? | Nil |
| | **How is the proposal likely to affect areas sensitive because of physical factors?** | |
| 1. | Coastline and dune fields, alpine areas, deserts, caves or other unique landforms | Nil |
| 2. | Land with high agricultural capability | Nil |
| 3. | natural waterbodies, riparian zones, wetlands, drinking water catchments or flood prone areas | Nil |
| 4. | groundwater recharge areas or areas where high water table | Nil |
| 5. | erosion prone areas, areas with slopes of greater than 18 degrees, | Nil |
| 6. | subsidence or slip areas | Nil |
| 7. | areas where acid sulphate, sodic or highly permeable soils | Nil |
| 8. | areas where salinity or potential salinity problems | Nil |
| 9. | area with degraded air quality | Nil |
| 10. | area with degraded or contaminated soil area with degraded or contaminated water (ground or surface) | Nil |

| TABLE 1<br>IDENTIFY THE ISSUES | | |
|---|---|---|
| | **Characteristics of the Activity (during construction & operation)** | **Potential Issues** |
| 11. | any sensitive areas. | Nil |
| | **How is the proposal likely to affect areas sensitive because of biological factors?** | |
| 1. | corals and seagrass beds, wetland communities (coastal, peatlands or inland), native forests, urban bushland, arid and semi and communities, | Nil |
| 2. | critical habitats or the habitats of threatened fauna or flora species, populations or ecological communities (within the meaning of the TSC Act) | Nil |
| 3. | habitat of species listed under international agreements including Japan-Australia Migratory Birds Agreement (Jamba) and China-Australia Migratory Birds Agreement (Camba) | Nil |
| 4. | wildlife corridors and remnant vegetation | Nil |
| 5. | habitat of protected aquatic species (within the meaning of Fisheries Management(General) Regulation 1994) or of aquatic species having conservation status under Conference on Australian Threatened Fishes | Nil |
| 6. | fishing grounds and commercial fish breeding or nursery areas | Nil |
| 7. | bushfire prone areas | Nil |
| 8. | any other sensitive areas | Nil |
| | **How is the proposal likely to affect areas allocated for conservation purposes?** | |

| TABLE 1<br>IDENTIFY THE ISSUES | | |
|---|---|---|
| | **Characteristics of the Activity (during construction & operation)** | **Potential Issues** |
| 1. | National Parks and other areas reserved or dedicated under the National Parks and Wildlife (NPW) Act 1974 | Nil |
| 2. | land reserved or dedicated within the meaning of the Crown Lands Act 1989 for preservation or other environmental protection purposes | Nil |
| 3. | world heritage areas | Nil |
| 4. | environmental protection zones in environmental planning instrument or lands protected under SEPP 14 - Coastal Wetlands or SEPP 26- Littoral Rainforests | Nil |
| 5. | land identified as wilderness under the Wilderness Act 1987 or declared as wilderness under the NP&W Act 1974 | Nil |
| 6. | aquatic reserves reserved or dedicated under the Fisheries Management Act 1994 | Nil |
| 7. | wetlands areas dedicated under the Ramsar Wetlands Convention | Nil |
| 8. | heritage items identified on the Register of the National Estate, under the NSW Heritage Act or an environmental planning instrument | Nil |
| 9. | community land under the Local Government Act (for which a plan of management has been prepared) | Nil |
| 10. | land subject to a "conservation agreement" under the NP&W Act 1974 | Nil |
| 11. | any other factors. | Nil |

| TABLE 1<br>IDENTIFY THE ISSUES | | |
|---|---|---|
| | **Characteristics of the Activity (during construction & operation)** | **Potential Issues** |
| | **How is the proposal likely to affect areas sensitive because of community factors?** | |
| 1. | Aboriginal communities or areas subject to land rights claims | Nil |
| 2. | communities with strong sense of identity | Nil |
| 3. | disadvantaged communities (reduced economic, social or cultural indicators) | Nil |
| 4. | areas with degraded amenity from noise, traffic congestion or odour | Nil |
| 5. | areas or items of high anthropological, archaeological, architectural, cultural, heritage, historical, recreational or scientific value | Nil |
| 6. | areas or items of high aesthetic or scenic value | Nil |
| 7. | any other factors. | Nil |

# STEP 2:

# Analyse the Impacts

1. Analyse the extent of the impacts
2. Analyse the nature of the impact!

## 1. How to analyse the extent of the impacts

The following criteria are used to determine the extent of the impacts on the environment:

| | |
|---|---|
| **1. Determine the type of impact** | **4. Determine the intensity of the impacts**<br><br>power, vigour, force, strength<br>concentration<br>rate<br>ratio, proportion<br>degree<br>other |
| **2. Determine the size of the impacts**<br><br>amount<br>quantity<br>volume<br>mass<br>other | |
| **3. Determine the scope of the impact's effects**<br><br>area<br>number<br>range or limits<br>other | **5. Determine the duration of the impacts**<br><br>time length<br>period<br>interval<br>term<br>continuation<br>other<br><br>Considering the extent of the impacts, the potential significance for each impact and for impacts (considered as a whole) for each section should be ranked as -<br><br>high<br>medium, or<br>low. |

| TABLE 2(a)<br>ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS | | | | |
|---|---|---|---|---|
| **Characteristics of potential impacts (adverse & beneficial)** | **Type of Potential Impacts** | **Evaluation criteria** | | **Ranking of potential Significance of extent** |
| | | **size, scope & intensity** | **Duration** | |
| **Physical or pollution impacts (during operation and construction**)<br>***(a) Air impacts*** | | | | |
| 1. air quality impacts (eg dust, smoke, grit, odours, and precursors to photochemical smog, fumes, toxic or radioactive gaseous emissions) with economic, health. ecosystem or amenity considerations | There will be air quality impacts expected during the works period will be created through air borne dust, as well as fumes and odours from machinery and tools etc. | Minor | Short term | Low |
| 2. air impacts with greenhouse or ozone damage consideration | Potential for the generation of greenhouse gases from plant & equipment during the construction phases | Minor | Short term | Low |
| 3. any other air impacts. | Nil | | | N/A |
| ***(b) Water impacts***<br>1. impacts from the use of surface or groundwater | Nil | | | N/A |
| 2. impacts from changes to natural waterbodies, wetlands or runoff patterns | Nil | | | N/A |
| 3. impacts from changes to flooding or tidal regimes | Nil | | | N/A |
| 4. impacts from change in water quality with economic, health, ecosystem or amenity considerations eg salinity, colour, odour: turbidity, temperature, dissolved oxygen, nutrients, pH factors or pollutants (intentional or unintentional releases of oil, fuels, toxins (including heavy metals and anti-foulants), spoil, sediment, | Nil | | | N/A |
| 5. any other impacts on or from the use or storage of water. | Nil | | | N/A |

| TABLE 2(a)<br>ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS | | | | |
|---|---|---|---|---|
| **Characteristics of potential impacts (adverse & beneficial)** | **Type of Potential Impacts** | **Evaluation criteria** | | **Ranking of potential Significance of extent** |
| | | **size, scope & intensity** | **Duration** | |
| ***(c) Soil and stability impacts*** | | | | |
| ***1.*** degradation of soil quality including contamination (intentional or unintentional), salinisation, acidification | Nil | | | N/A |
| 2. loss of soil from wind or water erosion | There is the potential for some minor soil erosion or sedimentation during works, but these will be minimise through the implementation of soil and sediment control measures | Minor | Temporary | Low |
| 3. loss of structural integrity of the soil | Some minor loss of soil integrity may occur during the works | Negligible | Temporary | Low |
| 4. results in land instability with high risks from land slides or subsidence | Nil | | | N/A |
| 5. any other impacts on soils. | Nil | | | N/A |
| ***(d) Noise and vibration impacts*** | | | | |
| 1. results in increased noise or vibrations to unacceptable levels for the surrounding communities | There will be some noise impacts associated with the works. However, general construction noise associated with the works is unlikely to cause a significant disturbance. All works will occur during the day and although relatively low in this location, the background noise levels may assist in ameliorating any significant noise. The nearest residential receivers are unlikely to be adversely impacted by noise generated by the works due to the substantial separation distance. | Minor | Short term | Low |
| 2. affects sensitive properties (educational, hospitals, residential, heritage) | Although there are a number of local heritage items and Heritage Conservation Areas along the route, as assessed by the project heritage consultant, the works are considered acceptable from a heritage perspective, subject to further archaeological assessment, landscape advice on what new trees species will have the least impact on heritage fabric and the retention (or salvage and storage) of sandstone kerbs. | Minor | Ongoing | Low |

| TABLE 2(a)<br>ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS | | | | |
|---|---|---|---|---|
| **Characteristics of potential impacts (adverse & beneficial)** | **Type of Potential Impacts** | **Evaluation criteria** | | **Ranking of potential Significance of extent** |
| | | **size, scope & intensity** | **Duration** | |
| 3. any other impacts from noise, blasting or vibration. | Nil | | | N/A |
| *4. Any other physical or pollution impacts* | Nil | | | N/A |
| **Accumulation of physical or pollution impacts** | Nil | | | N/A |
| **Biological impacts (during operation and construction)**<br>**(a) *Fauna impacts***<br>1. any endangering or displacement of species of fauna (including animals, birds, frogs, reptiles, insects, fish or crustaceans)[2]<br>2. any reduction of critical habitat of any unique, threatened or endangered fauna (within the meaning of the National Parks and Wildlife Act 1974)<br>3. which create significant barriers to fauna movement<br>4. any other impacts. | Nil | | | N/A |
| **(b) *Flora impacts***<br>1. any endangering of species of flora (including trees, shrubs, grasses, herbs or aquatic plants)<br>2. impacts from the clearing or modifying of extensive areas of relatively undisturbed native vegetation or wetlands;<br>3. any other impacts. | Nil | | | N/A |

| TABLE 2(a)<br>ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS | | | | |
|---|---|---|---|---|
| **Characteristics of potential impacts (adverse & beneficial)** | **Type of Potential Impacts** | **Evaluation criteria** | | **Ranking of potential Significance of extent** |
| | | **size, scope & intensity** | **Duration** | |
| **(c) *Ecological impacts***<br>1. any threat to the biological diversity or ecological integrity of species or communities<br>2. any barrier to the normal replenishment or revegetation of existing species following disturbance<br>3. impacts from the introduction of noxious weeds, vermin, feral species or disease or releases genetically modified organisms<br>4. impacts from the uses of pesticides, herbicides, fertilisers or other chemicals which may build up residues in the environment<br>5. high bushfire risk impacts<br>6. any other impacts. | Nil | | | N/A |
| **Accumulation of Biological Impacts** | Nil | | | N/A |
| **Resource use impacts (during operation and construction)**<br>***(a) Community resources***<br>1. any significant increase in the demand for services and infrastructure resources including roads, power, water supply and drainage, waste (including sewage) management, education, medical and social services<br>2. any significant resource recycling or reuse schemes to reduce resource usage<br>3. any diversion of resources to the detriment of other communities or natural systems<br>4. any degradation of infrastructure such as roads, bridges<br>5. any other impacts. | Nil | | | N/A |

| TABLE 2(a)<br>ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS | | | | |
|---|---|---|---|---|
| **Characteristics of potential impacts (adverse & beneficial)** | **Type of Potential Impacts** | **Evaluation criteria** | | **Ranking of potential Significance of extent** |
| | | **size, scope & intensity** | **Duration** | |
| ***(b) Natural resources***<br>1. any disruption or destruction of natural resources (eg fish habitat or fish species) with impacts on industries based on these resources<br>2. any disruption of existing activities (or reduction of options for future options) because of the natural resource demands of the proposal.<br>3. any use which results in the wasteful use of large amounts of natural resources<br>4. any use which results in the substantial depletion of natural resources<br>5. any use which results in the degradation of any area reserved for conservation purposes<br>6. any other impacts. | Nil | | | N/A |
| **Accumulation of Resource Impacts** | Nil | | | N/A |

| TABLE 2(a)<br>ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS | | | | |
|---|---|---|---|---|
| **Characteristics of potential impacts (adverse & beneficial)** | **Type of Potential Impacts** | **Evaluation criteria** | | **Ranking of potential Significance of extent** |
| | | **size, scope & intensity** | **Duration** | |
| **Community impacts (during operation and construction)**<br><br>***(a) Social factors***<br><br>1. any impacts which result in a change in the demographic structure of the community<br>2. any environmental impact that may cause substantial change or disruption to the community (loss of neighbour cohesion, access to facilities, links to other communities, community identity or cultural character)<br>3. any impacts which result in some individuals or communities being significantly disadvantaged<br>4. any impacts on the health, safety, security, privacy or welfare of individuals or communities because of factors such as<br>a) air pollution or odour,<br>b) noise, vibration, blasting, electromagnetic fields or radiation<br>c) release of disease or genetically modified organisms<br>d) lighting, overshadowing or visual impacts<br>5. any impacts that result in a change in the level of demand for community resources (eg facilities, services and labour force) | Potential for minor environmental impacts during the works. However, these will be minimised through the implementation of appropriate safeguards / mitigation measures. | Minor | Short term | Low |
| ***(b) Economic factors (including impacts on employment, industry and property value)***<br><br>1. any impacts which result in a decrease to net economic welfare<br>2. any impacts that result in a decrease in the economic stability of the community<br>3. any impacts which result in a change to the public sector revenue or expenditure base<br>4. any other economic impacts. | Nil | | | N/A |

| TABLE 2(a)<br>ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS | | | | |
|---|---|---|---|---|
| **Characteristics of potential impacts (adverse & beneficial)** | **Type of Potential Impacts** | **Evaluation criteria** | | **Ranking of potential Significance of extent** |
| | | **size, scope & intensity** | **Duration** | |
| ***(c) Heritage, aesthetic, cultural impacts***<br>1. any impacts on a locality, place, building or natural landmark having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, recreational, scenic, aesthetic or social significance or other special value for present or future generations<br>2. any impacts from new lighting, glare or shadows<br>3. any other heritage, aesthetic or cultural impacts. | As described previously, there are a number of local heritage items and Heritage Conservation Areas along the route. However, as assessed by the project heritage consultant, the works are considered acceptable from a heritage perspective, subject to further archaeological assessment, landscape advice on what new trees species will have the least impact on heritage fabric and the retention (or salvage and storage) of sandstone kerbs. | Minor | Ongoing | Low |
| ***(d) Land use impacts***<br>1. any major changes in land use<br>2. any curtailment of other beneficial uses<br>3. any property value impacts with land use implications<br>4. any other land use impacts | Nil | | | N/A |
| ***(e) Transportation impacts (during construction and operation)***<br>1. substantial impacts on existing transportation systems (rail, water, road, air or pedestrian both public and private), altering present patterns of circulation, modal split or movement of people 8/or goods<br>2. encourages directly or indirectly additional traffic<br>a) during construction<br>b) during operation<br>3. increases demand for parking (off and on street including in residential areas)<br>4. any other impacts on transport or traffic. | Once complete, the works may encourage higher cycling use, which in turn may alter the modal split with less dependence on car usage.<br>During works there is likely to be a small increase in traffic to the locality, as well as temporary disruptions to traffic flows.<br>Potential minor increase in traffic during works phase.<br>Nil | Minor – small number of additional vehicle movements associated with works.<br>However, these impacts can be appropriately managed / minimised through the implementation of safeguards / mitigation measures. | Short term | Low |
| **Accumulation of Community Impacts** | Minor | | | Low |

| TABLE 2(a)<br>ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS | | | | |
|---|---|---|---|---|
| **Characteristics of potential impacts (adverse & beneficial)** | **Type of Potential Impacts** | **Evaluation criteria** | | **Ranking of potential Significance of extent** |
| | | **size, scope & intensity** | **Duration** | |
| **Sensitive because of physical factors** | | | | |
| 1. coastline and dune fields, alpine areas, deserts, caves or other unique landforms | Nil | | | N/A |
| 2. land with high agricultural capability | Nil | | | N/A |
| 3. natural waterbodies, riparian zones, wetlands, drinking water catchments or flood prone areas. | Nil | | | N/A |
| 4. groundwater recharge areas or areas where high water table | Nil | | | N/A |
| 5. erosion prone areas, areas with slopes of greater than 18 degrees | Nil | | | N/A |
| 6. subsidence or slip areas | Nil | | | N/A |
| 7. areas where acid sulphate, sodic or highly permeable soils or | Nil | | | N/A |
| 8. areas where salinity or potential salinity problems area with degraded air quality | Nil | | | N/A |
| 9. area with degraded or contaminated soil area with degraded or contaminated water (ground or surface). | Nil | | | N/A |
| **Accumulation of Community Impacts** | Nil | | | N/A |

| TABLE 2(a)<br>ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS | | | | |
|---|---|---|---|---|
| **Characteristics of potential impacts (adverse & beneficial)** | **Type of Potential Impacts** | **Evaluation criteria** | | **Ranking of potential Significance of extent** |
| | | **size, scope & intensity** | **Duration** | |
| **Sensitive because of biological factors** | | | | |
| 1. corals and seagrass beds, wetlands communities (coastal, peatlands or inland), native forests, urban bushland, arid and semi arid communities, | Nil | | | N/A |
| 2. habitat of endangered terrestrial or aquatic fauna species and of species listed under Japan-Australia Migratory Birds Agreement (JAMBA) and China-Australia Migratory Birds Agreement (CAMBA) | Nil | | | N/A |
| 3. wildlife corridors and remnant vegetation | Nil | | | N/A |
| 4. protected, rare or threatened plant species or inadequately reserved plant communities | Nil | | | N/A |
| 5. areas which are bushfire prone | Nil | | | N/A |
| 6. fishing grounds and fish breeding or nursery areas. | Nil | | | N/A |
| **Accumulation of Community Impacts** | Nil | | | N/A |

| TABLE 2(a)<br>ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS | | | | |
|---|---|---|---|---|
| **Characteristics of potential impacts (adverse & beneficial)** | **Type of Potential Impacts** | **Evaluation criteria** | | **Ranking of potential Significance of extent** |
| | | **size, scope & intensity** | **Duration** | |
| **Sensitive because of conservation factors** | | | | |
| 1. national parks and other areas reserved or dedicated under the National Parks and Wildlife (NPW) Act 1974 | Nil | | | N/A |
| 2. land reserved or dedicated within the meaning of the Crown Lands Act 1989 for preservation or other environmental protection purposes | Nil | | | N/A |
| 3. world heritage areas | Nil | | | N/A |
| 4. environmental protection zones in environmental planning instrument or lands protected under SEPP 14 - Coastal Wetlands or SEPP 26- Littoral Rainforests | Nil | | | N/A |
| 5. land identified as wilderness under the Wilderness Act 1987 or declared as wilderness under the NPW Act | Nil | | | N/A |
| 6. aquatic reserves reserved or dedicated under the Fisheries Management Act 1994 | Nil | | | N/A |
| 7. wetlands areas dedicated under the Ramsar Wetlands Convention | Nil | | | N/A |
| 8. heritage items identified on the Register of the National Estate, under the NSW Heritage Act or an environmental planning instrument | Nil | | | N/A |
| 9. community land under the Local Government Act (for which a plan of management has been prepared) | Nil<br>Nil | | | N/A |
| 10. land subject to a "conservation agreement" under the NPW Act | Nil | | | N/A |
| 11. any other factors | | | | N/A |
| **Accumulation of Community Impacts** | Nil | | | N/A |

| TABLE 2(a)<br>ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS | | | | |
|---|---|---|---|---|
| **Characteristics of potential impacts (adverse & beneficial)** | **Type of Potential Impacts** | **Evaluation criteria** | | **Ranking of potential Significance of extent** |
| | | **size, scope & intensity** | **Duration** | |
| **Sensitive because of community factors**<br>1. Aboriginal communities or areas subject to land rights claims.<br>2. communities with strong sense of identity<br>3. disadvantaged communities (reduced economic, social or cultural indicators)<br>4. areas with degraded amenity from noise, traffic congestion or odour<br>5. areas or items of high anthropological, archaeological, architectural, cultural, heritage, historical, recreational or scientific value<br>6. areas or items of high aesthetic or scenic value | Nil | | | N/A |
| **Accumulation of Community Impacts** | Nil | | | N/A |

# 2. How to Analyse the Nature of Impacts

The following criteria are used to determine the nature of the impacts on the environment:

**What is the level of confidence in predicting impacts?**

1. Is there an adequate of knowledge and understanding of the:
   a. environment likely to be affected?
   b. proposed technology or design?
   c. potential interaction?
   d. proposed mitigation and management?
   e. community's concerns and values?
2. Are there established and reliable predictive modelling techniques?
3. Is there past experience which demonstrates the acceptability of the type of activity or the ability for the environment to cope with similar impacts?

**How resilient is the environment?**

1. What is the ability of the environment to resist change?
2. What is the ability of the environment to assimilate change without undergoing irreversible changes?
3. Is the environment close to its assimilation capacity for the type of impacts identified'?
4. Can other land uses at and around the site be sustained?
5. What is the ability of the environment to return to its original state once external influences arc removed?

**How reversible are the impacts?**

1. Will the site be able to be used beyond the life of the proposed activity for the same or other purposes (eg the area can be reused, rehabilitated or restored)?
2. Can restoration works be undertaken to assist in reversing impacts?
3. What is the likely recovery rate?
4. To what extent will there be any flow-on impacts resulting from any restoration works?

**Can the impacts *be* mitigated or managed?**

1. How extensive are the risks without proposed mitigation measures?
2. How effective are the mitigation measures to reduce the risks?
3. Is there adequate precedent that the proposed mitigation measures will be effective?
4. How acceptable are the residual risks?
5. Considering the track record of the proponent, is there likely to be adequate commitment that the proposed mitigation measures will be implemented and maintained?

**Will the activity comply with standards, plans or policies?**

1. Is the proposed activity consistent with strategic planning objectives for the local area, region or State considering:
   a) existing toning and development control plans?
   b) existing resource allocation strategies?
   c) long term policy framework for the area or the region eg resource sector policy (eg forests, minerals, agricultural land) or environmental protection policy (eg for rivers or estuaries)?
2. Can the activity meet performance standards including:
   a) codes of practice or guidelines'?
   b) environmental promotion requirements?
   c) design and technology standards?
3. Is the proposed activity consistent with precedents
4. established in the Land and Environment Court?

**What is the level of public interest in the activity or its impacts?**

1. Does the community perceive that the carrying capacity of the environment will be exceeded?
2. Does the community consider that there is a threat to human health or safety?
3. Does the community perceive that the amenity, lifestyle or value of private property will be adversely affected?
4. Does the community consider that new inequities will be generated in the community?
5. Does the community object to materials or technologies that are a component of in the activity?
6. Is there a high level of uncertainty about the effects of the activity on the community?

**Are further studies required on impacts or mitigation strategies?**

Considering the nature of the impacts, the potential significance for each impact and the impacts for each section (considered as a whole) should be ranked as –

high
medium, or
low.

**TABLE 2(c)**
**ANALYSIS OF THE NATURE OF THE POTENTIAL IMPACTS**

| Characteristics of the potential impacts | Evaluation Criteria | | | | | | | Ranking potential Significance |
|---|---|---|---|---|---|---|---|---|
| | What is the confidence in Predicting impacts? | How resilient is the environment to cope with impacts? | Can the impacts be reversed? | How well can the impacts be mitigated? | Do the impacts comply with standards plans policy? | What is the level of Public concern? | Are further studies required on impacts on mitigation? | |
| **Physical impacts or pollution *impacts***<br>***(a) Air impacts***<br>1. air quality impacts (eg dust, smoke, grit, odours, precursors to photochemical smog, fumes, toxic or radioactive gaseous emissions) with economic, health, ecosystem or amenity considerations<br>2. air impacts with greenhouse or ozone damage consideration<br>3. any other air impacts. | Moderate | High | Yes | High level of mitigation can be achieved through implementation of appropriate safeguards and mitigation measures | Yes | Negligible | No | Low |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***(b) Water impacts***<br>1. impacts from changes in surface or groundwater quantity<br>2. impacts from changes to natural waterbodies, wetlands or runoff patterns<br>3. impacts from changes to flooding or tidal regimes<br>4. impacts from changes in water quality with economic, health, ecosystem or amenity considerations eg salinity, colour, odour, turbidity, temperature, dissolved oxygen, nutrients, pH or pollutants (intentional or unintentional releases) oil, fuels, spoil, sediment, sewage, toxins (including heavy metals, and anti-foulants) or other waste)<br>5. any other impacts on water or from the use or storage of water. | Negligible | High | Yes | High level of mitigation can be achieved through implementation of appropriate safeguards and mitigation measures | Yes | Negligible | No | Low |
| ***(c) Soil and stability impacts***<br>1. degradation of soil quality including contamination (intentional or unintentional), salination, acidification,<br>2. loss of soil from wind or water erosion<br>3. loss of structural integrity of the soil<br>4. results in land instability with high risks from land slides or subsidence<br>5. any other soil impacts. | Negligible | High | Yes | High level of mitigation can be achieved through implementation of appropriate safeguards and mitigation measures | Yes | Negligible | No | Low |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***(d) Noise and vibration imparts***<br>1. results in increase noise or vibrations to unacceptable levels for the surrounding communities<br>2. potential to affect sensitive properties (educational, hospitals, residential, heritage) by noise or vibration<br>3. any other impacts from noise, blasting or vibration? | Minor | Yes | High | High level of mitigation can be achieved through implementation of appropriate safeguards and mitigation measures | Yes | Negligible | No | Low |
| **Accumulation of Physical or Pollution Impacts** | Minor | Yes | High | High level of mitigation can be achieved through implementation of appropriate safeguards and mitigation measures | Yes | Negligible | No | Low |
| **Biological impacts**<br>(**a**) **Fauna impacts**<br>1. any endangering or<br>2. displacement of species of fauna (including animals, birds, frogs, reptiles, insects, fish or crustaceans)<br>3. any reduction of critical habitat of any unique, threatened or endangered fauna (within the meaning of the National Parks and Wildlife Act 1974)<br>4. impacts which create significant barriers to fauna movement<br>5. any other impacts | Nil | | | | | | | N/A |
| (**b**) **Flora impacts**<br>1. any endangering of species of flora (including trees, shrubs, grasses, herbs or aquatic plants)<br>2. impacts from the clearing or modifying of extensive areas of relatively undisturbed native vegetation or wetlands<br>3. any other impacts | Minor – despite the loss of 21 existing trees, an additional 89 trees are to be planted (in addition to other landscape embellishment plantings), there will be a nett gain of 68 trees. | Yes | High | | Yes | Negligible | No | N/A |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **(c) Ecological impacts**<br>1. any threat to the biological diversity or ecological integrity of species or communities<br>2. any barrier to the normal replenishment or revegetation of existing species following disturbance<br>3. impacts from the introduction of noxious weeds, vermin, feral species or disease or releases genetically modified organisms<br>4. impacts from the uses of pesticides, herbicides, fertilisers or other chemicals which may build up residues in the environment<br>5. high bushfire risk impacts<br>6. any other impacts. | Nil | | | | | | | N/A |
| **Accumulation of Biological Impacts** | Minor | High | Yes | High level of mitigation can be achieved through implementation of appropriate safeguards and mitigation measures | Yes | Negligible | No | Low |
| **Resource use impacts**<br>(a) **Community resources**<br>1. any significant increase in the demand for services and infrastructure resources including roads, power, water supply and drainage, waste (including sewage) management, education, medical and social services.<br>2. any significant resource recycling or reuse schemes to reduce resource usage?<br>3. any diversion of resources to the detriment of other communities or natural systems?<br>4. any degradation of infrastructure such as roads and bridges?<br>5. any other impacts? | Nil | | | | | | | N/A |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| a) **Natural resources**<br>1. any disruption or destruction of natural resources (eg fish habitat or fish species) with impacts on industries based on these resources<br>2. any disruption of existing activities (or reduction of options for future options) because of the natural resource demands of the proposal<br>3. any use which results in the wasteful use of large amounts of natural resources<br>4. any use which results in the substantial depletion of natural resources<br>5. any use that results in the degradation of any area reserved for conservation purposes<br>6. any other impacts. | Nil | | | | | | | N/A |
| **Accumulation of Resource Use Impacts** | Nil | | | | | | | N/A |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Community Impacts**<br><br>***(a) Social impacts***<br><br>1. any impacts which result in a change in the demographic structure of the community<br><br>2. any environmental impact that may cause substantial change or disruption to the community (loss of neighbour cohesion, access to facilities, links to other communities, community identity or cultural character)<br><br>3. any impacts which result in some individuals or communities being significantly disadvantaged<br><br>4. any impacts on the health, safety, security, privacy or welfare of individuals or communities because of factors such as -<br><br>a) air pollution or odour,<br>b) noise, vibration, blasting, electromagnetic fields or radiation<br>c) release of disease or genetically modified organisms<br>d) lighting, overshadowing or visual impacts<br><br>5. any impacts which result in a change in the level of demand for community resources (eg facilities, services and labour force)<br><br>6. any other social impacts. | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***(b) Economic factors*** *(including impacts on employment, industry and property value)*<br>1. any impacts which result in a decrease to net economic welfare<br>2. any impacts which result in a direct cost to the community or individuals<br>3. any impacts which result in a decrease in the economic stability of the community<br>4. any impacts which result in a change to the public sector revenue or expenditure base<br>*5.* any other impacts. | Nil | | | | | | | N/A |
| **(c)** ***Heritage, aesthetic, cultural impacts***<br>1. any impacts on a locality, place, building or natural landmark having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, recreational, scenic, aesthetic or social significance or other special value for present or future generations;<br>2. any impacts from new lighting, glare or shadows<br>3. any other heritage, aesthetic, cultural impacts. | Minor (refer to Heritage Opportunities and Constraints Assessment prepared by City Plan Heritage | High | Yes | High level of mitigation can be achieved through implementation of appropriate safeguards and mitigation measures | Yes | Negligible | Yes | Low |
| **(d)** ***Land use impacts***<br>1. any major changes in land use.<br>2. any curtailment of other beneficial uses<br>3. any property value impacts with land use implications<br>4. any other land use impacts. | Nil | | | | | | | N/A |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***(e) Transportation impacts*** (during construction and operation)<br>1. substantial impacts on existing transportation systems (rail, water, road, air or pedestrian both public and private), altering present patterns of circulation, modal split or movement of people &/or goods<br>2. encourages directly or indirectly additional traffic -<br>a) during construction<br>b) during operation<br>3. increases demand for parking (off and on street including in residential areas)<br>4. any other impacts on transport or traffic | Minor | High | Yes | High level of mitigation can be achieved through the implementation of appropriate safeguards or mitigation measures. | Yes | Low | No | Low |
| **Accumulation of Community Impacts** | Minor | High | Yes | High level of mitigation can be achieved through the implementation of appropriate safeguards or mitigation measures. | Yes | Low | N o | Low |

# STEP 3:
# Evaluate the Significance of the Impacts

**Criteria for evaluating the likely environmental significance of the impacts**

1. **How extensive are the impacts?**

2. **How adverse are the impacts on environmentally sensitive areas?**

3. **How acceptable are the impacts considering the nature of the impacts?**

| TABLE 3<br>EVALUATE THE LIKELY SIGNIFICANCE OF<br>POTENTIAL IMPACTS ON THE ENVIRONMENT | | | |
|---|---|---|---|
| **Impacts** | **Potential Significance Considering the extent of impacts** | **Potential significance considering the level of adverse impacts on environmentally sensitive areas** | **Potential significance considering the Nature of the impacts** |
| **Physical and pollution**<br><br>a) air impacts<br>b) water impacts<br>c) soil impacts<br>d) noise and vibration impacts | Minor | Negligible | Minor |
| **Biological**<br><br>a) fauna<br>b) flora<br>c) ecological | Negligible | Negligible | Negligible |
| **Resource use**<br><br>a) community resources<br>b) natural resources | Negligible | Negligible | Negligible |
| **Community**<br><br>a) social impacts<br>b) economic impacts<br>c) heritage, aesthetic, cultural impacts<br>d) land use impacts<br>e) transportation impacts | Minor | Negligible | Negligible |
| **Activity as a Whole** | Minor | Negligible | Minor |

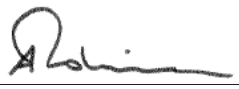
| | |
|---|---|
| This activity is **not likely** to significantly affect the environment. No EIS is required. | **X** |
| This activity is **likely** to significantly affect the environment. An EIS is required. | |

# DECISION

## Person who prepares the EIA

I certify to the best of my knowledge that:

- I am suitably qualified and competent to complete this REF:
- I have completed this REF and
- The assessment meets the requirements of sections 5A, 111 and 112 of the EP&A Act, clause 228 of the EP&A Regulation and other relevant legislation and guidelines discussed in the REF, and
- The information contained in the REF is not materially misleading, and
- My assessment has been adequately completed, and
- My conclusion as to the likely environmental impact of the project is reasonable and
- I am satisfied that subject to the inclusion of the mitigation measures included above, the project will not have a significant impact on the environment during both the construction and operation phases.

| | | | |
|---|---|---|---|
| **Signature** |  | **Date:** | 14 September 2018 |
| **Name** | Andrew Robinson – Consultant Planner<br>Andrew Robinson Planning Services Pty Ltd | | |

## Sign Off

## Determining Officer – Council Officer Who Verifies the EIA

I certify to the best of my knowledge that:

- I am suitably qualified and competent to verify the completion of this REF.
- The person who completed this REF is suitably qualified and competent and

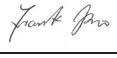
**EITHER**

☒ Based on the completed REF and my knowledge of the project, the assessment has been adequately completed, the project has minor and predictable impacts, the conclusion as to the likely environmental impact of the project is reasonable and **the project can proceed** subject to the relevant control measures and conditions in any approvals, licences or permits.

**OR**

☐ The project requires additional environmental assessment because:

**NOTE:** A site visit may be required depending on level of confidence and risk to the environment.

| | | | |
|---|---|---|---|
| **Signature** |  | **Date:** | 29 Oct 2020 |
| **Name** | Frank Ko | | |

# Appendix B

Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park - Exhibition Sheets – Randwick City Council / Group GSA

# Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park

Doncaster Ave, Day Ave, Houston Rd, General Bridges Cres, Sturt St

## PROJECT BACKGROUND

**Randwick City Council is committed to providing safe and healthy transport options to improve our streets and make them easier and more pleasant to walk and cycle along.**

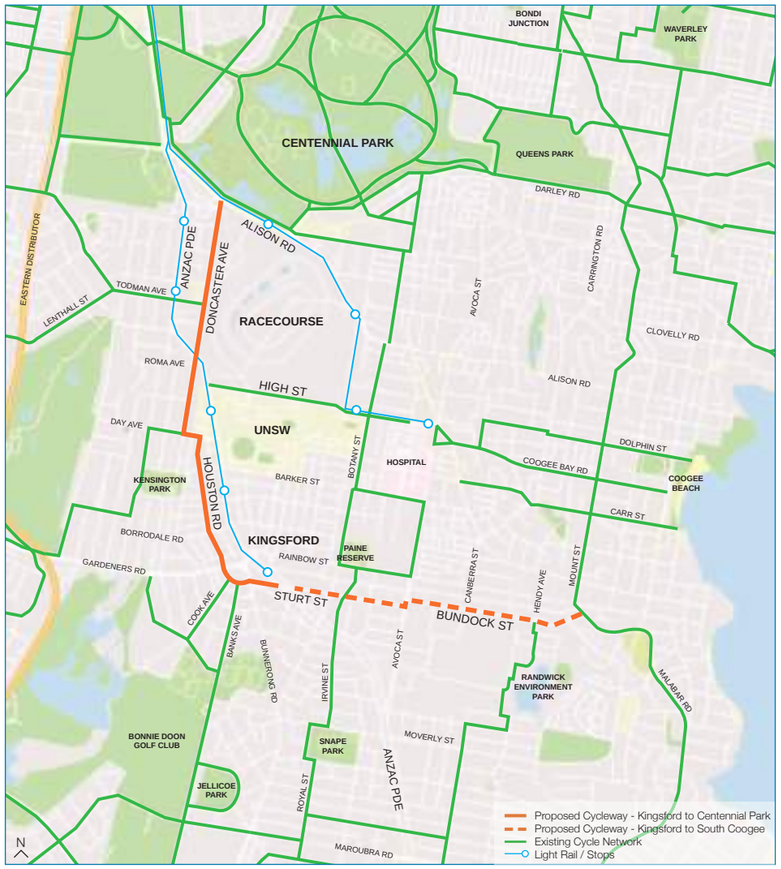
**In 2015, after extensive consultation, Council adopted a Cycle Strategy which outlines our commitment to prioritising walking and cycling upgrades.**

**The Kingsford to Centennial Park project is identified as a high priority. It provides a north connection to an existing cycleway in Centennial Park and onto the Sydney CBD, and a south connection to the new Kingsford light rail terminus.**

The project includes safer pedestrian crossings, new trees and plants, enhanced streetscapes, improved lighting, traffic calming and a cycleway separated from moving traffic. This will create a safe and convenient transport option for local residents, parents and kids, students and commuters for a range of local activities.

The design development of the project is funded by the NSW Government as part of the Active Transport Program.

Construction of the project is anticipated to take place in future years subject to funding from the NSW Government.




Existing Cycle Network Map

## PROPOSED IMPROVEMENTS

**Randwick City Council invites your feedback on plans to improve the link from Kingsford to Centennial Park and Sydney CBD. These works will enhance safety and improve connections for people walking and riding bikes between popular destinations, as well as creating stronger connections within the wider community.**

Works will include installing new pedestrian crossings, a new separated cycleway, streetscape enhancements and upgrades, including new tree planting, improved street and pedestrian lighting and traffic safety measures.

### Pedestrian Connection

+ New pedestrian crossings
+ Safer intersections and calmer traffic through implementation of clear markings and separation
+ Pavement and pram ramp upgrades for improved pedestrian access



### Cycleway Network

+ A 2.6 km new bi-directional separated cycleway along Doncaster Ave, Day Ave, Houston Rd, General Bridges Cres and Sturt St to provide a safer option for people who ride bikes
+ Connection to local and regional bike routes



### Streetscape Upgrade

+ An overall increase of approx. 50 trees along the route
+ New garden beds
+ Enhancement of existing verges and streetscape
+ New shared zone markings to improve awareness and safety where pedestrians / cyclists or vehicles cross paths
+ Improved safety with new intersection treatments and by introducing traffic calming measures



### HAVE YOUR SAY

For further information and to contact Randwick City Council please visit, www.yoursayrandwick.com.au
A full concept drawing package of the entire cycle route can be viewed online to accompany this information.

Consultation closes Friday 22nd June 2018

## ARTIST IMPRESSIONS

General Bridges Crescent, Daceyville

Doncaster Avenue at Todman Ave Intersection, Kensington

Doncaster Avenue at Carlton Street Intersection, Kensington

This project is endorsed and funded by NSW Roads and Maritime Services

Sheet: 1.0

June 2018

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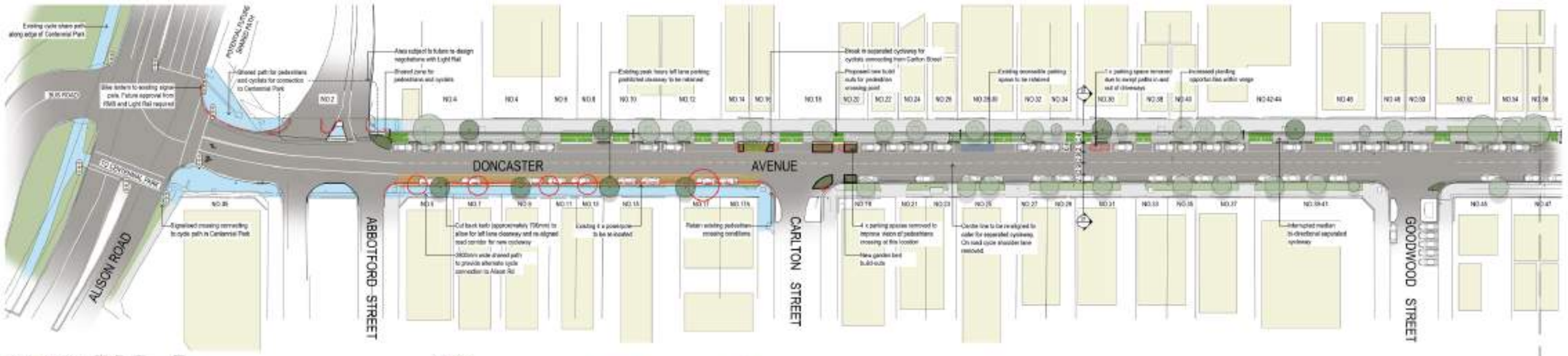
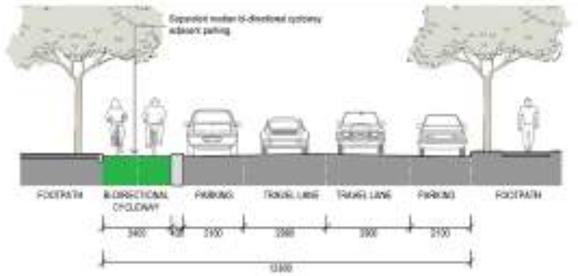
# Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park

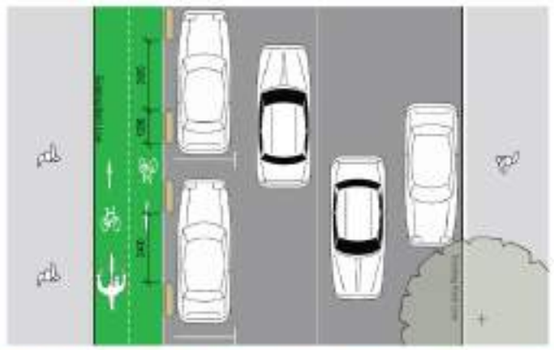
Doncaster Ave, Day Ave, Houston Rd, General Bridges Cres, Sturt St




LEGEND

- EXISTING ITEM TO BE REMOVED
- NEW CYCLEWAY WITH PHYSICAL SEPARATION
- NEW CYCLEWAY ACROSS DRIVEWAY
- CYCLEWAY AT FOOTPATH LEVEL
- DISABLED ACCESS
- EXISTING DISABLED PARKING TO BE RETAINED
- SHARED PATH
- SHARED INTERSECTION TREATMENT
- LOADING ZONE
- CLEARWAY
- PEDESTRIAN CROSSING
- EXISTING TREE RETAINED
- PROPOSED TREE
- REMOVED TREE
- NEW GARDEN BED
- TRAFFIC SIGNALS
- EXISTING PARKING RETAINED
- EXISTING PARKING REMOVED
- NEW PARKING SPACE
- EXISTING STREET LIGHT
- PROPOSED STREET LIGHT
- ITEMS TO FURTHER INVESTIGATION



TYPICAL INTERRUPTED MEDIAN SEPARATED CYCLEWAY


DONCASTER AVE AT CARLTON ST INTERSECTION, KENSINGTON

TREES

| | REMOVED | NEW |
|---|---|---|
| Sheet 1.1 | - 5 | + 8 |

PARKING

| | REMOVED | NEW |
|---|---|---|
| Abbotford St to Carlton St | - 2 | 0 |
| Carlton St to Goodwood St | - 5 | 0 |

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Sheet: 1.1

June 2018

Randwick City Council
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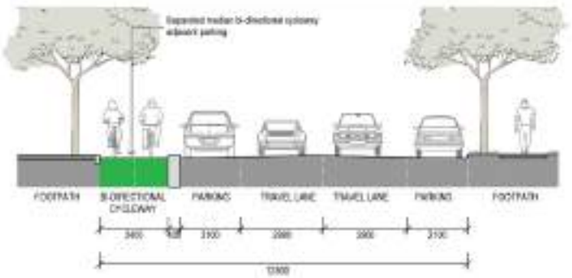
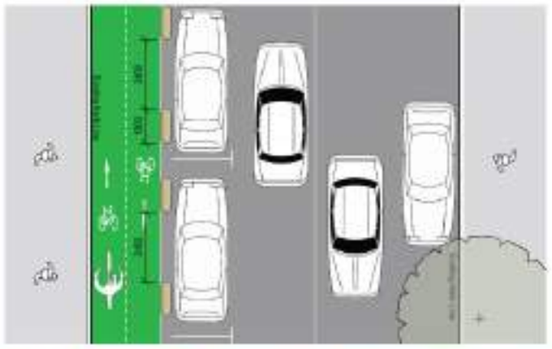
# Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park

Doncaster Ave, Day Ave, Houston Rd, General Bridges Cres, Sturt St


LEGEND

EXISTING ITEM TO BE REMOVED
NEW CYCLEWAY WITH PHYSICAL SEPARATION
NEW CYCLEWAY ACROSS DRIVEWAY
CYCLEWAY AT FOOTPATH LEVEL, DISABLED ACCESS
EXISTING DISABLED PARKING TO BE RETAINED
SHARED PATH
SHARED INTERSECTION TREATMENT
LOADING ZONE
CLEARWAY
PEDESTRIAN CROSSING
EXISTING TREE RETAINED
PROPOSED TREE
REMOVED TREE
NEW GARDEN BED
TRAFFIC SIGNALS
EXISTING PARKING RETAINED
EXISTING PARKING REMOVED
NEW PARKING SPACE
EXISTING STREET LIGHT
PROPOSED STREET LIGHT
ITEMS TO FURTHER INVESTIGATION



TYPICAL INTERRUPTED MEDIAN SEPARATED CYCLEWAY


DONCASTER AVE AT CARLTON ST INTERSECTION, KENSINGTON

**TREES**

| | REMOVED | NEW |
|---|---|---|
| Sheet 1.2 | - 9 | + 8 |

**PARKING**

| | REMOVED | NEW |
|---|---|---|
| Goodwood St to Ascot St | 0 | 0 |
| Ascot St to Bowral St | - 3 | + 1 |
| Bowral St to Todman Ave | 0 | 0 |

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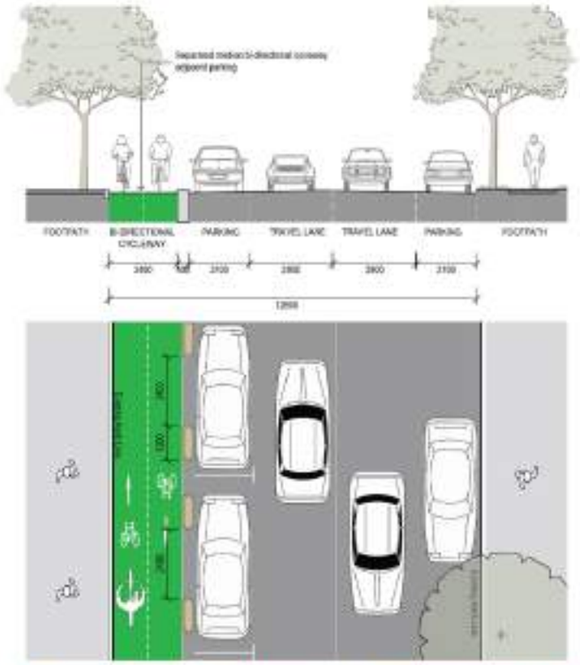
# Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park

Doncaster Ave, Day Ave, Houston Rd, General Bridges Cres, Sturt St

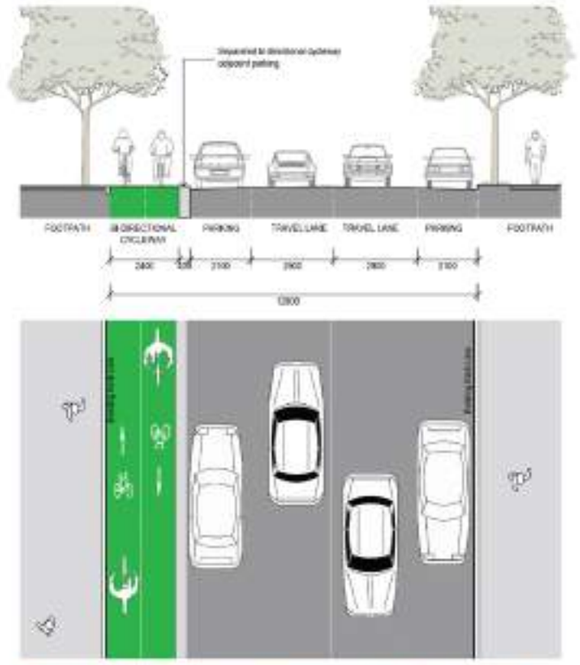

N ← SCALE 1:500@A1

LEGEND

- EXISTING ITEM TO BE REMOVED
- NEW CYCLEWAY WITH PHYSICAL SEPARATION
- NEW CYCLEWAY ACROSS DRIVEWAY
- CYCLEWAY AT FOOTPATH LEVEL
- DISABLED ACCESS
- EXISTING DISABLED PARKING TO BE RETAINED
- SHARED PATH
- SHARED INTERSECTION TREATMENT
- LOADING ZONE
- CLEARWAY
- PEDESTRIAN CROSSING
- EXISTING TREE RETAINED
- PROPOSED TREE
- REMOVED TREE
- NEW GARDEN BED
- TRAFFIC SIGNALS
- EXISTING PARKING RETAINED
- EXISTING PARKING REMOVED
- NEW PARKING SPACE
- EXISTING STREET LIGHT
- PROPOSED STREET LIGHT
- ITEMS TO FURTHER INVESTIGATION




TYPICAL INTERRUPTED MEDIAN SEPARATED CYCLEWAY - Section 1




TYPICAL FLUSH SEPARATED CYCLEWAY - Section 2

**TREES**

| | REMOVED | NEW |
|---|---|---|
| Sheet 1.3 | 0 | + 13 |

**PARKING**

| | REMOVED | NEW |
|---|---|---|
| Todman Ave to Darling St | - 0 | 0 |
| Darling St to Anzac Pde | - 6 | 0 |
| Anzac Pde to Roma Ave | - 0 | 0 |
| Roma Ave to Kooringa Ave | - 2 | 0 |

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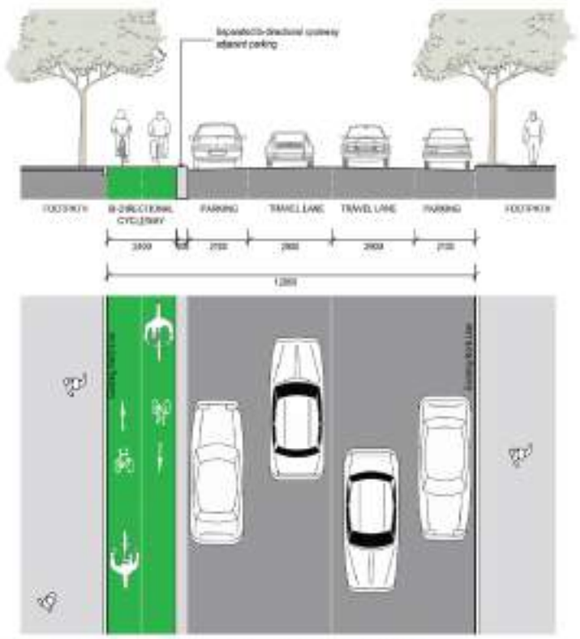
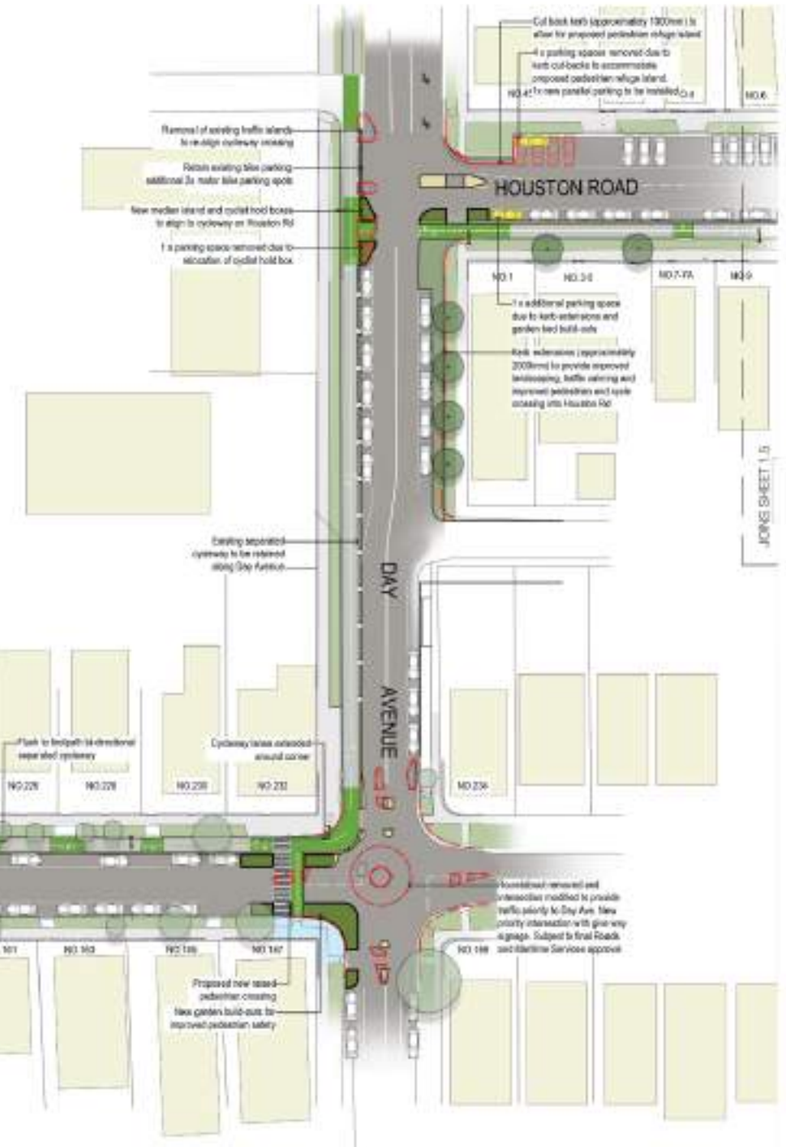
# Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park

Doncaster Ave, Day Ave, Houston Rd, General Bridges Cres, Sturt St




TYPICAL FLUSH SEPARATED CYCLEWAY




N ← SCALE 1:500@A1

LEGEND

- EXISTING ITEM TO BE REMOVED
- NEW CYCLEWAY WITH PHYSICAL SEPARATION
- NEW CYCLEWAY ACROSS DRIVEWAY
- CYCLEWAY AT FOOTPATH LEVEL, DISABLED ACCESS
- EXISTING DISABLED PARKING TO BE RETAINED
- SHARED PATH
- SHARED INTERSECTION TREATMENT
- LOADING ZONE
- CLEARWAY
- PEDESTRIAN CROSSING
- EXISTING TREE RETAINED
- PROPOSED TREE
- REMOVED TREE
- NEW GARDEN BED
- TRAFFIC SIGNALS
- EXISTING PARKING RETAINED
- EXISTING PARKING REMOVED
- NEW PARKING SPACE
- EXISTING STREET LIGHT
- PROPOSED STREET LIGHT
- ITEMS TO FURTHER INVESTIGATION

| TREES | REMOVED | NEW |
|---|---|---|
| Sheet 1.4 | 0 | + 8 |

| PARKING | REMOVED | NEW |
|---|---|---|
| Koorinda Ave to Day Ave | 0 | 0 |
| Day Av and Houston Rd Corner | - 5 | + 2 |

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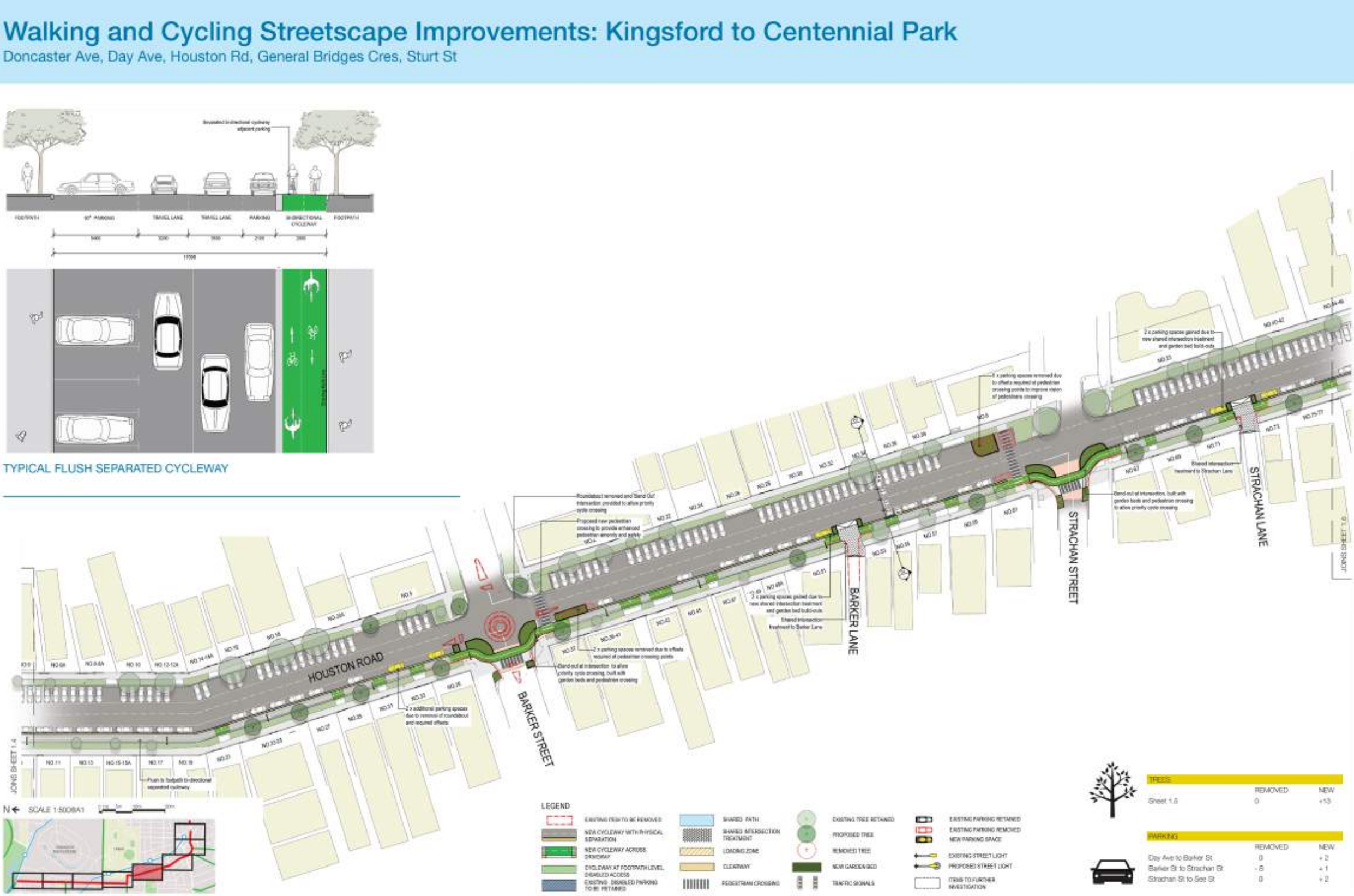
# Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park

Doncaster Ave, Day Ave, Houston Rd, General Bridges Cres, Sturt St




TYPICAL FLUSH SEPARATED CYCLEWAY




This project is endorsed and funded by NSW Roads and Maritime Services

# Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park

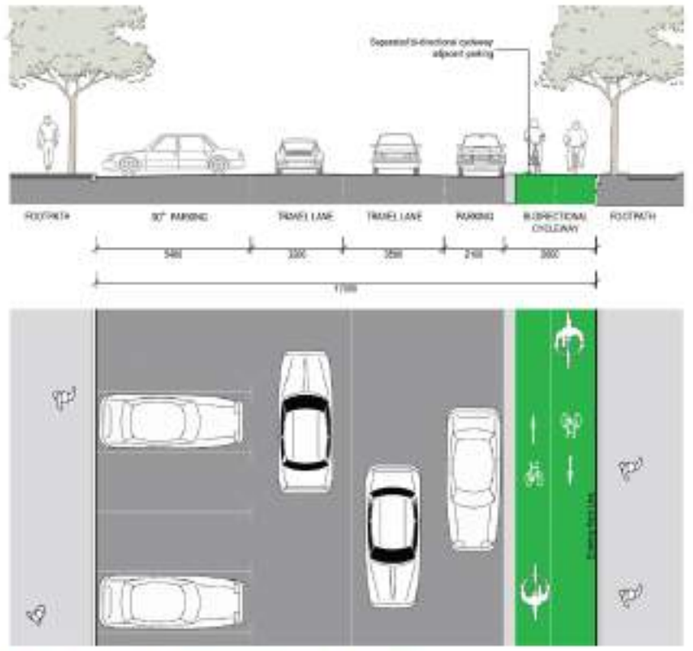
Doncaster Ave, Day Ave, Houston Rd, General Bridges Cres, Sturt St

| TREES | REMOVED | NEW |
|---|---|---|
| Sheet 1.6 | 0 | + 12 |

| PARKING | REMOVED | NEW |
|---|---|---|
| Sea St to Borrodale St | - 1 | + 4 |
| Borrodale St to Gardeners Rd | 0 | 0 |


LEGEND

- EXISTING ITEM TO BE REMOVED
- NEW CYCLEWAY WITH PHYSICAL SEPARATION
- NEW CYCLEWAY ACROSS DRIVEWAY
- CYCLEWAY AT FOOTPATH LEVEL, DISABLED ACCESS
- EXISTING DISABLED PARKING TO BE RETAINED
- SHARED PATH
- SHARED INTERSECTION TREATMENT
- LOADING ZONE
- CLEARWAY
- PEDESTRIAN CROSSING
- EXISTING TREE RETAINED
- PROPOSED TREE
- REMOVED TREE
- NEW GARDEN BED
- TRAFFIC SIGNALS
- EXISTING PARKING RETAINED
- EXISTING PARKING REMOVED
- NEW PARKING SPACE
- EXISTING STREET LIGHT
- PROPOSED STREET LIGHT
- ITEMS TO FURTHER INVESTIGATION




TYPICAL FLUSH SEPARATED CYCLEWAY

This project is endorsed and funded by NSW Roads and Maritime Services

Sheet: 1.6

June 2018

Randwick City Council
a sense of community

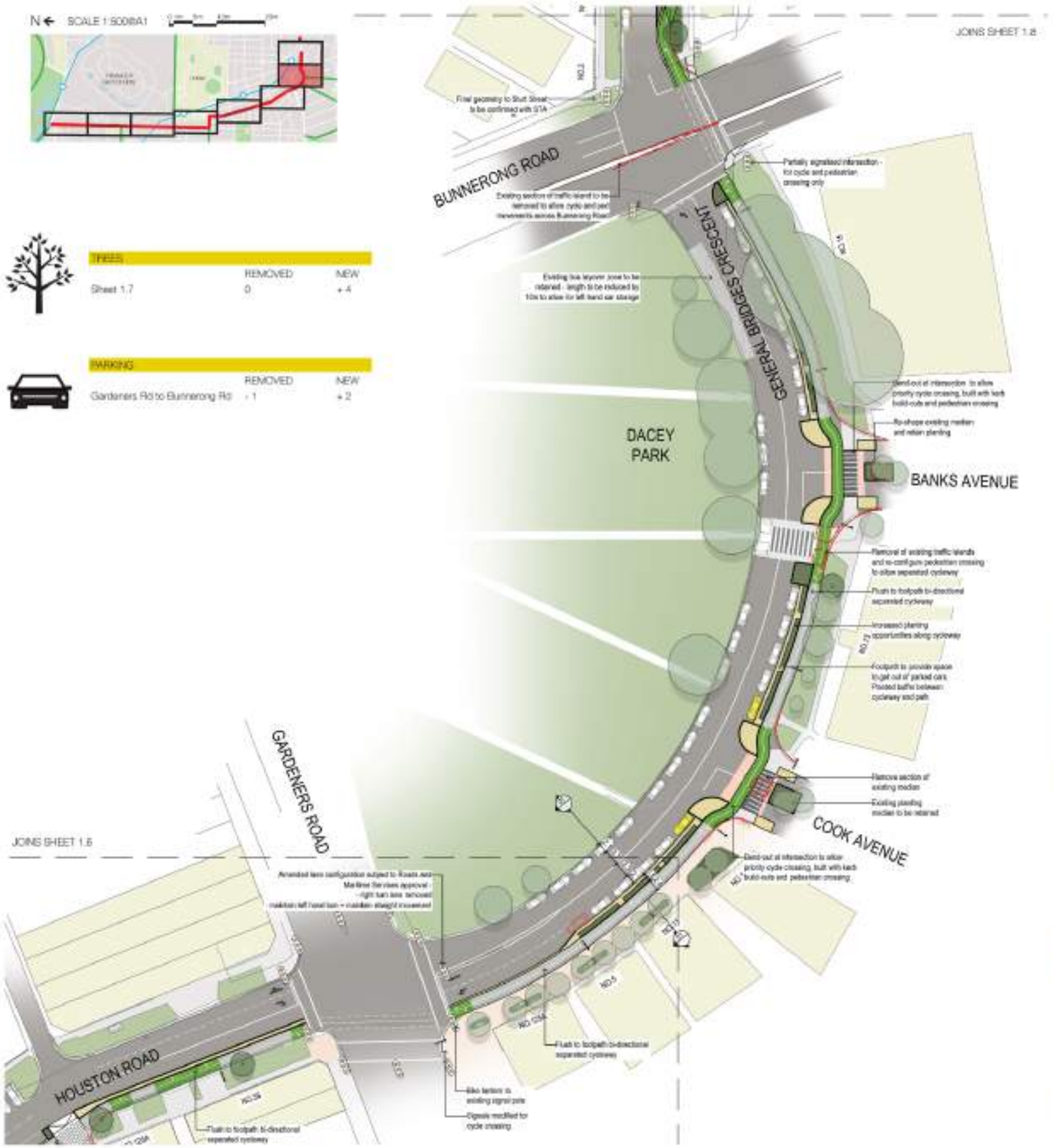
# Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park

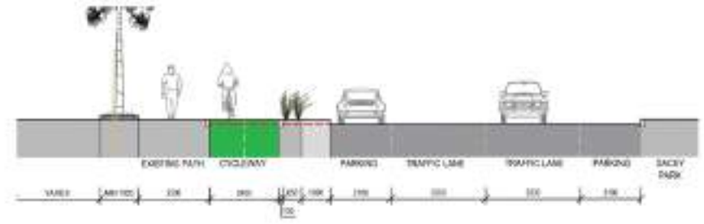
Doncaster Ave, Day Ave, Houston Rd, General Bridges Cres, Sturt St

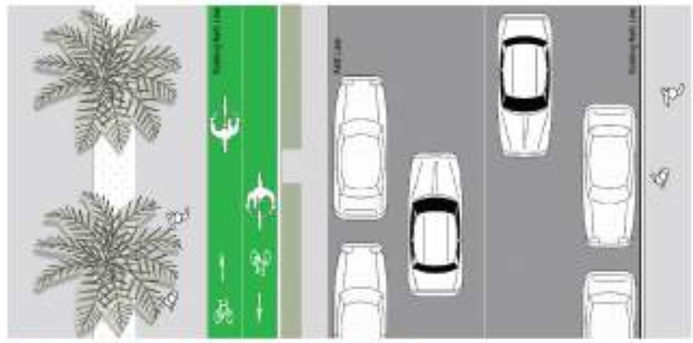



| TREES | REMOVED | NEW |
|---|---|---|
| Sheet 1.7 | 0 | + 4 |

| PARKING | REMOVED | NEW |
|---|---|---|
| Gardeners Rd to Bunnerong Rd | - 1 | + 2 |



TYPICAL FLUSH SEPARATED CYCLEWAY


GENERAL BRIDGES CRESCENT, DACEYVILLE

LEGEND

- EXISTING ITEM TO BE REMOVED
- NEW CYCLEWAY WITH PHYSICAL SEPARATION
- NEW CYCLEWAY ACROSS DRIVEWAY
- CYCLEWAY AT FOOTPATH LEVEL, DISABLED ACCESS
- EXISTING DISABLED PARKING TO BE RETAINED
- SHARED PATH
- SHARED INTERSECTION TREATMENT
- LOADING ZONE
- CLEARWAY
- PEDESTRIAN CROSSING
- EXISTING TREE RETAINED
- PROPOSED TREE
- REMOVED TREE
- NEW GARDEN BED
- TRAFFIC SIGNALS
- EXISTING PARKING RETAINED
- EXISTING PARKING REMOVED
- NEW PARKING SPACE
- EXISTING STREET LIGHT
- PROPOSED STREET LIGHT
- ITEMS TO FURTHER INVESTIGATION

This project is endorsed and funded by NSW Roads and Maritime Services

Sheet: 1.7

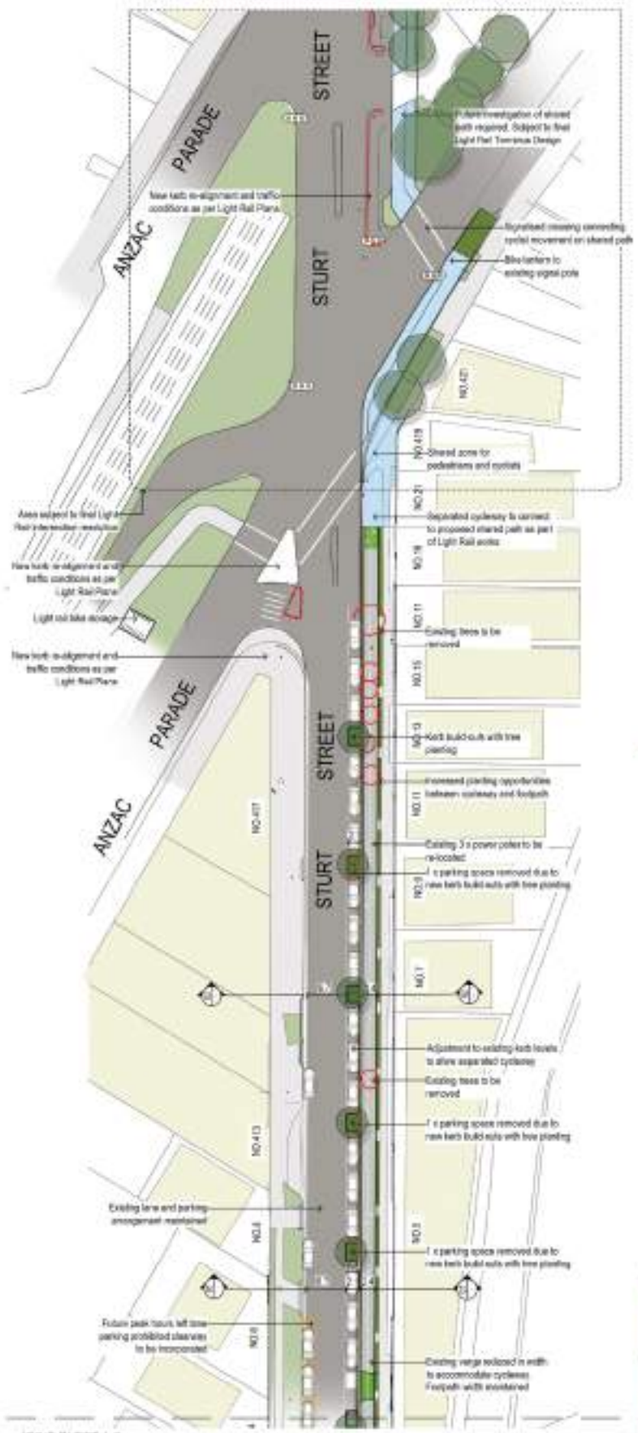
June 2018

Bayside Council

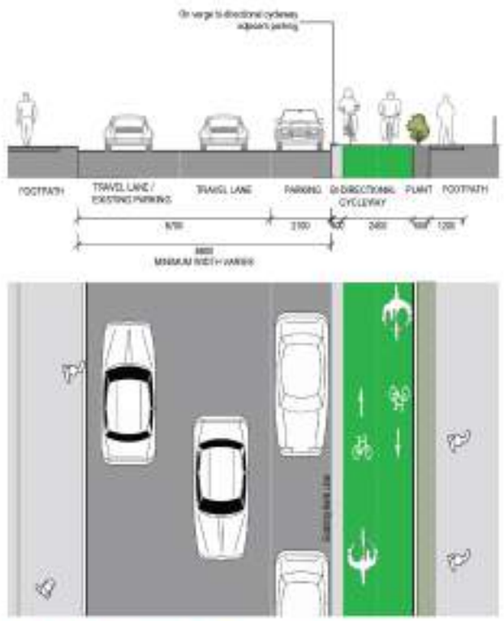
Randwick City Council
a sense of community

# Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park

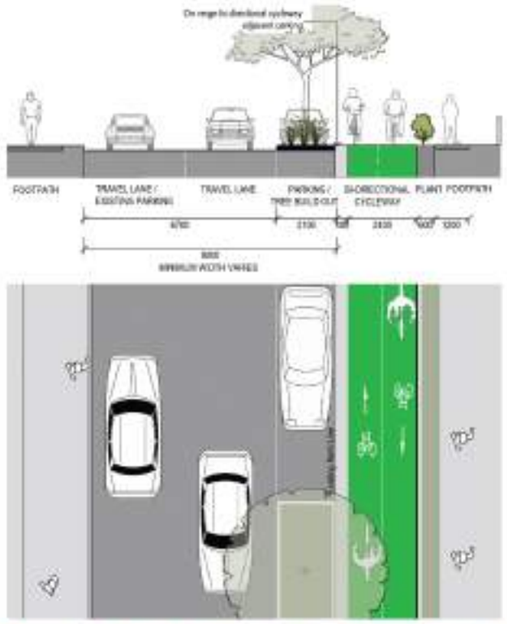
Doncaster Ave, Day Ave, Houston Rd, General Bridges Cres, Sturt St




JOINS SHEET 1.7




TYPICAL ON VERGE CYCLEWAY




TYPICAL ON VERGE CYCLEWAY WITH IN ROAD PLANTING

| TREES | REMOVED | NEW |
|---|---|---|
| Sheet 1.8 | - 7 | + 5 |

| PARKING | REMOVED | NEW |
|---|---|---|
| Bunnerong Rd to ANZAC Pde | - 3 | 0 |

N ← SCALE 1:500@A1

LEGEND

- EXISTING ITEM TO BE REMOVED
- NEW CYCLEWAY WITH PHYSICAL SEPARATION
- NEW CYCLEWAY ACROSS DRIVEWAY
- CYCLEWAY AT FOOTPATH LEVEL, DISABLED ACCESS
- EXISTING DISABLED PARKING TO BE RETAINED
- SHARED PATH
- SHARED INTERSECTION TREATMENT
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- PROPOSED TREE
- REMOVED TREE
- NEW GARDEN BED
- TRAFFIC SIGNALS
- EXISTING PARKING RETAINED
- EXISTING PARKING REMOVED
- NEW PARKING SPACE
- EXISTING STREET LIGHT
- PROPOSED STREET LIGHT
- ITEMS TO FURTHER INVESTIGATION

This project is endorsed and funded by NSW Roads and Maritime Services

# Appendix C

Summary of the issues raised in the Community Consultation and Randwick City Council Responses – Attachment 5 of Director City Services Report No. CS35/18 to Randwick City Council Ordinary Council Meeting 27 August 2018

28 August 2018

Randwick City Council
a sense of community

# Attachment 5

## Community consultation responses

Walking and cycling improvements: Kingsford to Centennial Park

**Attachment 5 - Community consultation responses**

28 August 2018

Kingsford to Centennial Park - Walking and Cycling Streetscape Improvements

| Submission | Council response |
|---|---|
| Looks interesting. Hard to imagine a bike friendly area without all the tram construction right now. If only the Barker Street steep hill east of Anzac Parade could be leveled for the bike riders. I meet walkers young and old puffing up it. Even the loaded buses have to crawl in slow motion to the top. With snow, the descent would rank as an intermediate run at Thredbo. Maybe an electric bike would suit the route. | Thank you for your comment and taking the time to make a submission. |
| I support this as long as bike riding on Anzac parade becomes prohibited. If the plan does not prohibit riding on Anzac parade this project will be a waste of money as riders will continue to use Anzac parade and allow down the traffic. | Thank you for your comment. Anzac Parade is classified as a 'State Road' in this area and is managed by Roads and Maritime Services (RMS). Council would not support prohibiting people from riding a bike along Anzac Parade. |
| First, I was delighted to see on the map that Coogee Bay Rd is marked as an existing cycleway.<br>This is a good choice, because (i) it is a wide road and there is room for cyclists and cars almost all the way (ii) much of it is well lit (iii) as a way out of the Coogee basin, it is not too steep (important for elderly cyclists) and (iv) it has lots of pedestrians so potential witnesses for deliberate aggression by motorists, which may lead to better behaviour.<br>Problem: I regularly ride this route but have never noticed that it was a cycleway. Presumably motorists don't notice this either. It would be good to let them know that we have a right to be there as well. | Thank you for your comment. Coogee Bay Rd is an 'on-road cycle route' as marked on our Cycling and Walking Map (published 2010). There are no current plans to change the line marking on Coogee Bay Rd. |
| I think this is a great proposal.<br>I would also like to see a separate cycleway on Coogee Bay Road from Coogee Beach to the light rail stop at the hospital in Randwick to assist getting to the light rail.<br>Thanks | Thank you for your comment. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| Absolutely fantastic. I have lived on Doncaster all my life. When I attended Kensington Public School I was forbidden from riding my bike to school because it was considered too dangerous. I was similarly forbidden from riding to Sydney Boys' High; again, because of the perils of riding with cars. This segregated cycle path is the best possible thing for Kensington. It should also encourage cycling, rather than driving, to UNSW. It has long bewildered me that Australia's largest university does not have a dedicated cycle way for its students. Thank you for finally installing a safe cycle way.<br>I do have one suggestion. The Roma Avenue to Koorinda Avenue section of Doncaster Avenue rises with the topography. Cars travelling south accelerate from the Anzac Parade lights. Cars travelling north tend to hit a higher speed too, as they come down the rise. Over the 58 years of living on Doncaster Avenue I have witnessed a number of accidents on this section because of the speed. My suggestion is that traffic calming measures, specifically for this section, be installed as part of the cycling way construction. | Thank you for your comments. Council will consider the speeding issue you mention. By adding in the separated cycleway, it will reduce the width of the road space and help reduce average traffic speeds. |
| I welcome this proposal. I am very enthusiastic about the opportunity, at last, to cycle from my home safely to Centennial Park - where I can cycle some more. I think this will be a great start to further extension of separated cycleways in the City of Randwick. I have lived and cycled in several cycle-friendly cities - Cambridge UK, Lund Sweden and Canberra but I gave up cycling in Randwick because it became too dangerous. This is a very important development and I heartily endorse it. | Thank you for your comment and taking the time to make a submission. |
| Great ideas! | Thank you for your comment and taking the time to make a submission. |
| May you please reinforce the cycling pathway up and down Alison Road between Darley Road and Botany Street. There use to be a shared cycle and pedestrian path on this street prior to light rail construction which ran next to the Randwick Racecourse.<br>Since the light rail construction, cyclists have been re-directed to travel through King Street and Church Street to access Botany Street due to the dangerous cycling conditions currently present on Alison Road. An example of the dangers include Alison Road being a steep uphill climb and cyclists unable to maintain a safe riding speed to not 'annoy' cars which in most instances will overtake with less than a metre gap.<br>Although the routes through King Street and Church Street are labelled as an existing Cycleway Network in the project overview, Church Street is not an ideal access point to Botany Road because the round-a-bout at the intersection of Cowper street and Church street is a high traffic area for buses, and when cyclists are following buses through the round-a-bout, most cars do not notice the cyclist when entering the round-a-bout, with the risk of running over a cyclist.<br>According to the Project overview, it does not appear that there will be a cycleway on Alison Road (between Darley/Botany) anymore, may you please clarify. | Thank you for your comments. The cycle network in the 'project overview' pdf was marked in its current form. The shared path on Alison Rd between Darley Rd and Wansey Rd is part of the light rail project and will be in place once light rail construction is complete. Accordingly, Council will update any cycle network maps at that time. |
| Dear Randwick Council,<br>I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>I have often thought about cycling but am afraid to ride in traffic. By building such as cycleway I will be much more likely to cycle in the future. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
|---|---|
| Ideally, the cycleway would be integrated with the new tramway. In the absence of this being possible, I support the initiative. | Thank you for your comment. Council continues to communicate with Transport for NSW regarding the light rail project. |
| I strongly believe that if there was a coordinated system of safe, divided and linked bicycle paths throughout Sydney, tens of thousands of people would get out of their cars and cycle to work or for pleasure. This would have obvious benefits for traffic and pollution reduction, and for individual health. All efforts by Randwick Council to improve cycle paths and walkways are to be welcomed and supported. Any reduction in car lanes will be offset by a reduction in traffic as more people use bicycles rather than cars. Please keep up the effort to install as many bike paths as possible, but ensure that they are safe, separated from traffic, and linked. | Thank you for your comment and taking the time to make a submission. |
| Very happy to see this initiative is starting. Please can you also extend the Kingsford to South Coogee link too? | Thank you for your comment. Council is currently working on Walking and Cycling Improvements along a second route from Kingsford to South Coogee. Plans are being developed and are likely to be on public exhibition in the second half of 2018. |
| Anything you can do to improve routes for cycling is great.<br>I'm a regular commuter cyclist to the CBD, and don't consider any of the routes from South Coogee (Malabar Road for me) up until the cycle way half way down Allison Rd safe.<br>Considering local traffic conditions, as many as able should be encouraged to get on their bikes. | Thank you for your comment and taking the time to make a submission. |
| This is terrific. I am 75 and am too frightened to ride a bike. With this separated cycleway, I would start to ride a bike again. If priority could be given to Doncaster Ave, this would be much appreciated. My only question is, how would this connect to Centennial Park? | Thank you for your comment. The connection from Doncaster Ave into Centennial Park is dependent on the light rail project, and a future shared path bridge to Centennial Park. The bridge is a project managed by Centennial Park and Moore Park Trust. Council will continue to communicate with both organisations and work towards a strong connection into Centennial Park. |
| At this stage there is NOT enough parking for the residence as most houses on the eastern side of Doncaster Ave don't have off street parking. Working shift work and coming home at different hours through out the day and night and living on Doncaster Ave I'm lucky to get a parking spot with in 500metres of my house at present. Non residents park along Doncaster Ave all day at the moment and the only time a council ranger bothers to come around is if someone rings and complains. It will become a complete nightmare if this happens.<br>How will the elderly people that live along the route get their shopping home or the mothers with young children in prams get in and out of houses without walking extremely long distances. | Thank you for your comments. Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. |
| So happy you have had the foresight to include a separated cycleway. This will improve safety for cyclists and encourage more people to use their bicycles as a means of transport. | Thank you for your comment and taking the time to make a submission. |
| I think this shared bike path is a great idea to improve access to Centennial Park. Currently many bike riders use the footpath along Doncaster Ave traveling to Centennual Park as it is safer particularly with young kids on bikes. Please progress these plans and look at extending the bike path along Todman Ave. Todman Ave is more than wide enough to accommodate a bike path and would service the many houses in this area. Given the noise and disruption all of us residents have had to put up with due to Light Rail it would be good to see a project like this get approved to benefit the locals. | Thank you for your comment. Council has a list of bicycle route construction priorities and this route is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps<br>Council is currently working on improvements to the bicycle shoulder lanes along Todman Ave. We will be approaching the NSW Government asking for the Todman Ave and Lenthall St route to be considered a 'Sydney Strategic Bicycle Corridor', as seen in the NSW Government document 'Sydney's Cycling Future'. If successful, this will assist with implementation and funding of this section. |
| This is an excellent plan, the sooner it is complete the better!!<br>Doncaster ave is a highly used cycle way and is currently quite dangerous, can't wait for the improvements. | Thank you for your comment and taking the time to make a submission. |
| This will make my daily commute immeasurably safer, especially along Doncaster/Houston.<br>Would have assumed you would use the left side of Gnr Bridges Cresent rather than the right? Less street crossings for cyclists that way (and would have assumed this would be a lot safer?)<br>Otherwise excellent. | Thank you for your comment. The alignment of General Bridges Crescent was proposed as shown to match the surrounding alignments on Houston Rd and Sturt St. It also enables direct cycling links to Cook Ave and Banks Ave in Daceyville. |
| Most residents are sick and tired of your focus on cyclists. We want roads free from obstruction including cyclists who continually disrupt traffic flow. Do not take away any more roads - roads have already disappeared due to the light rail. Traffic is constantly in a state of chaos. Fix it first. And please note that the great majority of us will never ride bikes. | Thank you for your comment and taking the time to make a submission. |
| A welcome and needed connection between Centennial Park and Kingsford. Cars have made me feel very unsafe riding down Houston Road, despite how wide the street is. | Thank you for your comment and taking the time to make a submission. |
| These improvements are sorely needed, as one who regularly cycles through this area. They look like they will greatly increase accessibility and improve the general feel of the streets to be something like Bourke St, which is a great street | Thank you for your comment and taking the time to make a submission. |
| Great! Very excited for safe cycle infrastructure | Thank you for your comment and taking the time to make a submission. |
| How is it going to affect submission for house renovations with changes to driveway access? Also it is already hard to park on Sturt Street during the week with people from the hospital and uni parking there all day (especially when you have to park a block or 2 away and have a toddler) & will be even harder once the light rail is finished, are there any plans to put timed parking in & all day parking for resident permit holders? | Thank you for your comment. Council will continue to consider driveway construction requests, as per current practices. Kerbs and any future cycleway infrastructure will be modified if and where necessary.<br>There are no current plans to modify or add timed parking along Sturt St. Any future resident parking scheme would be separate to this project. |
| Please when you plant new trees or shrubs, find species which are small and won't interfere with the wires when they mature. Tall trees which are cut to avoid growing into wires look terrible. Also very unsafe for arborists who need to trim the trees on a regular basis. | Thank you for your comments. The Project Team will continue to work closely with the Tree Management Team to ensure planting and species selections is appropriate. |

| Submission | Council response |
|---|---|
| Do it, and do more of it! I live nowhere near this and would love to see Randwick turn its attention to pedestrian and cycle travel, which is currently not that pleasant and clearly sidelined in favour of wide roads, wide intersections, and street parking. In particular note the huge gap in the overall plan of the North Randwick area. Avoca St, Belmore Rd, Frenchmans Rd and Clovelly Rd all need work to improve walking and cycling as options. The area's main shops are on Belmore Rd/Avoca St for starters, then you have Randwick State School in the gap with bad access. I haven't ridden my bike since I moved to Randwick apart from a scary ride on Darley Rd to get to Centennial Park, and that makes me sad :( (I currently walk to work every day 45 mins each way across Randwick, and only shop by foot as well). | Thank you for your comment and taking the time to make a submission. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| The cycle way enhancements look great. It would be ideal to use the centre grassy section of of anzac parade between kingsford and Maroubra Junction - even further out to La Perouse - to put in a cycle track on the old tram lines. the land is just there waiting for it. | Thank you for your comment. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list. http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| Great work randwick council | Thank you for your comment and taking the time to make a submission. |
| Great news!<br>I use this route every day and wrote to council a while ago on this very design. I am very pleased to see it coming through. It looks great, and will make a notable difference to cycling amenity and encourage more people to use active transport. Well done, look forward to seeing this become a reality!<br>My only comment is it would be great to have a single crossing of Alison Rd instead of two, to get to the link to Centennial and Anzac. Other than than, great job, thank you, appreciate your support for active transport. | Thank you for your comments. Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd at the north end of Doncaster Ave. Unfortunately the request was declined by RMS. |
| Are you effing kidding? At present cycle lanes follow alongside traffic and have all the “right of way” that intails. By putting us on the right hand side - against traffic- we will have to stop at every intersection, slowing the commute to a crawl. As a daily commuter I will not use this lane and instead will enforce my rights as a “vehicle” and will ride in the traffic lane. Stupidest idea ever. | Thank you for your comment. A number of treatments are proposed to enable people on bikes to cross intersections. 'Bend out' treatments will allow priority for people walking and cycling. Elsewhere traffic signals will be used. Bicycle commuters will continue to be allowed to use the traffic lane if they choose. |
| This is a great idea and I m in full support of this | Thank you for your comment and taking the time to make a submission. |
| Thanks for the opportunity to respond.<br>I think this project is a great idea.<br>I have a few concerns that hopefully can be addressed.<br>(1) With the roundabouts being removed from Borrodale/Houston and Houston/Barker intersections, I'm very concerned with our ability to get across Houston Rd, especially during morning and afternoon peak hours. I live on Borrodale Rd.<br>(2) The design of cyclists crossing Day Ave from Houston appears very dangerous to me. The intersection gets very busy in the peak periods, and I'd be very concerned with cyclist safety, especially with many cars turning left onto Day Ave in front of the cyclists. | Thank you for your comments.<br>1. The proposed pedestrian crossing adjacent to the intersection of Houston Rd and Borrodale Rd will allow pedestrians to cross more easily. If travelling in a car, the modified intersection treatment will require waiting for traffic on Houston Rd to clear before driving across. Council is aware that the proposed design will result in changes to traffic flow at this location.<br>2. The Project Team will take on this feedback and evaluate options to see if any further improvements can be made. |
| These planned improvements are very positive! I do have a concern about the planned shared cycle/pedestrian zones. But, with the limited amount of space available, it's the lesser of two evils (ie: shared zone vs. on-road bike lanes). Looking forward to seeing them built! | Thank you for your comment. Council has sought to provide a separated cycleway where possible. The shared path treatment is proposed where necessary. |
| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>I am a regular and fairly confident cyclist, but am weary of intimidation by drivers and the closeness of the traffic. Such a cycleway would certainly improve my chances of survival. | Thank you for your comment and taking the time to make a submission. |
| looks good, have chosen good streets/ inclines a reasonable gradients<br>Also streets are all of good width, good space for pass-by of other traffic | Thank you for your comment and taking the time to make a submission. |
| Cyclist are the most dangerous vehicles in the park. They do not obey the speed limits are aggressive to both cars and pedestrians. Therefore they need to have a dedicated track on the inner circle of the road (even change the horse track for this) and pedestrian crossings should be either over or under the track. This will ensure safety for all concerned. These pedestrian crossing should be dedicated and the road, parking and bike track should be fenced off from the park areas. | Thank you for your comment. Centennial Park is managed by the Centennial Park and Moore Park Trust. Please contact them with any suggestions regarding the planning of walking and cycling paths within Centennial Park. https://www.centennialparklands.com.au/home/contact |

| Submission | Council response |
|---|---|
| Just do it. Public assets should not be used to store private assets (parking). We MUST prioritise active transport if we are going to make meaningful improvements to traffic congestion. People need to be encouraged to leave their cars at home or better still not buy them in the first place. This will only be realistic if it *feels* safe and practical to do so. Ignore the haters - we have a serious social problem with bike hate. It will eventually change when they see the evidence, but it requires perseverance. You are not building this for those who ride now, but for those who will ride when it feels safe | Thank you for your comment and taking the time to make a submission. |
| 1/. I'd like to make a correction to your proposal.... It states that Houston road does not have a existing cycle way, in fact it has - it was one of the first streets in Kingsford to have one.<br>2/. In your drawings showing examples of cycle ways I saw a number of them where the nature strip was considerably reduced, any more reduction of the only piece of green space left In Houston Road is not desirable by is residents. Considering the fact that Houston road is a wide road that already accomodates a cycle way in each direction north and south there is no reason why the new path way cannot be accommodated in the existing space. I oppose any reduction in the nature strip especially on the western side of Houston road. | Thank you for your comments.<br>1. Houston Rd currently has a bicycle 'shoulder lane' in both directions and is an established 'cycle route'. Apologies if our communication was unclear.<br>2. There are very few kerb adjustments (shown with a red line) proposed along Houston Rd. The proposed cycleway is positioned on the western side of the existing roadway space, not the existing nature strip. |
| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington. Although I live in Potts Point, I ride along these streets every Sunday, which are an important link between the city and La Perouse, a popular cycle route.<br>This much-needed link in the Sydney cycling network will allow people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play. | Thank you for your comment and taking the time to make a submission. |
| I think the proposal is tremendously exciting and long overdue. Active transport is essential to the community's future in transport. If implemented, I would use the cycleway at least 5 days each week. Traffic along those routes is currently far too fast, close and disregarding of road rules to be safe for cyclists, especially as an ever-growing group | Thank you for your comment and taking the time to make a submission. |
| This is a fantastic project. I have ridden my bike along Doncaster Ave for many years and had many unpleasant experiences with cars- this separated cycleway will help less confident cyclists start riding here. | Thank you for your comment and taking the time to make a submission. |
| This is a great initiative. Please consider having shared paths to connect the cycleway to other local schools. For example, shared paths on darling street will help connect students from OLR and OLSH to it. | Thank you for your comment. Council is conscious of nearby schools and improving access via walking and cycling. Surrounding streets are beyond the scope of this project, but Council is willing to investigate suggestions that make such access easier. |
| I support any new safe cycling infrastructure in the area. Good job. | Thank you for your comment and taking the time to make a submission. |
| Pedestrian Crossing on corner of Arden St and Clovelly Rd, very dangerous, too close to round about.<br>Also cars always parked too close to corner in Clovelly Rd at Keith St intersection.<br>Bus stop on corner of Clovelly Rd and Keith St should be moved up Clovelly Rd. | Thank you for your comments. Council will investigate your concerns separately to this project. |
| Looks great and is certainly overdue. A great vision for more sustainable transport options and significant improvement to the streetscape along is the entire route. | Thank you for your comment and taking the time to make a submission. |
| Loving the dedicated path plans. Great as these are such busy routes with the university and nearby schools! Also, looking forward to a safe cycling route to Coogee. I'm a local mum of two young boys and dedicated cycling paths means my family can get around our local area without use of our car as is often the case. Cycling on footpath with kids is legal - but with driveways/busy stretches I feel that dedicated cycling paths are really so much safer.<br>Thank you and please keep investment in cycling infrastructure in Randwick City up! | Thank you for your comment and taking the time to make a submission. |
| Randwick Council is to be congratulated on the cycling improvements, I ride a bicycle along Doncaster Ave usually five (5) times per week. My feedback is:<br>* please make sure that the cycle path is as straight as possible and does not have deviations;<br>* please ensure that human beings are prioritised over horses on the intersection of Bowral St, ideally horses should be transferred elsewhere and the disruption to traffic removed;<br>* please make sure that the waiting time at the traffic lights on Bunnerong Rd & Anzac Pde are synchronised so that cyclists can cross with minimum waiting time | Thank you for your comments.<br>1. The alignment of the cycleway has been designed to be direct and link to important destinations in the local community. The route may deviate where necessary due to factors beyond Council's control.<br>2. Council is communicating with stakeholders relating to the racecourse, and seeks to accommodate the needs of all road users along the route.<br>3. Council is working with RMS on signal design, and seeks to accommodate all road users. |
| Doncaster avenue is the place i have been closest to being hit by a car door. The current bike lane is unsafe and i will feel much more confident riding on a separated cycleway. I have been cycling this route for 10 years. | Thank you for your comment and taking the time to make a submission. |
| I vote for such improvements! | Thank you for your comment and taking the time to make a submission. |
| I strongly support these planned cycling abd walkmg improvements as someone who regularly cycles from the inner west to the eastern suburbs. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| Thank you Randwick Council for supporting cyclists, this is a great plan. I wonder if you could extend the proposed new cycle ways from Kingsford to Little Bay, particularly from the end of the light rail at Kinsgford. This would be handy for those of us who plan to catch the light rail to and from work in the CBD, since we could cycle more safely between Kingsford station and the southern ward. Just a thought. | Thank you for your comment. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| 1. Well done. Be great to see more.<br>2. I'd guess a lot of that bike traffic is people going to UNSW. Is there a safe way to get from Doncaster Av to the uni. There'll need to be.<br>3. Can you build a whole network that leads to the UNSW/Hospital/Randwick Shopping area. This would get a lot of cars off the road (and take stress off the buses) for people going to work and study there. As you know it's a lot of people.<br>4. Can you please build a safe cycleway from Centennial Park to the ocean.<br>5. Can you please get together with Waverley Council and the City of Sydney to build a whole bike network for the Eastern Suburbs - including lobbying for State and Federal Government Infrastructure money to do it.<br>6. It's still very unsafe to ride and people won't ride for that reason. It needs a whole network to be built.<br>7. The money is around to do it. It's just that it's not a priority for Council, State and Federal Governments. Instead, at Council level it's put into toilet blocks, at State into knocking stadiums over and building tunnels for cars, and at Federal into company tax cuts and submarines.<br>8. A complete bike network: helps alleviate traffic congestion, climate change, air pollution and health issues (like obesity.) It's a good investment. | Thank you for your comments.<br>1. Thank you.<br>2. Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is working with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible.<br>3. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. One proposed route goes through the centre of Randwick.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps<br>4. Please refer to point 3.<br>5. Council has worked with Waverley Council and the Centennial Park and Moore Park Trust on a funding proposal for a cycleway on the south side of Queens Park. This project and others are often dependent on NSW Government funding. We will continue to put forward proposals to further improve the cycle network.<br>6. Council recognises that separated cycleways are typically safer for people choosing to ride a bike. We will work towards this as funding and resources allow.<br>7. Noted.<br>8. Noted. |
| I don't live in the area, but I use Doncaster Avenue to ride to and from UNSW. When I ride on Doncaster I keep out of the door zone for safety reasons, but I feel uncomfortable because I can sense many drivers expect me to be in the bike lane. It would be much better for everyone, drivers included, if there were a safe place for people of all abilities to ride. It will make it easier to promote riding to UNSW, too, once there are safe connections. Thanks! | Thank you for your comment and taking the time to make a submission. |
| I very much support the creation of a safer mode for the sharing of the roads with cycles and cars. The passage along Doncaster ave connecting centennial park with Anzac pde is an excellent idea , and I endorse the plans | Thank you for your comment and taking the time to make a submission. |
| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>Anything encouraging more physical activity is worthwhile. | Thank you for your comment and taking the time to make a submission. |
| The plan is good however the extension from Kingsford to Maroubra via Anzac Bike Way Mid 'A' (2) or Irvine, Royal and Pain (8) must be a priority #1. Maroubra has a high density of people therefore potential bike commuters. They shouldn't left apart. Currently the Maroubra to Kingsford 9 ways corridor is a high risk route and it won't take long before car/cyclist crash happens.<br>Building a path in between Centennial and Kingsford will bring more Maroubra cyclist on the road automatically. The bike path must be extended to Maroubra immediately. | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| I am very pleased to see a dedicated bike way being included in this busy part of Randwick Council. Doncaster Ave is a major thoroughfare to Centennial Park and also to UNSW. Both of these locations have many patrons arriving/leaving on bikes. Presently Doncaster Ave does not provide a safe laneway for cyclists, so this is a very much needed piece of infrastructure. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| I think that is long overdue that Randwick Council upgrades the network for cyclists.<br>I cycle less due to safety concerns and would love to cycle more. My partner and I both live and work in Randwick City and often feel threatened by cars on busy streets.<br>The maps included in this plan indicate that there are existing cycle ways on Botany Street and High Street to name few. I have lived, studied, worked and cycled these streets for over five years and would encourage the council to visit these streets. No bike lanes exist. If there were painted bike lanes, these are long gone.<br>I would like to see the Council upgrade existing cycle ways/ make existing cycle ways safe and useable.<br>I would also encourage the council to build more bike racks for people to park their bikes when at shops within Randwick City. Especially given the huge number of apartments going into Randwick over the next few years and the opening of the light rail line.<br>Creating space for cyclists will encourage people to cycle. As a cyclist and motorist, it will encourage me to drive less. | Thank you for your comments. The map on the 'Project Overview' PDF showed the existing cycle network. It was drawn from Council's Cycling and Walking Map (published 2010). Botany St and High St are classified as 'on-road cycle routes' in this map. Council apologises if the existing cycle network map was unclear. |
| Love them | Thank you for your comment and taking the time to make a submission. |
| Dear Randwick Council,<br>I fully support the plans for an improved streetscape plans, including a separated cycleway along Doncaster Avenue and Houston Road, Kensington, to support active travel in Randwick.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe passage for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this infrastructure will provide protection and safe facilities to support people walking, people cycling, as well as people driving, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the area a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>(If applicable to you) I have often thought about cycling but am afraid to ride in traffic. With this new cycleway I will be much more likely to cycle in the future. | Thank you for your comment and taking the time to make a submission. |
| Dear Council,<br>Please please please can we have this cycleway. It will be a great link for students and city commuters, enhancing transport options and community health. | Thank you for your comment and taking the time to make a submission. |
| As a cyclist who uses doncaster ave regularly in the mornings between CP to Lapa and return. look at the existing use of the separated cycleway on Day Ave. 99.9 % of the bike riders never use this infrastructure. | Thank you for your comment. Council is aiming to provide strong links from Doncaster Ave and Houston Rd to the Day Ave cycleway so that it is better utilised by the community.<br>As is the case with many separated cycleways, people on bikes will not be compelled to use the new bicycle infrastructure. They are welcome to use the road if confident and capable. |
| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide<br>social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>When I visit Sydney I would like to use my bicycle and this would encourage me as I have many friends in the Eastern Suburbs. | Thank you for your comment and taking the time to make a submission. |
| 'I strongly support all proposed streetscape improvements, and would like to see them implemented, except for the following:<br>- It seems to me that removing roundabouts is inefficient. Is there any modeling or simulations that can be shared with the public and that would suggest removing roundabouts is more efficient or safe?<br>- I strongly dislike elevated pedestrian crossings, speed bumps, and any other artificial unevenness in the roads: they tend to be very tough on the suspension of cars, have damaged many under-bodies of cars, lead to fuel inefficiencies and unnecessary pollution, are tough on the wrists and knees of cyclists, and many cyclists and motorcyclists swerve to avoid them. For pedestrian crossings, I would prefer to see the use of cat's eyes instead of elevated pedestrian crossings. | Thank you for your comments.<br>1. Council has sought to accommodate all users in the proposed design and to incorporate improved walking and cycling facilities. Unfortunately roundabouts are incompatible at intersections that include bi-directional separated cycleways. Roundabouts and cycleways are discussed in the NSW Bicycle Guidelines (2005) in section 7.2.4, on page 46, stating: "Large roundabouts fitted with two-way off-road adjacent bicycle paths are not favoured as the two-way flow on the cycleway is in the opposite direction to normal roundabout operation."<br>http://www.rms.nsw.gov.au/business-industry/partners-suppliers/documents/technical-manuals/nswbicyclev12aa_i.pdf<br>2. Raised pedestrian crossings are acknowledged to improve safety and visibility and will be included in plans where considered appropriate. |

| Submission | Council response |
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| These improvements are long overdue and urgently needed for cycling commuters. Because of the danger and mad traffic along the existing bike lane from Gardener to Alison road I currently reduce my cycling commute from everyday to at most 3 times a week, due to a previous near-death accident along this route (plus a few times of almost accident) no matter how safe I ride. The current bike lane is a death trap and I feel like cheating death every time I ride that section. | Thank you for your comment. Sorry to hear about your incident. Improving the safety of people choosing to ride is a key consideration of the project. |
| Cycleways and walkways are the commuting options that need to be funded and encouraged by councils. Cars have to much room in our environment and only add to polution, separate safe facilities for pedestrians and cyclists are the future option. | Thank you for your comment and taking the time to make a submission. |
| Although disappointed with the removal of some parking space for the residents on the eastern side of Doncaster avenue, I understand the rational behind it. I appreciate you putting in the pedestrian build outs close to the corner of doncaster avenue and carlton st however i dont think this will make crossing doncaster avenue safe because of the busy traffic along it. We will need a formal padestrian crossing so that the traffic will actually stop for pedestrians when we cross with children or prams and are unable to move as quickly. Given there is a loss of parking for the residents along doncaster avenue, i think there should be an increase in timed parking (except for residents with permits) on the side streets off Doncaster avenue to make up for the loss of parking for the residents. I'm happy to be contacted if you would like to talk more about the issues raised. | Thank you for your comments. Council recognises the needs of pedestrians and the ability to cross Doncaster Ave. Unfortunately this location doesn't currently meet the requirements for a pedestrian crossing.<br>There are no current plans to modify or add timed parking along Doncaster Ave or the nearby streets. Council is willing to consider feedback from residents. However, any future resident parking scheme would be separate to this project. |
| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington. This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>I have often thought about cycling but am afraid to ride in traffic. By building such as cycleway I will be much more likely to cycle in the future. | Thank you for your comment and taking the time to make a submission. |
| Although not a resident of Randwick LGA, I do ride a bicycle and I applaud any initiatives to improve the safety and enjoyment of Sydney cyclists. This city needs to get serious about offering green alternatives to traffic congestion and this certainly is a step in the right direction. | Thank you for your comment and taking the time to make a submission. |
| We need a safe connection from maroubra junction to cycling paths to the city. It is extremely dangerous riding on Anzac parade from maroubra junction or beyond towards the cycling paths near Unsw.<br>And it needs to be well lit. If you want to encourage cycling, it needs to be safe for the riders!!<br>And with the light rail that stops in Kingsford (which isn't super helpful for people who live beyond) you must have heaps of secure bike parking that is safe. Could bike lockers be an options. Look at what other cycling nations do. | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps<br>As part of the light rail project, 30 bicycle parking spaces within a secure 'bike shed' are proposed adjacent to the Kingsford Terminus. |
| I cycle to and from Botany and Chippendale, through Kensington and Zetland, to get to/from work. These changes would be of great benefit to my commute, linking the quieter back streets down south with Centennial Park, where I could then follow current paths through to the city.<br>I would change my route just to use this cycle path, and it'd be a big step forward for cycling in the area - especially as an arterial path out of the city. | Thank you for your comment and taking the time to make a submission. |
| I think they're great. I'm really keen on seeing the cycleways improved, since i use them all the time. Having a safe network on cycleways next to anzac pde will take all cyclists away from the big road, thus improving traffic both for cars and cyclists.<br>Would be great to have it extended to todman ave. as well.<br>Thanks and best regards! | Thank you for your comment and taking the time to make a submission. |
| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington. This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>I wish all Sydney councils would get behind this sustainable form of transport with such integrated plans, and reduce congested on our roads, emissions from vehicles, and improve personal and community health and well being | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington.<br>I regularly cycle along Doncaster Ave and beyond and while there is a painted bike lane next to the parked cars on either side, nothing beats a separated cycleway for keeping cyclists out of harm's way.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>Separated cycleways encourage more people to cycle short distances and help ease congestion on the roads and also enhance the streetscape. One only has to look at the stretch of Bourke Street from Redfern to Taylor Square to see how the separated cycleway has improved that street.<br>The proposed Doncaster/Houston route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction. | Thank you for your comment and taking the time to make a submission. |
| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>I have often thought about cycling but am afraid to ride in traffic. By building such as cycleway I will be much more likely to cycle in the future. | Thank you for your comment and taking the time to make a submission. |
| I support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington.<br>This is a highly needed link in Sydney cycling network, allowing cyclists to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>I am an occasional cyclist but am afraid to ride in traffic. By building such as cycleway I will be much more likely to cycle more in the future. | Thank you for your comment and taking the time to make a submission. |
| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>I have often thought about cycling but am afraid to ride in traffic. By building such a cycleway I will be much more likely to cycle in the future. I do not live in the area however visit often taking kids to local sporting venues and we often bring our bikes. | Thank you for your comment and taking the time to make a submission. |
| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>I have often thought about cycling but am afraid to ride in traffic. By building such as cycleway I will be much more likely to cycle in the future. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| If waste bins are left in the cycle path (as they currently are every Monday), then there is considerable increase in risk for cyclists. The treatment of round-abouts needs to be improved, as typically the cycle paths end and re-start after the round-about, forcing bicycles and cars together. There needs to be an improved connection between the Doncaster Cycleway and the recently completed Alison Road cycleway. Currently there is an awkward dog-leg to go from one to the other. | Thank you for your comments.<br>1. Waste management is a key consideration. The Project Team is working with the Waste Services Team at Council to manage the proposed changes along the route.<br>2. Some existing roundabouts are proposed to be changed to 'bend-out' style treatments, with a priority intersection (e.g. give way, or stop signs). Unfortunately roundabouts are incompatible at intersections that include bi-directional separated cycleways.<br>3. Council is looking closely at all intersections, and keen to link the cycleway with surrounding cycle routes. Staff have previously spoken with Roads and Maritime Services (RMS) requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS. |
| I support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington. Good work!<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but dangerous – route.<br>Additionally, the addition of a cycleway will remove bicycle traffic from general traffic lanes, thereby benefiting all road users. | Thank you for your comment and taking the time to make a submission. |
| Dear Randwick Council,<br>I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington. This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>I have often thought about cycling but am afraid to ride in traffic. By building such as cycleway I will be much more likely to cycle in the future. | Thank you for your comment and taking the time to make a submission. |
| Hi Randwick City Council,<br>I live on Doncaster Ave and will be impacted by this new project. Whilst I'm in favour of building a safer cycle way for both cyclists and pedestrians, I would like you to re-consider removing 4 car parking spaces outside my home.<br>I have already been impacted negatively by the building of the Light Rail Stabling yard right behind my house with a 24 hour operational facility. There is already daily noise and light shining into my backyard all night.<br>Currently there are ~5 car parks between 4 houses (.....) and lots of random cars always park infront of my house (Acciona contractors, other residents, people who work in the disabled facility. So as it is today - it is already difficult to find a spot in front of my house. If you propose to remove another 4 spots in this vicinity, it will become extra difficult to just find a car spot for myself infront of my house. I need you to re-consider the design and keep at least 2 car spots there because in theory 4 spots for 4 houses is great but there are always other people parking there for reasons named above.<br>Would you consider moving the proposed pedestrian crossing in front of no. 20 a little bit up the road to no.14-16 (behind the new propose "break") - this way you can save at least 1 car spot and at least make my life easier.<br>My standard of living has already been negatively impacted due to the light rail stabling yard behind, now I'm getting boxed in from the front, so I'm asking for special consideration for this group of residents between number ....<br>Thank you for your consideration. | Thank you for your comments.<br>Council is aware of the pressures faced by residents along Doncaster Ave that back on to the light rail stabling yard, and also of the demand for on street parking in this area.<br>Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces.<br>Unfortunately the pedestrian crossing facility proposed can't be moved north outside 14-16 Doncaster Ave, due to the presence of the clear way on the west side. |
| Fantastic that a separated cycleway will be installed along this heavily-used route. The turn from Day Ave into Houston Rd may need to have some more storage space for cyclists. Great work in general though! | Thank you for your comments. Council will further investigate the Day Ave and Houston Rd intersection to suitably accommodate all road users. |
| Fantastic. Great to see separated cycle ways. | Thank you for your comment and taking the time to make a submission. |
| Yes, please. | Thank you for your comment and taking the time to make a submission. |
| Looks great. Will be well used. Build it soon, build more. Residents need more safe and active transport options in Randwick. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| I am delighted at the dual carriageway, separated bike lanes. These are a fantastic addition to our community and suburb. They are wonderful to use, safe and a great experience. Please keep bringing more of them!<br>The project overview shows the existing cycle network. However many of the roads indicated do not have proper bike ways. Some are just a sprayed picture of a bike on the road to indicate it is a shared space. This often creates an unsafe mix of can and bike traffic. Can the council outline a plan to bring these roads up to the same standard or at least to have a proper lane painted on the road for bikes?<br>We have a young family and enjoy bike riding together and to school. These bike paths are essential for safe riding and we really hope the network will continue to improve and expand. Thank you. | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| It's an excellent idea and looks great. We need more across Randwick. | Thank you for your comment and taking the time to make a submission. |
| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington. This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>I used to cycle to work every day, but the increased traffic and attitude of a lot of drivers have made me afraid to ride in traffic. By building such as cycleway I will be much more likely to start cycling again. | Thank you for your comment and taking the time to make a submission. |
| It looks good, the hard separation between the road and the cycleway is definitely a plus.<br>Great to see that something is done to improve the safety of cyclists. | Thank you for your comment and taking the time to make a submission. |
| Randwick Bicycle Plan: A comprehensive network of well-connected and safe cycle routes<br>Dear Councillors<br>Support for Walking and cycling improvements: Kingsford to Centennial Park<br>In Randwick its estimated that bicycles account for 2% of trips to work, compared to 45% undertaken by car.<br>Even though across Randwick City residents have a reasonably high rate of bicycle ownership, it appears that most of the cycle trips are being made for recreation, not commuting.<br>Higher levels of commuter cycling do occur in the inner areas of Sydney, where more high quality off-street cycling facilities exist, and where more people live closer to their place of work.<br>Why don't more people choose cycling in Randwick City?<br>While there has been a steady and pronounced increase in public transport use, as infrastructure and services have been improved, the potential for major increases in cycling has not yet been realised due to a lack of safe cycling facilities.<br>The experiences observed in other cities around the world shows that an increased level of cycling is highly dependent on the existence of a connected network of safe bicycle routes.<br>-Berlin created a major turnaround on its declining bicycle use from 1970. The success has been credited to a range of policies, but by far the most important has been the provision of a network of off-street bicycle paths.<br>-Portland, Oregon (USA) cycling has increased more than four times from 1996 to 2008, substantiating research findings that more people will cycle if they are provided with safe facilities separate from motor vehicles.<br>Its great news that Randwick City Councillors are committed to implementing the 2015 Randwick Bicycle Plan to make cycling easier, safer and (even) more enjoyable.<br>These 'active transport' projects when completed will be also be substantial assets to Randwick City.<br>References: bicycling Western Australia, 2016 Census Results – Randwick | Thank you for your comment and taking the time to make a submission. |
| Thank you, I support the separated cycle way.<br>Please be mindful to build good buffers between the Traffic lane and cycleway.<br>Consider safety features at driveways and intersections so that cars can't speed in/out across the path. Examples include raised paths, markings. | Thank you for your comments. Driveway access and physical separation are key considerations of the project. |
| I would like to support plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington.<br>Safety worries is what stops me from cycling more.<br>The proposed cycleway is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>By building this cycleway I will be much more likely to cycle in the future. | Thank you for your comment and taking the time to make a submission. |
| Safer pedestrian crossings<br>I would be happy with any sort of crossing for pedestrians to be able to cross Houston road.<br>Living in Borrodale rd and trying to cross Houston rd, at certain times near the roundabout were two previous fatality's have happened in my 30 years of living here has become an accident waiting to happen, due to the heavy increase in traffic since the light rail construction commenced, so yes to a crossing PLEASE. | Thank you for your comments.<br>Pedestrian safety is a key consideration of the project. 3 pedestrian crossings are proposed along Houston Rd - near Barker St, Strachan St and Borrodale St. A pedestrian refuge is also proposed near the intersection with Day Ave. |
| good improvement | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| I am cycling daily to work. I don't feel safe on roads with moving traffic because I have experienced many dangerous situations where cyclists were not respected as road users. Bi-directional cycling ways would help mitigate these risks - the more the better. Alas, the route you propose doesn't go all the way to the CBD when departing from Kingsford or Randwick. Are there plans for a cycling route connecting Randwick to Maroubra? | Thank you for your comments. The proposed design at the north end connects to the Alison Rd shared path, which leads to Moore Park and City of Sydney cycle routes.<br>Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. There are no current plans to provide a separated cycleway between Randwick and Maroubra.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| very happy to see that there will be a separate cycleway on Doncaster linking uni/hospital to centennial park - nice one Randwick Council! We live in coogee and have always commuted by bicycle. We appreciate these efforts to provide safe options for people doing active transport - walking and cycling. Can we have more please, and can we get unsw to be more proactive on the cycling front!! | Thank you for your comment and taking the time to make a submission. |
| The only thing I can see here that would be a potential problem is the turning bay from Day Street into Houston Road. At the moment, the turning bay is only deep enough to hold one bike (two if side-by-side); the relocated turn bay could stand to have some kind of extension or filter lane or similar to allow a couple of more bikes to wait for turning without blocking through-traffic.<br>But overall it looks pretty great. There will no doubt be a lot of pushback, particularly about lost parking spaces, but I implore you to push ahead with it because as a regular user of Doncaster Avenue I have had so many near-misses. The tendency for doors to fly open (especially near the school), cars parked halfway into the bike lane and that weird bit at Goodwood Street where the bike lane crosses where cars wait to turn are all constant hazards that would be instantly eliminated by this design. | Thank you for your comments. Council will further investigate the Day Ave and Houston Rd intersection to accommodate all road users. |
| Dear Randwick Council,<br>I fully support the plans for an improved streetscape plans, including a separated cycleway along Doncaster Avenue and Houston Road, Kensington, to support active travel in Randwick.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe passage for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this infrastructure will provide protection and safe facilities to support people walking, people cycling, as well as people driving, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the area a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction. What is needed is to extend South to Maroubra especially as light rail will not go that far. Encouraging more cycling to connect with light rail via dedicated paths would be terrific. Time to work with Bayside to get Banks Ave up to scratch. | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route from Kingsford to Maroubra is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| Will you or the light rail people be reinstating the Wansey Rd safe cycleway? | Thank you for your question. The reconstruction of the shared path along Wansey Rd is part of the light rail project. |
| Very glad to see Sydney catching up with more advanced cities overseas where alternatives to the combustion engine were embraced years ago. Sydney needs a safe comprehensive green mode of transport. | Thank you for your comment and taking the time to make a submission. |
| the current plan looks good only for a new cycling lane. No that the thousands of lycra clad riders will use the big lane. they will just end up riding on the road.<br>There has been no consideration given to the traffic snarl that happens every Saturday and Sunday down Doncaster ave. This is amplified when Randwick Races has large racing events.<br>By adding lights at Acsot street you will push all the Taxi traffic down Goodwood and Bowral st as the Taxi's try to get back to the race course faster and avoiding the lights. This happens anyway on busy Race days.<br>Doncaster Ave should have be two lanes in either direction with special event clearways in place for races day/ festival etc.<br>There is only going to be more and more traffic on Doncaster Ave as housing density increase around the Uni/Kensington and Kingsford. Randwick council should be planning for this. | Thank you for your comments.<br>This project aims to provide an improved range of transport options for the community, and improve the safety of all road users. Traffic lanes are proposed to remain the same, with minor changes at reconfigured intersections. |

| Submission | Council response |
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| As a cyclist and resident of Doncaster Ave, I'm happy Randwick council is endeavouring to improve conditions. I've been cycling to and from Pyrmont, every weekday for the last 5 years.<br>However I am unconvinced this bi-direction cycleway is the most effective, based on my experience with similar bike ways through the city. Cycleways that flow with car traffic, left and right hand sides, are more effective. Please consider the following points:<br>1- Driveway access - I am unaware of another bidirectional cycleway which has so many residential driveways on it. eg: Bourke St, Kent st, etc, have nowhere near as many residential driveways as Doncaster Ave. There is much danger for cyclists, when residents must navigate a bidirectional cycleway at the driveway as well as bi-directional car traffic in front. 1st hand experience shows that drivers have difficulty assessing the lines of cycle traffic and car traffic all at once, if they are not flowing together. They are likely to not check left and right for cyclists.<br>2- These sorts of cycle ways have definite start and end points which do not reflect the fact that cyclists are most likely going the same places that cars are. eg: Todman Ave, Anzac Pde. It is difficult to get off these cycleways when you need to turn down a side street, as stopping at an intersection is impossible when a cycle light is green and there are other cyclists behind you. To turn, you must cross oncoming path of cyclists, mount the kerb, and wait for a pedestrian light, or try to merge out of the cycle lane and into traffic; which is impossible if you are going against the direction of traffic. The same goes for getting onto these cycleways, when you're entering from a side street such as Todman ave or Anzac Pde.<br>In 5 years of cycling Doncaster Ave at peak hour, I can't recall ever having a problem with the current situation of cycle lanes left and right, except for potholes. That is my experience. As a motorist, the most problems with cyclists are the Lycra mates who do enjoy a chat, and slow ride 2 or 3 astride; cyclists who I am certain will continue to use the road, and not be using this new cycleway which will require them to cycle in a single row.<br>To recap, I feel the danger posed by Bidirectional cycleways, mostly by driveway users not looking and assessing both ways accurately, is more of a threat than improving cycle ways on opposing sides of the street.<br>Separated cycleways, are certainly safer but it is more logical that cyclists should follow the direction of traffic, making them easier to spot, and creating easier points of entry and exit from the cycleway.<br>Having endured 2 years of continuing road and rail construction, night and day, if we are to endure even more on our doorstep, could we please consider the best option for cyclists, motorists and residents, not just the cheapest? | Thank you for your comments.<br>1. Driveway access is a key consideration of the project and we are evaluating the many issues associated with this.<br>2. Council is looking at every intersection and the many movements made on and off the cycleway. The Project Team is seeking to accommodate all roads users and improve overall safety along the route.<br>3. Council acknowledges that a single lane separated cycleway on each side of the road, matching the direction of vehicle traffic is a desirable design outcome. However, there are road widths constraints along the route that prevent this option. A whole lane of parking would have to be removed along the route, which is not feasible. Council is conscious of the demand for on street parking, and many parking spaces would be lost. A bi-directional cycleway on one side of the road allows many parking spaces to be retained, hence the proposed design. |
| Fantastic as someone who rides between Kingsford and the city this will be of great positive significance to me! | Thank you for your comment and taking the time to make a submission. |
| The proposed intersection at Day Avenue and Houston Road will be very dangerous for cyclists at peak hours.<br>During peak hours there is lots of northbound traffic on Houston road turning left onto Day Avenue and lots of eastbound traffic on Day Avenue. Cyclists travelling in both directions will be forced to wait at this intersection for long periods of time for a break in traffic in both directions to cross Day Avenue.<br>This could also lead to several accidents as motorists turning left onto Day avenue from houston road are focussed on other westbound traffic already on Day avenue and not cyclists crossing Day avenue to their left. | Thank you for your comments. Council will further investigate the Day Ave and Houston Rd intersection to suitably accommodate all road users. |
| I fully support the proposal, specifically the separated bike paths along Houston Road and associated landscaping. Keep up the great work! | Thank you for your comment and taking the time to make a submission. |
| Where are residents and visitors (to both friends' homes and nearby shops) going to park? You have given too much importance to a small number of cyclists at the expense of car-dependent road users. The majority of road users use their cars out of necessity and the option of riding a bike is an impossibility for them. | Thank you for your comments. Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. Existing traffic lanes and access will remain largely unchanged. |
| While commendable, these works should not proceed until the light rail works traffic debacle is completed. We do not need any more traffic disruption until the light rail is completed. There is already a cycle way in place which is sufficient until then. | Thank you for your comments. Construction funding and timing is dependent on Roads and Maritime Services (RMS). Planning and consultation is taking place in 2018. The timing of construction is not yet set and construction funding has yet to be received. Any construction wouldn't take place before mid-2019. |
| The planned cycling improvements look excellent to me, and I very much look forward to them. I would also like to see the cycle path extended along Sturt St and Bundock St. Cars tend to drive very quickly along these roads and I think that a separate cycleway would really help to form a safe connection between Centennial Park and Maroubra and beyond. | Thank you for your comments. Council is currently working on Walking and Cycling Improvements along a second route from Kingsford to South Coogee. Plans are being developed and are likely to be on public exhibition in the second half of 2018.<br>Council is also aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. Routes towards Maroubra are on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |

| Submission | Council response |
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| Improvements in cycle ways is always welcome. The current plans look promising. There is an ongoing need to extend these services to Maroubra and beyond; particularly with the rapid surge in new residences in the south east | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. Routes towards Maroubra are on the list. http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| I strongly support the improvements to the cycleways along Doncaster Ave and through Kingsford. This is a key thoroughfare for cyclists going from Kingsford and south to Centennial Park and the city. It will increase my use of cycling as a means of transport. | Thank you for your comment and taking the time to make a submission. |
| It is nice to see the Sturt St to General Bridges Crescent crossing of Bunnerong Rd is finally been addressed. It has been missed from previous works and was always the most dangerous part of cycling to city. | Thank you for your comment and taking the time to make a submission. Council is working closely with Bayside Council to ensure a cohesive design. |
| I think the cycleway is excellent, but I would like more traffic calming in Doncaster Ave, which has become a 'speedway' outside of peak hours. We need more plant beds on the edge of the roadway to slow the traffic. | Thank you for your comment.<br>Improving safety for all road users is a key consideration of the project. Due to the addition of the separated cycleway, the available space for vehicle traffic will be narrower. This is acknowledged to result in lower average speeds. The design proposes a number of kerb extensions, and Council will consider whether more can be added. |
| Great progress! Fantastic to see something positive like this being done! | Thank you for your comment and taking the time to make a submission. |
| Excellent proposal! Well done and thank you. Improvements like improve the quality of life and safety for all residents, visitors and tourists. This is an example of great public policy/town planning. Congrats on your clear commitment to:healthy living, cycling, safety, better use of existing infrastructure, reducing congestion, etc etc. Well done of linking it perfectly to the existing off road nike paths and to joining up with major community venues eg. Unsw, kensington public, kensington park, the juniors (thousands of people go there for food, entertainment, swimmimg lessons, the gym), centennial park. Be good if you can extend/develop the separated bike path in the future to link with the Hospitals, es marks athletics track, daceyville public, pcyc @ daceyville, etc. Thanks again | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. Some of the routes you mention are on the list. http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps<br>We are also working with Bayside Council to ensure this project links well with potential future projects in their LGA. |
| I'm broadly supportive of these changes. However, there is one major issue with the shared pedestrian/cycleway at the Alison Road end. I currently use the shared areas that already exist on a near daily basis as a pedestrian and while I keep to the left constantly, I find cyclists riding way too close to me and other pedestrians. Not all. But many. And they certainly don't keep to their speed limit. Pedestrians and cyclists in the same space is not safe for either. Shared spaces also encourage adult cyclists to use footpaths that are not shared spaces causing potential for accidents. I recommend you to look at options that give each group their dedicated spaces before there are injuries enabled by this design. | Thank you for your comments. Council has aimed to include a separated cycleway along as much of the route as possible. Shared paths are proposed in some locations. The kerb will be cut back between Abbotford St and Carlton St, however we will seek to maximise the avaible width of this shared path to better accomodate people walking and cycling. Council acknowledges that in busy public spaces a variety of people use the footpath, and encourage everyone to exercise caution and be mindful of others. |
| The proposed bicycle path along Doncaster Avenue is an excellent initiative.<br>Given the huge bicycle traffic to and from UNSW, the following small additions would have a big positive impact on staff and students who cycle to UNSW.<br>(a) a small connecting separated bicycle path from the Anzac Pde / Doncaster Ave intersection to the Anzac Pde / High St intersection on the eastern side of Anzac Pde. This would better connect UNSW to the Alison Road path via the proposed Doncaster path. The short section of High St from the International Rd intersection to Anzac Pde is a comfortable ride for cyclists and this extra short path would allow cyclists to avoid riding directly on Anzac Pde to reach Doncaster Ave.<br>(b) Extending the Day Ave path another block to Anzac Pde and widening the footpath around Anzac Pde so that there is a smooth 'on/off ramp' for cyclists exiting/entering the new paths from UNSW's university mall. | Thank you for your comments.<br>a. Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is working with Transport for NSW and will work towards creating a facility that enables easier movement at this location.<br>b. Council recognises the many users of the space along Day Ave and Anzac Pde near UNSW. Council communicates with UNSW and with Transport for NSW about managing walking and cycling movements in the area. |
| I'm grateful of all upgrades to bike lanes, but we need to enforce their use. Unfortunately I need to drive on Anzac parade in peak hour and there are still cyclists on Anzac parade and Oxford street, despite perfectly functioning bike lanes!!! | Thank you for your comment. Bicycle riders have the same rights and responsibilities on the road as other road users. Unless otherwise signposted, they are allowed to use the road. Anzac Parade is classified as a 'State Road' in this area and is managed by Roads and Maritime Services (RMS). Council would not support prohibiting people from riding a bike along Anzac Parade. |
| Freat improvement for cyclists. I am in my late 70's and still cycle. Well done Randwick Council. I look forward to more cycle ways as many of my cycling friends will not brave shared roads. | Thank you for your comment and taking the time to make a submission. |
| What about bundock street and Avoca street I could not see any plans for them in more detail | Thank you for your comment. Council is currently developing plans for Walking and Cycling Improvements along a second route from Kingsford to South Coogee. Plans are being developed and are likely to be on public exhibition in the second half of 2018. |
| I think this is a very good idea. The current arrangements for bikes on Doncaster is dangerous. This would be much safer. The community would also benefit from the increased tree cover and raised pedestrian crossings. 👍👍👍 | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| Great to see actual cycleway designs, but the intersection Doncaster Road and Alison Road should really have had a big roundabout or a better alternative for cyclists and pedestrians to cross, especially with the location of the light rail. Medians for bidirectional cycleways are generally too high and potential hazards. Cycling is relatively safe if roads make it so. 40+ years of cycling experience, and never have I crashed and burnt into high kerbs as often as in Sydney 4 times in 1 year... The roads are just as important for cyclists as they are for motorists, but the design should be fit for the purpose. If a road is meant to be shared, use the lowest denominator as a reference. | Thank you for your comments.<br>1. Council is looking closely at intersections such as Alison and Doncaster Ave. To access the shared path on the north side of Alison Rd, people on bikes can cross at the two signalised pedestrian crossings at the north end of Doncaster Ave. The alternative is crossing further south along Doncaster Ave, when safe to do so.<br>Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS.<br>2. Without the physical separation of the cement median blocks, cars may intrude into the cycleway. This separation also improves the sense of safety felt by people using the cycle lanes. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people. Flooding analysis along the route has required a concrete block / intermittent median treatment along the northern section of Doncaster Ave. A raised cycleway at footpath level is possible in other sections of the route where potential flooding is less of an issue.<br>3. Improving safety for all road users is a key consideration of the project. |
| It's a great idea to have the cycling path extended as proposed. My suggestion is in regards to the separation. Garden beds are a nice addition, however, other parts where is not feasible to have them, instead of having a cement division, have it clear with only the cycling path painted like bus lanes are (alternatively have it raised, same height as the footpath). Visually It's much better than the cement divisions we see in the city centre. | Thank you for your comments.<br>Flooding analysis along the route has influenced the decision to use a concrete block / intermittent median treatment along the northern section of Doncaster Ave. A raised cycleway at footpath level is possible in other sections of the route where potential flooding is less of an issue.<br>Without the physical separation of the concrete median blocks, cars may intrude into the cycleway. This separation improves the safety of people using the cycle lanes. |
| I strongly support the proposed improved cycle ways. I cycle with hundreds of other to work every day and use these roads. The health, wellness and social benefits of cycling are enormous, as well as taking people off crowded buses. Safety though needs improvement. The moment I reach the new separated cycle path on Alison Road, we feel safe. Please provide the new paths asap for the benefit of all. Thanks. | Thank you for your comment and taking the time to make a submission. |
| Overall, the separated infrastructure plan is much needed and looks good. There are two things that would make it perfect. Firstly, confirm that the footpath alongside Anzac parade starting at Doncaster Avenue and finishing in from of UNSW will definitely be converted to a shared pathway (hopefully widened too). It is already regularly used by cyclist on narrow paths with loose sand either side. Permitted or not by law, this happens and it's appropriate to make it safe and legal, as the council needs to manage the risk, given it's been used this way.<br>Secondly, when the cycle path reaches Alison road at the end of Doncaster, a crossing over Alison road on the same side as the proposed cycle path would be an ideal solution.<br>Thanks for the work so far! | Thank you for your comments.<br>1. Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is communicating regularly with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible.<br>2. Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS. |
| As a commuting cyclist, I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction. | Thank you for your comment and taking the time to make a submission. |
| Simply this: the more trees and bushes, the better. Keep planting, and keep the network operator from their aggressive pruning.<br>The problem is far bigger however (so I acknowledge the intransigence of RMS on real-life cycling matters, one metre matters notwithstanding). It does not feel safe to cycle on Sydney/Randwick's roads. The whole bicycle network needs to be better integrated. These improvements do nothing to make me or my children feel safer or provide a direct route to cycle where we want/need to go. Shame really. | Thank you for your comment and taking the time to make a submission. Council is seeking to provide additional planting and landscaping where possible. |
| Parked cars protecting cyclists is excellent. We love the trees, landscaping and that they have been placed to protect riders from 'dooring' and vehicles egressing into the bike lane. We recommend the expansion of bi-directional cycleways to 3m, to better accommodate the anticipated volume of riders, people riding at different speeds, cargo bike etc. if this is not possible over the course of the whole cycleway, we recommend it be widened on hills to improve safety where faster riders need to overtake slower ones. | Thank you for your comments. The existing road widths and need to accommodate all road users limits the available width of the bi-directional cycleway. Widths will be increased where possible. |

| Submission | Council response |
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| I am a cyclist and a resident in this area. I completely disagree with the need to create a cycleway with a raised concrete divider along this route. eg I can already cycle safely to Centennial park. Council needs to look at the pros and cons. The suburbs of Kensington & Kingston have already been totally disrupted by:-<br>1) Lack of parking<br>2) No drop off/pick up areas for public school on Doncaster Todman etc<br>3) Insufficient parking for residents visitors, friends relatives etc<br>4) Insufficient parking for elderly residents<br>5) Elderly and incapacitated people have insufficient parking to access shopping areas<br>6) Cycle tracks are more beneficial for non residents. We are the ones who continually pay higher rates then any other councils. We will lose too many benefits.<br>7) Raised concrete dividers in and around Alexandria have doomed local businesses, removed amenity to residents, who have no where to pull over even when there are no cyclist in the general area.<br>8) The UNSW continued expansion has led to grid lock in the back streets with student parking on both sides of most roads narrowing safe access and dominating resident off street parking.<br>9) Two way cycle ways in many of these streets will rob residents of parking on one side of the street which will make the other side even more precious.<br>10) There are already some shared footpaths with bicycles eg Doncaster. I support this and it works. For many hours of the day footpaths are not used by pedestrians at all. This means bicycles could use these footpaths with almost no pedestrians say from after 5.45pm for about 12 hours. No exposure to cars or pedestrians.<br>11) I have worked as a Safety Professional for 30 years with qualifications from UNSW. I am happy to discuss how these concepts can work.<br>12) The raised concrete Divider is also a safety risk to cyclists.<br>13) If you totally ignore my comments at least consider options eg The cycle way only applies during day light hours form say 7.00am to 6.00pm thus allowing residents to park at night time etc. | Thank you for your comments.<br>1. Council acknowledges that parking is an important issue for the community. Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces.<br>2. The 'kiss and go' zone for Kensington Public School is on Doncaster Ave and marked with signs. Council communicates regularly with the Principal of the school.<br>3. Please refer to point 1.<br>4. Please refer to point 1.<br>5. Council has a process that allows people with disabilities to apply for a dedicated parking space. Council also has an Access Advisory Committee that provides a forum for such issues. Information of both of these can be found on our website. www.randwick.nsw.gov.au<br>6. The proposed separated cycleway connects key destinations such as UNSW, Kensington Public School, Kingsford shops and the future Kingsford light rail terminus. It also links to Centennial Park and routes leading to the CBD. In the longer term we also see that this cycleway will link to a wider network, eventually extending south to Maroubra, Little Bay and La Perouse. The proposed cycleway will be available for the whole community to use.<br>7. Physical separation and raised blocks prevent cars from entering cycleway, and provide a safer space for people to cycle in. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. females, children and elderly people.<br>8. Please refer to point 1.<br>9. In general, the addition of the separated cycleway will not replace parking on one side of the road. The existing bicycle shoulder lanes will be removed and traffic lanes narrowed to 2.9m each way. This enables a separated cycleway to be incorporated into the design.<br>10. Council has sought to provide a separated cycleway along the route where possible. The shared path treatment is proposed where the separated cycleway treatment is not possible.<br>11. Noted.<br>12. A separated cycleway that is at the same level as the footpath is the preferred treatment. However, due to potential flooding issues, this is not possible along sections of Doncaster Ave. The concrete median blocks are therefore required.<br>13. Thank you for taking the time to make a submission. Your comments are welcome. The proposed cycleway is planned to operate at all hours, on all days. There are no plans to limit its availability to certain housrs only. |
| Dear Randwick Council,<br>I fully support the plans for an improved streetscape plans, including a separated cycleway along Doncaster Avenue and Houston Road, Kensington, to support active travel in Randwick.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe passage for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this infrastructure will provide protection and safe facilities to support people walking, people cycling, as well as people driving, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the area a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction. | Thank you for your comment and taking the time to make a submission. |
| This is a wonderful initiative. I cycle and the need for separated cycleways is crucial to encourage people to get out of their cars and reduce congestion and air pollution. The proposed route is already heavily used by cyclists, and it can be dangerous with uneven road surfaces and cyclists for into the area where they can be car doored. This proposal is fantastic. | Thank you for your comment and taking the time to make a submission. |
| Much needed infrastructure that is long overdue. Separated cycle ways need to be introduced across the Randwick council area. Heavy traffic leaves cycling and walking as dangerous forms of transport. Public amenity and mobility would be substantially enhanced if separated cycle ways are rolled out to clovelly road conncecting centennial park to clovelly beach and Coogee bay road connecting Coogee beach to POWH. | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |

| Submission | Council response |
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| I think it is a great idea.<br>commute from inner west to UNSW<br>Bus and car not a good option<br>learnt to ride bike and find good routes with no cars<br>problem get to Alison road no option or leave Centennial Park - no many good bike options<br>this proposal will assist extremely with drivers, cyclist and pedestrians<br>cycle to work = best option to travel (minus pollution, congestion, and affortable- regarding time | Thank you for your comment and taking the time to make a submission. |
| What are the details for the Bundock Street section?<br>What will happen with the current Botany Street on road cycleway (which is currently very dangerous)… | Thank you for your comments. Council is currently developing plans for Walking and Cycling Improvements along a second route from Kingsford to South Coogee. Plans are being finalised and are likely to be on public exhibition in the second half of 2018.<br>Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. Botany St is not on the list. However, Council will investigate revising this list within approximately 2-3 years.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| About time - so thank you for eventually recognising that you have been servicing cycling commuters very poorly for so long.<br>However, I remain concerned that the proposed bi-directional cycleway will be too narrow to allow efficient commuting. The council seems intent on making recreational cycleways suited to mum and dad and kids having a leisurely ride on a Sunday to pick up a baguette when the "best practice" worldwide is to provide "cycle superhighways" that allow fast, efficient and mass commuting to the central city area by bicycle. Just have a look at how London has done it.<br>If there are too many impediments, too many "bicycle lanterns" at horse crossings etc people will still prefer the uninterrupted and more efficient roadway. I realise this council is hell-bent on putting obstacles in the path of riders to "slow them down" - the illegal barricades around the light rail project are just one case in point - re-emphasizing the "car first" and "for your own protection" mentality. Why not make bicycle commuting an obviously better, faster and more efficient pathway to work - then you'll see more people taking advantage of the facility.<br>While this is a step in the right direction I am concerned that it will be another 50 years before we get what should being done right the first time.<br>Specifically I have 2 concerns:<br>The plan at this stage seems to drop southbound riders off on the wrong corner of Anzac Pde and Sturt St. How is one supposed to get from the south-eastern corner to the remaining part of Sturt St? get off and walk while waiting for two sets of lights seems to be your plan. Won't happen. Bike riders will use the roadway making a mockery of your safety "improvements".<br>Similarly at the junction of Doncaster Ave and Allison Rd - cyclists are dumped at the wrong corner and will have to negotiate two sets of pedestrian crossing lights to get back onto the cycle path around Centennial park heading north. Dumb design. | Thank you for your comments.<br>1. Council is communicating with Transport for NSW in regards to the light rail project, and with Roads and Maritime Services (RMS) regarding the signal designs. We are looking closely at intersections such as Anzac Pde and Sturt St. As noted on the concept design, on Sheet 1.8, this area is subject to final light rail intersection resolution.<br>The design proposes a shared path along the south side of Sturt St to cross Anzac Pde. To reach the Kingsford light rail terminus and future 'bike shed' people walking or cycling can use the signalised crossings. However, bike riders won't be compelled to use the separated cycleway or shared path. If confident and capable, they can use the traffic lanes.<br>2. Council is looking closely at intersections such as Alison Rd and Doncaster Ave. To access the shared path on the north side of Alison Rd, people on bikes can cross at the two signalised pedestrian crossings at the north end of Doncaster Ave. The alternative is crossing further south along Doncaster Ave, when safe to do so.<br>Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS. |
| Very supportive. All possible efforts should be made to improve facilities for cycling. Greater efforts to offer cyclists separate from road traffic are encouraged. Vocal criticism from locals affected by loss of parking and drivers can be expected, but more cyclists ultimately improve road conditions for all. | Thank you for your comment and taking the time to make a submission. |
| Please go ahead with the improvements, something needs to be done. | Thank you for your comment and taking the time to make a submission. |
| I and my friends love the idea of the walking and cycling improvements in that area, we would use them a lot. Please go ahead with them - it's the only way forward in our car-choked city - give people an alternative. If you build it, people will come. Thanks. | Thank you for your comment and taking the time to make a submission. |
| There is no question that staff and students travelling to UNSW will greatly benefit from this important cycling link.<br>The link from this path to UNSW, the last 100 metres, could have a shared path all the way to UNSW entrance with pedestrians. Students and staff are likely to take this direct route and it would be ideally a designated shared pedestrian cycle path along Anzac Pde linking from the Doncaster Anzac Pde intersection.<br>The cycle way will encourage and support sustainable active transport, improving health and wellbeing, and reduce the proportion of people traveling by car and ease pressure on public transport.<br>The addition of bike lanes also stimulates the economy and increase sales for businesses they pass by.<br>Safe bike lanes also help to lower the number of vehicles on the roads, which lowers emissions and pollution levels.<br>Bike lanes therefore improve the environment and the local economy, and provide a safer means of travel for cyclists and pedestrians alike. This path will form vital local connection in a slowly but steadily growing network of cycle ways that will improve the quality of our urban domain and ultimately the quality of our lives.<br>Do this please! | Thank you for your comments. Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is communicating regularly with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible. |

| Submission | Council response |
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| I think it is a great idea to have safer pedestrian and cycle areas. Particularly cycling as it is better for the environment and having safe bike paths will enable more people to cycle reducing traffic on the roads.<br>My only disappointment is that this plan is for only a particular area- this should be extended to other streets around Randwick making cycling safer for a greater number of people. | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| I completely support the construction of separated bike paths in the Randwick City Council area. My husband cycles to work every day and I am anxious about his safety. Cycling is good for general health and for the environment and it is imperative that, particularly given the growing popularity of cycling, much more is done - and quickly - to keep cyclists safe. | Thank you for your comment and taking the time to make a submission. |
| I love the proposal to plant more trees and provide safe space for people riding bikes. The proposed intersection improvements are most welcome as they will make it much safer for people crossing the road, particularly at Doncaster Avenue / Ascot Street.<br>The separated cycleway will encourage a lot more people to ride in the area which has big benefits for everyone.<br>Bravo Randwick Council! Please build this project ASAP!!! | Thank you for your comments. Pedestrian safety and improvements are a key consideration of the project. |
| I think it is an excellent idea. As well as segregating cyclists from cars it would also help to segregate cyclists from pedestrians. I think it will also provide people in the area an excellent way to cycle into the city. It would be handy if it could continue up Botany Street to link with UNSW, the Hospital precinct and the amenities in and around Randwick itself. | Thank you for your comments. Council has sought to provide a separated cycleway along the route where possible. The shared path treatment is proposed where the separated cycleway treatment is not possible.<br>Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| I love Bourke street cycleway and I cannot wait riding this new one.<br>I am happy it is recognised the actual Doncaster bike path is dangerous (too narrow, car doors opening on the path) and its link with Centenial park is unpractical.<br>I am living in Little bay, and to ride to the city (at least weekly), I rarely use the cycle network because it is too long and some road crossings are difficult. Like cars, I prefer to chose the shortest path and, even if it is dangerous I ride along Anzac Parade. Reducing the speed limit would be a good option.<br>Otherwise, a separated cycleway between La Perouse and Kingsford to join the Kingsford light rail stop seem a feasable and not too expansive project because all the avaiblable space along Anzac Parade. | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route south along Anzac Pde is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| Clear vision for cyclists and motorist is obviously essential. Low native shrubs are ideal for residents and commuters. | Thank you for your comment and taking the time to make a submission. |
| I think that this is terrific and long overdue. Both Doncaster Road and Houston Road are ideally suited for separated cycleways. The current approach of lines on those roads for cyclists does not work well. | Thank you for your comment and taking the time to make a submission. |
| The plans look great, with one dangerous bottleneck remaining: the link between High St and Doncaster Avenue, along Anzac Parade. Please consider a shared path on the Eastern side of Anzac Parade to fully connect UNSW to the city.<br>Thank you | Thank you for your comments. Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is communicating regularly with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible. |
| It's great - we need a separated cycleway from CBD to UNSW for many workers and students. Currently the on-street cycle lane is unsafe, and there is no safe or legal way for cyclists to get from Doncaster/Anzac Parade corner to UNSW - I either ride on the footpath or if I'm feeling brace on Anzac parade. Not ideal solutions.<br>My only comment is to include certainty of a shared path along anzac parade to UNSW. | Thank you for your comments. Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is communicating regularly with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible. |

| Submission | Council response |
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| The project is welcomed and supported as it provides the community with safe and sustainable facilities for everyday cycling for ages 8 to 80. I add the following technical concerns and comment on the published concept design drawings:<br>1. No suitable, safe or convenient cycleway connection is proposed at the northern end of Doncaster Avenue linking to the shared path being constructed along the northern side of the light rail corridor along Alison Rd. The current design shows the cycleway terminating on the south-eastern corner of Doncaster/Alison with no proposed signalised crossing of Alison Rd and no physical connection to the shared path. The drawing (Sheet 1.1) shows the existing path location, and road layout minus the tram tracks and road reconfiguration. The new location of the path on the northern edge of Alison Rd should be shown along with the method of safe connection. Without this vital connection the cycleway project will not be used or supported by the community as it will be extremely difficult and dangerous to access at its northern end.<br>2. Green pavement colouring across cycleway at residential driveways is not required by existing best practice. Recommend using the City of Sydney's guidelines for marking of cycleways: a) For domestic driveways green pavement, bicycle symbols and arrows are not required. b) For commercial driveways accommodating <25 car parking spaces bicycle symbols and pavement arrows ARE required green pavement IS NOT required. c) For commercial driveways accommodating > 25 car parking spaces bicycle symbols, pavement arrows and green pavement MUST be applied.<br>3. At the cycleway crossing of Day Ave near Houston Rd a path priority crossing on a raised pavement platform is recommend for the safety and amenity of the cycleway crossing.<br>4. The southern termination of cycleway should include a crossing of the Anzac Pde southbound carriageway to likk with Sturt St east of Anzac Pde. The current design does not provide a safe entry/exit into streets suitable for safe and comfortable cycling. Anzac Pde is not a safe cycling environment for the users of the cycleway. | Thank you for your comments.<br>1. Council is aware of the need to provide a safe and convenient connection with the shared path along Alison Rd and to Centennial Park. We are communicating with Transport for NSW regarding the light rail project and Roads and Maritime Services (RMS) regarding the signal designs.<br>Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS.<br>2. Noted. We will give consideration to this approach in the final design stage.<br>3. Council will further investigate the Day Ave and Houston Rd intersection to suitably accommodate all road users.<br>4. Council is currently developing plans for Walking and Cycling Improvements along a second route from Kingsford to South Coogee. Plans are being developed and are likely to be on public exhibition in the second half of 2018. The south bound Anzac Pde crossing will be included as part of this concept design. |
| It's fantastic news that the council has made this project a high priority. As a mother of two children at Kensington Public School, a resident of Kensington and a business owner employing 25 people in Redfern, I'm very pleased this project will allow for greater cycle access from Kingsford to Centennial Park and the CBD. We will ride during the week and also on weekends if safe dedicated bike lanes are provided which will be better for the environment and our health. The routes along Doncaster Ave past the school seem very good and would be well utilised. | Thank you for your comment and taking the time to make a submission. |
| I fully support the plans for a separated cycleway along Doncaster Avenue and Houston Road, Kensington. This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe cycling for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this cycleway will separate cars from cyclists, as well as cyclists from pedestrians, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the two streets a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>I have often thought about cycling but am afraid to ride in traffic. By building such as cycleway I will be much more likely to cycle in the future. | Thank you for your comment and taking the time to make a submission. |
| Hi there. I cycle to and from work Monday to Friday and have done for the past eight years. I ride from Astrolabe Road in Daceyville to the CBD. My ride takes me the entire length of Doncaster Avenue - from Gardeners Road to Alison Road. This is by far the most dangerous section of my journey for (in my experience) three reasons:<br>1. Mornings heading North cycling past Kensington Public School during school drop-off. Try to avoid parents flinging doors open across the cycleway.<br>2. Mornings heading North on bin day. The garbos leave the bins on the cycleway which forces cyclists onto the road, in and out of the cycleway as they dodge bins.<br>3. Mornings and evenings in either direction. Frustrated drivers try to overtake cyclists going through the Ascot Street roundabout - pushing them into the gutter.<br>Thanks | Thank you for your comments. Council aims to address each of the issues you mention with the addition of a separated cycleway and streetscape improvements.<br>1. The proposed separated cycleway will help reduce the risk of doorings with the inclusion of a 40cm median divider.<br>2. The Project Team is working with the Waste Management Team to address the issues you mention.<br>3. The addition of a separated cycleway will help reduce the risk of close calls, and separate vehicle traffic from bicycle movements. The Ascot St intersection is marked to change to a signalised intersection. |
| I'm very excited, especially the bike path along the dangerous Doncaster Avenue. I ride it every day, as ironically it is the safest option to get from Malabar to the City. Once there is a safe cycle way from Gardiners Road to Centennial Park I think there will be a huge increase in cycling. It will be wonderful. | Thank you for your comment and taking the time to make a submission. |
| I don't think any more funding should be wasted on making such changes to our roads. The so called benefits are wasted on a few and cause more disruption to traffic and local business having a far more compounding effect than benefit. Proposed changes are also situated on surrounding roads where changes to include tram lines are and current congestion is nothing compared to what it will be once the work is concluded where you will have buses, bikes, trams and cars on the road? Absolute stupidity. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| This is a significant active transport infrastructure project that the Council and RMS should be commended for championing. It provides benefits to the local community and provides an important link to UNSW - a major destination. Such infrastructure will likely assist in easing congestion by attracting more people to cycle and less people to drive to UNSW and within the Council area. It will likely provide benefit to retailers on Anzac Parade as international studies have shown that more cyclists equals more business. It would be good to ensure adequate cycle parking and direction connections are made to Anzac Parade to further promote future cyclists in patroning commercial premises. | Thank you for your comment and taking the time to make a submission. |
| It is a good start! I lived in four countries and Australia is a great place, but honestly Sydney is very late on cycle path development.<br>Anzac Parade, from Maroubra to Kingsford, is really in need of cycle path too.<br>I ride twice a day 10 km and it is very dangerous, unbelievable that on such a large main avenue there not 2 meters allocated for bicycle.<br>People don't respect distances and on the other side, drivers park and open their door without checking if a bike is coming or not. Cyclist are just trap and injuries/accident are not prevented. Some even "play" driving a 20 cm from us...<br>Wish me luck! and I count on you not to stop to Doncaster Road that is already a lot safer than Anzac Parade.<br>Thank you for reading. | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| Very valuable improvements. Benefits will accrue to more than just greenie cyclists - residents are likely to benefit from less traffic, and everybody benefits from a cleaner environment. If there is net parking loss it is likely to be worth this benefit.<br>Having good bicycle infrastructure to UNSW is also likely to reduce the pressure of university student parking on local roads and residents.<br>However, it is essential that the new path be connected to UNSW at Anzac Parade to make sure student commuters do not have to cycle on busy Anzac Parade, holding up traffic and endangering themselves. | Thank you for your comments. Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is working with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible. |
| Linking up cycling lane from Kingsford to UNSW | Thank you for your comment. |
| Omg, it would be amazing to have a proper, separated cycle lane on Doncaster! I cycle there every day and it's tight with all those parked cars. One thing I would add is the need for a shared pavement of 100 meters along Anzac between Doncaster and High Street. Nobody going to unsw will go around via Day Avenue, so this small stretch, which is a wreck right now really needs to be the final piece in connecting the cycle lane and the university. For example, widening the pavement and getting rid of that big advertising board that jutts out onto pavement on corner with High Street. Thank you! | Thank you for your comments. Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is communicating regularly with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible. |
| Excellent proposals and well overdue - must ensure that cycleway are adequately connected though or they will not encourage new riders and may be bypassed by experienced ones | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps<br>We are also aware of the need to connect to surrounding cycle routes such as the shared path on Alison Rd. |
| I am fully supportive of a separated cycle path as it is proposed. My main concern is at the intersection of Doncaster Ave & Alison Rd, and heading into Centennial Park. The Light Rail has provided assurance there will be an entrance into the park to replace the bridge that was previously across Kensington Ponds. At present there is no sign of this happening. With the addition of the separated cycleway on Doncaster there is EVEN MORE reason for a bridge/entrance into the park to be placed directly across the road. Currently you would have to cycle around to the right and up Darley Rd, or around to the Robertson Road entrances. Neither is appealing for families, or other cyclists who would see a separated path along Doncaster as a safe and convenient way to access Centennial Park. | Thank you for your comments. The connection from Doncaster Ave into Centennial Park is dependent on the light rail project, and a future shared path bridge to Centennial Park. The bridge is a project managed by Centennial Park and Moore Park Trust. Council will continue to communicate with both organisations and work towards a strong connection into Centennial Park. |
| I bike from Alexandria to UNSW every day (barring really rainy ones, 'cause I'm a wuss) and welcome any improvement to riding conditions and safety for all vehicles. As it is, riding along Doncaster is hazardous as parked cars don't check before they open doors or pull out form the kerb, and driven cars monster bike riders at roundabouts, I think largely because they're confused as to how to behave (despite me indicating that I'm pulling out into the car lane in order to get around the bout). Good on you, council, for considering a new dedicated bike path. It's what's going to make Sydney a more liveable city, in terms of reduced pollution, ease of commuting, and increasing fitness/lowering obesity. And personally, riding just makes me happy. | Thank you for your comment and taking the time to make a submission. |
| This is just a wonderful idea and I am a very strong supporter. Sydney needs all the cycling infrastructure it can get, especially around the universities. | Thank you for your comment and taking the time to make a submission. |
| I'm cycle to and from work and I support any effort to help people cycle safely and effectively. These proposed improvements look great and I support it.<br>I'm however concerned about parking for residents in the affected areas. What kind of accommodations can be made for them because not everyone is able to cycle and many residences do not have off street parking. | Thank you for your comments. Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. |
| Very happy for cycleway opposite us on Doncaster Ave Kensington. We need this to keep cars and bikes safer. | Thank you for your comment and taking the time to make a submission. |
| I support having more spaces for pedestrians and cyclists given back. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| ... Doncaster Ave is my address. There is a large pepper tree that RCC planted on the nature strip out front. It is not a suitable tree as roots have again broken the curbing, lifted road asphalt, my front fence and the concrete footpath. RCC made repairs some years ago but further damage and footpath trip hazard have returned. Please replace the tree with one less damaging, repair the damage and remove the trip hazard. | Thank you for your comment. The Project Team at Council has forwarded this issue onto the Tree Management Team to address. |
| A dedicated cycle path is desperately needed alobg Doncaster Ave. The path currently available to cyclists is very dangerous. I experience many near misses while using it. | Thank you for your comment and taking the time to make a submission. |
| The new cycleway looks good! A question about the north end of the cycleway for people cycling from the north side of Alison Rd to the east side of Doncaster Rd. Is the recommended/ideal means for riding between these cycle ways to cross Doncaster at the lights? And will most cyclists instead take a shorter route by crossing Doncaster at Abbotford St? | Thank you for your comments.<br>Yes. To access the separated cycleway from the north side of Alison Rd, people on bikes can cross at the two signalised pedestrian crossings. The alternative is crossing further south along Doncaster, when safe to do so. Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS. |
| The more infrastructure that can be built for healthy transport, both walking and cycling, the better. Improve liveability and make Randwick a city of the future - not a car-based city of the past! Separated cycleways and pedestrian zone are especially important and should be prioritised! | Thank you for your comment and taking the time to make a submission. |
| Love the proposed cycleway! | Thank you for your comment and taking the time to make a submission. |
| Love it - the more we can create infrastructure for safe cycling the better - more bikes means better health and less cars! | Thank you for your comment and taking the time to make a submission. |
| Terrific plan Randwick Council! Well thought out proposal. Will make cycling much safer on high usage Doncaster Avenue cycle way. I've seen a large number of 'car door' near miss incidents with cyclists under the existing bike lane next to parked cars. The cycling improvements will save serious injuries and lives. In addition these changes will materially improve the cycling and walking amenities for residents. Safer walking and cycling links to Centennial Park will vastly improve every day living amenities for residents and visitors. Likely to get more people physically active and get more cars off roads for short trips.<br>Great initiative! Completely support the approach taken for this improvement. | Thank you for your comment and taking the time to make a submission. |
| These plans are a fantastic start to alternative sustainable transport options this City is in desperate need of. The Bourke St cycleway has proven to be a successful transport corridor, and this can be seen during not only peak traffic periods, but throughout the day | Thank you for your comment and taking the time to make a submission. |
| Brilliant | Thank you for your comment and taking the time to make a submission. |
| Will this new cyclepath connect with the Alison Road Busway to the new Centennial Parklands (CP) bridge over Kensington Pond? If it does not, I am concerned that the cycleway will only direct cyclists to using the CP Randwick Gates or Lang Rd Gates. | Thank you for your comment. The connection from Doncaster Ave into Centennial Park is dependent on the light rail project, and a future shared path bridge to Centennial Park. The bridge is a project managed by Centennial Park and Moore Park Trust. Council will continue to communicate with both organisations and work towards a strong connection into Centennial Park. |
| I support the proposed cycling and walking improvement between centennial park and Kingsford. I would ask for additional works to support north-south pedestrian crossing of Day ave at the western side of Doncaster ave. | Thank you for your comment. Council has reviewed existing pedestrian movements at a number of locations along the route. A pedestrian refuge will be kept but slightly modified on the west side of the intersection. A north-south pedestrian 'zebra' crossing doesn't currently meet the criteria for implementation in this location. |
| Great, I strongly support the idea and think the planning is good. As someone who was not allowed to cycle to school (Kensington Primary and Sydney High) because it was deemed "too dangerous" I wish you had done this years ago. Better late than never. Thank you, this is a really good idea. | Thank you for your comment and taking the time to make a submission. |
| I would like to strongly support the introduction of the cycling improvements.<br>The separated cycleway will increase safety for cyclist and encourage more people to cycle. | Thank you for your comment and taking the time to make a submission. |
| Thank you for the opportunity to comment<br>1. Doncaster AVe / Alison Road intersection unresolved. This should give direct access onto the Alison Road bikeway - level change now looks impossible; very unsatisfactory as this is a major route both to east and west along Alison Road<br>2. Doncaster Ave bikeway is too narrow for two way cycling - this is a busy bike route including for fast cyclists, and there is plenty of space. If the design is too narrow, fast cyclists will continue to use the road surface, particularly northbound, which will cause conflicts with vehicle drivers shouting "get on the bikeway";<br>3. Please make sure there is a north/south option at Day Street - many cyclists use Doncaster Road through towards the Gardeners Road bridge over Southern Cross Drive | Thank you for your comments.<br>1. The Doncaster Ave and Alison Rd intersection is often very busy, with many different transport modes and road users. RMS looks after signalled intersections and TfNSW is managing the light rail construction. Council is communicating with both stakeholders and will seek to provide safe access to the Alison Rd shared path.<br>Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS.<br>2. Unfortunately there are road width constraints along much of the route, which has determined the 2.4m wide bi-directional cycleway. People riding bikes will not be compelled to use the proposed cycleway. Confident and capable cyclists are welcome to use the road if they choose to. The addition of a separated cycleway provides a greater choice of transport modes for the community.<br>3. The focus of the project is along Doncaster Ave, Day Ave and towards Houston Rd. Council will note the movements you mention for future cycle route planning. |

| Submission | Council response |
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| To whom it may concern,<br>As a resident of Doncaster Avenue, I am greatly concerned with the councils plans to remove multiple parking spots from the street. This comes at a time where parking is scarce enough as it is with competition between houses without parking and apartments without parking at an all time high thanks to new developments in the area.<br>This parking issue compounds on weekends when the races are on, where visitors from areas outside of the local area take the remaining spots that local residents would otherwise be fighting over already. Furthermore, light rail development on Anzac Parade has taken away more parking for visitors to the area, meaning visitors and locals alike looking to park near shops such as Peters of Kensington are parking in Doncaster Avenue instead.<br>I question the council's decision to choose Doncaster Avenue over Anzac Parade as a main thoroughfare for the cycleway, given it is a local residential street that is already under stress, and given that Anzac Parade already is a main conduit for transportation of all types.<br>Doncaster Avenue already has two dedicated cycle lanes on either side of the street. If these have been designed to allow cyclists and motorist to co-exist on the road already, I strongly question the need to redevelop a dedicated cycleway at the cost of local residential parking.<br>It is critical that the council understand that any further stress to the parking situation in the immediate vicinity of Doncaster Avenue would have dire effects on local residents, especially for those with families in houses without onsite parking who rely on their vehicles to carry out their day to day activities. and I would ask the council to consider if the benefits of this new cycleway are justifiable given the impact it will have on our local community, and given that there are already 2 dedicated cycle lanes on the road already. | Thank you for your comments. Council acknowledges that on-street parking is an important issue for residents. Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces.<br>Doncaster Ave and Houston Rd are currently well-used by pedestrians and bike riders. They link Kingsford with Centennial Park, and paths to the Sydney CBD. Community consultation took place in 2015 to identify and prioritise the construction of cycling routes across the LGA. This route was identified as the number one priority. The route also aligns with NSW Government plans for key strategic cycling corridors.<br>The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. females, children and elderly people. Council is commited to providing a network of safe and convenient walking paths and cycle ways linking major land uses and recreation opportunities. |
| I fully endorse the planned streetscape and cycling improvements and the more detailed response by BIKEast.<br>I would also like to see lateral access from the side streets made safer by concurrently introducing 40 kph local pedestrian priority zoning.<br>Cycling Without Age is also being introduced nearby at Montefiore Randwick Council. Therefore, for operation of trishaws it is necessary to ensure minimum 1.4m clearance, 3.0m wide two-way separated cycleway and allow for 6.0 metre radius turns for ease of operation. Within the next 3 years we expect 10 to 12 such trishaws to be in operation through Randwick LGA. | Thank you for your comments. Council has considered access from side streets as part of the design. Currently there are no plans to reduce the speed limit to 40kph, however the project team will consider this request. Council acknowledges the Cycling Without Age initiative and the access requirements needed for practical movement. For much of this route, a 3m wide bi-directionsl separated cycleway was not possible due to road width constraints. |
| You have my support, this will be fantastic. I regularly ride around UNSW as I am a student and I don't like to pay for public transport. I have been very close to accidents before with aggressive drivers and have been doored before. A separated bike lane would help a lot. | Thank you for your comment and taking the time to make a submission. |
| i think they great improvements that will improve the flow of traffic, promote cycling and increase safety for cyclists. | Thank you for your comment and taking the time to make a submission. |
| I am a student who lives in Darlington and I cycle on Doncaster Avenue almost everyday to get to UNSW to study. I have almost being hit by cars on this road many times. The current bike lanes on this street are not wide enough and many times I have had doors nearly opened on me. The bike lanes are very bumpy in places too. Doncaster Avenue can be especially dangerous at peaks times, particularly 3pm (parents collecting their kids from school) and 5pm and I try to avoid cycling at these times. Separated and dedicated bike lanes would make my everyday journey much, much safer and much less stressful. It would encourage more students to ride to uni too, knowing that it's a significant part of their journey where they do not have to worry about cars overtaking them which can be at best stressful and at worst deadly. | Thank you for your comment and taking the time to make a submission. |
| Any extra cycling facilities are welcome. | Thank you for your comment and taking the time to make a submission. |
| Hi,<br>I think it is a fantastic idea! I've only recently started bike riding and have always wanted to cycle to centennial Park and Kingsford but with the lack on bike paths I've been putting it off until the road works are finished. Please take into account my support for your proposal! | Thank you for your comment and taking the time to make a submission. |
| I ride through this area regularly and find it very scary and dangerous. I welcome any changes that make cycling safer and more enjoyable. | Thank you for your comment and taking the time to make a submission. |
| This proposed cycleway would be a big improvement, currently it is very dangerous for cyclists to ride this route. It is also needed to continue such a cycleway to maroubra and beyond | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| We own the property at ... Doncaster ave and the proposed cycle path is directly impacting access ways to our property. The proposed garden bed seems to impact any future plans to have drive way access to the property. I am also concerned about children's safety as the cyclists will be whizzing past our front gate and collect people who come out of the gate. The safety of the parked car passengers is also compromised by putting the car parking right next to the moving traffic on one side and cyclists on the other side. how is this going to guarantee the safety of people getting in and out of parked cars? I don't see how these concerns have been addressed in the proposed plans.<br>We do support putting more trees along the street and the additional pedestrian crossings that have been proposed.<br>We need further consultation opportunity about what is happening right outside our gate and the access path to the property. Council has not made any effort to meet with us. How can I meet with an council official to discuss our concerns further? | Thank you for your comments.<br>1. Council will consider any future driveway construction requests, as per current practices. Kerbs and any future cycleway infrastructure will be modified if and where necessary.<br>2. No changes to the nature strip are proposed between the existing footpath and proposed cycleway outside your property. Council acknowledges that people of all ages use the footpath along Doncaster and pedestrian access will be maintained.<br>3. As always, Council encourages all road users to exercise caution and be mindful of others. The design introduces new streetscape elements and aims to improve safety for people choosing to ride or walk along the route.<br>4. Council staff door knocked the whole route during the consultation period, and visited your property on Thursday 7 June 2018. For people that weren't home, we left a calling card inviting residents to call or arrange a follow up meeting. The Project Team is willing to discuss your concerns in person, and will be in contact with you shortly. |
| I like the inclusion of tree's in the development; more of them would be welcome. Please select varieties that grow tall and form a natural canopy. It helps so much when riding in the hot summer months.<br>I would also be great if the bi-direction lane was a little wider (2.9m, same as a vehicle lane). A lot of commuter cyclist are not riding road bikes with narrow handle bars, but larger commuting bikes, often with pannier bags. These are a lot wider and need more space to pass each other safely (particularly at speed). It will also improve the amenity of the cycle path. | Thank you for your comments. The Project Team is working closely with the Tree Management Team to select appropriate trees along the route.<br>Council acknowledges your concerns regarding the cycle lane width and safe passing distances. Unfortunately there are road width constraints along much of the route, which has determined the 2.4m wide bi-directional cycleway. |
| Wonderful initiative<br>For the perspective of protecitng the safety of the human beings that are trying to get around our busy city - pedestrians and cyclists alike<br>I love that it is genuinely spearated and bidirectional<br>I love the street scape improvements enhancing those streets for residents and street users across the board<br>I take my 8 and 10 year old dauhters on bike rides around Sydney (and on holidays around the world)<br>I like the initiative to try and begin the catch-up to other global cities | Thank you for your comment and taking the time to make a submission. |
| I applaud the plan. Anything to benefit walking, cycling, use of public transportation, in that particular order, this is starting to be the priorization scheme of transport in major first world cities. Randwik should not stay behind. Decentivising the use of car by favouring eco-friendly alternatives is exactly what Sydney needs. Car congestion is an actual or impending plague(disease) in major cities; you should do everything to prevent it. For god sakes, yield to pedestrians, we need zebra walks. Pedestrians should be kings, car traffic should vow. | Thank you for your comment and taking the time to make a submission. |
| i ride everywhere with my children and live locally. it is very important to have a bike path that is seperate from the road. riding on the road is dangerous due to the aggressive nature of sydney drivers. | Thank you for your comment and taking the time to make a submission. |
| Good improvement over current setup and will be a good starting point for a network of top quality cycle paths. Good to get bikes out of the door Zone | Thank you for your comment and taking the time to make a submission. |
| It is very essential to have the planned cycling planned cycling. | Thank you for your comment and taking the time to make a submission. |
| Hi I made a submission earlier in support of this but had something important to add. It's important that any cycle lane removes the risk of 'car door' impacts; otherwise, it's not an improvement on the current arrangement. The proposed designs appear to leave only 40cm between parked cars and the cycle lane. This is much less than the size of a car door, so the gap should be increased, perhaps with a hedge/planting. Thanks! | Thank you for your comments.<br>Council is aware of the issue of 'car dooring' and the safey of people riding is a key consideration of the project. There are road width constraints along much of the route, which limits the width of the cycleway and divider.<br>The proposed cycle lane adjacent to parked cars on Doncaster Ave (north bound bike riders) runs in the opposite direction to parked cars. This allows improved line of sight between bike riders and people in the passenger seat, compared to current 'shoulder lane' conditions. It also means any potential collision would occur against the flat side of the car door. |
| Hi. To be frank this bike route is not something i would probably ever use outside of recreational purposes. If it goes down i will definitely test it out!<br>Since i started cycling in January I have been looking around for useful dedicated bike paths instead of having to drive my car around and commend the Council on this plan and very much hope that it is completed. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| A cycle path on Doncaster ave would work if wide enough as most cyclists ride in peleton groups on the road and not the cycle path. However I would not be happy if parking was lost for a cycleway. Parking on Doncaster is already extremely difficult with the loss of parking on Anzac parade.<br>It would also be great if council could at the same time fix the many potholes on Doncaster ave so residents aren't woken to the shouting of many cyclist groups yelling 'hole' before 6am. | Thank you for your comments.<br>The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. females, children and elderly people. The design doesn't aim to draw road cyclists away from their chosen routes.<br>Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces.<br>Thank you for identifying the presence of uneven surface along Doncaster Ave. Council will conduct an inspection of the road. |
| Yes. I love the plans for the new and improved separated. Bidirectional cycleways . The more the better , | Thank you for your comment and taking the time to make a submission. |
| I regularly cycle from Redfern to Heffron Park, Maroubra via Doncaster Ave and Houston Road. At a glance of your proposals, I am happy with the proposed bike lanes. On Doncaster Avenue, changing the existing "bicycle lane" from a dangerous car-door lane to a real, separated bike path is definitely the right move. The way the bike path continues and remains separated from motor traffic at the intersection of Doncaster and Day is a good design.<br>If I have one concern, it is to make sure residents and visitors of houses along those streets check for cyclists before pulling into and out of their driveways and side streets (eg Barker Lane, Strachan Lane). Green paint and a targeted leafletting or doorknocking education campaign will help this. I look forward to seeing this constructed soon. Good proposal. | Thank you for your comments. Driveway access is a key consideration of the project and Council will work to deliver supporting information to the community to manage such issues. |
| Yes please! I have just started cycling to work (South Coogee to Surry Hills) and it has improved my health and fitness so much. It also means one fewer car o the road and less pollution. But it is terrifying on the roads without separated cycleways. Cars are very aggressive and drive dangerously to push me off the road. A separated cycleway would make a huge difference. | Thank you for your comment and taking the time to make a submission. |
| Great ideas, especially the cycle path. Better for the environment and health. | Thank you for your comment and taking the time to make a submission. |
| I fully support this - will be a good addition to safe cycling and walking infrastructure | Thank you for your comment and taking the time to make a submission. |
| I think this is a wonderful initiative. Really happy to see Randwick Council is committing to serious biking infrastructure for the general public who need safe, separated bike paths.<br>I do think we should be doing more and faster. I frequently see funds spent on infrastructure that will be low use and could be better diverted to better cycling infrastructure (eg. the footpath built next to South Coogee cemetery a few years ago - where no-one ever walks - but where there is no adequate cycling path).<br>Specifically, it would be great to see the following extensions of the existing planning:<br>1. the section in this plan along Bundock St should be upgraded to a separated bike path also. This road could be an important link from Doncaster Avenue to South Coogee and Maroubra Beach. The road is wide and has no houses on one side - so its a perfect candidate for an upgrade - at a minimum, the footpath should be fixed so that cyclists can ride on it.<br>Further improvements should include:<br>2. Add a proper segregated bike path from cnr. Malabar Rd, down Torrington Rd, along Marine Pde the length of Maroubra beach and join with the existing marked lane on Fitzgerald Ave up to Anzac Pde. This would create a safe bike path for a key transport route and link several key local zones eg. the beach with Des Renford Centre<br>3. create a proper separated bike path along Malabar Rd between Fitzgerald Ave to Mount St. This is identified as an existing bike lane route, and is used by many cyclists, but in fact is a busy street with lots of traffic and no bike lane marked - only a token bike symbols painted in various places<br>Just generally - a number of roads identified in the network plan are not proper bike paths. Several roads have a bike logo painted on the road, but there is no dedicated lane for bikes to ride along. This creates dangerous mixes of car and bike traffic. As is well-documented, women and children will rarely use unsafe routes, and improving these routes could greatly increase cycling in our community:<br>https://www.theguardian.com/commentisfree/2018/jun/13/safety-women-cycling-roads?utm_source=esp&utm_medium=Email&utm_campaign=The+Best+of+CiF+-+AUS+-+2018+rebrand&utm_term=278018&subid=22593358&CMP=ema_2313 | Thank you for your comments.<br>1. Council is currently developing plans for Walking and Cycling Improvements along a second route from Kingsford to South Coogee, along Sturt St and Bundock St. Plans are being developed and are likely to be on public exhibition in the second half of 2018.<br>2. Council conducted community consultation in 2015 to prioritise the construction of bike routes in the LGA. A map of the routes is on our website. http://www.randwick.nsw.gov.au/__data/assets/pdf_file/0004/24556/RCC-bicycle-route-construction-priority-map.pdf<br>At this stage, separated cycleways on Torrington Rd and Marine Pde aren't a focus for Council.<br>3. Please refer to point 2. Council currently has no plans to upgrade Malabar Rd to include a separated cycleway.<br>4. Council is aware of the need to provide further cycle infrastructure and improve the network, and will work towards these improvements. |
| I am very excited that Council will be creating bike paths and promoting active transport. My only concern is that this is dependent upon NSW Gov Funding, and that there is no timeline for completion. It would be good to complete something tangible so that the public can have faith that more cycling infrastructure will be provided, thus prioritising cyclists and helping to change the current attitudes of motorists. | Thank you for your comment. As you mention, the project is dependent on NSW Government funding. Council will continue to follow due process and work with the local community and Roads and Maritime Services (RMS) with the aim of completing this project. |
| Why are you punishing the people of Doncaster Avenue by taking away half their parking, while simultaneously increasing the population density along Anzac Parade (requiring more parking!) AND forcing more cars that used to drive on Anzac Parade, into Doncaster.<br>Please, stop this. All it will do is create congestion, and build for a cycleway that no one uses 23 hours in a day, if it is used at all. | Thank you for your comment. Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. |

| Submission | Council response |
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| I think this is a really well considered and planned cycleway, which will go a long way to improving connectivity in the region. Hats off to Council for being proactive in bringing about the provision of infrastructure such as this where it is needed.<br>It would be great if the next cycleway projects linked this network to the existing City of Sydney Cycleway network, as cycleways need to be connected for unsure road users to take advantage of them. The leading opportunity for this would be Todman Avenue, given the width of the road and the ability for Randwick Council to enable this change. | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| Any additional separated bikeways are much appreciated. Will Alison road also have the bike way reinstated that was removed for tram line ? | Thank you for your comments.<br>A shared path on north side of light rail tracks beside Alison Rd has been constructed as part of the light rail project between Anzac Pde and Darley Rd. On the south side of Alison Rd, from Darley Rd to Wansey Rd the shared path will be reinstated. It will continue up the west side of Wansey Rd to High St.<br>The previous cycle path along Alison Rd will not be reinstated. |
| I support there that are more traffic calming and pedestrian crossings that are not hard for children, parents or elderly<br>Connected cycling routes routes to other cycleways as well as the popular Centennial Park will allow a greater catchment of riders and families to get to the park and beyond safely | Thank you for your comment and taking the time to make a submission. |
| Long overdue upgrades.<br>More people walking and cycling = fewer cars on the road and a healthier community.<br>I have recently moved here from Melbourne where I was an avid cyclist. Randwick roads are poorly maintained and drivers are overly aggressive I dont feel safe cycling here and would never encourage my children to ride on the roads.<br>This needs to be addressed urgently | Thank you for your comment and taking the time to make a submission. |
| Fantastic to see Randwick Council build these separated cycleways. As a parent with children, it is very important that we have safe, separated infrastructure for kids and less confident riders.<br>It's also good to see a commitment to pedestrian safety and convenience such as raised zebra crossings. | Thank you for your comment and taking the time to make a submission. |
| This is an important addition to the light rail. It is a populous area and a popular cycling route, so good cycling/pedestrian measures will allow better car-free commuting. In particular it will allow kids who go to Sydney Girls or Sydney Boys to cycle to school from the south-east. The distance is not great, but the traffic is scary. Separated cycleways are by far the best option.<br>The increased trees etc also improves the general amenity. Thoroughly supported. | Thank you for your comment and taking the time to make a submission. |
| I support this streetscape and protected bidirectional cycleway. I believe this is key in getting more people cycling, improving community health, and decreasing inactivity related diseases, childhood obesity, congestion, pollution. I have many friends who state they would love to cycle to Centennial Park, but are too scared at the moment with the current lacking facility. I also support the pedestrian upgrades as it can be difficult to cross these streets at the moment, which is of concern due to the public school and kids travelling towards Centennial Park. It is important that this streetscape joins on either end - Randwick to join Alison Road and Bayside Council to develop Banks Ave. I hope that many more cycling routes will be built very soon. | Thank you for your comment and taking the time to make a submission. |
| Brilliant. The city needs more improvements like this. | Thank you for your comment and taking the time to make a submission. |
| As a cycle commuter who uses this route daily between Centennial Park and UNSW, this is a very important safety and green development. At present Doncaster Ave is one of the more dangerous parts of a commute in the area (heavy traffic in single lane road, and cycle lane renders one at risk of being "doored"), and I am aware of several accidents. Cycling danger increases the closer one gets to UNSW, and it is hoped Doncaster can link to UNSW via a shared footpath. Great to see Randwick Council taking the initiative here and promoting green transport. Residents in these streets will see the value of their properties rise through enhanced local amenity. | Thank you for your comments. Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is communicating regularly with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible. |
| It's great that you are finally moving to separated cycleway. This is the only way to make cycle paths attractive and safe. I have lived in multiple cities in Canada (Ottawa, Montreal) where these have been used very successfully and appear to have grown the number of cyclists over time, which will be great for the environment. The current cycleways used in Randwick city where there is a bike painted on the curb are dangerous in my opinion - drivers seem to take no notice of these. I ride on the road to work and routinely bet abused by drivers coming past me. | Thank you for your comment and taking the time to make a submission. |
| As a daily commuter from Circular Quay to UNSW, I congratulate Randwick Council to take the initiative to improve cycling access around the Eastern Suburbs. I am particularly concerned about the current unsafe situation along Doncaster Ave. The so called bike lanes along both sides of the road are completely inadequate. All they do is force cyclists into the door zone of parked cars and encourage unsafe overtaking by motorists. The two roundabouts along Doncaster Ave. are also a dangerous to negotiate for cyclists. Cyclists are forced to merge into the car lane and I had numerous near misses with aggressive car and truck drivers.<br>I encourage you to proceed with the planning and implementation of the proposed new bicycle route and to take on board the recommendation of bicycle user groups such as Bike East. | Thank you for your comments. Improving safety for all road users and providing enhanced infrastructure for people choosing to walk and cycle are key considerations for the project. |

| Submission | Council response |
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| I support the newly planned streetscape improvements for the cycleway, especially the stretch along Doncaster Avenue and Houston Rd. The current stretch is particularly dangerous, due to poor visibility, small dimensions, parked cars, poor road surfacing and especially with the increased traffic due to lightrail construction. It is a much needed link in the cycling network and will support travel to UNSW and the south east. The inclusion of seperated cycle paths will encourage much wider adoption of active forms of transport. | Thank you for your comment and taking the time to make a submission. |
| I am delighted with your streetscape plans, and particularly the development of a separated cycleway along Doncaster Avenue and Houston Road, Kensington. I cycle Doncaster Road every day on my commute from Bondi Junction to UNSW. It is almost certainly the most dangerous part of my ride despite, or I would argue perhaps because, of the present cycling lane arrangement. I have to travel at the edge of this lane due to the risk from car doors being flung open. This is a real risk - last year I had one of my students taken out in just this manner on Doncaster Road. He was thrown off his bike into the car lane and was very lucky that no cars were going by at that time.<br>When cycling at the edge of the lane, however, I estimate that the majority of cars pass within one metre of my right handlebar. Some drivers even make a point of yelling out that I should get into my the cycling lane. I can understand their annoyance - they just don't appreciate what a death trap the current bike lane is if you ride close to the parked cars. I should add that since the revised cycling road laws in NSW, I have seen numerous cyclists pulled up by police in the Eastern Suburbs but never once seen a driver pulled up for coming within a meter of a cyclist. I understand from Press reports that cyclist bookings absolutely dwarf motorist bookings under the changed laws.<br>During the last School holidays I had to bring three nine year olds from Bondi Junction over to UNSW sports camp for one of the weeks. It was wonderful to put them on their bikes and bring them through Centennial Park and then the cycle way down Alison Rd. However, I coudn't risk them riding on Doncaster Rd so we had to go on the footpath, with all the risks that entails for them with cars pulling out of driveways, but also for pedestrians, their dogs etc. A separated cycleway would be a wonderful solution to this problem - I am sure it would encourage increased cycling. It would certainly have made it far easier to persuade my wife to allow us all to cycle. She was, rightly, very concerned about the risks to the kids from the present, inadequate, cycling facilities. The other proposed cycling improvements are also desperately needed. Coming down High St past UNSW at present on an bike is extremely dangerous due to the car parking, and buses. Climbing up the hill is also dangerous due to the slow speed of cyclists yet high speed of many cars.<br>To conclude, I entirely support your proposed cycling and walking improvements. If anything, I ask that the Council have even greater ambition in providing safe, secure and attractive cycling and walking options. Could I also ask that you pressure local police to actually take cycling and pedestrian safety more seriously. In the end, our challenge is one of culture and responsibility as well as cycling infrastructure. | Thank you for your comments. The proposed design and inclusion of a separated cycleway aims to provide a safer transport corridor for all road users.<br>We are very sorry to hear about the incident. |
| I am very supportive of the changes and our family would benefit greatly from the bike path to Centennial Park. | Thank you for your comment and taking the time to make a submission. |
| We ive at ... Doncaster Ave.<br>... I have four young children. We have a serious problem of 1) bikes using the footpath (often at speed) and 2) bikes who are in the existing bike lane proceeding south on Doncaster Ave "running" the red light by going up the driveway nearest the lights, proceeding through the red light on the footpath, then going back into the bike lane via the next driveway once the bike has gone through the red light. These problems present a danger to are four chilkdren, we have nearly been hit by a fast moving bike when coming our our gate on several occasions. We are worried tha tthe bike lane will attract even more bikes who will do these things. A pedestrian should feel safe when walking or standing on a footpath. Is it possible to construct a bollard or something similar to stop or deter bikes from doing this? ie something that allows pedestrians to walk down the footapth but stop biked doing this? It is particuarly needed near the lights given the occurance of 2) above. Thanks for you attention to this feedback. | Thank you for your detailed feedback. The Project Team has considered access to side streets and connections to the cycleway. We are looking closely at intersections such as Doncaster Ave and Todman Ave to accommodate the various movements of people walking, cycling and driving. Council will work closely with Roads and Maritime Services (RMS) on the signals and seek to improve through movements for bicycles at this location. In doing so, this will likely result in fewer people on bicycles using the footpath. |
| I hope this will go some way to improving the safety of my commute, and that you you use the proposed separated cycleways, and appropriate traffic calming measures, and improved lighting.<br>The busy intersection of Day Avenue and Housten Rd, and the roundabout of Day Av and Doncaster Rd, are currently very dangerous for cyclists.<br>I cycle daily from St Peters, where I live, to UNSW, where I work. In Randwick, I use the shared car/bike and car/pedestrian cycleways where they are useful for me.<br>I hope this is a genuine commitment to improving cyclist safety, and a box ticking exercise. My observation is the council does a poor job with regards to maintenance of its existing shared bicycle facilities, which I use most days. Here are some examples:<br>- The painted bicycles on the roads are frequently faded/chipped and invisible in bad weather, and only rarely repainted (unlike other aspects of road painting, which seems to be done at different times.<br>- The mini-roundabout 'watch for bicycles' sign-age on shared bike/car roads is frequently missing. After it has been destroyed by a large vehicle, it is my observation it is not replaced (although the destroyed old signage does get picked up).<br>- Illegal parking of vehicles associated with a garage around the point joining of the bike/pedestrian path and the bike/car shared road of Tunstell Road (south) and Gardeners Rd is a frequent hazard area, can be slippery due to buid up of fallen leaves, and is poorly marked. | Thank you for your comments. Council is soon to update the bicycle 'shoulder lane' line marking on Todman Ave, and also investigating improvements to line marking for bicycles at intersections. Council officers will visit the intersection of Tunstall Ave and Gardeners Rd. Please write to Council with any future issues you may have. |

| Submission | Council response |
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| Long overdue. As a former (I moved to Randwick) bicycle commuter (CBD to Maroubra) I understand this is a high volume route for many (in cars, on foot too). Don't wait until someone dies along this route when you could have done something to improve it. With a school zone and drop off, parked cars, rubbish bins on the streets, the Doncaster Av area in particular needs better infrastructure to make it safer for everyone. Thanks | Thank you for your comment and taking the time to make a submission. |
| The Centennial Park to Kingsford route via Doncaster Avenue is extremely popular with cycling groups and as such often has bunches of 10+ riders.<br>Given that the proposed cycle way does not appear to meet the legal criteria to be defined a 'Cycle Lane' its use will not be mandatory and is unsuitable for groups. What measures (such as signage) will be implemented to prevent the abuse of cyclists who chose to legally ride on the road by car drivers? | Thank you for your comments. Council is aware that road cyclists use Doncaster Ave and will continue to do so. The proposed cycleway will not be marked as a 'bicycle lane', and therefore people on bikes won't be compelled to use it. The Project Team will consider using other signs where appropriate in the final design stages of the project. |
| I fully support bidirectional separates cycleways to and from Centennial Park to Kingsford. I'm a frequent user of this route, particularly on weekends to connect through to other off road cycleways such as the Cooks River and the one past the airport to Botany bay | Thank you for your comment and taking the time to make a submission. |
| Wonderful -will make getting to UNSW easier by bike | Thank you for your comment and taking the time to make a submission. |
| No, no, no to the Doncaster cycleway plans! Improve current signage and markings but you are disadvantaging one entire side of the street, and limiting parking for all - parking that is already beyond stretched. | Thank you for your comments. Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. |
| The planned streetscape improvements are much needed to keep cyclists and pedestrians safe from the growing number of motor vehicles on the road.<br>It will also reduce the bikes using the road to commute hence the agro towards cyclists will diminish in the areas. | Thank you for your comment and taking the time to make a submission. |
| I support all the improvements to cycling and walking. Safer infrastructure is very important. | Thank you for your comment and taking the time to make a submission. |
| I sometimes need to ride from my city office to UNSW. This infrastructure will provide a safer, more direct route. I look forward to using it. | Thank you for your comment and taking the time to make a submission. |
| I strongly support the provision of highest quality separated cycling paths with maximum priority to cycling at intersections. | Thank you for your comment and taking the time to make a submission. |
| The bike lane is a great idea! I ride to uni (UNSW) from Newtown and between the Paddington and Kensington UNSW campuses most days of the week, so these improvements will really help the safety and health of students like me, and of other locals and commuters. | Thank you for your comment and taking the time to make a submission. |
| I am a Sturt Street resident and I strenuously object to this plan on the following basis;<br>1. The loss of the nature strip is a substantial insult to the appearance and amenity of the street. The 1.5 meter green space provides a valuable buffer to the substantial street commotion since traffic has doubled and quickened since light rail diversions have been in place.<br>2. Sturt St is a two sided residential street, the imposition of clearway and the destruction of green space is profoundly incompatible with the lives people are living on this street. Kids play, dogs are walked, relatives and friends need to park their cars. This plan is more compatible with a main road like Rainbow Street where residences are on one side and the infrastructure could sit comfortably on the other proving safe bike access for students on all three campus, Rainbow St and both the boys and girls high schools.<br>3. The loss of parking through clearway unacceptable as parking is already very scarce with the university and school and proximity to the major transport corridors. The pressure on parking will only be enhanced once the light rail opens. Friends and family, specifically aged relatives will no longer be able to visit.<br>4. The proximity of the forthcoming Inglis Development and additions to Rainbow Street school will further compress the substantially increased traffic on Sturt Street - the emphasis should be on slowing traffic with speed humps not creating further compression.<br>5. The plan detailed online is incomplete and therefore does not allow for true consultation. The streetscape does not show the section of Sturt Street between Botanya nd Anzac Parade.<br>6. The plan shown indicates the bike lane is on the north side of the street, I was advised in today's telephone conversation it is on the south side. How can the community make informed comment when they are being shown an incorrect plan?<br>7. The loss of tree canopy will take decades to replace the visual hazard at sunrise and sunset will be substantial as this is an East West road and the trees provide essential shade for visibility.<br>8. Details of the clearway hours are not available online, how can the community make informed comment?<br>9. In 2009 RCC built cycleway fragments across the front of Payne Reserve linking it to Anzac Parade via Byrd Ave. It makes more sense to join the Payne Reserve track to Doncaster Avenue and save money rather than destroying the amenity of Sturt St.<br>10. I have provided council with at least two incidents where I have been clipped on Sturt Street by the | Thank you for your comments.<br>1. As you mention, the proposed design uses existing nature strip to accommodate the cycleway. Due to road width constraints and the desire to maintain sufficient on street parking, it is necessary to modify the nature strip. Some planting along the roadway is proposed to offset the trees lost for the cycleway near Anzac Pde. 6 trees will be removed, and 6 new ones planted.<br>2. Sydney Buses (STA) plan to use Sturt St between Bunnerong Rd and Anzac Pde, and requested a 20 metre length of 'No Stopping 4pm-7pm, Mon-Fri' restriction to assist bus access to Sturt St. Council has endorsed this through the Traffic Committee – March 2018 meeting. We have therefore indicated this on the designs.<br>3. Council acknowledges the demand for on street parking. On the south side of Sturt St, the plans show that 3 car parking spaces will be removed, and replaced by planting.<br>4. Council is proposing streetscape improvements and a separated cycleway along the route to encourage people to choose active modes of travel. This will help reduce the number of people driving on local streets.<br>5. Apologies if this was unclear in Council's communication. The 'Walking and Cycling Improvements - Kingsford to Centennial Park' route extends from Anzac Pde and the new light rail terminus west and north to Centennial Park. Council is working on a second route from Anzac Pde east along Sturt St, Avoca St and Bundock St. We are currently developing a concept design for this route and it is likely to be on public exhibition later in 2018.<br>6. Council apologises for any confusion regarding the plans. Page 9 of the plans (sheet 1.8) includes a north arrow. Along the stretch of Sturt St between Bunnerong Rd and Anzac Pde, the separated cycleway is proposed to be on the south side of the road. |

| Submission | Council response |
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| increased traffic (once as a pedestrian and once as a cyclist) - the crossing of the Botany St intersections is extremely problematic and there is no provision in this plan to make that safer for cyclists or pedestrians. | 7. Council acknowledges that the shade from newly planted trees may not fully replace that of trees that are removed. The Project Team is working closely with the Tree Management Team to select appropriate trees along the route.<br>8. The matter was discussed in Item 4.7 at Council's Traffic Committee meeting in March 2018.<br>http://www.randwick.nsw.gov.au/__data/assets/pdf_file/0008/219842/M2018.03.pdf<br>9. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route from Paine Reserve west towards Anzac Pde and Houston Rd is not on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps<br>10. Thank you for taking the time to report these incidents to Council. Safety is a key consideration for our streetscape improvement projects. Council is working on improvements for a second route from Anzac Pde east along Sturt St, Avoca St and Bundock St to South Coogee. We are currently developing plans for this route, which are likely to be on public exhibition in the second half of 2018. Council will promote this consultation in a similar manner to this one. |
| I like to visit the area both by foot and on my bike, especially in the warmer months. My biggest concern and desire is for well considered, designed and implemented separated cycle paths. Shared paths are ok, but there is still the contention of pedestrians and bike riders. A more viable option is to always include dedicated bike infrastructure - I'll feel far more welcome and able to get around by bike and will choose that more frequently than foot as it's a lower impact form of transport for me. It also means I can plan my trips and stop longer in the local shops with easy access and feel safe every time i come to visit. | Thank you for your comments. Council has sought to provide a separated cycleway along the route where possible. The shared path treatment is proposed where the separated cycleway treatment is not possible. |
| I highly support these works, and in particular the construction of a new cycleway. Doncaster Av is a major thoroughfare for cyclists, as it is a quiet street away from Anzac Pd. however due to the current design of the street, it is not safe for cycling as cyclists are forced into the door zone of parked cars. This upgrade will significantly improve the safety and usability of active transport in the area, creating a critical link from Kingsford to Centennial Park, the most highly utilised area by cyclists in Sydney. | Thank you for your comment and taking the time to make a submission. |
| I am regular cyclist who commutes through Doncaster Av on a weekly basis. I would like to express my support for this project, as it will provide a significant improvement in safety for all road users. Thanks | Thank you for your comment and taking the time to make a submission. |
| Appropriate, well considered | Thank you for your comment and taking the time to make a submission. |
| An urgent dedicated cycle way, either side of Todman, with surface colour to stand out from main road colour. Would increase visibility and hence cyclist safety. Would then hopefully also reduce present frequent use by cyclists of footpaths along Todman endangering pedestrians as well as residents leaving their driveway. | Thank you for your comments. Council is currently working on improvements to the bicycle shoulder lanes along Todman Ave. We will be approaching the NSW Government asking for the Todman Ave and Lenthall St route to be considered a 'Sydney Strategic Bicycle Corridor', as seen in the NSW Government document 'Sydney's Cycling Future'. If successful, this will assist with implementation and funding of this section. |
| I think anything that gets people into active transport rather than cars will have a long term benefit for the local community | Thank you for your comment and taking the time to make a submission. |
| I am interested in the decision to align the cyclelane along the southern side of Doncaster given that the crossing at Alison Rd is on the northern side, and whether there was any discussion with RMS to realign the crossing on to the southern side? | Thank you for your comment. There were a number of factors considered to determine the cycleway alignment. These include driveways, side streets, schools, intersections, surrounding land uses and the existing cycle network. Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS. |
| I am 100% for the creation of new cycle paths on the main axis but also to add more pedestrian crossing. It is crazy how they are uncommon, even on the busy crossing, near schools or public facilities, shopping center! It is so dangerous to use or cross the road when you are not in a car! | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| Who has right of way when crossing the bike path? pedestrians or bikes?<br>What is the speed limit for cyclists riding on the path? How will that be enforced?<br>What happens when we need to unload or load kids/groceries in the car? it take take awhile for this to happen, one lane of the bike path will be blocked.<br>Will bike riders be forced to use the bike lane or will we still have a Peleton's of bikes riding down Doncaster Rd? if so whats the point?<br>How is it going to be built as to least effect Doncaster residents?<br>How many bike accidents have occurred on Doncaster? and is there any modelling suggesting that the new bike path will better this?<br>What steps are being taken to alleviate parking concerns with several parking spots being removed along Doncaster?<br>We have 24 hour noise and light behind our homes, and now you are going to put bike riders a few meters from our front doors?<br>Will there be any extra light spillage from new lights into residents houses? | Thank you for your comments.<br>1. The separated cycleway will be marked with 'bicycle only' symbols, which indicates that people riding bikes have priority.<br>2. There will be no speed limit marked on the cycleway for people riding bikes, however, cautionary surface marking such as 'slow' may be used in appropriate areas.<br>3. As always, Council encourages people to use caution and be mindful of others in the public spaces.<br>4. People riding bikes will not be compelled to use the proposed cycleway. Confident and capable cyclists are welcome to use the road. The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people. The proposed design doesn't aim to draw road cyclists away from their chosen routes.<br>5. Council will continue to inform the community regarding the project. Once approval is gained, construction is likely to be staged along the route.<br>6. There were 6 reported bicycle accidents and 22 total reported traffic accidents along Doncaster Ave between 2011 and 2016. It is widely acknowledged that physically separated cycleways are safer and attract a wider cross section of the community - e.g. women, children and elderly.<br>7. Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. The addition of streetscape improvements and a separated cycleway will enable more people to walk and cycle to local destinations, and in doing so, help reduce parking demand and congestion.<br>8. Council acknowledges the impact the light rail yard has had on residents of Doncaster Ave. We will inform the community of project progress and seek to minimise any future construction impacts where possible.<br>9. Lighting is being carefully considered and lighting infrastructure will be selected to minimise impact into neighbouring homes. A greater level of lighting is required at new pedestrian (zebra) crossings to meet standards. |
| I cannot see how this will be an improvement to the existing mess!<br>1. Traffic on Doncaster Ave is already excessive with the changes made as a result to the light rail construction<br>2. The removal of parking on Anzac Parade has contributed to the limited parking for residents on Doncaster - your plan proposes more reduction on parking spaces<br>3. Foot traffic is already heavy on this busy street - the 'trimming' back of the footpath will actually be a hazard waiting to happen - have we forgotten about the school age children? In addition, my observation of increased pedestrians during festivals, University exams held at the race course, Wednesday and Friday Sport for the local schools that walk to and from the park, Randwick Raceday - a smaller footpath does not facilitate safety<br>4. How are you going to guarantee that the bike riders are actually going to use the lane way and not the footpath? This is currently a FACT that not all bike riders use the existing bike lanes- many of them use the pedestrian footpath. Further to this, the street is already narrow, when I park my car and I run the risk of hitting a bike rider by opening my door as they do not follow the rules and weave in and out of the road, bike lane to the pedestrian footpath<br>5. Residents in number ... (rehab residence) - this cycle way will have a strong impact on their overall well being. They are already struggling with parking there vehicles and require substantial space/room to escort their 'residents' in and out of the centre<br>6. I personally hold a temporary accessible pass and will be impacted by the removal of parking to build your bike lane<br>7. Wouldn't it make more sense to move the pedestrian crossing closer to the ... rehab centre? Again, how can you expect them to cross the road???? | Thank you for your comments.<br>1. Council acknowledges that Doncaster Ave is a busy road.<br>2. Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. The addition of streetscape improvements and a separated cycleway will enable more people to walk and cycle to local destinations, and in doing so, help reduce parking demand and congestion.<br>3. Some of the kerb will be cut back (approximately 50cm) opposite Kensington Public School. Council is communicating with the Principal to understand all their concerns. Footpath access will be maintained along the route.<br>4. People riding bikes will not be compelled to use the proposed cycleway. Confident and capable cyclists are welcome to use the road. The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people. The proposed design doesn't aim to draw road cyclists away from their chosen routes.<br>5. Disabled parking is a key consideration of the project. We will be contacting people associated with a Mobility Impaired Person's Parking Spaces who are or may be directly affected, and work to provide alternative solutions where necessary.<br>6. Noted.<br>7. Pedestrian crossings are typically placed near intersections to optimise use. Council sought to install a pedestrian 'zebra' crossing at the intersection of Doncaster Ave and Carlton St, but the usage doesn't currently meet the criteria. The kerb extensions and planting are proposed to improve existing pedestrian movements and to facilitate a future zebra crossing. |

| Submission | Council response |
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| I am a resident of Doncaster Avenue and would like express my concerns regarding the new proposed bike lane.<br>Doncaster Avenue is one of the most congested street in Kensington and introducing a bike lane will create more traffic and seeing the proposed plans there will also be reduced cars spots, this is a major disruption for as to commute. It's bad enough now trying to find a parking spot and now to loss more car space will make not just my family but our residents on the streets lives a lot more difficult. Also what is more concerning is viewing the plans we noticed on ... Doncaster Avenue the current car space we have will be removed which will make my family harder to commute because my wife has a disability and she had a disable parking permit.<br>I would like you to reconsider this new development and can someone please contact me on .... | Thank you for your comments.<br>Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. On Doncaster Ave between Alison Rd and Todman Ave there is a loss of 8 spaces and 1 newly created.<br>Traffic lanes will be narrowed to 2.9m, but traffic lane arrangements will be largely unchanged.<br>By providing streetscape improvements and a separated cycleway, Council seeks to enable more people to to ride and walk for local trips helps, and in doing so, ease congestion and parking demands.<br>A Council officer has called to discuss your concerns. |
| To whom it may concern, we are a resident at ... Doncaster Avenue Kensington and would like to provide the following feedback regarding the proposed walking and cycling improvement from Kingsford to Centennial Park;<br>-The dedicated cycleway will remove a significant amount of parking on our side of the road which is impractical given the development, subsequent people and ongoing events in the area.<br>-We are a family with small children and the parking is already difficult and if this means we will need to cross Doncaster more regularly to park a distance from our property this will only make this situation worse.<br>-The cycleway and reduced parking will also mean that we will have limited access to our property in situations where we would ideally need directly access to the front, such as building, large items, shopping etc<br>-With the current proposal I fully expect the cycleway to reduce the value of our property given these parking and access issues, and on the back of the cark park we have just had to endure built behind our property.<br>While I believe a cycleway in principal is a positive proposal for the area the parking impacts need to be improved significantly for our positive support. | Thank you for your comments.<br>1. Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. On Doncaster Ave between Alison Rd and Todman Ave there is a loss of 8 spaces and 1 newly created.<br>2. Noted. Please refer to point 1.<br>3. Council is aware of the impact of the light rail construction work at the rear of properties on Doncaster Ave. Residents will be kept informed of future construction work for this streetscape project. |
| I am a Sturt Street resident and I strenuously object to this plan on the following basis;<br>1. The loss of the nature strip is a substantial insult to the appearance and amenity of the street. The 1.5 meter green space provides a valuable buffer to the substantial street commotion since traffic has doubled and quickened since light rail diversions have been in place. The traffic is in fact so bad, I won't allow my two children to play in the front yard for fear of speeding cars and accidents.<br>2. Sturt St is a two sided residential street, the imposition of clearway and the destruction of green space is profoundly incompatible with the lives people are living on this street. Kids play, dogs are walked, relatives and friends need to park their cars. This plan is more compatible with a main road like Rainbow Street where residences are on one side and the infrastructure could sit comfortably on the other proving safe bike access for students on all three campus, Rainbow St and both the boys and girls high schools.<br>3. The loss of parking through clearway unacceptable as parking is already very scarce with the university and school and proximity to the major transport corridors. The pressure on parking will only be enhanced once the light rail opens. Friends and family, specifically aged relatives will no longer be able to visit.<br>4. The proximity of the forthcoming Inglis Development and additions to Rainbow Street school will further compress the substantially increased traffic on Sturt Street - the emphasis should be on slowing traffic with speed humps not creating further compression.<br>5. The plan detailed online is incomplete and therefore does not allow for true consultation. The streetscape does not show the section of Sturt Street between Botany St and Anzac Parade.<br>6. The plan shown indicates the bike lane is on the north side of the street, however I have been advised by my neighbour who has been in contact with the Council, that it is in fact on the south side. How can the community make informed comment when they are being shown an incorrect plan?<br>7. The loss of tree canopy will take decades to replace, the visual hazard at sunrise and sunset will be substantial as this is an East West road and the trees provide essential shade for visibility.<br>8. Details of the clearway hours are not available online, how can the community make informed comment?<br>9. In 2009 RCC built cycleway fragments across the front of Payne Reserve linking it to Anzac Parade via Byrd Ave. It makes more sense to join the Payne Reserve track to Doncaster Avenue and save money | Thank you for your comments.<br>1. As you mention, the proposed design uses existing nature strip to accommodate the cycleway. Due to road width constraints and the desire to maintain sufficient on street parking, it is necessary to modify the nature strip. Some planting along the roadway is proposed to offset the trees lost for the cycleway near Anzac Pde. 6 trees will be removed, and 6 new ones planted.<br>2. Sydney Buses (STA) plan to use Sturt St between Bunnerong Rd and Anzac Pde, and requested a 20 metre length of 'No Stopping 4pm-7pm, Mon-Fri' restriction to assist bus access to Sturt St. Council has endorsed this through the Traffic Committee – March 2018 meeting. We have therefore indicated this on the designs.<br>3. Council acknowledges the demand for on street parking. On the south side of Sturt St, the plans show that 3 car parking spaces will be removed, and replaced by planting.<br>4. Council is proposing streetscape improvements and a separated cycleway along the route to encourage people to choose active modes of travel. This will help reduce the number of people driving and parking on local streets.<br>5. Apologies if this was unclear in Council's communication. The 'Walking and Cycling Improvements - Kingsford to Centennial Park' route extends from Anzac Pde and the new light rail terminus west and north to Centennial Park. Council is working on a second route from Anzac Pde east along Sturt St, Avoca St and Bundock St. We are currently developing a concept design for this route and it is likely to be on public exhibition later in 2018.<br>6. Council apologises for any confusion regarding the plans. Page 9 of the plans (sheet 1.8) shows the correct proposal and orientation. Along the stretch of Sturt St between Bunnerong Rd and Anzac Pde, the separated |

| Submission | Council response |
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| rather than destroying the amenity of Sturt St. | cycleway is on the south side of the road.<br>7. Council acknowledges that the shade from newly planted trees may not fully replace that of trees that are removed. The Project Team is working closely with the Tree Management Team to select appropriate trees along the route.<br>8. The matter was discussed in Item 4.7 at Council's Traffic Committee meeting in March 2018.<br>http://www.randwick.nsw.gov.au/__data/assets/pdf_file/0008/219842/M2018.03.pdf<br>9. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route from Paine Reserve west towards Anzac Pde and Houston Rd is not on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| Re: Walking and cycling improvements: Kingsford to Centennial Park.<br>Further to our recent meeting as residents for over 15 years at ... Doncaster Avenue Kensington we have some serious concerns regarding the proposed improvements that you are designing along Doncaster Avenue. We believe that with the design proposed that you will place residents and motorists in danger of physical harm, potential verbal abuse, as well as leading to an increase of damage to both cars and bicycles. You will increase congestion along the proposed route and the surrounding streets and unless adequately addressed could lead to the flooding of homes.<br>Firstly we acknowledge that separated bike lanes do lead to a safer environment for cyclists and we are not opposed to the principle of separated bike lanes and acknowledge that the benefits include:-<br>•Might encourage more cyclist's which is good for health and environment.<br>•Will be safer for cyclists.<br>•Might lead to less cars.<br>However below are just some of the issues that will arise.<br>Issue 1. Safety of entering/exiting driveways<br>Cars entering and exiting drive ways of houses on the eastern side of Doncaster Avenue will need to cross the bike lane, and a row of parked vehicles.<br>The average length of a car is around 5 metres long see annexure 'A' being a list of top 10 selling vehicles in 2017 plus other examples. The width of the traffic lanes are a combined 5.8 metres wide, the width of the parking lane is 2.1 metres, and the width of the bike lane with barrier is 2.8 metres.<br>Situation<br>Travelling in a Southbound direction on Doncaster Avenue and reversing into a driveway.<br>Hazards<br>Only 2.1 metres off the car will be off the road before entering the bike lane, the other 2.9 metres will be on the road.<br>Traffic along Doncaster Avenue stopped by reversing vehicle having to become perpendicular to Doncaster Avenue to navigate between cars parked either side of driveway. See attached images "B, C, D" showing parking habits along Doncaster Avenue.<br>Drivers will have no vision of cyclists in the bike lane approaching the driveway due to cars parked either side of the driveway until the bike lane is completely blocked.<br>When vehicle safely off road, bike lane will be blocked, until it has crossed the footpath and entered home.<br>Situation<br>Travelling in a Southbound direction on Doncaster Avenue and driving forward into a driveway<br>Hazards<br>Traffic along Doncaster Avenue stopped by vehicle having to manoeuvre into oncoming traffic to navigate between cars parked either side of driveway.<br>Drivers will have no vision of cyclists in the bike lane approaching the driveway due to cars parked either side of the driveway until the bike lane is partially blocked.<br>When vehicle safely off road, bike lane will be blocked, until it has crossed the footpath and entered home.<br>Situation<br>Travelling in a Northbound direction on Doncaster Avenue and driving forward into a driveway<br>Hazards<br>Traffic travelling North along Doncaster Avenue stopped by vehicle waiting to turn over oncoming lane.<br>South bound traffic on Doncaster Avenue backed up at Day Avenue not leaving a space to turn into driveway, blocking Doncaster Avenue in both directions.<br>Drivers will have no vision of cyclists in the bike lane approaching the driveway due to cars parked either side of the driveway until the bike lane is partially blocked.<br>When vehicle safely off road, bike lane will be blocked, until it has crossed the footpath and entered home.<br>Situation<br>Reversing out of a driveway to proceed either Southbound or Northbound on Doncaster Avenue.<br>Hazards<br>Driver's vision of the bike lane impaired due to trees on the footpath partially obscuring the bike lane see image "E".<br>Driver's vision of Doncaster Avenue will be obscured by cars parked either side of the driveway see | Thank you for your detailed comments, and taking the time to make a submission.<br>1. Driveways<br>Driveway access is a key consideration of the project and Council will continue to evaluate the many issues associated with this. A number of driveway crossings mean people walking, people in cars and people on bikes will have to wait where necessary, before continuing. As always, Council encourages the community to exercise caution and be mindful of other road users.<br>Where on street parking is permitted, parked cars may obstruct clear sight of oncoming vehicles. Council encourages all road users to exercise caution when entering or exiting driveways.<br>Council will consider line marking where appropriate to provide improved access to driveways along the route.<br>2. Roundabouts<br>Council has sought to accommodate all road users in the proposed design. Unfortunately the existing roundabouts are incompatible at intersections that include bi-directional separated cycleways. Council is aware that changing the intersection treatment may result in different traffic flows.<br>3. Road width<br>Waste management is a key consideration for the project. The Project Team is working with the Waste Services Team at Council to manage the proposed changes along the route and accommodate their service to the community. As you mention, lanes width are reduced to 2.9m in each direction. Narrower streets can result in lower average speeds. A key consideration of the project is to improve safety for all road users. Lower speeds, additional crossing points and kerb extensions will help achieve this.<br>4. Water flow<br>Thank you for your feedback. The Project Team is working with drainage and civil engineers to mitigate flooding issues. This is an important consideration for the project and we will continue to focus on this issue throughout the duration of the project. |

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| images “F, G, H”.<br>Car will need to be over 3 metres into the traffic lanes before driver has a view of other vehicles coming along the road.<br>Motorists driving along Doncaster Avenue having to swerve into oncoming traffic to avoid collision with car coming out of driveway.<br>Motorists driving along Doncaster Avenue having to brake suddenly to avoid collision with car coming out of driveway.<br>Traffic along Doncaster Avenue stopped by reversing vehicle.<br>Bike lane blocked whilst driver reverses into oncoming traffic.<br>Car unable to enter traffic lane due to traffic build up and blocking bike lane for an extended period.<br>Situation<br>Exiting forward out of driveway and driving Southbound or Northbound on Doncaster Avenue<br>Hazards<br>Driver’s vision of Doncaster Avenue blocked by cars parked either side of the driveway see images “F, G, H”.<br>Driver has to swing out over both lanes to manoeuvre out.<br>Motorists driving along Doncaster Avenue having to swerve into oncoming traffic to avoid collision with car coming out of driveway.<br>Motorists driving along Doncaster Avenue having to brake suddenly to avoid collision with car coming out of driveway.<br>Traffic along Doncaster Avenue stopped by vehicle to allow exit.<br>Traffic build up at Day Avenue not allowing car to exit resulting in car blocking bike lane for an extended period.<br>Risks arising from the above.<br>Vehicle collides with bike rider causing injury, death, damage to vehicle and bicycle.<br>Vehicle collides with vehicle causing injury, death, damage to vehicles.<br>Bike rider collides with vehicle causing injury, death, damage to vehicle and bicycle.<br>Potential verbal or physical altercation between car driver and bike rider.<br>Potential verbal or physical altercation between car drivers.<br>Legal action to determine accountability, between drivers, cyclists and Randwick City Council.<br>Criminal action resulting from a physical altercation.<br>Is risk increased after installation of proposed cycleway? YES.<br>Issue 2. Removal of Roundabout.<br>The proposal includes removing the roundabout at the intersection of Day Avenue and Doncaster Avenue and replacing with give way signs giving priority to traffic on Day Avenue.<br>Both Day Avenue and Doncaster Avenue have been identified by Randwick City Council as ‘Collector Roads’ ‘These are major traffic streets within a suburb’ see annexure “I”.<br>A traffic study in 2001 identified the average daily traffic movements on Doncaster Avenue were 3900, and on Day Avenue 6020, see annexure “J”. Traffic has dramatically increased over the past 17 years.<br>Identifiable faults.<br>Traffic backing up on Doncaster Avenue behind vehicle attempting to turn right on Day Avenue due to motorist turning right having to give way to all other traffic.<br>Increased congestion at the intersection.<br>Cars backing up on Doncaster Avenue resulting with drivers unable to exit driveways and blocking the bike lane.<br>Motorists creating alternative ‘Rat Runs’ impacting local roads that are unsuitable for high traffic volume.<br>Pedestrians attempting to cross road between stationary vehicles.<br>Risks<br>Drivers making unsafe decisions resulting in a collision causing injury, death, damage to vehicles.<br>Drivers stuck in traffic leading to road rage, potential verbal or physical altercation between car drivers.<br>Pedestrian injury at said intersection and in surrounding local roads.<br>Is risk increased after installation of proposed cycleway and give way sign? YES.<br>Issue 3 Narrowing of Road to accommodate cycleway.<br>Narrowing the road to 10 metres wide in total with 2.1 metres on each side being designated as a parking lane and the road carriageway being 2 lanes of 2.9 metres width each.<br>Identifiable faults<br>Doncaster Avenue has been identified by Randwick City Council as ‘Collector Road’ ‘These are major traffic streets within a suburb’ see annexure “I”.<br>Traffic volume too high for width of road.<br>Maximum legal width of a light or heavy vehicle or a trailer is 2.5 metres not including items like mirrors, meaning that if a vehicle of this type is parked it will be partially blocking the traffic lane.<br>Should vehicles of maximum legal width be parked on both sides of Doncaster Avenue opposite each other the road would be narrowed to less than 5 metres wide.<br>A Randwick City Council garbage truck is 2.9 metres wide including mirrors without allowing for the side arm, resulting in the truck being over the centre lane to be able to operate.<br>Drivers exiting vehicle will need to open door over and step onto the traffic lane, currently they step onto bike lane that has no barriers which allows a bike to manoeuvre onto the road if required.<br>Drivers who are wheelchair bound will need to place wheelchair onto the traffic lane to get into or out of | |

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| their vehicle, currently they step onto a bike lane that has no barriers which allows a bike to manoeuvre onto the road if required.<br>Passengers who use wheelchairs will need to place wheelchair in bike lane to get in and out of vehicle currently they step onto a footpath<br>Passengers including children and the elderly will be exiting onto the bike lane dramatically increasing the risk of injury with a collision with a bike, currently they step onto the footpath.<br>Unloading babies into prams will require prams to be in the bike lane rather than the footpath.<br>Emergency service vehicles may have to consider alternative routes to an incident which could be longer in time than currently available.<br>Risks<br>Vehicle collides with driver causing injury, death, and damage to vehicle.<br>Bike rider collides with vehicle passenger door causing injury, death, damage to vehicle and bicycle.<br>Bike rider collides with passenger causing injury, death, damage to bicycle<br>Potential verbal or physical altercation between car driver and bike rider.<br>Potential verbal or physical altercation between passenger and driver.<br>Person does not receive emergency assistance in time.<br>Is risk increased after installation of proposed cycleway and road narrowing? YES.<br>Issue 4 Water flow<br>The proposal indicates that the separated bike lane on Doncaster Avenue near the intersection with Day Avenue will be at the same level as the footpath.<br>Identifiable faults.<br>The new gutter will be placed 2.8 metres further out from its current location, the height of the existing road 2.8 metres out from the existing gutter is higher than the height of the current footpath.<br>Footpath will need to be higher than front yard of homes.<br>Storm water from homes on the Eastern Side of Doncaster Avenue runs under the existing footpath into the current gutter, which would need to be extended.<br>The drain near the corner of Doncaster and Day Avenue does not currently cope with a heavy downpour, with the intersection being subject to flooding see image “K”.<br>Water does not flow uphill.<br>Risks<br>Flooding of homes.<br>Flooding of bike path.<br>Flooding of road and intersection.<br>Is risk increased after installation of proposed cycleway at footpath level? YES.<br>As discussed you have acknowledged that large groups of cyclists will not use the bike lane and will continue to use the road.<br>You acknowledged that some drivers and some cyclists are overly aggressive.<br>You acknowledged that despite the legal definition surrounding the size of parking spaces which indicate that only one car should park in front of many of the houses, that mostly two cars park in that space and you expect that would continue. Refer previous images.<br>You acknowledged that some of the trees along the route are inconsistent with the design.<br>You acknowledged that for drivers crossing the cycleway that vision would be obstructed by either parked cars or trees. Refer previous images.<br>Summary<br>As mentioned previously we are not opposed to accommodating and promoting cycling and have not addressed other potential issues along the route, however the proposed design will lead to greater traffic congestion to both the roads where the cycleway is installed and the surrounding local roads.<br>It will lead to flooding.<br>Most importantly the proposed design will significantly increase the risk of serious accidents that will result in injury, damage to cars and bicycles, and potentially cost someone their life.<br>Should you have any queries regarding the above please do not hesitate to contact the undersigned. | |

| Submission | Council response |
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| The spaces given for cars both for parking and driving is too tight. there are a lot of lager SUV on the road as well as trucks all of these will take up the entire width if not more will be take up not to mention that many people don't park right next to the curb. This is making the roads too narrow and unsafe at any speed with no room for drives to react or move if some one comes running or even walking out from between cars which they do all the time.<br>Another point is that more parked cars are getting damaged by cars driving by in ever narrowing streets. I have friends living in narrow streets in the area that constantly have damaged to their parked cars when drivers don't judge the narrow space in their streets.<br>lastly getting in and out of a car in these narrow spaces is very dangerous particularly when it's a busy street. I am disabled and need to open my car door fully to get in and out and can't do it quickly. I have been abused at times for having my door open and cars not being able to pass not to mention the number of times that I was almost knocked over by passing SUV, busses and Trucks.<br>the Narrowing of our roads and streets is making it dangerous for people not making it safer.<br>I understand the theory that traffic will travel slower if the space is narrower but it doesn't matter what speed a large vehicle is doing if it hits you because there is not enough space and they have no way to avoid it people are going to be hurt or killed.<br>With many more larger cars on the road these days and more people parking on the street many of the roads in randwick are now too tight for two cars to pass let alone buses, emergency vehicles and small trucks. Our roads need to wider not narrower. the space for the bike lanes should be taken from the foot paths not the roads where possible and where not possible then they should not be installed at all. | Thank you for your comments. The proposed designs do include narrower traffic lanes, which will likely result in lower average speeds along the route. One key consideration of the project is to improve safety for all road users, and lower speeds will help achieve this. |
| Very excited about Doncaster Ave cycle path!!!<br>Between people who don't look before opening their car doors and the weekly bin invasion (of the supposed current cycle path area), the commute (to/from UNSW) has never truly felt safe along Doncaster, despite the bicycle symbols printed on the road (and I have experienced near-misses!).<br>How soon can you get started???? | Thank you for your comment. Construction funding and approval is contingent on Roads and Maritime Services (RMS). Planning and consultation is taking place in 2018. The timing of construction is not yet set and construction funding has yet to be received. Any construction wouldn't take place before mid-2019. |
| I am extremely supportive of the separated cycleway. I only started cycling to work when a separated cycleway was introduced by the City of Sydney. The separation from vehicles made me much more willing to cycle. This cycleway will really help me consider cycling to the family and friends in Randwick council. My Brother lives in Kingsford and the cycling option would be much appreciated.<br>Whilst there will inevitably be some concern about cycleway because of some lost parking etc, car owners should not have an expectation that they can park their car on public lands outside their house all the time. The road is for all to travel on, not just a place for private citizens to use to put their private cars on. It is not really realistic to believe that car vehicles can dominate both the driving lanes and all of the adjacent lands for parking. We have collectively just become used to a situation which is a bit crazy.<br>When residents start to transition to cycling, with their family they will slowly realise that it is terrific for them, their health and the environment. It is also much better for interactive community life as I often stop on my bike to say hello to people I know in the street. This is very limited in cars.<br>Cycling assists in making the streets a destination in themselves and not simply a travel pipe.<br>Best wishes on the the plans and implementation | Thank you for your comment and taking the time to make a submission. |
| I fully support the Kingsford to Centennial Park cycleway. I commute along this route by bicycle every working day. The current cycle conditions are extremely dangerous, particularly with the Doncaster Rd cycleway being in the 'car-door lane'. The proposed cycle route would represent a significant safety improvement along this route.<br>I have a number of comments on the design, mainly to prevent cyclists from leaving the cycleway and riding with traffic.<br>1. It is important that cyclists have the same priority as pedestrians on the intersection between Doncaster Rd and Alison Rd. If not, cyclists travelling north along Doncaster will be tempted to leave the cycleway (or not use it at all) and cross Alison Rd with the traffic.<br>2. It is very difficult to turn right from Day Ave into Houston Rd when travelling east from the roundabout. At the moment, to turn right i would have to (1) watch out for oncoming cyclists, (2) look over parked cars to see if there is any traffic (3) wait for traffic in both directions. This is quite confusing and dangerous. It is a lot safer for me to ride on the road as i would only have to look for oncoming cars. I'm not sure how to fix this problem but perhaps a right turn lane or priority crossing for cyclists. | Thank you for your comments.<br>1. Bicycle lanterns are planned at signalised crossings. The 'presence detectors' at all signalised intersections will be designed with bike riders in mind, and will be developed in detail with Roads and Maritime Services (RMS).<br>2. Your comments are noted. Council will further investigate the Day Ave and Houston Rd intersection to suitably accommodate all road users. |
| I think this is a wonderful development which will encourage children to cycle to Kensington Public School, thereby reducing traffic, improving health and encouraging a sustainable lifestyle.<br>My only concern is that there has not been enough consideration for how cyclists turn into or off the cycle path to or from other roads. I suspect this will inhibit use and has the potential for causing accidents. | Thank you for your comments. The project team has considered access to side streets and connections to the cycleway. We are looking all intersections along the route to accommodate the various movements of people walking, cycling and driving. |
| I cycle to work most days along the whole length of Doncaster Avenue. The existing cycle lane alongside closely parked cars feels very risky. It is hard to scan for hazards ahead on the road as well as car doors potentially opening suddenly, or cars pulling out having not seen me. I wear plenty of high vis but it's still hard to drivers to get past especially the many that make sure they give enough space. The proposed cycle way would greatly increase safety for both car drivers and cyclists. I strongly support the scheme. Thank you for all efforts in a comprehensive and detailed design. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| I cycle everyday from Maroubra to the City through this route from Kingsford through Houston Rd and Doncaster Ave and I think the existing cycle lanes are pretty good so I'm not sure if this is worth the disruption. However the additional cycle way from South Coogee to Kingsford would be very welcome as it would make my commute from Maroubra much safer and probably shorter. | Thank you for your comment. The existing shoulder lanes provide space on the road for people who are confident and capable to ride their bike. The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people.<br>Council is currently developing plans for Walking and Cycling Improvements along a second route from Kingsford to South Coogee. Plans are being developed and are likley to be on public exhibition in the second half of 2018. |
| Divided cycleway is excellent but the tragedy is that it doesn't go all the way to the biggest local source of bike transport -- UNSW. The last 100m is so easily done too. From Doncaster along Anzac Pde to Barker St, just pave the WHOLE WIDTH of the existing verge. As it stands there's a thin footpath and a strip of ripped up sand. Bikes crash in sand, so they use the footpath driving the pedestrians insane. Being yelled at by pedestrians is infinitely better than being run down by a car, bus or truck (esp. on a road with tram rails on it, which automatically results in a high-risk of a fatal accident as a cyclist as your evasive options are nearly zero). As full-width shared foot/cycleway along that last 100m or so to UNSW you overcome a major flaw in the existing plan, which is that it doesn't go all the way to where it's most useful. There's stacks of shared foot/cycleway in Sydney council area connecting separated cycleway to key points as the 'last leg', so it should be easy here. See for example where the bi-directional stretch on George St Redfern meets Prince Alfred park to reach the entry to Central. That last bit near the Central tunnel mouth is about the same width as that verge between Doncaster and UNSW mall if you paved the entire width. | Thank you for your comments. Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is communicating regularly with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible. |
| Hi, I don't support the cycling improvement program. I have seen the disruption and congestion this type of change caused in Alexandria and it is a massive waste of money.<br>I hope the NSW Govt does not provide funding for this to proceed and I will write to Bruce Notley-Smith to make my views known. | Thank you for your comment and taking the time to make a submission. |
| I have been using Doncaster Ave as a walking, running & cycling route to Centennial park since moving to Sydney. I have found that, depending on the time of day, it can be a very dangerous route, with sometimes heavy traffic and narrow cycling lanes that are positioned dangerously in the "door zone" of parked cars. I cannot imagine trying to get less experienced cyclists to use the route in its present state.<br>I really hope that council proceeds with changes to make this route easier. I believe that, in combination with some work around Eastlakes & Mascot, it could vastly improve access to Centennial Park and surrounds and reduce the amount of vehicle traffic through that area over time. The real test is not if experienced sport cyclists will use the route, but if it can be used by families, children and novice riders as a way to get to the park, and I believe the plans presented have a good chance of achieving this. | Thank you for your comment and taking the time to make a submission. |
| It is necessary, as bike rider I cannot find a safe way to go from UNSW to Centenial Park in my bike. | Thank you for your comment and taking the time to make a submission. |
| It's great to see more separated cycle lanes being introduced. The section along Doncaster Avenue will make my personal commute to UNSW safer and easier (The existing cycle lane adjacent to parked cars is dangerous and I have been close to serious collisions with opening doors there on a number of occasions. I also have colleagues who have been knocked off on that at street by opening doors.) Although the South Coogee cycleway won't affect me personally, it will benefit many of my colleagues who live in that area.<br>We aim to encourage cycling amongst staff and students at UNSW because of the health benefits for them, and because of the societal benefits including reduced road congestion and reduced carbon emissions reduction. More cycleways will help this aim. | Thank you for your comment and taking the time to make a submission. |
| Great idea to improve bicycle safety. I ride to work at UNSW. It would be a much safer and more enjoyable ride if bicycles and cars are separated! | Thank you for your comment and taking the time to make a submission. |
| I believe that having a bike lane along Doncaster is of the upmost importance for safety. Currently, this part of the ride from the city to UNSW is the most dangerous. This is an unnecessary hazard that could be fixed with the addition of a bike lane. | Thank you for your comment and taking the time to make a submission. |
| Dear Randwick Councillors,<br>Doncaster Ave is a very popular cycling route and currently very dangerous.<br>I highly support adding a safe 2-way cycling lane over the full length of Doncaster Ave that is separated from flowing car traffic.<br>Doing the same along Anzac Pde and stopping the light rail (fail) madness and the associated billion dollar wasting of residents money would obviously be a logical extension to the Doncaster Ave cycle way.<br>Thank you very much for your efforts in this matter. | Thank you for your comment and taking the time to make a submission. |
| I highly recommend having a dedicated cyclist track for safe biking | Thank you for your comment and taking the time to make a submission. |
| Cycling infrastructure is important. Anything that can be done to encourage people to ride will help ease traffic congestion and promote healthy incidental exercise. | Thank you for your comment and taking the time to make a submission. |
| More bicycle lanes is great and should be supported wherever possible. The plans seem well thought and reasonable. I love to support this initiative.<br>I have one small comment, though. Please make sure that new bike lanes are connected smoothly to existing one. For example the bike lane is planned on the East side of Doncaster avenue. To be connected to the new lane next to Centennial park (North of Alison Rd), the current plan is that cyclists share a footpath for 50 meters on the East of Doncaster, and then take two traffic lights to join the other path. I wonder whether this could be improved. | Thank you for your comments. Council has considered access to side streets and connections to the cycleway. We are looking at all intersections along the route to accommodate the various movements of people walking, cycling and driving.<br>Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS. |

| Submission | Council response |
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| I think this will be a great improvement for cyclist safety. Thank you so much, for making Sydney more bicycle friendly! | Thank you for your comment and taking the time to make a submission. |
| I think the proposed infrastructure to enhance bicycle safety is a wonderful and essential initiative! I work at UNSW and have lived both at Waterloo and Darlinghurst. Riding along Anzac Parade on the road is simply too dangerous. If there were a dedicated bike lane on Doncaster Avenue, I would consider riding more often. | Thank you for your comment and taking the time to make a submission. |
| This is a fantastic first step towards making the area safer for cyclists. The UNSW campus itself should also have bike lanes circumnavigating it. | Thank you for your comment and taking the time to make a submission. |
| +1 for the whole project.<br>It could be improved by:<br>* linking to UNSW Kensington Campus better. It either needs to link along ANZAC Pde to High St or through NIDA to the main walkway.<br>* Providing better cycle infrastructure the length of Todman Ave. The existing"'cycle in the gutter" / "avoid the rear-to-curb parked cars sticking out" solution is very dangerous.<br>Please also ensure that the cycle path is cyclist right of way the entire length, not one of those hopeless "Cyclists Dismount" every 5 metres paths that have been built elsewhere.<br>Nicer pedestrian environment / streetscaping are also greatly appreciated. | Thank you for your comments.<br>1. Council acknowledges the need to improve the path on Anzac Pde between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is communicating regularly with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible.<br>2. Council is currently working on improvements to the bicycle shoulder lanes along Todman Ave. We will be approaching the NSW Government asking for the Todman Ave and Lenthall St routes to be considered a 'Sydney Strategic Bicycle Corridor', as seen in the NSW Government document 'Sydney's Cycling Future'. If successful, this will assist with implementation and funding of this section. Please also refer to Council's list of bicycle route construction priorities.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps<br>3. The sections of separated cycleway will be marked to indicate that they are for bicycles only. There will be sections designated as 'shared path' where bicycles won't have right of way.<br>4. Noted. |
| As a regular (almost daily) bicycle commuter from UNSW to Paddington, I would very much welcome any improvement that will increase cyclists' safety along this route, in particular on Doncaster Street. At the moment, the "bicycle lane" is in practice a "door-opening lane", i.e. cyclists must ride on the inside edge of the lane or outside the lane, in order to avoid car doors suddenly opened by careless or distracted parked car drivers. Unfortunately, many car drivers do not acknowledge this situation and as such do not leave sufficient space on the right hand side of cyclists, nor slow down, when taking over. The danger occurring from this situation is exacerbated after dusk, which overlaps with standard commute hours for a large portion of the year, given the poor lighting on Doncaster.<br>Thank you in advance for considering seriously this initiative to improve our safety. | Thank you for your comments. Improved safety for people choosing to walk and cycle is a key consideration of this project. |
| A separated bike path would be fantastic for Doncaster Ave. It is a particularly dangerous stretch on the commute from North Sydney to UNSW which I make multiple times a week. Car doors present the most serious hazard, as they are often opened directly across the bike path. I have had a few near misses and seen first hand what can happen to a bike rider when a car door is opened across their path without time to stop or move. | Thank you for your comment and taking the time to make a submission. |
| I fully support the proposed separated cycleway along Doncaster Ave/Houston Rd, which connects South East Sydney to the CBD via Centennial Park.<br>As a cyclist that currently uses this route daily to commute to work (CBD) and a resident (Kensington), the proposed improvements will:<br>-Improve safety of cyclists, with a separated cycling lane;<br>-Reduce Doncaster Rd congestion, currently being experienced (8am and 6pm weekdays);<br>-Reduce future road congestion, with K2K changes to building density in the area;<br>-Improve the safety of Kensington Public School children in drop-off zones on the western side of Doncaster Ave;<br>-Links UNSW;<br>-Is consistent with the Greater Sydney Commission/Infrastructure NSW plans to accommodate a growing population.<br>Keep up the good work. | Thank you for your comment and taking the time to make a submission. |
| I am strongly supportive of these proposals. I cycle to UNSW for work and the ride from Centennial Park along Doncaster street is the most dangerous part of my trip. Cars are invariably parked in the lane, pushing me into traffic. Around school pick up and drop-off times it is especially dangerous around Kensington Primary School, with parents parking in the bike lane and opening doors without checking. A separated cycle way along Doncaster Ave is long overdue, and I hope that you will be able to construct this very soon.<br>Many thanks! | Thank you for your comment and taking the time to make a submission. |
| I support all plans to add separated cycle-ways.<br>Currently cycling to UNSW is a risk (as it is in much of Sydney) and this deters cyclists, therefore adding to traffic, pollution and poor public health. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| I have lived at ... Doncaster Avenue Kensington for 40 years. I am also employed by UNSW for 30years . I would say that I am very much aware of what works well and what the municipality issues in Kensington are.<br>a) currently its a nightmare getting in and out of our driveways. I genuinely feel that the risk to hitting cyclists will be multiplied greatly by councils decision.<br>b) Overgrown trees in Doncaster Avenue are a hazard . If council carefully inspects the front brick fences in Doncaster Avenue they will see the damage the trees are causing to fences. My fence has been cracked open / cement rendered many many times at my expense.<br>The older overgrown trees should be removed and a slower growing tree which will NOT infiltrate a persons property. Council should get onto this asap. May of my friends and neighbours have the same concerns.<br>c) The light rail project in Kensington has taken away many parking spots from business and the municipality visitors. This proposed project will add to the pain of residents and students and staff at UNSW. Grossly unfair.<br>I look forward to your reply. | Thank you for your comments.<br>a. Driveway access is a key consideration of the project and Council is evaluating the many issues associated with this.<br>b. Thank you for bringing this to our attention. Your concerns will be passed to the Trees Team to address.<br>c. Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. On Doncaster Ave between Anzac Pde and Day Ave there is a loss of 2 spaces. |
| I think the proposal for a bidirectional separated cycleway along the routes outlined (Kingsford to Centennial Park) is great, and commend Council for a well thought out plan, its consideration of connections to local and regional bike routes, and providing opportunity to "have my say".<br>Residing on ..., my feedback will primarily focus on Houston Road, i.e. between Day Avenue to Gardeners Road. I like the plan for the following reasons:<br>I like the plan for the following reasons:<br>A bidirectional cycleway separated from the main road greatly increases the safety of cyclists.<br>It removes the current hazard for drivers of vehicles having to cross a cycleway to park their car along Houston Road (angle and parallel).<br>Raised pedestrian crossings are welcome, as are zone markings to improve awareness where pedestrian/cyclists and vehicles cross paths.<br>Enhancement of existing verges, including garden beds at intersections and side streets into Houston Road are most welcome. This will help to create a friendlier streetscape.<br>More trees to create attractive streetscapes along the cycle route sounds promising.<br>Improved lighting for pedestrians welcome, and will also benefit cyclists.<br>Some concerns and considerations:<br>Houston Road is very busy, as is Barker Street and at times Borrodale Street. The removal of roundabouts may result in more traffic accidents unless there are well marked, effective slowing down zones at the approach from all directions.<br>There are no marked pedestrian crossings at Barker and Borrowdale to allow pedestrians to cross over to the north side of these streets. To walk up to traffic lights at Anzac Parade and then back-track would be particularly difficult for people with mobility problems, but more generally likely to lead to jay-walking across.<br>Cyclists frequently ride at very high speed that puts pedestrians at risk. On map provided there are 'shared intersection markings' at Barker Lane, Strachan Lane, See Lane, and Gardeners Lane. However, the map shows no such markings across the cycleway at Borrodale Street, See Street, Strachan Street, Barker Street. A cycleway without shared intersection markings would suggest no need to slow down, and the slight curve at those intersections is not likely to impede speed. To alert cyclists of street of intersection, could marking be extended by a few meters in the lane from which a cyclist approaches?<br>The markings on the maps suggest that "Fifty trees plus" along this several kilometres of cycleway is not enough (e.g. between Barker Lane and Barker St.), and parts of the route have bushes rather than trees.<br>Suggestions for consideration - that the number of trees be increased to create an evenly spaced treelined cycleway/footpath, and that consideration be given to match the tree planting also to the non-cyclist side of the roads/streets concerned. Further, that these trees are the same native species growing to full-sized trees, in order to create an avenue effect, reduce traffic noise, and help alleviate effects of pollution.<br>Conclusion:<br>I thoroughly approve of the Council's determination to facilitate cycling as an effective means of transport and linking with the Light Rail. Recently looking at the hundreds of bicycles outside many train stations in Sweden (e.g. Linkoping), this mode of transport could help avert a large increase of motor vehicles in the Kingsford/Kensington townships, i.e. provided bicycles racks are planned for and provided, including UNSW providing such on its premises to encourage students to use bicycles.<br>I am glad to read that finance is secured through Roads and Maritime Services as part of the NSW Government's strategic bicycle network, and hope that implementation can commence soon. | Thank you for your comments and taking the time to make a submission.<br>The proposed kerb extensions and pedestrian crossings on Houston Rd, in addition to the narrower road way will help slow traffic.<br>Council acknowledges that people on bicycles travel at different speeds. Bike riders won't be compelled to use the cycleway. Fast road cyclists can use the road, as per current practice. Signage on and around the cycleway to provide appropriate warnings will be considered in the final design stage.<br>The Project Team is working with Tree Management Team. We will assess whether more trees can be added in the final design stage.<br>Council has applied to Roads and Maritime Services (RMS) for construction funding. It has not yet been approved. |
| I often cycle to work. Improvements to safe cycleways are desperately needed. Getting to centennial park is hazardous. Cars open doors into cycleways. The tramway has caused chaos and the state of the paths is dangerous. Any upgrade to cycle ways is much needed and appreciated. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| I cycle to work (UNSW) every day along Doncaster Avenue. I personally know at least two cyclists who have had accidents with car doors opening on them along Doncaster Ave, so I am acutely aware of the danger. It is a stark contrast to the connecting cycleway from the city ending at Alison Rd. Providing a separate cycleway would greatly improve safety for cyclists, pedestrians and motor vehicles. I strongly support this initiative and hope that it facilitates greater uptake of cycling amongst other residents. | Thank you for your comment and taking the time to make a submission. |
| I have 3 concerns:<br>1. As an owner of a property on the Western side of Houston Rd that does not have parking, as well as a mother of small children I am concerned that this change will cause significant inconvenience and possibly harm in terms of safely and easily exiting my property and entering a parked car. I am concerned that there will not be adequate room to safely load and unload a vehicle without standing directly in the cycleway. If the cycleway is lower than the footpath (not clear whether this is the case) then this will also cause considerable inconvenience in terms of manoeuvring prams, shopping etc. to and from a car to the property. If the cycleway was at least at the same height with the footpath with no additional curbs this would alleviate some of this concern but if it is of similar design to the section already in place on Day Ave then I foresee this being very awkward and being a possible trip hazard for exiting safely from a vehicle.<br>2. I foresee issues with cars exiting driveways as they are very likely to block the cycleway while they are stationary and are determining whether it is safe to enter the traffic. Currently they would be waiting for both cyclists and cars at the same time, but with the proposed changes it will be necessary for them to give way first to cyclists and then block the cycleway while they determine if it is safe to enter the roadway. If traffic remains busy along these streets then I can imagine they may be stationary for some time and impede the flow of cyclists.<br>3. I am concerned that the removal of the roundabout on the intersection of Barker and Houston Rd will make this intersection unsafe as it is currently a very busy intersection. While the traffic calming measures and pedestrian crossings are welcomed I am not sure whether this will actually reduce the traffic load although it may slow cars down. I am concerned that it would be very difficult to turn right from Houston onto Barker St without the roundabout and that this could result in significant congestion on Houston Rd. Similarly turning right from Barker onto Houston would be difficult which may cause traffic to back up to Anzac Pde. There is already significant traffic congestion on Barker leading up to Anzac Pd in the afternoon/evening which may be worsened if traffic are halted at Houston Rd.<br>While I appreciate the efforts to make cycling safer and encourage more people to do so, I wonder whether you can share your rationale in particular for why the proposed cycleway is on the West side of Houston road which has a significant number of driveways and parking that is parallel to curb? Also can you expand upon what will be achieved by removing the roundabout at Barker St and Houston Rd? It would also be great to see an example of where such a cycleway has been constructed along roads that have a lot of driveways exiting? Is there another example nearby or within Sydney that has been found to be safe for both cycling and pedestrian activity where the street is primarily residential? | Thank you for your comments.<br>1. Council acknowledges the many ways in which the road space will be used. Some sections of the route the cycleway is at footpath level, and sometimes it is at road level. Along most of Houston Rd, the cycleway is proposed to be level with the footpath.<br>The cyclepath is wide enough to accommodate people on bikes moving around people accessing cars. As always, Council encourages people to exercise caution and be mindful of others in the public spaces.<br>2. Driveway access is a key consideration of the project and Council will continue to evaluate the many issues associated with this. A number of driveway crossings mean people in cars and people on bikes will have to wait where necessary, before continuing.<br>3. The proposed pedestrian crossings at the intersection of Houston Rd and Barker St will allow pedestrians to cross more easily. If travelling in a car, the modified intersection treatment will require waiting for traffic on Houston Rd to clear before driving across. Council is aware that the proposed design will result in changes to traffic flow at this location.<br>4. Council considered many factors to determine the alignment of the cycleway along the route. These included driveways, intersections, loading zones, connecting cycle routes and impact on parking.<br>5. Council has sought to accommodate all users in the proposed design. Unfortunately the existing roundabouts are incompatible at intersections that include bi-directional separated cycleways.<br>6. Bourke St in Surry Hills and Queens Rd in Westmead have separated cycleways that are similar to the proposed design. |
| I support the improvements and would like to see more separated cyclepaths throughout randwick. | Thank you for your comment and taking the time to make a submission. |
| Really keen to have separate cycle ways - I've stopped cycling to work because the roads are far too dangerous, even though it's flat from Maroubra to the city. Any cycle paths are a big improvement - thank you | Thank you for your comment and taking the time to make a submission. |
| Leave it as is. Nobody will use it. | Thank you for your comment and taking the time to make a submission. |
| Please ensure that all traffic lights that are crossed by the bike path, can be triggered by a bicycle approaching them. Otherwise the proposal looks great.<br>Thanks! | Thank you for your comment. Bicycle lanterns are planned at signalised crossings. The 'presence detectors' at all signalised intersections will be designed with bike riders in mind, and will be developed in detail with Roads and Maritime Services (RMS). |
| The provision of improved and safer cycling pathways is vital to Randwick City's growth and development into the future. This is the ideal time to add these improvements and fully integrate them into the broader light rail and transport networks. | Thank you for your comment and taking the time to make a submission. |
| Fine for landscaping and crucial for bike and cycling. This track needs to be very high quality as the users that get this far are generally road bike riders and go at a high speed and ride at night. Make sure that the driveways are well marked and the driveway users have high visibility of the cyclists. If in doubt, go back to Bikeast and consult with them. Once the project starts, consult with Botany council on the Banks Avenue project. | Thank you for your comment and taking the time to make a submission. |
| I think it's a great start, we are cycling too close to the cars and can get hit by parked cars opening doors or driving cars. I would like to feel safer when riding to work | Thank you for your comment and taking the time to make a submission. |
| While I have a car, I prefer cycling around my area of Coogee. However, lack of infrastructure makes cycling a very real hazard and a dangerous passtime. I would support any initiative that increases cycle lanes and encourages residents to leave their cars at home. | Thank you for your comment and taking the time to make a submission. |
| Great idea!! Completely support proposal for better cycling and walking paths. Please extend to maroubra beach | Thank you for your comment. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. A number of routes on the list are in Maroubra.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |

| Submission | Council response |
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| When will the bridge from Allison road across the duckponds be finished?<br>The original bridge has been removed and we were promised a wider newer version one. I now can't find any information about this bridge | Thank you for your comment. The connection from Doncaster Ave into Centennial Park is dependent on the light rail project, and a future shared path bridge to Centennial Park. The bridge across the duck ponds is a project managed by Centennial Park and Moore Park Trust. Please refer any queries regarding the timing of this project to them. Council will continue to communicate with both organisations and work towards a strong connection into Centennial Park. |
| Kingsford Centennial BiDirectional Cycleway is very good contribution. Enhancing. Well done R/W Council. | Thank you for your comment and taking the time to make a submission. |
| They look very nice. However given that the light rail project has already caused significant congestion and poor traffic flow of cars and bus services in Randwick/Kensington/Kingsford already, is this really necessary? It will only get worse when the light rail is up and running, so why add yet another form of above ground transport to the mix. If it doesn't incentivise people to not drive, it is not a worthwhile investment. | Thank you for your comments. The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women children and elderly people. |
| very simple...you cant build it quick enough. Great idea. Lots more cycling commuters so lets get them away form cars and keep them safe | Thank you for your comment and taking the time to make a submission. |
| More trees and bicycle lanes are welcome in Randwick. Could you please plant some trees in Murrabin Avenue.<br>It looks awefull without many trees. | Thank you for your comment. Your request is separate to project, and has been referred to Council's Tree Management Team to address. |
| Improved cycling around the entire council area is a good idea, especially to make it safer for people that cycle everyday to and from work. | Thank you for your comment and taking the time to make a submission. |
| I think it's a great idea, but will it ensure that bike riders who travel in groups of 3 or 4 or sometimes more will use the cycle lanes. Many times I have had bike riders 3 or 4 abreast in front of me while driving on the roads around Randwick when there was room for them to travel on the side of the road. | Thank you for your comments. People riding bikes will not be compelled to use the proposed cycleway. Confident and capable cyclists are welcome to use the road, as is currently the case. The addition of a separated cycleway provides a safer option that Council hopes will attract more of the community to use. |
| I think the two directional cycle path is a disaster. This idea seems to have started well before we knew about the Light Rail, or the closure of north bound access from Anzac Parade to Ascot, Carlton, Abbotsford Streets. This closure has caused enormous congestion on Doncaster Avenue. It was also planned before local residents were aware of the Taxi access from Ascot Street to the Racecourse. In addition there is now a multi storey Car Park near Ascot Street - which local residents were not informed of. The impact on local traffic will be enormous once this is operational.<br>Has any consideration been given to the impact of this bi-directional cycle path on the Horses who cross from Bowral Street to the Racecourse throughout the day?<br>And what consideration has been given to Garbage collection? How can Council trucks access the curb side bins when there's a bi-directional cycle path?<br>Since the construction of the Light Rail local street have been changed to Angle Parking on one side, which means there is a lot more traffic in our local streets. With the abolition of parking on the east side of Doncaster Avenue to create a cycle path, this will mean further congestion in our local streets.<br>And spare a thought for the Day Care Centre at ... Doncaster Avenue Kensington. How are parents meant to drop off and pick up very small children when there is no parking access to these premises? The same problem occurs for parents dropping off and picking up children from Kensington Primary School.<br>I am a local resident and have lived in Goodwood Street Kensington for six years. I walk my dog daily in Doncaster Avenue and it would seem there are very few cyclists who use this route, apart from very early morning squads of serious cyclists.<br>Kensington has been greatly disadvantaged by the impact of the Light Rail construction and our suburb has been ruined. It is almost impossible to use Doncaster Avenue on Race Days due to the heavy congestion of traffic. I strongly urged you scrap plans to build this bi-directional cycle park. | Thank you for your comments.<br>Council acknowledges the impact the light rail stabling yard has had on residents of Doncaster Ave. We will inform the community of project progress and seek to minimise any future construction impacts where possible.<br>The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people. The streetscape improvements and cycleway will enable more people to walk and cycle to local destinations, and in doing so, help reduce parking demand and congestion.<br>Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the length of the 2.6km route, being a removal of 34 spaces and 14 newly created spaces. On Doncaster Ave between Alison Rd and Todman Ave there is a loss of 8 spaces and 1 newly created.<br>As indicated in the concept design, between Ascot St and Todman Ave 3 car parking spaces will be lost and 1 created.<br>Council staff have spoken to racecourse representatives (ATC), Gai Waterhouse Racing (located in Bowral St), Kensington Public School and other stakeholders along the route. The Project Team is aware of the need to accommodate horses crossing Doncaster Ave at different times of the day.<br>Waste management is a key consideration for the project. The Project Team is working with the Waste Services Team at Council to manage the proposed changes along the route. |
| I thoroughly support them and encourage you to make separated walk and cycle ways as much as possible. I ride from Coogee to work most days and know that every day I run the risk of injury or death, but I love it for the mental and physical health that it brings. Thank you for your efforts in this area. I am so glad my rates are going into projects like this. | Thank you for your comment and taking the time to make a submission. |
| It is a fantastic idea and i will use it for sure | Thank you for your comment and taking the time to make a submission. |
| I do not believe that having two opposing cycling tracks on the ipsilateral side of the road is safe. Unidirectional cycling should concur with the motorised traffic. | Thank you for your comment.<br>Council acknowledges that a single lane separated cycleway on each side of the road, matching the direction of vehicle traffic is a desirable design outcome. However, there are road widths constraints along the route that make this option very difficult.<br>A whole lane of parking would have to be removed along the route to fit a cycleway on each side, which is not feasible. Council is conscious of the demand for on street parking, and many parking spaces would be lost. A bi-directional cycleway on one side of the road allows many parking spaces to be retained, hence the proposed design. |
| Great idea to have separate bike lanes - we need to encourage cycling in a safe manner! | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| The trees you propose to plant should be native trees identical to the trees that were removed. This means that the council needs to plant many Port Jackson figs, Hills figs and Morton Bay figs. The trees you propose to plant need to fulfil the needs and replace the homes for the native fauna. Thank you. | Thank you for your comments. Council may not be able to plant trees that are identical to the ones removed. This may be due to location constraints and available space. The Project Team is working closely with the Tree Management Team to select appropriate trees along the route. |
| The trees you propose to plant should be native trees identical to the trees that were removed. This means that the council needs to plant many Port Jackson figs, Hills figs and Morton Bay figs. The trees you propose to plant need to fulfil the needs and replace the homes for the native fauna. Thank you. | Thank you for your comments. Council may not be able to plant trees that are identical to the ones removed. This may be due to location constraints and available space. The Project Team is working closely with the Tree Management Team to select appropriate trees along the route. |
| I support anything to allow safe passage of all manner of cyclists from commuters to families with young children. Being able to safely travel to centennial park and the surrounding areas is a very exciting prospect to me as a new resident to the area, | Thank you for your comment and taking the time to make a submission. |
| Great idea. But it is still not going to stop the big groups of cyclesist riding three wide along Anzac parade | Thank you for your comments. The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people. This project doesn't aim to draw road cyclists away from their chosen routes. |
| I am totally in favour of your plans.<br>Making cycling safer by separating them from traffic will be safer and as a result I believe there will be a big take up. | Thank you for your comment and taking the time to make a submission. |
| It sounds like a great idea. However I think it would be much better if the planned bike path connects all the way to Maroubra and Malabar as this community would definitely benefit from this. There are a lot of commuters and residents who would be keen to use the bike path, so why not connect it all the way to Maroubra Junction and Malabar, where the public transport options are a lot more limited than Kingsford? | Thank you for your comments. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. A route further south along Anzac Pde is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| I am completely supportive of the new cycling improvements as shown in this plan.<br>One note: the timing of the lights at Sturt St and Anzac Pde may need modifying. The the time allowed for Sturt St traffic (both cars and bicycles - relevant here due to proposed cycling upgrades) is too low and makes it difficult for even a single bicycle to cross this road before the lights go red. | Thank you for your comment. Council is working with Roads and Maritime Services (RMS) on the signalised intersections. We have noted your comments and continue to work towards providing safe crossings for people walking and cycling. |
| Social Impact designer here, you should have us run a cycle hack with the public.<br>email ...<br>Thanks | Thank you for your comment. Council will note your suggestion for future reference. |
| Making safer cycling will encourage more people to get out and exercise and also to ride to work. Fully support this initiative. | Thank you for your comment and taking the time to make a submission. |
| Look great. Fully support. I am a cyclist and this route will provide a much safer cycle route for me to the city. My kids will use it too to get to centennial park and moore park footy club | Thank you for your comment and taking the time to make a submission. |
| Brilliant !<br>Start the Biking revolution. | Thank you for your comment and taking the time to make a submission. |
| A dedicated cycle way, either side of Todman, (or a bi-directional one) with surface colour to stand out from main road colour very urgently required. Would increase visibility for road users and hence cyclist safety. Would then hopefully also reduce present frequent use by cyclists of footpaths along Todman endangering pedestrians as well as residents leaving their driveway." Cyclists using footpath ride very fast and accidents are bound to happen when residents or cars are leaving their driveways. This even more likely after dark.<br>Todman avenue - apart maybe from the stretch from Supa Centa to Brompton road intersection - is not worthy of the name avenue with such poor provision of green. We must envy the efforts Sydney Council does in Zetland (O'Dea) and Waterloo (Bourke) for instance. Much more tree planting needed all along Todman. Get impression Kensington is not treated as well as Randwick proper and the seaside suburbs like Coogee.<br>Hope that when Light Rail finished that Todman will get a new surface (special low noise surface) because the avenue has suffered a lot because of the works in Anzac Parade and the various residential developments (traffic of cement mixers, truck and trailers with demolition waste, etc) in Zetland, Waterloo and Alexandria. | Thank you for your comments.<br>Council has a list of bicycle route construction priorities and this route is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps<br>Council is currently working on improvements to the bicycle shoulder lanes along Todman Ave. We will be approaching the NSW Government asking for the Todman Ave and Lenthall St routes to be considered a 'Sydney Strategic Bicycle Corridor', as seen in the NSW Government document 'Sydney's Cycling Future'. If successful, this will assist with the planning and implementation of this section.<br>Trees along Todman Ave is separate to this project. However, the Project Team will refer your tree planting request to the Tree Management Team.<br>Much of the road and footpath area along Anzac Pde that is within the scope of light rail works will be resurfaced. Otherwise, Council has no current plans to resurface Todman Ave. |
| I have lived in Kensington, near Doncaster Ave for a number of years and parking around here is always a nightmare and has become much worse with the amount of new apartments in the area. Removing car parks along Doncaster Ave to accommodate the cycle path is just going to make matters worse. So many car parks along ANZAC parade have been lost to the light rail and now you want to take more car parks away. Where are people to park? More apartments are on the plans to be built in this area but less places to park your car. Is there any land at the behind the houses on Doncaster ave, backing onto the race course that could accommodate a cycle path? | Thank you for your comments.<br>Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces.<br>Community consultation took place in 2015 to identify and prioritise the construction of cycling routes across the LGA. This route was identified as the number one priority. The route also aligns with NSW Government plans for key strategic cycling corridors. |

| Submission | Council response |
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| It's fantastic and about time we had separated cycle paths to protect us all from the many distracted motorists nowadays. If only we could have a similar network of separated cycle paths all over Sydney - what a joy that would be! Maybe we are at last, though slowly, trying to catch up with the rest of the world regarding the benefits of cycling and proper cycling infrastructure. | Thank you for your comment and taking the time to make a submission. |
| As a former vehicle accident investigator I make the following suggestion.<br>The lane for cyclists travelling in the same as traffic should be on the right and the lane heading toward oncoming traffic should be on the left or outside (as per the American model). Otherwise you will likely have head on collisions with cycles vs cars I it doesn't take much for either to swerve into the others path. Such accidents could easily cause death or very serious injury to the cyclist. Might take a bit of awareness training for cyclists but it is worth it if it saves lives on Randwick Council roads. | Thank you for your comments. Council acknowledges that dooring is a potential issue when cycle routes are situated close to parked or moving cars. Along most of the route, parked cars separate moving traffic from the cycleway.<br>However, in places where there are no parked cars, on-road vehicle traffic and people on bikes in the cycleway will be moving in opposite directions. The proposed design shows a barrier in the form of a median block or divider. This will help prevent collisions. As always, Council encourages all road users to use appropriate caution on roads and in public spaces. |
| I think it's awesome. Keep up the good work. | Thank you for your comment and taking the time to make a submission. |
| Hello thank you for your time. I have two questions. Will the council provide a pedestrian crossing on Sturt street to assist students, parents and carers reach Rainbow Street Public School and the High Schools safely? Its very dangerous now crossing the street. Secondly is the council removing parking spaces to make way for the cycling track? As Rainbow Street Public School grows from 400 students to 1000 students. There will be more people looking for parking like my family. It is a HUGE problem now I hope it won't be made worse with less parking.<br>Please don't invite me to ride or walk as we live on Pitt Street which is at the base of one of Randwick's steepest streets. Albert..and Alison is hardly easier. We live over 1 km away and have no convenient bus. Others like myself are put in this school catchment with no option but to drive.<br>Your plan to help cyclists and decrease cars is a good idea but keep in mind how dreadfully hilly Coogee and Randwick are. I can see only the very fit being able to make it to Coogee and back to Kingsford.<br>Thank you. | Thank you for your questions.<br>1. Council is working on a second, similar walking and cycling improvements project from Anzac Pde east along Sturt St, Avoca St and Bundock St t South Cooge. We are currently developing a concept design for this route and it's likely to be on public exhibition later in 2018.<br>Council is aware of the need to accommodate pedestrian movements on Sturt St and is currently exploring the possibility of crossing facilities, separate to these projects.<br>2. Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route from Kingsford to Centennial Park. This equates to a removal of 34 spaces and 14 newly created spaces. The addition of streetscape improvements and a separated cycleway will enable more people to walk and cycle to local destinations, and in doing so, help reduce parking demand and congestion.<br>Any parking changes for the second route from Kingsofrd to South Coogee will be shown in the concept designs produced later this year. |
| Let's hope this is just the beginning. Lethal Street Kensington needs immediate attention as does the three way intersection of Bundock/Avoca/Sturt Streets. There are many cycling cringe points in Randwick, but these two have got to be two of the worst. | Thank you for your comments.<br>Council is currently developing plans for Walking and Cycling Improvements along a second route from Kingsford to South Coogee, which includes Bundock St, Avoca St and Sturt St. Plans are being developed and are likely to be on public exhibition in the second half of 2018.<br>Furthermore, Council is aware of the need to provide additional cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The Lenthall St route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps<br>Council is currently working on improvements to the bicycle shoulder lanes along Todman Ave. We will be approaching the NSW Government asking for the Todman Ave and Lenthall St routes to be considered a 'Sydney Strategic Bicycle Corridor', as seen in the NSW Government document 'Sydney's Cycling Future'. If successful, this will assist with the planning and implementation of this section. |

| Submission | Council response |
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| I think that Randwick Council should do as Sydney City Council is reportedly doing and not worry so much about the streetscaping of the cycle route - just get the separated cycle route in place! This reduces the cost of the cycle way. I live in Maroubra and want to start cycling to work in Milsons POint. I am trying to find a good off road route. Once I get up to Kingsford it is ok, and this new cycle way will make it even better - I can then cycle pretty much off road all the way. My husband and two of my children work/study at UNSW. They all cycle up to the Uni - yet there is no good safe cycle path from Maroubra or beyond. We have many friends who live Maroubra/Malabar/LaPa who travel up to work at the Uni or the hospital - yet we are not served at all for cycle paths, and hardly considered in any plans. I do note that the extension down Anzac Parade is second priority - please bring it on! I think that there is a massive population who you could get out of cars and into self propelled transport if only you provide safe cycle ways. Plenty more parents would send their children to school by bike if this was an option. (All of my kids have studied at RGHS and RBHS and occasionally cycled). Why have you not seemed to consider much provision for people south of Kingsford/Coogee? We are arguably those most in need - it takes us the longest to get into town, by cycling we will probably be able to beat the new light rail. With the amount of residential development being constructed Council is really going to need to do some good forward planning for transport. Proper separated cycle ways for residents beyond Kingsford would be an excellent start.<br>This current plan from Kingsford to Centennial Park is good - I will use it frequently. It is the route I currently take to cycle into town, but it peters out in many places at present and you have to cross from one side to the other, then go on the road - generally just not properly in place. Well done for doing the upgrade. Please apply for mor RMS funding to extend to Maroubra and beyond. | Thank you for your comments and taking the time to make a submission.<br>Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| Firstly, we are delighted that Randwick are building bicycle paths separated from the traffic on this route. Safer bike paths encourage more people to cycle and make cycling safer for existing bike riders which we very much welcome.<br>A couple of comments- it would be good to have an additional bike/ pedestrian crossing at the east side of the Alison Rd intersection with Doncaster Ave intersection. As currently shown cyclists would need to cross 3 sets of lights (the light rail/ bus crossing, then Alison Rd, then Doncaster) to go between the Alison Rd and Doncaster Ave bike paths. Too long a wait makes it more likely people will cross unsafely.<br>Thirdly, we'd recommend aligning exits from the bike paths with the side streets to allow cyclists to join or exit the path safely. At one intersection there is a pedestrian crossing which could have bike signage to allow cyclists to cross.<br>Lastly, congratulations on the good design and the plans to construct the street improvements. | Thank you for your comments.<br>Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS.<br>The Project Team has considered access to side streets and connections to the cycleway. We are looking at all intersections along the route to accommodate the various movements of people walking, cycling and driving. |
| Great but what is council planning in ensuring that Cyclists remain within their cycle paths? Far too often, cyclists especially those traveling in groups ride outside the dedicated pathways blocking the roads used by vehicles. | Thank you for your comment. The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people. The proposed design doesn't aim to draw road cyclists away from their chosen routes. Confident and capable cyclists are welcome to use the road. In NSW legislation, bicycles are considered to be a vehicle and have the same rights and responsibilities as other road users. |
| Solar panel lights for corners that are dark. Especially the bike lanes behind UNSW. Sometimes there is broken glass and even hard to see for cars driving. | Thank you for your comments. Lighting is being carefully reviewed along the route. |
| In principle it is a great plan to have properly separated cycleways and safer pedestrian crossings and more plantings. Bundock St is a good choice. Re the plantings, please use dense, diverse bushy and grassy plants wherever possible, to increase biodiversity, provide shelter and contribute to habitat corridors for small species eg. lizards and birds. | Thank you for your comments.<br>Separate to this Kingsford to Centennial Park project, Council is developing a concept design for Walking and Cycling Improvements along a second route from Kingsford to South Coogee. This will include Bundock St. Plans are being developed and are likely to be on public exhibition in the second half of 2018.<br>The Project Team is working closely with the Tree Management Team to select appropriate trees and planting along the route. |
| Great initiative. Could the cycle way be extended through from Kingsford to Maroubra junction along Anzac parade? Will enable people to cycle to the light rail or keep going to the city. | Thank you for your comment.<br>Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| This would be a welcome update to the area as segregated cycle lanes improve the safety and traffic flow of all road users, and as a cyclist myself would like to see the change occur | Thank you for your comment and taking the time to make a submission. |
| Please include a safe crossing to Centennial Park using the Govett Street entrance. Darley Rd is becoming difficult to cross to access the park especially for the elderly and for the very young not to mention cyclist | Thank you for your comment. The Darley Rd and Govett St intersection in Randwick is separate to the project. Your request is noted and will be passed on to the Transport Team to address. |
| I wholeheartedly endorse seperate bike lanes in Randwick Council and a link to Centennial Park would be awesome. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| I strongly support the installation of bi-directional separated cycle paths.<br>— I suggest that ALL cycle paths should be separated, and bi-directional. This design is necessary for the safety of both cyclists and pedestrians. At present, where cyclists ride on shared footpaths, there is high risk of collisions between cyclists and pedestrians. This is especially the case because the vast majority of cyclists do not use a warning bell on approaching a pedestrian, even from behind, and many do not have lights on when it is dark. For this reason it is now no longer safe to walk on footpaths on many streets in my local area. This is a significant problem for me, as I walk my dog daily in my local area.<br>— I also suggest that it should be made mandatory for all bicycles to have a bell, and for all cyclists to sound a bell warning when approaching pedestrians.<br>— I also suggest that it should be made mandatory for all cyclists to have lights on when riding after dark.<br>— These two requirements would need to be enforced. I suggest that Council Rangers should be responsible for this enforcement, and for this reason that Council needs to increase the number of Rangers it employs for this purpose. | Thank you for your comments.<br>1. Council has sought to provide a separated cycleway along the route where possible. The shared path treatment is proposed where the separated cycleway treatment is not possible.<br>Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps<br>2. Legislation is a matter for NSW Government. Council encourages safe riding of bicycles and courteous behaviour by all road users.<br>3. It is currently compulsory for all bicycles on the road to have a bell, and to have appropriate lights when riding at night.<br>Please contact Transport for NSW for further legislation recommendations.<br>http://roadsafety.transport.nsw.gov.au/stayingsafe/bicycle-riders/helmets-gear.html<br>4. Law enforcement is a matter for police. Council is in regular communication with the local police and is happy to refer any issues on to the relevant authority. |
| Dangerous no matter how designated the cycleways<br>The population is too great for the narrowness of Randwick streets to allow cycling on public streets which are already a hazard .Cyclists slow traffic flow dangerously. | Thank you for your comment and taking the time to make a submission. |
| Any improvement for cyclists is worthwhile. At present, there are not enough cycleways, and some end abruptly and I often wonder how cyclists manage.<br>And of course I am in favour of landscaping and planting of more trees, shrubs, etc. - in other words, of beautiifying our suburban environment. | Thank you for your comment and taking the time to make a submission. |
| once again taking away possible car parking. where are the parking lots now planned?????????????????????????????????????????????????????????????????????? | Thank you for your comment. Implementing new locations for people to more safely walk across Doncaster Avenue has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. |
| I do not agree with the planned cycling improvements. Too much public roadway is given over to cyclists and is barely used. Our streets in the Eastern Suburbs are already over congested. These plans will only worsen the situation. Council needs to think about ways to improve the flow of traffic rather than bringing to a stand still for the benefit of a few people. | Thank you for your comments.<br>Council is proposing streetscape improvements and a separated cycleway along the route to encourage people to choose active modes of travel. This will help reduce the number of people driving on local streets and ease congestion. |
| Brilliant! I almost always support more accessibility for bikes and pedestrians. It is the best way to ensure sustainability in a busy area like Kensington. I ride my bike from home in Zetland to UNSW. I would love a safe, direct path from Todman to High St (riding along Anzac for a couple of blocks can be hostile). Although these planned improvements won't directly solve this problem, I think it is good progress. | Thank you for your comment. Council is currently working on improvements to the bicycle shoulder lanes along Todman Ave. We will be approaching the NSW Government asking for the Todman Ave and Lenthall St routes to be considered a 'Sydney Strategic Bicycle Corridor', as seen in the NSW Government document 'Sydney's Cycling Future'. If successful, this will assist with implementation and funding of this section. |
| I think the proposed cycleways and other improvements to the streetscape are a great first initiative to allowing better bicycle and pedestrian connections between areas of the Eastern Suburbs and the city. I will certainly be using the bike routes on a daily basis, but would also request that bidirectional bike lanes be implemented in areas further south of Kingsford such as Maroubra to Kingsford, Malabar to Maroubra and La Perouse to Malabar. | Thank you for your comment. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. Some of the routes you mention are on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| I do not believe there is sufficient information to make an informed comment<br>Has traffic modelling been conducted<br>When will the project commence/be completed<br>Will the light rail project be completed before planned improvements commence<br>I live in a block of units in Doncaster Avenue with underground parking for 18 vehicles. To access Doncaster Avenue I will be required to negotiate a footpath, 2 cycle lanes, a small cement lane divider, and a row of parked vehicles . What happens if I am stuck in the cycle lane whilst trying to enter Doncaster Avenue traffic? Will the row of parked vehicles obscure my vision?<br>Overall I believe the present improvements are dangerous to motorists exiting car parks, and cyclist trying to avoid exiting vehicles. | Thank you for your comments.<br>1. Yes. Traffic analysis has been an important part of the project.<br>2. The project is currently in design phase. Construction, if funding is approved, would commence no earlier than mid-2019.<br>3. Council is currently unable to provide exact timing for construction.<br>4. As always, Council encourages the community to exercise caution and be mindful of other road users. A number of driveway crossings mean people in cars and people on bikes will have to wait where necessary, before continuing.<br>5. Where on street parking is permitted, parked cars may obstruct clear sight of oncoming vehicles. Council encourages all road users to exercise caution when entering or exiting driveways.<br>6. Noted. |

| Submission | Council response |
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| I think this is a fantastic Idea. More cycle lanes the better! It would be even better in the future to see dedicated cycle lanes going south along Anzac Pde, to link the light rail with the already large and growing community. in Maroubra, Malabar, etc. | Thank you for your comment. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The routes you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| I support the proposals | Thank you for your comment and taking the time to make a submission. |
| I'm all for safety, but I do have concerns about the traffic and frequency of the traffic on Doncaster Avenue being the only thoroughfare to Alison Road. It's an extremely busy road. It becomes a road block most mornings, and it's particularly bad on racedays. Who knows what it's going to be like once the Light Rail commences.<br>Doncaster Ave has become 'paceway' at night time for many drivers, the roundabouts don't slow anyone down. Parking is at a premium already, I am pleased to read only a few parking spaces will be removed, but I am concerned the the cycle path isn't going to assist with the already high volume of vehicles and congestion and movement of traffic along the avenue.<br>My other concern is the noise levels. Cyclists are very early risers. Being on them talking at 5am most mornings as they cycle past, along with my neighbours. I understand in Maroubra, signs have been erected on posts to remind cyclists to cycle quietly while in a residential area. I would like to think Randwick Council could do the same. | Thank you for your comments.<br>Council is proposing streetscape improvements and a separated cycleway along the route to encourage people to choose active modes of travel. This will help reduce the number of people driving on local streets. The arrangement of traffic lanes will remain largely unchanged. Some lanes however, will be narrowed, which will likely result in lower average speeds along the route.<br>Council acknowledges that many people use Doncaster Ave, especially during events and in peak hours.<br>Streetscape improvements and traffic calming have been key considerations of the project with the aim of improving safety for all road users.<br>Council will consider adding signs where appropriate. |
| Definitely agree to having a dedicated cycle path. | Thank you for your comment and taking the time to make a submission. |
| I like the route chosen for the cycleways. My concern as a cyclist with the light rail is crossing the tracks when the roads are wet. The rail lines in the wet are slippery and if approached at an angle on the bike, easy to fall. That doesn't appear to be an issue here from looking at the plans. But i raise this in case I have misread the plans around Sturt st and Anzac pde and their relationship to the light rail tracks. That is where its a potential hazard for cyclists | Thank you for your comments. Council acknowledges your concerns and is looking closely at all intersections, including those that meet the light rail lines. The Project Team will investigate and adhere to standards that explain the interface between bicycle routes and light rail tracks. |
| I am in favour of this separated bicycle path. It is a good link to the existing bike path around centennial park and enables cyclists to more safely travel north-south through the randwick council area. I look forward to more children being able to cycle to Kensington Public school and a general increase in cycling participation rates in the area. An increase in the number of trees is also a nice benefit | Thank you for your comment and taking the time to make a submission. |
| Brilliant idea. Bundock street is a very dangerous road currently for cyclers and I believe a dedicated bike track will make is safe for everyone | Thank you for your comment. Council is currently developing plans for Walking and Cycling Improvements along a second route from Kingsford to South Coogee, which includes Bundock St. Plans are being developed and are likely to be on public exhibition in the second half of 2018. |
| The sooner the better. | Thank you for your comment and taking the time to make a submission. |
| All cyclists should have to use cycle ways when they are provided. Not in motorised traffic if they are there cyclist should use them as a matter of safety | Thank you for your comment. Bicycle riders have the same rights and responsibilities on the road as other road users. Unless otherwise signposted, they are allowed to use the road.<br>People riding bikes will not be compelled to use the proposed cycleway. Capable cyclists are welcome to use the road. The addition of a separated cycleway provides a greater choice of transport modes for the community. |
| I support the project. | Thank you for your comment and taking the time to make a submission. |
| This is great. Great for cyclist and motorists. Where possible I stick to cycle paths and stay within its lines. Yet I do see fellow cyclists riding two abreast and even three abreast which means they spill out into the main road. This holds up the motorist and annoys many of them. Designing the cycle path as you have protects me better from opening car doors and keeps these inconsiderate cyclists within the cycle lanes.<br>The only problem is that the original cycle lanes that ran along the edge of Centennial park have now been dug up. I no longer see a way to get from Doncaster avenue to the new raise shared cycle path that is on the other side of the light rail. I have to cycle east on Alison Road to get to the Park entrance on Darley. Will this change?<br>Happy that a percentage of my rates are being spent on promoting healthy activities.<br>Regards | Thank you for your comments. The connection from Doncaster Ave to the Alison Rd shared path is dependent on the light rail project. Council will continue to communicate with Transport for NSW and work towards strong connections to surrounding cycle routes. |
| I welcome the planned changes to the cycling and walking access in the area. I have been especially concerned that cyclists have not been well supported or provided for locally and I believe it is essential to encourage safer and easier access to cyclists. | Thank you for your comment, and taking the time to make a submission. |
| I support the improvements in the waling and cycling plan. | Thank you for your comment, and taking the time to make a submission. |
| Randwick Council should be commended on such an initiative. Great Idea and hope to see it come to fruition as detailed here in its entirety. | Thank you for your comment, and taking the time to make a submission. |
| The reduction of street parking for cyclists is unacceptable. It's obvious the greenies in council are trying to get all of us on bikes when the majority of us drive cars. The narrowing of streets will cause further Traffic congestion. | Thank you for your comment. Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces.. |

| Submission | Council response |
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| Please don't do it, the bike lanes that is. Our roads are not wide enough and it's hard enough now trying to get from A to B to them have lanes taken away to create bike tracks for the minority. We have witnessed a young boy being flown into the air by a cyclist as he tried to cross the bike lane exiting his parents vehicle to go to church in Taylor Square, he was concussed however very lucky to be alive. I will never forget this incident. | Thank you for your comment. Improved safety for people choosing to walk and cycle is a key consideration of this project. Very sorry to hear about the incident. |
| The proposal looks good. I have ridden to work along Doncaster Rd every day (unless raining) for the past 7 years. The only foreseeable issue is that bikes of different speeds won't be able to pass each other safely. But this is a limitation of all separated cycle ways. I would support the proposal as it is very safe and would encourage more people to cycle. The faster bikes will continue to use the road either way. | Thank you for your comment, and taking the time to make a submission. |
| As much as I support the rights of people to ride bicycles, our streets are just not suitably equipped. The bicycle lanes in the city CBD are a disaster and take a lesson from them. Try being on a bus from the city coming up Oxford St to Kingsford area and seeing one solo bicycle rider holding up the whole lane, bus can't go round, placing bicycle rider safety at risk and holding up traffic. In my opinion, bicycle lanes are a waste of tax payers money to serve a minority. Sydney and in particular, the Eastern Suburbs of Sydney do not have the space. Let the bicycle riders get their exercise in Centennial Park. It is a foolish plan. Living in Kingsford, I see so many bicycle riders at their peril and many of them are injured or killed like that pregnant woman on Anzac Pde at the end of my street (Botany). There is just not enough room. It's as simple as that. It is not about being 'green'. It is about being unrealistic and stupid. | Thank you for your comments. Council acknowledges that there are road widths constraints along the route. The design accommodates existing traffic lanes and existing footpaths, while adding a separated cycleway.<br>The inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people. |
| I think separated cycle ways are a great idea and long overdue. | Thank you for your comment, and taking the time to make a submission. |
| I don't believe a signalised intersection is required at Ascot St and Doncaster Ave. The roundabout functions very well and allows for traffic flow.<br>The right turn (only) lane from Doncaster Ave onto Anzac Parade when heading N, will be under utilised, while the left lane (left turn and straight) will be full of vehicles, based on morning peak hour traffic.<br>Suggest the right turn lane is also a straight lane and the left turn lane becomes a left only lane or stays as either left or straight. This will help with vehicles attempting to go straight across Anzac Parade, not getting stuck behind vehicles turning left that are stuck due to Anzac Pde traffic and vehicles turning right. | Thank you for your comments.<br>Council has sought to accommodate all users in the proposed design. Unfortunately roundabouts are incompatible at intersections that include bi-directional separated cycleways.<br>Council is communicating with Transport for NSW on the light rail project and reconfigured intersections. We will continue to look closely at this intersection through the duration of the project. |
| I really hope you get this through and it gets built.<br>Last year I cycled along Doncaster Avenue daily for six months commuting from UNSW to Surry Hills. I nearly collided with cars multiple times, especially during the school drop off/pick up hours. The danger was such I would sometimes cycling along the footpath on the west side of Anzac Parade (even though footpath cycling is illegal) for the sake of personal safety.<br>My only issue with the plans is I don't see a clear way for commuters to UNSW to access the path. Personally I used to cycle along the footpath on the east side of Anzac Parade between High St and Doncaster Av, though this is narrow, crowded with pedestrians and technically illegal. No way would I cycle from UNSW on Anzac Parade to get to Doncaster Avenue, I enjoy living.<br>I hope that you make the small stretch of footpath just north of Day Avenue accessible to cyclists coming from UNSW. (-33.917646, 151.226009)<br>Cheers! | Thank you for your comments. Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is working with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible.<br>Council recognises the many users of the space along Day Ave and Anzac Pde near UNSW. We are in conversation with the University and the light rail project staff about managing walking and cycling movements in the area. |
| As a UNSW staff member and regular bicycle rider, I am delighted to see RCC's proposal to have a separated bike path along Doncaster and Houston. I am most familiar with Doncaster, which currently is treacherous for bicycle riders, a fine balancing act between cars passing and car doors opening. As a major corridor between Centennial Park and UNSW campus, having this dedicated, separated, bike path will make a big difference to the safety of bike riders, including myself. Hopefully it will encourage more people to be confident enough to ride their bike to campus, or to Centennial Park - one of the greatest assets of the Eastern Suburbs. Thank you for making this path a priority and I am looking forward to seeing the bicycle path network expanding in the East. | Thank you for your comment, and taking the time to make a submission. |
| Great idea to encourage cyclists and make their lives safer. I take my hat off to the crazy-brave cyclists who fly past parked cars in the traffic. Every single car could take them out just by opening their door! Let's make them safer. Sydney drivers have a very jealous attitude - my lane, my right of way etc. In other countries, cycle only lanes may not be so necessary, but in Sydney, they are vital.<br>Approve! | Thank you for your comment, and taking the time to make a submission. |
| I don't think we have space for bike lane on Anzac Pr, its not going to be used anyway ... | Thank you for your comment. The route runs from Kingsford along part of Sturt St, General Bridges Crs, Houston Rd, Day Ave and Doncaster Ave towards Centennial Park. It does cross Anzac Pde in 2 locations. |
| I am very concerned about the proposal to remove the roundabout at barker and Houston Rd. This is an exceedingly busy intersection in the morning and evening. What will be the proposed traffic flow? I am also concerned about the loss of parking. It is already down because of the light rail. | Thank you for your comments.<br>The proposed pedestrian crossings at the intersection of Houston Rd and Barker St will allow pedestrians to cross more easily. When travelling in a car, the modified intersection treatment will require waiting for traffic on Houston Rd to clear before driving across. Council is aware that the proposed design may result in changes to traffic flow at this location. |

| Submission | Council response |
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| I love Randwick Council's dedication to ensuring a safe an separated cycle-way along this very important regional active transport corridor. Being doored along this route is always a reality and with school pickup and drop-off at Kensington PS, i think this facility will be a huge safety benefit to the community and cyclists alike. Separated cycleways WILL make a big difference.<br>Quick Comment: When I use this route in a southerly direction I cross Alison Rd at the Centennial Park lights. I think having a distinct painted separation of this crossing (ped/cyclists) would assist with the sheer volumes expected of both modes expected here (CBDSELR). When I travel further south I often proceed onto the share path(western side) , however this path is of pretty low quality at the moment and has several pole/trees along the route. I then cross Doncaster at Carlton St. Will this path surface be upgraded? Will this be the expected route from this crossing of Alison road.<br>Great work guys! more of these please! | Thank you for your comments.<br>Council is working with Roads and Maritime Services (RMS) on the signal design at each signalised intersection along the route. We will accommodate people walking and cycling in each location.<br>It is likely that the shared path surface between Abbotford St and Carlton St on the west side of Doncaster Ave would be upgraded as part of the project. People on bikes would be welcome to use the shared path on the west side of Doncaster Ave north of Carlton St, or continue along the separate cycleway on the east side. |
| These changes look great, please implement them. Centennial park is really popular with many different types of groups. The more people who are happy to walk and cycle there, the more cars we get of the road and out of the park. | Thank you for your comment, and taking the time to make a submission. |
| Please make it cycle friendly along Doncaster Ave between Alison Road and Anzac Parade. Please make it cycle friendly between Alison Road and the Darley Street entrance to Centennial park. Please make Todman Ave cycle friendly.<br>They are the missing links. | Thank you for your comments.<br>Council has a list of bicycle route construction priorities and some of these routes are on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps<br>Council is currently working on improvements to the bicycle shoulder lanes along Todman Ave. We will be approaching the NSW Government asking for the Todman Ave and Lenthall St route to be considered a 'Sydney Strategic Bicycle Corridor', as seen in the NSW Government document 'Sydney's Cycling Future'. If successful, this will assist with implementation and funding of this section. |
| I ride from South Maroubra to Kingsford every day along Anzac Parade. Are you intending to build a cycle way along Anzac Parade or must cyclists risk their lives every day on this itinerary? Once in Kingsford, it's easy to access the cycle ways along Houston Road, Doncaster Avenue and Centennial Parks. | Thank you for your comment. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route south along Anzac Pde from Kingsford is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| It's about time we had a separated cycleway to keep riders, especially children, safe. It is a great way for families to get to Centennial park and being able to leave the car behind. It is a vital and important link for commuters.<br>I'd still like to see more shared footpaths in and around Randwick to get around better eg. Avoca St. | Thank you for your comment, and taking the time to make a submission. |
| Yes please. I can get from Centennial to Surry Hill's without touching street traffic however getting from Coogie to Centennial Park is dangerous. It was only this morning a car with an old couple in it almost ran straight into me and I had my 3 year old daughter on the back. After it happened I looked back and everyone was pretty shocked. The car just didn't see us even though we were in plain view doing the right thing. Please give us a route to follow to get to the Centennial. There's paths the rest of the way. | Thank you for your comment. Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| My concern is the loss of car park spots along Doncaster Ave. Taking parking spots from Doncaster Ave impacts on all the streets off Doncaster Ave. Parking is at its peak now. As a resident living in this area - where are you to park once the cycle way is built? Council keeps approving more new apartment developments in this area but you want to decrease the car parking spots. This doesn't add up. | Thank you for your comments. Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. |
| I have just discovered that the bi-directional cycle lanes will allow a width of 1.2 meters in each direction. The handlebars on my standard commuter bicycle are 70 cms wide. If I were to ride in the middle of the lane and an oncoming bike was doing the same there'll be 50cms of clearance. That's HALF the legislated minimum passing distance! Given the two bicycles will be traveling at 25 - 30 km/h that's two handspans between traffic at a combined speed of 60 km/h. How is this possibly safe? Unless you can provide adequate, safe and world best practice infrastructure I oppose this proposal. It provides infrastructure that is less safe than presently in place! | Thank you for your comment. Council acknowledges that a single lane separated cycleway on each side of the road, matching the direction of vehicle traffic is a desirable design outcome. However, there are road widths constraints along the route that prevent this option. A whole lane of parking would have to be removed along the route, which is not feasible. A bi-directional cycleway on one side of the road allows many parking spaces to be retained, hence the proposed design. |
| HOWABOUT TAXING PEOPLE ON BICYCLE AFTERTHEYARE DAMN NUISANCE TO PEDESTRAIAN.I WAS NERLY KNOCKDOWNY SOME CYCLIST, ANDTHAT CYCLIST WAS RIDUIF PRETTY FAST FASTER THAN A CAR AT LEAST MORETHAN 60 KMH. AT 60 KMH IT CAN KILLED. I GOTMY WALKING STICK. I HAD TO VIOLENTLY KNOCK THECYCLIST OFF HIS BIKE OTHERWISE I WOULD BE KILLED. I AMANOLD GEZER GOTNO HASRD HAT ON THE CYCLIST IS FORTUNATE TO SUGFFER BRUCES ONLY. NO BROKEN BONE. THIS IS SICKENING. | Thank you for your comment. Council encourages people to exercise caution and be mindful of others in all public spaces. It does not condone unlawful or violent behaviour. |
| I'd like to register my support for this scheme. As a long-time bike commuter (since 2002 in Randwick) I regularly ride through Centennial Park, to UNSW, the city centre and Randwick. Doncaster Avenue has always been the weak link in the area and I think it is wonderful that a fully separated cycle-way will be installed. Keep up the good work! | Thank you for your comment, and taking the time to make a submission. |

| Submission | Council response |
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| I run a business at ... ... Kingsford called ... and am concerned about the proposed tree outside my business blocking my signage. It is placed directly in front of the sign that that extends from my building. Also there are proposed garden beds between the cycleway and the road. What are these to contain? If they are low plants that would be great; if a hedge once again that would block line of sight to my business and be of concern. I like the idea of the proposed improvements and am hoping my livelyhood will be taken into consideration with the proposed changes. Regards | Thank you for your comment. Council will consider your feedback and continue to work with the Tree Management Team to determine appropriate planting. Species selection will take place in the final stages of design. |
| Sounds good - but we need a way to tame the many cyclists who misuse the facilities - speeding in centennial park is a group event condoned by cycling groups and causes problems with innocent pedestrians and motorists obeying the limits. Cycleways can be dangerous when cyclists speed - they should be restricted when using them to 30kph. | Thank you for your comments. Council will consider all roads users in the design and allow people riding bikes to continue to use the road if they choose to do so. Appropriate signs will be marked or installed to encourage courteous behaviour. |
| Although the loss of car spaces is never optimal there seems little else can be done with the implementation of these plans. I would however raise the matter of timed parking zones as it is often difficult for visitors to find parking longer than one hour in the area - inadequate for normal social visits. Also, the thought of more cyclists appals me due to their poor behaviour. How can the issue of their noise be addressed? I have lived here for nearly 25 years and now am unable to have my windows open in summer for the noise of cyclists shouting conversations to each other as they cycle past from about 5am, not to mention the shouting of "CLEAR" as one after another they race through the roundabout at Ascot Street - contrary to safe practice which other road users must adhere to.<br>I understand that cyclists are to be better catered for but what education can be given to cyclists for them to be more aware of their impact on the residents who live adjacent to their new facilities?? After moving into the area all those years ago I feel that the amenity has diminished in the name of progress; is this to be one more negative impact that cannot be addressed?<br>It is pleasing to see that the plans are focussed on garden and tree planting to accomodate any losses due to pavement adjustments. | Thank you for your comments.<br>As always, Council encourages people to exercise caution and be mindful of others in all public spaces. Specific complaints regarding noise and law enforcement can be directed to the police. Council will consider appropriate signs as part of the project along the route.<br>Please email council with any specific requests or concerns regarding time restricted parking or residential parking permits. It would be separate to this project. |
| I think that for everyones safety and wherever possible cyclists, pedestrians & vehicles should be separated & have their own lanes.<br>Too many accidents occur with one trying to avoid the other, especially in the dark! | Thank you for your comments. Safety is a key consideration for the project. By separating people riding bikes from people walking and driving, Council aims to provide a safer overall streetscape while providing improved transport choices. |
| While I applaud the council for trying to address the need for much improved cycle infrastructure this follows the method used by the city of Sydney which has 2 MAJOR design problems and many minor ones<br>The width of the path is much too narrow - Doncaster is a major corridor for cyclists who enter and exist the park including groups of cyclists<br>The width is barely sufficient for cyclist traveling in opposite directions - requiring a very slow speed while in the cycle lane.<br>Club and sport cyclist will NOT use the lane - and use the road which will aggravate motorist.<br>There is no space to overtake another cyclist<br>Second fault with theses lanes is the parked cars open their doors INTO the cycleway - this is a major risk and hazard. There needs to be enough buffer between the cycle lane and the parked cars to allow a door to be opened without the door going into the cycle lane.<br>The other major problem with this design is the cycleway is on the racetrack side of Doncaster yet to cross Allison Rd the only crossing is on the OPPOSITE side of the road.<br>How do you expect cyclist to cross Allison and link up with the pathway that runs parallel to Allison road?<br>Is everyone going to be expected to cross Doncaster here and then cross Allison?<br>So any extra stop and wait because it is on the wrong side?<br>How about addressing the danger of cyclists crossing where the tram and buses run to get onto the CP cycle path that runs parallel to Allison?<br>You also are ignoring that many cyclist turn onto and from Todman Ave - this plan has no way to get from the cycle path to Todman | Thank you for your comments.<br>Council acknowledges that wider single lane separated cycle lanes on each side of the road, matching the direction of vehicle traffic is a desirable design outcome where possible. However, there are road widths constraints along the route that prevent this option. A whole lane of parking would have to be removed along the route, which is not feasible. A bi-directional cycleway on one side of the road allows many parking spaces to be retained, hence the proposed design.<br>People riding bikes will not be compelled to use the proposed cycleway. Capable cyclists are welcome to use the road. The addition of a separated cycleway provides a greater choice of transport modes for the community.<br>Council is looking closely at intersections such as Alison Rd and Doncaster Ave. To access the Alison Rd shared path, people on bikes can cross at the two signalised pedestrian crossings at the north end of Doncaster Ave. The alternative is crossing further south along Doncaster Ave, when safe to do so. Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS.<br>The area between Alison Rd and the Alison Rd shared path is currently part of the light rail construction project. Council is communicating regularly with the light rail project team to ensure adequate safety and access is maintained.<br>The project team has considered access to side streets and connections to the cycleway. We are looking closely at intersections such as Doncaster Ave and Todman Ave to accommodate the various movements of people walking, cycling and driving. Council will continue to look at the various movements of all roads users at this intersection in the final documentation stage. |

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| Does this mean less parking for local residents? No drop off zone for parents of students at Kensington Public school? Can you explain how the garbage trucks will collect the garbage bins from outside the residents homes and be able to reach over the extra width of the cycle track. The pavements are wide enough now for pedestrians to walk on. Except they are a mess due to the Light rail work. Speeding cyclists can be very dangerous to pedestrians. How does building a cycle path equate to more trees? Surely it is Randwick Council's obligation to residents to plant more trees and replace the ones that were removed regardless of whether a cycle track is installed or not? We do not need a cycle path, but we do need more parking and more trees. | Thank you for your comments.<br>1. Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces.<br>2. The drop off zone for Kensington Public School is on the west side of Doncaster Ave and marked with signs. It will remain in it's current location. Council communicates regularly with the Principal of the school.<br>3. Waste management and the collection of bins are key considerations of the project. The Project Team is working with the Waste Services Team at Council to manage the proposed changes along the route.<br>4. Council has sought to provide a separated cycleway along the route where possible. This will mean people walking, people riding bikes and people driving will be physically sepearted, helping to create a safer environment for all road users. The shared path treatment is proposed where the separated cycleway treatment is not possible.<br>5. A number of streetscape improvements are proposed, in addition to the cycleway. These include pedestrian crossings, pedestrian refuges, kerb extensions and new trees on the verge. They provide more space for planting opportunities. In some locations existing trees will be removed. |
| This is a frequent route used by pretty much all commuters along the anzac parade corridor and would hugely improve their safety. The current cycle lane is too narrow, with unsafe roundabouts and cars parked into the cycle lane.<br>It will encourage many more commuters to get on their bikes. I spoke to many local residents who considered riding the work but did not do so simply because of the current lack of safe cycleways. | Thank you for your comment and taking the time to make a submission. |
| With the number of high density buildings increasing and same if not less parking space around, people will be more inclined to opt of bicycle travel, which would lead to more bikes, people and cars going around. So clearer road/cycle/people rules will make everything much safer, which is great! | Thank you for your comment and taking the time to make a submission. |
| I strongly suggest there be no work done on the construction of the bi-drectional cycle path in Doncaster Avenue until the Light Rail Project is complete, and the multi-storey car park in the Race Course (access from Ascot Street Kensington) is operational. We would all be better placed to make an assessment of this need once the major projects are completed. There is too much chaos in Kensington at the moment to start yet another project which will greatly disrupt local residents. | Thank you for you comment. This project does not currently have funding approval for construction from Roads and Maritime Services (RMS). If funding was approved, construction would commence no earlier than mid 2019. |
| I'd just like to register my enthusiasm and support for the bicycle infrastructure your council is planning on installing in the Randwick area. I have been commuting from Randwick to Redfern Station and beyond since 2002 and am now raising my family in the area. Most of my household activities (shopping, socialising etc.) are conducted via bicycle and I carry my toddler son to Centennial Park and Coogee on my bike.<br>It is wonderful to see cycling infrastructure improve in Randwick, and in the wider city. I am very much looking forward to seeing the plans on your "cycling streetscape improvements" web-page implemented. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
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| I applaud Randwick council for this proposal to construct streetscape improvements and dedicated cycling/walking infrastructure. In a time when congestion is one of the most prominent issues in the media, it is absolutely essential that councils do what they can to encourage more people to use better space and energy efficient modes of transport. This is the only sure way to beat congestion, and in doing so we all benefit from less pollution, and better health too when the modes chosen are cycling and walking.<br>I hope this infrastructure gets built soon.<br>I'd like to mention a few things that may be relevant in the design and consultation phase:<br>1. It appeared that roundabouts are being removed, but I question this. In the Netherlands, roundabouts are designed to prioritise cyclists and work very well. The can shorten cycling trip times and conserve momentum which is important on a bicycle, especially on the flat (like Doncaster Ave). Its helps cyclists conserve energy, and this means faster, but less sweaty and more enjoyable rides. Having to stop for lights will discourage some cyclists from using the path. However, it is very important to design the roundabout well so that cars are significantly slowed prior to entry. A poor roundabout is worse than no roundabout. The Dutch designs are best.<br>2. If signalised crossings do replace roundabouts as per the plans (such as on Doncaster Ave), it important that they are prioritised for cyclists. This sends a strong message that cycling is a preferred mode, and makes it easier for people to make the switch from car or bus to bicycle. While on congested city roads cycling is often faster than car, the RMS controlled signalling on some of the City of Sydney's cycle paths is terrible and requires cyclists to stop and wait at multiple intersections that cars can cross in one green phase. Union St Pyrmont is perhaps the worst example of this, but there are others. The potential issue is that Doncaster Ave could be likewise signalled poorly, discouraging cyclists. it also means that the recreational weekend cyclists will be unlikely to use the cycle lanes, which is practically fine, but may cause consternation with motorists who don't understand the reason why.<br>3. Please keep and strengthen the traffic calming measures - these are really important. Slowing motor traffic down is perhaps the one thing that reduces the death and injury rate more than any other. I support decreased speed limits too.<br>4. Please consider international best practice in regard to the design of the separations i.e the physical edges of the repeated bicycle lanes. I have yet to see anything in Australia that is close to matching Dutch and Danish separations. These often have a gentle slope that allows bicycle wheels to climb them, a designed safety feature missing on City of Sydney cycle paths. Without them cyclists can lose their balance in emergencies or overcrowding situations. Details matter, through I also accept that getting the infrastructure built expediently takes priority over some details.<br>One other thing I'd like to mention concerns removal of parking and effect on businesses. Firstly, removal of parking reduces congestion in the long run, something that is well known internationally even if its not appreciated by Australian electorates. However, there is some great evidence coming out that shows creating bicycle paths increases patronage of local businesses to an extent that is better than that of having local car parking. I think its really important that the council spruik this benefit to local businesses, especially those on Anzac Parade that have been hard hit by the light rail construction. With proper infrastructure and provisioning of bike racks, these businesses could see a flood of bicycle traffic.<br>And lastly, thought its not part of the current plan, I'd like to say that I think Randwick council should remove the painted on "door-zone-death-lanes" that comprise parts of your cycling network e.g Dangar St between Govett Ln and King St. By marking lanes close to parked cars you encourage inexperienced cyclists to ride there, creating the risk of getting doored. They are worse than useless, they are dangerous. If dedicated infra can't be built on such streets then they should more simply have reduced speed limits and be traffic calmed, with signage or paint indicating cyclists can use the whole road, as is there legal right and safer option. I understand the City of Sydney is now planning on implementing cheaper forms of cycling infra that may be suitable for such locations.<br>I would be happy to provide more detail should you require it. Thanks again for creating a bicycle infrastructure plan. This will definitely making Randwick more liveable, and on a personal note, is something that I feel will be of great use to my wife and two young kids. | Thank you for your comments.<br>1. Council has sought to accommodate all users in the proposed design. Unfortunately the existing roundabouts are incompatible at intersections that include bi-directional separated cycleways. The road constraints and property boundaries prevent wide, arcing cycleways next to roundabouts along the route.<br>2. All signalised intersections will be designed with bike riders in mind, and be developed in detail with Roads and Maritime Services (RMS).<br>3. Improving safety for all road users is a key consideration of the project. Due to the addition of kerb extensions and separated cycleway, the available space for vehicle traffic will be narrower. This is acknowledged to result in lower average speeds.<br>4. Council acknowledges your comments and will look at appropriate kerbs and dividers in the final designs.<br>5. Noted. |

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| Hello.<br>This email is in response to the proposed upgrades to walking and cycling infrastructure between Kingsford and Centennial Park. I am an Architecture student at UNSW who cycles in the area daily. I have a few comments on the proposed design. Each comment will refer to corresponding drawings.<br>On the whole, I am very satisfied with the design. The layout that is being considered will provide a much safer, more efficient and aesthetically pleasing streetscape. It bridges a gap that exists between Centennial Park and UNSW, meaning UNSW students finally have a safe way of getting to uni by bike.<br>Sheet 1.1 (Doncaster Avenue / Alison Rd)<br>- The cycleway should continue all the way to the intersection, followed by push-buttons that are easily accessible for cyclists (reachable without needing to dismount or move bicycle), fig.1. Ideally the cycleway should cross diagonally across Alison Rd, eliminating the need for city-bound cyclists to cross multiple intersections. (fig. 2)<br>- Kerbs should be extended and keep narrow angles to slow down traffic and make pedestrian and cyclist crossing safer (fig 1-2). The footpath should be continued and kept level when crossing streets, giving priority to cyclists and pedestrians (fig 3).<br>- The shared path along the western side of Doncaster Avenue is a good idea, but it should be marked early and clearly that the path to UNSW/Kingsford is on the eastern side of the road, avoiding confusion where cyclists end up having to cross the street (or even worse, riding on the footpath) when reaching Carlton Street.<br>Sheet 1.2<br>Eliminating the roundabout at the intersection of Doncaster Ave and Ascot St is not ideal. Roundabouts provide significantly better traffic flow than conventional intersections and the current design works rather well. Instead, the cycleway should be incorporated into the roundabout design. Below is a link to a video showing how this is done in the Netherlands with both one-directional and bi-directional cycleways.<br>Dutch roundabouts: https://www.youtube.com/watch?v=41XBzAOmmIU<br>Sheet 1.3<br>- The cycleway should be extended slightly to provide improved sightlines for cars turning onto Anzac Pde. This will decrease the possibilities of car/bike conflicts resulting from (a) cyclists running a red light in order to cross Anzac Pde and (b) cars ignoring/missing the red turning light when turning onto Anzac Pde. The latter incident happened to me when riding down the Bourke Street Cycleway in Surry Hills at the intersection of Bourke Street and Fitzroy Avenue, an intersection with similar flush stop lines. While the bicycle lantern was green, the driver of the car did not see his red turning light and turned into my path, which ended in me being hit and almost hospitalised. Accidents like this are much less likely with improved sightlines.<br>This concept is explained at around 1.30 in this video on Dutch Junction<br>Design: https://www.youtube.com/watch?v=FlApbxLz6pA<br>- A cycleway (preferred) or a wide shared path should continue along Anzac Pde and link with another cycleway running along High Street. This would provide a better link to UNSW as well as a link to Wansey Rd/Alison Rd and Randwick Junction/Coogee. High Street is currently not a safe street to cycle on and should be improved. Until a link along Anzac Pde is provided, cyclists riding to UNSW should be directed to continue along Doncaster Avenue rather than the Anzac Pde footpath to avoid pedestrian/cyclist conflicts. Good, consistent signgage is important. Currently there is an issue with cyclists riding on the footpath on the stretch of Anzac Pde running from Doncaster Ave to High Street. The footpath is extremely narrow and the roadway is too congested for most cyclists to feel comfortable using it.<br>Sheet 1.4<br>- The intersection of Doncaster and Day Ave works well for cyclists using the cycleway.<br>- The connections between Doncaster Avenue south / Day Ave west and the Cycleway are poor. The proposed crossing design deviates from the cyclists' desired path and will be avoided by many cyclists | Thank you for your comments.<br>1. Light rail communications<br>Council seeks to provide strong connections to Centennial Park from Doncaster Ave and is communicating regularly with the light rail project team and Transport for NSW.<br>Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS. Working to improve safety for people walking and cycling, and will continue to work with stakeholders along the route to improve conditions.<br>2. Wayfinding<br>Indicating key destinations is an important outcome and Council will add wayfinding signs where appropriate along the route.<br>3. Roundabouts<br>Council has sought to accommodate all users in the proposed design. Unfortunately the existing roundabouts are incompatible at intersections that include bi-directional separated cycleways. The road constraints and property boundaries prevent wide, arcing, bi-directional separated cycleways next to roundabouts along the route.<br>4. Pedestrian crossings<br>Thank you for the suggestions. Council will consider improvements at key intersections, but it is made difficult by the location of existing utilities. Council also recognises safety at crossings is very important and will work with Roads and Maritime Services (RMS) to consider all road users.<br>5. Anzac Pde footpath<br>Council acknowledges the need to improve the path on Anzac Pde, between Doncaster Ave and High St. This area is currently part of light rail construction work. Council is working with Transport for NSW and will work towards creating a facility that enables easier walking and cycling along this stretch as soon as it is feasible.<br>6. Doncaster & Day intersection<br>Thank you for your comments on the Doncaster Ave and Day Ave intersection. We will continue to look at this intersection and the various movements of all road users.<br>7. Additional traffic calming<br>Improving safety for all road users is a key consideration of the project. Due to the addition of the separated cycleway, the available space for vehicle traffic will be narrower. This is acknowledged to result in lower average speeds. The design proposes a number of kerb extensions, and Council will consider whether more can be added.<br>8. Bayside Council<br>Randwick City Council is working closely with staff at Bayside Council on the part of the route in their LGA along General Bridges Crescent. Please refer to their cycleway plans for routes along Banks Ave.<br>9. Cycle network and Todman Ave<br>Council has a list of bicycle route construction priorities. Todman Ave and a route south along Anzac Pde from Kingsford are both on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and- |

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| who will opt to use the roadway instead.<br>- Keeping the roundabout and integrating the cycleway into it might make the design easier and more efficient for all road users.<br>Sheet 1.5<br>- The intersection treatments are very good. As this type of junction design will be unfamiliar to many road users, good signage will be important.<br>- The Barker St roundabout could be retained. Zebra crossings should be installed on all sides of the Barker and Strachan Street intersections to improve ease of access for pedestrians. This is common in many northern European cities and suburbs.<br>- The cycleway crossing Barker and Strachan Lanes should be kept level (raised from roadway) to discourage fast-moving traffic cutting across. Each of the laneways could be one-way. This works well on the Bourke Street Cycleway in Surry Hills.<br>- More kerb extensions and zebra crossings (between intersections) along Houston Road would increase safety for pedestrians and reduce vehicle speeds.<br>Sheet 1.6<br>- More raised zebra crossings could be added (See St intersection + between Borrodale St/Gardeners Ln)<br>- The cycleway stop line at Gardeners Rd should be extended as noted on sheet 1.3. Pedestrian crossings could be set back and changed into a raised zebra crossing.<br>- A cycleway (preferred) or wide shared path is needed to connect to the Gardeners Rd shared path. This will create a good connection to Rosebery/Mascot/Airport.<br>Sheet 1.7<br>- An exension along Banks Avenue should be provided for access to Eastgardens. This extension could link up with the Bunnerong Road shared path and create a cycleway that runs all the way from the City to La Perouse.<br>Sheet 1.8<br>- Increased tree planting would be preferred.<br>- A future Anzac Pde extension to La Perouse would provide a good connection for commuters and tourists.<br>_____<br>Sidenote<br>A street that in my opinion should be deemed as a high priority project is the 1km stretch of Todman Avenue linking O'Dea Ave, Anzac Pde and Doncaster Ave. This road links the UNSW and the Eastern Suburbs to the Inner West and is an important missing link in the current cycling network. At the moment it is an extremely dangerous stretch of road (especially when riding eastbound). Anyone riding down this road on a bicycle will immediately identify severe issues with the street design (fig 9-10). The street lacks any separated infrastructure for cyclists and the existing bike lanes are dangerous and poorly placed. Close calls with cars, buses and trucks are commonplace and I fear that this may lead to serious injuries and fatalities as more people begin to cycle in the area.<br>- The street should be overhauled with separated cycleways and link up with the cycling infrastructure that exists on both sides of O'Dea Avenue.<br>- A cycleway/shared path should be added along South Dowling St (along Supa Centa), linking up with the shared path that exists between Dacey Avenue and Cleveland Street.<br>Useful links<br>I have no doubt the council has good resources for bicycle infrastructure, but I will include some links that have been helpful to me.<br>BicycleDutch (videos showcasing dutch cycling infrastructure and culture):<br>https://www.youtube.com/user/markenlei/featured<br>Sydney seen from a Dutch Cyclists'<br>Perspective: https://www.youtube.com/watch?v=ibNNdMgHmHs&t=<br>Dutch Junction Design: https://bicycledutch.wordpress.com/2014/02/23/junction-design-inthe-netherlands/<br>Copenhagenize: http://www.copenhagenize.com/<br>_____<br>I hope my comments are useful. I applaud the efforts being made and I have no doubt that the final outcome and future projects will be a success for the council. | maps<br>Council is currently working on improvements to the bicycle shoulder lanes along Todman Ave. We will be approaching the NSW Government asking for the Todman Ave and Lenthall St route to be considered a 'Sydney Strategic Bicycle Corridor', as seen in the NSW Government document 'Sydney's Cycling Future'. If successful, this will assist with implementation and funding of this section.<br>10. Trees<br>The Project Team is working closely with the Tree Management Team to select appropriate trees along the route. |

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| Submission in response to the 'Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park' design.<br>Recommendations<br>1. Consider the safety implications for residents and cyclists as a result of the design to install the dedicated bi-directional cycle way in front of the residential properties on Doncaster Avenue.<br>2. Relocate the bi-directional cycle way designed for Doncaster Avenue, between Alison Road and Ascot Street, to the rear of the residences on the eastern side of Doncaster Avenue.<br>Background<br>Residents from the eastern side of Doncaster Avenue have had a meeting regarding the proposed bi-directional cycle way to be installed in front of our homes. The majority of residents support a dedicated cycle path for cyclists however, many concerns were raised including:<br>• Safety for residents, loading and unloading their vehicles<br>• Safety for children, parents with babies, elderly, disabled, and pets getting in and out of vehicles. It will not be safe to linger in the bi-directional cycle way to get into and out of vehicles. At the moment, only the street side of the vehicles is unsafe. If the bi-directional cycle way is installed, neither side will be safe.<br>• The kerb between the designed bi-directional cycle way and the parking spaces will not be a sufficient respite island upon which to stand. It can take many minutes for children and the less able residents of number 28-30 to get in and out of vehicles.<br>• Residents will have to be mindful of bicycles coming from both directions instead of one, particularly during peak periods when cyclists are more likely to be using the bi-directional cycle way and residents are more likely to be getting into and out of vehicles.<br>• Safety for cyclists, as car doors may be opened on cyclists by unintentional children. Doncaster Avenue parents currently unload their children from the footpath side of the parked vehicles because Doncaster Avenue is a busy road and cyclists currently transit on the road.<br>• Loss of 5 parking spaces<br>• The bi-directional cycle way will make our properties less attractive to potential buyers and will bring down the sale prices of our properties.<br>On top of this residents already feel encroached upon by the Light Rail Stabling Yard looming over our homes. Residents have been negotiating with Acciona and the NSW State Government for years regarding the adverse affects of the Stabling Yard on our homes, and now we may have a bi-directional cycle way and an increasingly busy road to contend with at the front of our properties. Many residents have wanted to sell their homes during their light rail construction, however the light rail construction is affecting our property prices and the bi-directional cycle way will as well.<br>If the bi-directional cycle way is installed, as designed, it will just be a matter of time before a resident and a cyclist have a collision.<br>Solution<br>After much consideration, I believe I may have come up with a solution. I propose the new bi-directional cycle way be re-directed behind the houses on the eastern side of Doncaster Avenue. Please see diagram with the proposed cycle path drawn in red (Enclosure 1).<br>Benefits:<br>• There is sufficient space between the acoustic wall and the vegetation growing behind the fences of the residences to have a dedicated bi-directional cycle way.<br>• Cyclists will not have to worry about children or animals unintentionally running out in front of them.<br>• The space is owned by the NSW State Government and is not in use. It exists for 2 purposes: firstly to provide drainage overflow for the stabling yard should it experience a 1 in 50 year flood event and; secondly, as a footpath for TransDev staff to access the 'acoustic' wall if it is damaged. Note – If the Stabling Yard is flooded, then Doncaster Avenue will be flooded as well so flooding should not make a difference to where the bi-directional cycle way is installed.<br>• The surface could be made out of permeable paving in order for water to drain away if there should be a flood. (http://www.mpspaving.com.au/permeable-paving)<br>• The space is very well lit by the flood lights installed in the Light Rail Stabling Yard so no further lighting would need to be installed.<br>• Directing cyclists away from cars and pedestrians will be safer for cyclists and pedestrians.<br>• The traffic lights at the corner of Doncaster Avenue and Ascot street would not have to be installed. A bike traffic light could be installed at the small round-a-bout adjacent to the multi-story car park at the end of Ascot street. Alternatively traffic calming in the form of an S bend could be installed to slow cyclists as they approach the round-a-bout to cross Ascot Street.<br>• It may in fact be possible to continue the cycle path all the way to the intersection of Anzac Parade and Doncaster Avenue but this may require negotiation with the race course.<br>• Locating the bi-directional cycle way behind the residences will speed up installation/construction because there will be no necessary road closures and no pedestrians, residents, or vehicles to contend with.<br>Considerations<br>Proper consultation with NSW State Government may be required in order to create an easement or similar over the land in order to construct the bi-directional cycle way.<br>Conclusion<br>This solution does not have a down side. The solution is safer for cyclists, residents, and pedestrians and will be easier and cheaper to install. I encourage you to give this proposed solution due consideration. It is a solution that would be a good outcome for all stakeholders. | Thank you for your detailed comments.<br>Council is aware of the pressures the light rail stabling yard has had on residents of Doncaster Ave.<br>Doncaster Ave and Houston Rd are currently well-used by pedestrians and bike riders. They link Kingsford with Centennial Park, and paths to the Sydney CBD. Community consultation took place in 2015 to identify and prioritise the construction of cycling routes across the LGA. This route was identified as the number one priority. The route also aligns with NSW Government plans for key strategic cycling corridors. Your detailed suggestion is appreciated, however Council has no plans to change the route. Council acknowledges your concerns.<br>Flooding analysis along the route was a contributing factor to the cement block / intermittent median treatment along the northern section of Doncaster Ave. Without the physical separation of the cement median blocks, cars may intrude into the cycleway. This separation also improves the sense of safety felt by people using the cycle lanes.<br>The proposed cycleway is wide enough to accommodate people on bikes moving around people accessing their cars. As always, Council encourages people to exercise caution and be mindful of others in all public spaces. At time, people on bikes may have to wait before passing if there is no room to continue along the cycleway.<br>Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces.<br>Improving the safety of pedestrians is a key focus of the project. Pedestrian crossings are proposed along the route, along with kerb extensions containing additional planting. The traffic lanes will be narrower along much of the route and this is acknowledged to reduce average travel speeds, thereby improving safety for all road users. A narrower road way will also enable a shorter crossing distance.<br>Disabled parking is also a key consideration of the project. We have been contacting people and organisations associated with Mobility Impaired Person's Parking Spaces (MIPPS) who are or may be directly affected, and working to provide alternative solutions where necessary. |

| Submission | Council response |
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| Hello,<br>I'd like to provide my comments regarding the proposed cycleway between Kingsford and Centennial park. I added a few comments to the community page but would like to expand here.<br>I have been cycling along the entire route as part of my daily commute for the past three years, so I'm very excited about the plans.<br>In its current state, the existing route has a number of problems and hazards that I'd like to share - many are improved by the plans, others not so much.<br>Hazard: Parked cars/dooring<br>The most significant hazard today relates to the bike lane running along side existing parking. There are a number of risks associated with this, and more than once I've collided with a sudden opening door along Doncaster Avenue. Thankfully nothing more than a bruise so far. Outside Kensington public school is particularly scary as parents often open their doors without looking.<br>The new plans virtually eliminate this risk, I'm looking forward to not having this risk any more. Though there is still a smaller hazard of passengers opening doors into the cycle lanes - appropriate planning and signage should be in place to address this.<br>Hazard: Houston Road south onto Gardeners Road<br>Travelling south towards Gardeners road has always been dangerous, in particular the car lane currently splits in two across the bike lane. Sometimes cars will try to creep into the left turn lane early and I've been cut off and swiped a few times here by this. There is also the continuing hazard of cars entering or leaving 90 degree parking spots into the bike lane.<br>Again, these problems are virtually eliminated by this plan, making the ride much less stressful.<br>Hazard: Gardeners Lane<br>Riding north past Gardeners lane, there are occasionally cars turning left into here, and who fail to notice or give way to cyclists heading north past it. A few times I've had close calls or even bumped into turning cars.<br>With the new plans, the hazard still seems to exist. I'd like to understand if there is further consideration here to reduce the risk, whether it be by signage or traffic calming measures. This isnt clear from the plans.<br>Hazard: Bin day on Houston Road<br>Every Monday morning, bins are out on Houston road. Especially in front of the apartment blocks, where there may be a dozen all lined up - invariably placed onto the bike lane. Avoiding these involves maneuvering around them into the car lanes, again a hazardous risk.<br>I'm concerned that the new plans don't really address this. After implementation, the bins may end up blocking the cycle path, necessitating entering the main road to get past. I feel some consideration needs to be made in order to ensure there is a clear path at all times.<br>Hazard: Entering Houston Rd from Day Avenue<br>Cycling onto Houston Road from the Day Avenue cycle path is often quite challenging and hazardous. There are vehicles coming from 4 directions to watch out for, and a steady stream of cars can make it very slow. I often see cyclists skip this path entirely and use the roadway on Day Avenue to allow for an easier entry to Houston Road.<br>The new plans don't really simplify this - whilst the road narrows slightly, there is still the stream of traffic and little indication to vehicles of bike traffic. Many bikes will still take the direct roadway, and those crossing may still have a long wait ahead of them.<br>In addition, cars turning left from Houston Road are often looking to the right for traffic from Anzac Parade and I can imagine a cyclist being knocked down by a car not paying attention to a cyclist crossing to their left.<br>To reduce this risk, I would like to suggest that there be a raised pedestrian/bike zebra crossing placed here. This will allow cyclists to cross with less delay and give more warning to vehicles of cross traffic.<br>Hazard: Low tree branches on Doncaster avenue<br>There are a number of trees with low hanging branches along here, particularly near Day Ave - there have been times when I've had to swerve into the main roadway to avoid them.<br>The new bike path will put cyclists closer to these trees and branch hazards. I'd like some reassurance that appropriate measures (regular pruning, etc) will be in place to ensure a clear ride.<br>Concern: Doncaster/Todman Ave intersection<br>I often see cyclists travelling south at this intersection ignore any red light - no vehicles travel across the bike lane so I guess they see no purpose in stopping. However there may be pedestrians crossing, hence the need for the light there.<br>The new path runs along the same section of the intersection, and includes plans for bike lights here as well. For the same reasons as today, I anticipate a number of cyclists will ignore this light and continue on. I would instead propose that there be a zebra crossing across the bike path here, and only have the pedestrian lights on the main roadway section. This will reduce delays for cyclists as well as reducing hazards to pedestrians as all will be encouraged to pay more attention.<br>Alternatively, perhaps the cyclist lights can only go red when the a pedestrian button is pressed.<br>Concern: Ascot St intersection<br>On my morning and afternoon ride here, I predominantly see traffic along Doncaster Avenue and entering or leaving Ascot St on the west side. Traffic to/from the Racecourse is rare, and likely only bursts at certain times. The current traffic patterns mean I rarely have to stop for cars coming out of there, only those turning from Ascot St west.<br>The new bike path adds lights to this intersection - this will have the effect of stopping all bikes even for | Thank you for your detailed comments.<br>1. Gardeners Lane<br>A shared intersection surface treatment is shown in the plans, which will encourage all road users to slow down in that area. Additionally, a planted buffer will slow vehicles turning left from Houston Rd travelling across the cycleway.<br>2. Bin collection<br>Waste management and the collection of bins are key considerations of the project. The Project Team is working with the Waste Services Team at Council to manage the proposed changes along the route.<br>3. Day Ave and Houston Rd intersection<br>Council will further investigate the Day Ave and Houston Rd intersection to suitably accommodate all road users.<br>4. Branches<br>The Project Team is working closely with the Tree Management Team to ensure appropriate trees are selected and existing trees are managed.<br>5. Signals<br>Council seeks to accommodate people walking and cycling at all signalised intersections. We are working with Roads and Maritime Services (RMS) on the signal designs.<br>6. Alison Rd and Doncaster Ave intersection<br>Thank you for your comments regarding potential bicycle movements. They will be considered in final construction drawings and in discussions with Transport for NSW about the entrance to the light rail stabling yard. |

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| traffic not crossing the path. I believe some further consideration needs to be given here to minimise the need for cycists to stop when unnecessary.<br>Concern: Alison Rd/Doncaster Ave<br>Today, cyclists heading south after crossing Alison Rd will either cross Doncaster at the lights here then continue south on Doncaster. Others will go along the shared path on the west side of Doncaster then cross when there's a gap in traffic.<br>The new path effectively encourages all to cross at the lights and continue on the east side. The plans need to be mindful of allowing increased bike traffic across that intersection, as well as the likelihood of some cyclists going along the roadway for ~50metres before entering the bike path instead of the proposed shared path. In addition, given that there's effectively no cars along this stretch whilst the crossing is green, perhaps some provisioning needs to be made to easily allow bikes to enter the bike lane from the roadway at that point, as many will attempt to.<br>I hope these comments are useful and can help with the final design of the plans. If you would like further information, don't hesitate to get in contact with me. | |
| Dear Randwick City Council,<br>The University of NSW (UNSW) support the proposed 'Walking and Cycling Streetscape Improvements: Kingsford to Centennial Park', including the proposed 2.6km bi-directional separated cycleway along Doncaster Avenue, Day Avenue, Houston Road, General Bridges Crescent and Sturt Street. The proposed connection will support active transport to and from the UNSW Kensington campus, which supports our wellbeing vision, and is a much needed link allowing staff and students to safely ride along a busy cycle and traffic route.<br>A bi-directional dedicated cycleway which provides segregation for cyclists from the general traffic and pedestrians, will encourage UNSW staff and students who do not currently cycle to take up cycling as a form of transport to and from UNSW and may reduce the dependence on vehicle usage in an already congested precinct. All efforts to improve cycling connections to the local and regional network are welcomed by UNSW as we believe cycling infrastructure provides social, environmental and economic benefits. This connection is one of several Randwick City Council proposed cycling routes which is of key importance to UNSW, and our strategy to have 5% of the staff and students commuting to and from UNSW by bicycle by 2019.<br>UNSW understands there are other proposed cycling improvements which are also needed to further increase safety for current cyclists and to encourage other UNSW staff and students to cycle . An example of a much needed connection is the proposed east-west link between Randwick Town Centre, the UNSW Campus and Doncaster Avenue. At present cycling along this section is dangerous due to the high interaction with vehicles and buses. UNSW hope that Randwick City Council will continue to make much needed improvements to the cycle network.<br>Overall, this infrastructure will provide the required safety to support UNSW staff and students who choose to walk, cycle or drive.<br>Kind regards | Thank you for your comments, and taking the time to make a submission.Council is aware of the need to provide further cycle infrastructure and improve the network. From community consultation in 2015 a list of bicycle route construction priorities was created. The route you mention is on the list.<br>http://www.randwick.nsw.gov.au/services/transport/bicycles/bike-routes-and-maps |
| Dear General Manager,<br>We are writing to provide feedback on Randwick City Council's Walking and Cycling Improvements for Kingsford to Centennial Park.<br>Waverley Council strongly support this proposal. The proposal aligns with Waverley's People, Movement and Places (WPMP) strategy which aims to make it easier for people to move around by improving the quality of our streetscapes and public places. You can see the first two of our Signature Projects are Number 1. Better Streetscapes and Number 2. Cycling Strategy.<br>As part of feedback from the public exhibition of our draft People, Movement and Places report, we asked 'There are twelve Signature Projects recommended in the report. Please identify which projects you think Council should pursue as the top three priorities.'<br>Out of the responses regarding the 12 signature projects recommended in the report, the highest ranking priority project was 'Cycling superhighways' at 23% (162 responses). 'A walking strategy' came in at 5th out of the 12 with 8% of responses.<br>The importance of providing protected, dedicated, safe cycleways is important for getting more people in the community on bicycles, especially those who may be less experienced and/or less confident. In a separate question, when asked what the most important direct intervention that would help them walk or ride a bicycle more often would be, 21% of respondents (208) nominated dedicated safe cycleways.<br>Our Cycling Strategy outlines the goal of providing safe cycling infrastructure across Waverley and beyond. Your Kingsford to Centennial Park project will add to and improve the safety and amenity of cycling and support the Inner Sydney Regional Active Transport Plan. This will support the growing popularity of dockless share bikes, e-bikes and cargo bikes that illustrate the convenience, relative ease of parking, and time savings that cycling offers in the Eastern Suburbs.<br>The Waverley Bike Plan 2013 identifies a number of routes that connect to Centennial Park.<br>Randwick's proposal joins Centennial Park to the Randwick LGA and is an important connection for various travel routes in addition to Randwick Town Centre, including UNSW, Randwick TAFE, Royal Randwick Racecourse, Randwick health precinct, Green Square, and various sporting facilities. | Thank you for your comments, and information on the initiatives Waverley Council is currently undertaking. |

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| Transport challenges facing the Waverley LGA (and surrounding areas) include traffic congestion, safety, concerns with walking and cycling due to difficult terrain, poor quality footpaths and lack of separated cycleways. Australia's population has progressively become more sedentary which is having a huge impact on the health of our communities and budgets. Australia-wide the cost of obesity and associated illness, and loss of wellbeing,<br>totals $130 billion per annum. It is important that local councils facilitate people to do more incidental exercise (walking and cycling) as part of their everyday lives – to the local shops, to the bus stop, to school and work. Walking is the most popular form of exercise in Australia.<br>As part of our transport plan which aims to tackle our current transport problems and best meet the changing demands of the future, Waverley adopted the Transport Hierarchy that puts people first, prioritizing pedestrians first, followed by people riding bicycles, using public transport, service vehicles, shared mobility and private motor vehicles. Continuing the support for safe active transport and network connectivity in our neighbouring areas bodes well for people travelling by walking and cycling across our LGA boundaries, and will be a vital part of improving the health of our community, environment and economy.<br>Best regards, | |
| Thank you for coming to Kensington Public School the other day. I had a few other thoughts about the proposed changes to Doncaster Ave that we discussed.<br>Firstly, I would suggest that you not use the recently built footpath design at intersections around schools (see attached photo). The narrow footpath around the garden bed is very attractive to young children to navigate, but is too narrow for parents pushing strollers to follow. This means children walk right next to the road without adult supervision. Parents have a minor heart attack each time this happens. Please see the attached photo.<br>Please also ensure that all footpath ramps, especially around schools are wide enough for two strollers to pass, if possible. The recently rebuilt footpaths at Duke-Boronia St are an example of poorly designed footpaths (see same photo). It is only wide enough for one stroller, which means that you can only cross single file when you really want to cross as quickly as possible with children in your sight, not behind you (children tend to walk beside parents or follow, they don't lead). These are easily solved issues with little to no impact on other design considerations. Please observe traffic flows around schools at pick up and drop off times to understand peak traffic requirements.<br>If you wish to encourage cyclists to use the separated cycle lane, instead of using the road, is it possible to use smart traffic lights for the bike lane that do not require buttons or activating sensors? Every bike light that I am aware of defaults to red until activated. This is very frustrating and makes me avoid bicycle paths, since normal roads (ie cars) are given priority and are faster. If one set of traffic lights are triggered, can you anticipate the next set of traffic lights and set it to green, or synchronise them with car traffic lights?<br>In case you haven't seen these articles about bicycle infrastructure design:<br>https://www.wired.com/2014/06/a-new-bike-lane-design-that-could-make-biking-more-popular-and-save-lives/<br>https://theconversation.com/measures-to-increase-cycling-in-australia-are-predicated-on-failure-89078<br>Thank you again for listening carefully to all the stakeholders. | Thank you for your detailed comments. Council will consider your feedback regarding foopaths and signals to help inform the final design.<br>Council seeks to accommodate people walking and cycling at signalised intersections along the route. We are working with Roads and Maritime Services (RMS) on the signal designs. |
| BIKEast is pleased to make a submission on the proposed cycleway component of the Walking and Cycling Improvements – Kingsford to Centennial Park.<br>We believe these improvements are a great step in making this area safer and more accessible for residents and visitors partaking in active travel on their journey - encouraging more people to walk and cycle. In particular, the improved bicycle route infrastructure has been a long time coming. As such, BIKEast fully support implementation of the proposed improvements at the earliest opportunity and submit the following comments on design elements.<br>Protected Cycleway<br>BIKEast thank Randwick Council for this protected bi-directional cycleway along this major North / South route through the Randwick LGA. We believe it is a pivotal piece of infrastructure in getting more people participating in active travel, and will facilitate easier and safer travel to UNSW, TAFE, Kensington Primary School, Centennial Park and surrounding educational, business, and residential locations.<br>Light Rail connection<br>BIKEast are concerned about the connection of the cycleway at the intersection of Alison Rd and Doncaster Ave and would like more details. The route to access the shared path along Alison Rd / Centennial Park is currently unclear on the design proposal. When travelling from Doncaster Rd (with the intention to travel towards Randwick) most people will naturally head in the Easterly direction. If the only bicycle-accessible ramp is on the Western side of the Light Rail station, confusion and conflict may be caused. In addition, there is a desire-line for cycle access along the southern footpath of Alison Road, which would require a shared path between Doncaster Ave and Darley Rd.<br>The crossing of Alison Rd itself is also problematic with a two-stage crossing to reach the Centennial Park side of the road. This is likely to lead to the unsafe behaviour due to the unnecessarily long delays.<br>Light Rail Stops & Bike Parking<br>Secure Bicycle Parking at the Light Rail Terminals is required for multi-modal journeys. We hope that Randwick will work with the Sydney Light Rail project to install as many bicycle parking facilities as possible and plan towards future proofing these facilities for growth in numbers. | Thank you for your detailed submission.<br>1. Light rail<br>Council is looking closely at intersections such as Alison and Doncaster Ave, and communicating regularly with the light rail project team.<br>Council has previously spoken with Roads and Maritime Services (RMS), requesting an additional pedestrian crossing over Alison Rd (east side) at the north end of Doncaster Ave. Unfortunately the request was declined by RMS.<br>Council acknowledges that the south side of Alison Rd outside the racecourse may be an attractive route for people on bicycles. We have spoken recently with ATC and will investigate the possibility of a shared path in this location.<br>2. Bike parking<br>Council has been informed that there will be 5 racks / 10 spaces for bicycle parking in close proximity to light rail stops, and 30 spaces in 'bike sheds' at each terminus.<br>3. Day Ave intersections<br>Council will further investigate both the Doncaster and Day Ave intersection, and Houston Rd and Day Ave intersection to suitably accommodate all road users.<br>4. Signals<br>Council is looking closely at intersections to safely accommodate all road users. We will work with the Roads and Maritime Services (RMS) on the detail signal design.<br>5. Houston Rd kerbs<br>Council will further investigate the possibility of additional kerb extensions along the route. |

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| The Canberra Light Rail and the Sydney Metro projects offer examples to estimate bike parking demand. The Gold Coast Light Rail project is an excellent example of implementing bike parking facilities.<br>Local / Regional Bike Network<br>BIKEast would like to emphasise the importance of continuing to build a network of protected and connected bike routes. Once the proposed cycleways are built, it will be important to quickly and safely join the major East / West routes to desirable locations (as outlined on the Construction Priority list), for example, Bondi Junction, Coogee, Maroubra, Green Square. Otherwise, people on bicycles risk being led onto busy, unsafe, on-road routes when continuing on their journeys.<br>Children on bikes<br>Children are often using the footpath to ride bicycles along this stretch. We hope that Kensington Public School will embrace this proposal. We encourage Randwick Council, similar to City of Sydney, to facilitate and support educational programs to support school kids riding to school. It is important to teach kids cycling skills, especially as legally from the age of 12, they are no longer allowed to ride on the footpath.<br>Day Ave intersections<br>We support the road narrowing designs at the Day Ave/Houston Rd intersection. We recommend that people walking and riding bikes be given priority (using design) over motor vehicle traffic at the crossings of the streetscape / cycleway and Day Ave. Alternatively, a wide median could be considered to allow a safer crossing with less delay.<br> Further west at the Day Ave/Doncaster Ave intersection, special attention is required for the westbound off-road to on-road transition.<br> Further east along Day Ave, consideration could be given to angle parking in lieu of the painted median, for improved parking supply.<br>Other site-specific matters<br> The intersection at No2 Doncaster Ave (AJC driveway) causes an unnecessary delay and safety problem for pedestrians and cyclists. Consideration should be given to a “priority intersection” for pedestrians and cyclists such as those proposed along Houston Rd.<br> Consideration could be given to trade off some green space in the Abbotford St median to replace the 5 lost parking spaces on Sheet 1.1.<br> No details are provided for the signal phasing at new and existing intersections. Bicycles typically incur a significant delay penalty at signalised intersections with just 4 seconds of green out of a 120+ second green-amber-red phasing program. Every effort must be made to maximise pedestrian and bicycle green time, eg at Ascot St, the eastern leg of the intersection only requires green time during AJC events. The right and left turn bays remove delay for general through traffic along Doncaster Ave. The cycleway could be set to “green” automatically most of the time.<br> Along Houston Road, there appear to be opportunities for improved design details at the various kerb extensions, with the pedestrian path extending the full width of the kerb extension. This would also allow reduced parking set-backs and thus increase the number of parking spaces. In addition, the zebra crossings could be raised to help control traffic speeds and improve road safety especially for pedestrians. A kerb extension on the southeast corner of Houston Rd/Gardeners Rd/General Bridges Cr could also increase parking supply while at the same time improve traffic signal efficiency due to the reduced pedestrian crossing width.<br> There appear to be opportunities for increased tree planting along the northern side of Sturt St. This helps with summer heat protection for pedestrians, air-conditioning costs for residents and streetscape improvements.<br> At the Anzac Pde/Sturt St intersection, all crossing should have bicycle lanterns for ease of access to the light rail terminus. Also, this intersection appears dangerous and creates an unsafe barrier between the median parking, the light rail stop and the South Sydney Juniors club. Consideration should be given to close the median with alternate access readily available at Botany St.<br>Other General Matters<br> Consider removing road centreline marking along all or sections of the route. This is a proven measure to help reduce traffic speeds and improve safety for all road users.<br> Green paint is best used sparingly. This saves costs and allows it to be used to emphasise the most significant conflict points. The latest versions of the Austroads Guides provide suitable criteria, eg exclude domestic driveways; include busy commercial driveways.<br> The Australian Standard for on-street parking is under review and will include increased requirements for disabled parking. This should also be taken into account.<br> There appear to be further opportunities for installation of street trees. This helps with summer heat protection for pedestrians and bicycles, air-conditioning costs for residents and streetscape improvements.<br> There are opportunities for additional “continued footpaths” at intersections on the opposite side of the cycleway. This would significantly improve safety for pedestrians and at the same time opportunities for younger students to walk to school.<br> There are opportunities for cost reduction through use of combined bicycle/pedestrian lenses at traffic signals along sections of shared path. These are currently under RMS evaluation and expected available for general use imminently, eg Anzac Pde/Sturt St, Anzac Pde/High St and Alison Rd/Doncaster Ave.<br>Conclusion | 6. Trees<br>The Project Team is working with the Tree Management Team. We will assess whether more trees can be added in the final design stage.<br>7.Anzac and Sturt St intersection<br>Council is looking closely at intersections such as Anzac Pde and Sturt St, and communicating regularly with the light rail project team. |

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| BIKEast support this design for improved walking and cycling facilities from Kingsford to Centennial Park and look forward to additional route connections to happen soon, to better connect our local area, and encourage residents and visitors to partake in active travel.<br>Thank you for taking the time to read our feedback.<br>Yours sincerely,<br>BIKEast | |
| Hello council,<br>I have no doubt this will fall on deaf ears (as previous email criticisms have), but for pity sake can we please stop ripping up areas of Randwick to create more construction zones.<br>It's laughable to even comment on these walking and cycling tracks helping to provide access to the light rail when all reports indicate that the light fail white elephant won't be finished for at least 3 years. Is your plan to build paths for three years?<br>You folks can't even cure the problem of the shared bike scrap metal blocking our current paths and want to build more homes for these monstrosities.<br>Let's stop wasting money on this sort of rubbish when current paths work just fine. Let's rather invest in traffic lights at key points where people are being run over in Randwick and spend money on opening up more free parking for residents instead of having an overpaid GM sending out his bully boys to revenue raise from residents every five minutes.<br>How about pumping some of this excess cash you appear to have into helping out residents to deal with the recent rate hikes?<br>I won't hold my breath on an honest answer not written by a lawyer or PR company.<br>Enjoy making the paper planes from this they should fly well in the hot air that emanates from council chambers. | Thank you for your comments.<br>The project aims to support active and healthy lifestyle choices by encouraging more people to walk and cycle to local destinations such as Centennial Park, the Light Rail and University of New South Wales. It will physically separate people cycling from those who walk, and from cars. This makes the street safer for everyone.<br>The design is fully funded by Roads and Maritime Services (RMS). Construction funding has not yet been approved. |
| my name is ..., resident of Kensington.<br>I want every one to be safe and commute from A to B without worries.<br>Having a better road infrastructure will probably save life and make citizen of Australia more ware of cyclist and pedestrian.<br>We will be more confident to use the road instead of using your car for short or long distance.<br>The environment will only benefits from less pollution and cleaner road, not corrupted by cars!<br>And finally, I would like to add that cycling safely makes you happy. | Thank you for your comment and taking the time to make a submission. |
| Dear Sir/Madam<br>I am a resident living at ... Doncaster Avenue, Kensington and wish to let you know that I have serious concerns about the proposed new cycleway on Doncaster Avenue. I am one of the lucky residents who have a drive way, but reversing out over two lanes of cycleway and cars parked either side of the drive will not be easy.<br>You appear to have removed more parking spots than indicated on your map, in a section of Doncaster Ave. that is increasingly busy and hard to find parks on a normal day, let alone race days or Sunday when the church in Bowral St. has its services, or the school has an event to which parents are invited.<br>This is a section of Doncaster Ave which has a number of young families, and those of them that are lucky enough to be able to get a park on this side of the street are going to find it extremely difficult to get children out of their car across the cycleway and on to the foot path in a safe manner, especially if there is more than one child.<br>I notice that we are going to lose some trees which I presume will be in the way when the cycleway extends onto the verge, but there is no mention of the power poles which are in line with the trees or closer to the road than the trees, and I am wondering if this has been taken into account in the planning.<br>The cycleway comes to a stop at Alison Road, do you propose that the cyclists cross at the pedestrian crossing on Doncaster Ave. to then cross Alison Road to access the cycleway along Alison Road or to enter Centennial Park?<br>I feel that this cycleway concept has not really been thought through and I'm not sure if you have consulted with any of the cycling clubs to get feedback from them as I'm not sure that they would use a cycleway such as this, but would prefer the cycleway as it is now. | Thank you for your comments.<br>Driveway access is a key consideration of the project and Council will continue to evaluate the many issues associated with this. As always, Council encourages the community to exercise caution and be mindful of other road users. A number of driveway crossings mean people in cars and people on bikes will have to wait where necessary, before continuing.<br>Council has considered existing utilities along the route and power poles have been included in the plans. In some locations power poles will be relocated. They have been marked as red dots on the concept design.<br>Council is looking closely at intersections such as Alison Rd and Doncaster Ave. To access the Alison Rd shared path, people on bikes can cross at the two signalised pedestrian crossings at the north end of Doncaster Ave. The alternative is crossing further south along Doncaster Ave, when safe to do so.<br>People riding bikes will not be compelled to use the proposed cycleway. Confident and capable cyclists are welcome to use the road. The addition of a separated cycleway provides a greater choice of transport modes for the community. |
| How do you intend on keeping the children, the elderly and the disabled safe? | Thank you for your question.<br>The project aims to improve safety for all roads users. A number of additional pedestrian crossings and streetscape improvements are proposed, and seek to enable more people of all ages and abilities to walk to local destinations.<br>The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people.<br>The available space for vehicle traffic will also be narrower, at 2.9m in each direction. This is acknowledged to result in lower average speeds. |

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| Dear Randwick City Council,<br>I have been a resident of Doncaster Ave for serval years and therefore understand how many cyclists ride along Doncaster Ave. I have viewed your plans and share some concerns.<br>The plans for Doncaster Ave at Carlton Street intersection, Kensington we see a loss of 5 car spots along Doncaster Ave.<br>Are you able to advise what the plans will be to implement additional parking or at least recoup the 5 spots we will lose ?<br>Residents are not lucky enough to have carports or driveways; back in 2014 we approached Council to obtain a carport and our request was rejected numerous times.<br>With all the changes happening in our area regarding to Light Rail the parking situation for the Residents has not improved.<br>I'm very well aware of the changes on the side streets from parking vertically to now parking horizontally however you have catered to the needs of light rail workers who park ALL day in 1 or 2 hour parking spots. You have also catered to Commuters traveling to the City and park in Kensington so that they are able to jump on an express bus to the City. On weekends when its Race day you have catered to those that drive and park their cars ALL day and this pass week you have catered for those Uni students that are taking their exams and think its also OK to park half a day in a 1 or 2 hour parking spot.<br>There is no respect given to the street parking signs and the Residents continue to suffer. We pay for our annual permits and then struggle to be able to find a car spot within reasonable walking distance to our property.<br>The lack of Parking Rangers is another battle; most of the time I'm ringing Council to report illegally parked cars!<br>The other concern is the safety. We have young children, The Doncaster Disable Home and elderly Residents residing between Alison Road and Goodwood Street . Can you please advise how their safety will be a priority ?<br>Lastly, the existing bicycle lane is not being used by ALL cyclists. Can you please explain how the NEW Cycling plan will make ALL cyclists use their dedicated lane ?<br>Currently the cycling gangs ride together in formations for anything from 3 across to 6 rows or more back. Such gangs will never use the upgraded lane.<br>My suggestion is to paint the existing bike lanes on Doncaster Ave green like many of the other bike paths around the city. This would make it very plain to all persons transitting Doncaster Avenue, by foot, car, motorbike or bicycle, that the bike lanes exist.<br>For your consideration, | Thank you for your comments.<br>Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. As you mention, Council has previously added parking in the side streets nearby. There are no additional opportunities to increase on street spaces as part of this project.<br>Council acknowledges the pressures faced by residents along Doncaster Ave that back on to the light rail stabling yard and close to Anzac Pde.<br>Improving the safety of pedestrians is a key focus of the project. Pedestrian crossings are proposed along the route, along with kerb extensions containing additional planting. The traffic lanes will be narrower along much of the route and this is acknowledged to reduce average travel speeds, thereby improving safety for all road users. A narrower road way will also enable a shorter crossing distance.<br>Disabled parking is also a key consideration of the project. We have been contacting people associated with a Mobility Impaired Person's Parking Spaces who are or may be directly affected, and work to provide alternative solutions where necessary.<br>People riding bikes will not be compelled to use the proposed cycleway. Confident and capable cyclists are welcome to use the road. The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people. The proposed design doesn't aim to draw road cyclists away from their chosen routes. |
| RE: Kingsford to Centennial Park – Walking & Cycling Improvements<br>Bicycle NSW has been the peak bicycle advocacy group now in NSW for over forty years, and has over 30 affiliated local Bicycle User Groups (BUGs) throughout the State – a number of which are located in the Randwick area. Our mission is to create a better environment for cycling.<br>Thank you for the opportunity of commenting on the proposed Walking & Cycling Improvements between Kingsford and Centennial Park. . Council is to be congratulated in bringing these plans to fruition. The improvements to Active Transport along this corridor are much needed, and will produce increased safety and amenity.<br>By increasing safety and amenity, more people will be encouraged to use Active Transport. This project will produce benefits for health and the environment. We totally support this project.<br>Should you require further information, please do not hesitate to contact the under signed.<br>Yours faithfully, | Thank you for your comment and taking the time to make a submission. |

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| Hi<br>Thank you for the opportunity to provide feedback on the above.<br>I am specifically providing feedback in relation to the proposed bike path along Sturt Street, Kingsford.<br>My feedback is as follows:<br>1. Please give serious consideration to putting the designated bike path on the north side of Sturt Street for following reasons:<br>a. As a resident of Bass St, I have noticed increased levels of traffic flow in the surrounding streets following the road changes around Kingsford due to the light rail. Apart from Sturt Street itself, the busiest roads are Botany, Bass and Paton streets. Most of the traffic is thus flowing north up these streets to Sturt or coming off Sturt and heading south down these 3 streets. Having the bike path on the north side would reduce the chances of any incidents between bikes and vehicles given most of the traffic is flowing on the other side of the road.<br>2. Consideration should be given to more safe places to cross Sturt Street between Anzac Parade and Avoca Street for the following reasons:<br>a. Vehicle traffic along Sturt street already high and only likely to increase<br>b. Introduction of a cycle path will lead to more bicycle traffic<br>c. the expansion and increased student capacity of Rainbow Public school will lead to more pedestrians needing to cross Sturt Street as they make their way to and from the school<br>3. Installation of traffic lights at Sturt and Avoca St and Avoca and Bundock St. A lot of through vehicle traffic flows between these streets currently and at times these intersections are quite congested. With the cycle path looking to go down these same streets it will be more necessary to have traffic lights to help with both the flow and safe passage of vehicles and bicycles between these streets.<br>4. There are times when it is difficult to find on street parking in the area. Once the light rail is completed and more people will be parking their cars in the area before getting the light rail, parking will be even more difficult.<br>Strong consideration should be given to limiting the amount of parking that will be removed along Sturt street when installing the new cycle path.<br>I hope you will find this feedback useful.<br>Thank you | Thank you for your comments.<br>The cycleway is shown to be on the south side of Sturt St between Bunnerong Rd and Anzac Pde. Council is currently developing plans for Walking and Cycling Improvements along a second route from Kingsford to South Coogee, which includes Sturt St, east of Anzac Pde. Plans are being developed and are likely to be on public exhibition in the second half of 2018. We welcome your specific feedback during this upcoming consultation period.<br>Parking is a key consideration in the two walking and cycling improvement projects. Council is aiming to minimise the loss of on street parking spaces where possible. |
| To whom it may concern,<br>We are a resident at ... Doncaster Avenue Kensington and would like to provide the following feedback regarding the proposed walking and cycling improvement from Kingsford to Centennial Park;<br>- The dedicated cycleway will remove a significant amount of parking on our side of the road which is impractical given the development, subsequent people and ongoing events in the area.<br>- We are a family with small children and the parking is already difficult and if this means we will need to cross Doncaster more regularly to park a distance from our property this will only make this situation worse.<br>- The cycleway and reduced parking will also mean that we will have limited access to our property in situations where we would ideally need directly access to the front, such as building, large items, shopping etc<br>- With the current proposal I fully expect the cycleway to reduce the value of our property given these parking and access issues, and on the back of the cark park we have just had to endure built behind our property.<br>While I believe a cycleway in principal is a positive proposal for the area the parking impacts need to be improved significantly for our positive support.<br>Regards | Thank you for your comments.<br>The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people.<br>More people choosing to ride and walk for local trips helps ease congestion and parking demands. The street will benefit from improvements such as traffic calming, new pedestrian crossings and pram ramps, making the street safer for local walkers too.<br>Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. On Doncaster Ave between Alison Rd and Todman Ave there is a loss of 8 spaces and 1 newly created. |
| Dear Randwick Council<br>I am very pleased to hear about the plans to upgrade the cycleway and streetscape in the Kingsford and Centennial Park areas.<br>The route along Doncaster Avenue is very familiar, as I cycle that way several times a week on my way to work at UNSW. The existing arrangement is fraught with hazards and the proposed upgrade can only increase the safety of cyclists, pedestrians and motor vehicle drivers alike. Separated cycleways need to become the standard across the city, as they avoid many dangerous situations. For example, cars frequently park in, and across, non-separated cycle lanes, which forces riders to move to the right, potentially into the paths of vehicles approaching from behind. The hazard is accentuated by other factors including careless car door opening and obstacles such as refuse bins etc. All these things typically occur along Doncaster Avenue at present.<br>I strongly support the proposed plans and hope for a speedy implementation.<br>Hopefully other plans to develop safer cycling across the suburb will continue to emerge in the near future.<br>Sincerely | Thank you for your comment. Safety improvements are a key focus of the project. |

| Submission | Council response |
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| To whom it may concern,<br>As a homeowner and resident of Doncaster Avenue I would like to registered my objections to your proposed cycleway along Doncaster Avenue.<br>These objections include, but are not limited to the following:<br>1: reduced resident parking. Parking is already a problem in the area for residents - even with your "band aid" solution of parallel parking in the surrounding streets.<br>2: Your proposed cycleway will remove all parking from in front of my house - leaving me to cross an extremely busy street whilst juggling three small children, shopping, etc. This is not only logistically difficult but exceptional dangerous. And our household will not be the only one facing such a multiple times a day, high risk activity.<br>3: increased noise from cyclists - especially early in the morning when the cyclists routinely travel in groups - talking/shouting to each other. Will all be focused on one side of the street.<br>4: enough is enough. The residents of Doncaster Avenue and the surrounding areas have be well and truly slammed by all the recent so called "improvements"/developments implemented or approved by your council in the area. Many with absolutely no benefit to the residents and most actually at a cost. I have yet to complain to any of your proposals but this is truly the icing on the cake.<br>I indeed hope that the council takes onboard and listens to my objections and no doubt the many other objections you will be receiving about your proposed cycleway. | Thank you for your comments.<br>The proposed design will physically separate people cycling from those who walk, and from cars. This makes the street safer for everyone. More people choosing to ride and walk for local trips helps ease congestion and parking demands. The street will benefit from improvements such as traffic calming, new pedestrian crossings and pram ramps, making the street safer for local walkers too.<br>Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces.<br>People riding bikes will not be compelled to use the proposed cycleway. Confident and capable cyclists are welcome to use the road. The addition of a separated cycleway provides a greater choice of transport modes for the community.<br>Council acknowledges the pressures faced by residents along Doncaster Ave that back on to the light rail stabling yard and close to Anzac Pde. |
| Hello, I have added to my husband's comments below and summarised the concerns from ... Doncaster Ave as:<br>Likely reduction in parking spaces<br>The proposed dedicated cycleway will remove parking on our side of the road, which is impractical given the volume of new development, density and existing parking load on the streets.<br>While I note from your link there no changes to parking immediately adjacent to our property, there is a material change at Ascot which will add cumulative pressure to already difficult parking conditions.<br>Minimal bike incidents to date<br>You state 6 bike accidents over a 5 year period. This is not significant given the volume of cyclists and hardly warrants a major disruption as a dedicated cycleway<br>I also question how much it will be utilised given the large volume of peloton riders down Doncaster that will continue to use the road rather than the cycle way<br>Safety risk for residents (including children) crossing Doncaster.<br>Residents on the east side of Doncaster will be regularly forced to cross a VERY busy road to access their house.<br>A number of properties (including ours) DO NOT have off-street parking, so this would mean we would need to cross the street regularly to access our house.<br>With two small children and a heavy traffic load on Doncaster already the proposed bike track raises significant and unpalatable safety concerns.<br>Reduced access to house<br>The proposed dedicated cycleway will limit access to property when a park out the front of our home cannot be sourced. For example<br>• Arriving home with shopping and large / bulky items (AKA will need to park over the road and ferry shopping bags)<br>• Rubbish collection (Acknowledge that process is TBA)<br>• Deliveries<br>• Building works<br>• Large scale rubbish removal (AKA skip bins etc)<br>• Etc.<br>Impact to living standards and property prices<br>Reduced access will result in our day to day rhythm as a family being seriously disrupted and poses a safety risk.<br>Plus will reduce the value of our property as it will be turn off potential buyers.<br>This is a critical issue that will negatively and severely impact living standards and property prices.<br>We strenuously object to this proposal and would like our feedback acknowledged and a formal response regarding the next steps and our rights as property owners.<br>Thank you | Thank you for your comments.<br>The proposed design will physically separate people cycling from those who walk, and from cars. This makes the street safer for everyone. More people choosing to ride and walk for local trips helps ease congestion and parking demands. The street will benefit from improvements such as traffic calming, new pedestrian crossings and pram ramps, making the street safer for local walkers too.<br>Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. On Doncaster Ave between Alison Rd and Todman Ave there is a loss of 8 spaces and 1 newly created.<br>Council officers have reviewed all submissions and prepared a report summarising the consultation activities, feedback received and recommendations. This report and its recommendations will be considered at a Council meeting.<br>Council has applied for construction funding from the RMS. Residents will be kept informed of the project and any future construction information. |
| Hello, I just filled out your survey and wrote comments about your proposed Cycle path on Doncaster Avenue. Your survey form asked my suburb of residence. I tried to enter "Kensington" but the form continually defaulted to a South Australian suburb. Please note that I live in Kensington NSW and not Kensington SA. Please acknowledge receipt of this note.<br>Thank you, | Thank you for your comment. We have forwarded the issue to the software company. |

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| Hi there,<br>I applaud the councils initiative to improve the cycling and walking facilities along Doncaster Avenue. I do have a few questions I hope you can answer:<br>Firstly, as there will still be parking alongside the new cycle lane on Doncaster, presumably there is enough room for this or will you need to widen the road to accomodate it plus the two lanes of traffic and parking on the Western side? I can't quite work out how its all going to fit!<br>Also, can you explain why trees need to be removed? Kensington has already lost an unacceptable amount of canopy coverage due to the light rail construction and particularly around our neighbourhood (we live on Abbotford St). We simply cannot afford to lose any more established trees and while I understand you have included new plantings in your plan - often the trees planted are tiny saplings and take years and years to mature.<br>Will the clearway on Doncaster Ave north bound leading into Alison road be 24 hour 7 days a week? If not may I suggest it is. With the increased amount of north bound traffic funnelled into Donaster Ave. this intersection is busy all the time and often there are cars left in the clearway holding up the traffic substantially.<br>The footpaths along Anzac parade and its side streets have been ripped apart due to light rail construction and are a disgrace. Will these be replaced and who is responsible for that? Also in terms of pedestrian safety can I also suggest more zebra crossings near Our Lady of the Rosary school. Not just directly adjacent to the school but further out in the surrounding streets allowing children to walk to school safely from all areas in the surrounding neighbourhood.<br>Finally, with the cycle way leading to Centennial parklands, presumably the Kensington ponds bridge has been considered as part of your plan - it makes sense for cyclists and pedestrians to have easy access to the park directly from Kensington and the cycleway. However, as you would know - the bridge has still has not been constructed. I have been chasing information from Centennial Parklands and Sydney Light Rail on the construction of the bridge and why it has been delayed but have had little success. Can I urge you to also put pressure on them and Transport for NSW to ensure this vital access to the park is restored and of high priority.<br>I look forward to your response.<br>With thanks | Thank you for your comments.<br>1. The concept designs show that the kerbs are cut back in some places. In most parts, the existing kerb will be kept and the road lanes will be narrowed. Please refer to the section diagrams in the concept designs that show the proposed lane arrangement.<br>2. Trees are proposed to be removed to cut back the kerb, or to accommodate the new cycleway. As you mention, new trees will be planted, but may not be the same height as previous ones.<br>3. Changing the clearway arrangement is not within the scope of this project. It assumes existing or known clearways along the route.<br>4. The footpaths along Anzac Pde are largely part of the light rail project, which is managed by Transport for NSW. Your suggestion of more pedestrian crossings near Our Lady of the Rosary School will be addressed separately to this project.<br>5. Council is communicating with the light rail project team and Centennial Park and Moore Park Trust with the aim of providing strong, safe connections to Centennial Park. We are aware that the Trust is well advanced in its development and plans for the Kensington Ponds bridge. |
| I rang last week and again this afternoon to ask a few questions but have missed you both times and your phone does not go to voicemail so I was unable to leave you a message.<br>I did speak with Sarah Thorne last week however she indicated that most of my questions were still unanswerable as the decisions about the actual design and operational impacts are outstanding.<br>The questions I have, amongst others, are:<br>1. The overview map showing existing cycle routes is not accurate and does not match the main routes used ny the majoroty of cyclists within and transitting Randwick. For example in excess of 1,000 cyclists use Avoca St (N & S) on the weekends whereas from observation less than a dozen or two use Irvine St. Cyclists then connnect with Anzac Parade heading south towards La Perouse splitting into westward to Maroubra Rd, Beauchamp etc or through to the Bunnerong Rd intersection. The shown cycle route/way square of Botany St, Rainbow St, Avoca St & Barker St equally is nowhere near the volume of those cyclists using Avoca St N/S during the week nor weekends. Similar comments are applicable to other 'cycle routes' shown on the map. How did the routes shown get decided?<br>2. What will the width be for gaps in the raised cycleway kerbing to allow for access to/from residential driveways? Will it allow for rigid trucks to turn into the driveways without having to pull out across the road centrelines (such as in Bundock St or Sturt St)?<br>3. Speaking with your colleague about the issues of rubbish/recycling trucks accessing the wheelie bins given the raised kerbs - she suggested that this was currently being discussed with waste mgmt but that the bins would be left on the footpath requiring additional personnel to walk along the routes in advance of the trucks and moving them out to the road side of the raised kerbs. Then once the trucks have been these personnel will be required to do the reverse. If this is the case was this costed as a direct cost of these proposals and iof so what is the expected additional cost per annum? If not why was this not done so back in 2015?<br>4. If there is no driveway opening then the wheelie bins will have to be lifted up and over the raised kerbs - surely this would raise serious WHS issues and liabilities for RCC? Was this discussed back in 2015 as I cannot find any public records on the RCC web site indicating it was? If it was how were these risks to be miniimised? If not, why not?<br>5. It is common to see bins fallen over once the truck as emptied them. If this occurs in the context of the cycle way then it can create a dangerous obstacle for cyclists until the 'waste walkers' come along to remove them and place them back on the footpath. How will this be addressed?<br>6. With the susbequent narrowing of many of the existing road lanes due to the approx 2.8m width required by the cycleway & kerbing - are any of the proposed new lanes widths non-complaint with Australian standards as is the case with the CSELR in places?<br>7. Given the current proposed routes for divided cycle ways - how many trees are likely to be removed due to footpath narrowing?<br>8. Approximately what is the cost to move a power pole due to footpath narrowing on a per pole basis? What would be the equivalent cost to undergound the power lines along the routes instead? If this has not | Thank you for your comments.<br>1. The project overview map was based on Council's Cycling and Walking map, published in 2010. It shows suggested on-road and off-road cycle routes and usually indicates low stress routes that can be used as alternatives to busier/main roads. Bicycle riders have the same rights and responsibilities on the road as other road users. Unless otherwise signposted, they are allowed to use all roads in the Council area.<br>2. Driveway access is a key consideration of the project and Council will continue to evaluate the many issues associated with this. Please refer to the concept design for indicative widths. Exact widths will be determined in the final design stage.<br>3. Council is working closely with the Waste Management Team to understand how their staff collect waste from bins in the community. Waste operations are informed with the whole community in mind.<br>4. Council is working closely with the Waste Management Team to understand how their staff collect waste from bins in the community.<br>5. Council staff aim to provide a high quality service to the community. We encourage all road users to exercise caution and be mindful of other people and objects in the road way.<br>6. The proposed traffic lanes are narrowed to 2.9m due to road width constraints. Council is seeking to safely accommodate all road users along the route.<br>7. Improving planting along the route by providing additional planter beds and trees has been a key priority for the project. Some 21 trees are proposed to be removed to accommodate traffic changes or improve safety, however there will be 72 new trees planted. This results in an increase of around 50 additional trees overall.<br>8. There is a sizeable cost to both moving power poles and putting them underground. The Project Team is working with an experienced group of people and has assessed a number of options in managing existing utilities.<br>9. Driveway access is a key consideration of the project and Council will continue to evaluate the many issues associated with this. Please refer to the concept design for an indication of the kerb and driveway arrangement.<br>10. Council is working closely with the Infrastructure Services Team to keep them informed of the project. The on-going cleaning requirements of the cycleway will be assessed by our Infrastructure Services Team if the project proceeds. |

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| been calculated - why not? With all the excavation requitred to move the footpath kerbing and remove existing poles and re-install them then would the difference in earthworks required be that substantial especially given the cost savings from not having the cost (and future replacement) of each pole, the cost of tree trimming to ensure the powerlines are not damaged by trees etc?<br>9. Where there are adjacent driveways such as for multiple semis - then would it be likely that the actual length of raised kerbing (allowing sufficient width for each drive way to be accessed by a rigid truck) may be a significantly smaller proportion of the street length than undivided cycle way?<br>10. An issue with existing cycle ways is continual maintenance and cleaning. It is very common for glass bottles to be broken at pich points on existing cycle ways - especially late on Friday nights or early Saturday mornings - making them unuseable and forciing cyclists back onto now narrow roads. How is RCC proposing to deal with this additional required out-of-hours cleaning? Has it been budgeted for in on-going operational costs of this proposal? How will it operate?<br>11. I realise the rest of Sturt St, Avoca St and Bundock St do not form part of the rough plans displayed on YourSayRandwick.com.au - are drafts in existence for those sections as shown on the overview?<br>12. If so, how is the intersection of Sturt & Botany proposed to be managed? If not then how can RCC propose to proceed with one end of it?<br>13. If, so, how is the major intersections of Avoca & Sturt and Avoca & Bundock to be dealt with? Is it proposed to install traffic lights covering these combined intersections? Would there also be pedestrian crossings associated with the signalised intersections? If this is the proposed or draft proposal - have any traffic studies been conducted on the impact of signalising this would have on transit times throughout Randwick? The 1995 Cwth Govt study on putting traffic lights in this stretch of Avoca St found significant negative impacts that caused cascading gridlock as far away as Sutherland with predicted additional transit times at major Sutherland intersections of as much as 90 seconds in peak hours during to such signalisation. RCC had multiple copies of this approx 300+ page traffic study as a result of proposals for the Bundock St site.<br>14. Given the adverse traffic flow changes resulting from the E/W closure with clear through north bound access to Anzac Parade fron Avoca St reduced from 3 roads to 1 - the impact of signalising any additional intersection in Avoca St could only have worse impacts that the C'wth' earlier extensive traffic study found - as this proposal was made before the road closures and diversions due to the CSELR were known or decided - has the proposed cycle way routes been reassessed for suitability?<br>regards | 11. Council is working on a second route from Anzac Pde east along Sturt St, Avoca St and Bundock St. We are currently developing a concept design for this route and it is likely to be on public exhibition later in 2018.<br>12. Please refer to point 11. Council is looking at all intersections along the route, with the aim of accommodated all road users. Any specific questions can be made during the consultation.<br>13. Please refer to point 11. Council is looking at all intersections along the route, with the aim of accommodated all road users. Any specific questions can be made during the consultation.<br>14. Please refer to point 11. Council is looking at all intersections along the route, with the aim of accommodated all road users. Any specific questions can be made during the consultation. |
| To the General Manager Randwick Council:<br>We are long time residents and property owners in the area affected by the proposed Cycle Lane Centennial Park to Kingsford. Our property is at ... Doncaster Avenue. We would like to lodge the following objections in respect of the changes:<br>• Increased hazards for properties such as ours with carports when reversing onto the street. The situation on Doncaster Avenue is already extremely hazardous as it requires a reversing vehicle to veer onto the centre of the road across the existing bike lane and a lane of fast moving traffic, often with very poor visibility. The proposal allows for two cycle lanes (one in each direction) thereby greatly increasing the hazards for cars.<br>• Increasing the number of bike lanes can encourage cyclists to ride in an unsafe fashion, is confusing to motorists and is likely to cause turning and crossing conflicts. For example, a bicycle travelling in the dedicated cycle lane must veer right across oncoming cycle traffic and merge with cars to make right hand turn, which will be unexpected from a motorist's perspective. Left hand turns are also more hazardous for motorists who will be expected to give way to cycle traffic in two directions. The intersection of Doncaster Avenue and Anzac Parade is a case in point. This is a very busy motorist route funneling traffic towards the University and four major local hospitals. This will be added to the motoring chaos in the future as motorists attempt to accommodate light rail traffic also.<br>• Commuting cyclists are capable of impressive speeds and motorists often underestimate the speed of an approaching bicycle. At the same time, bike lanes can give cyclists a false sense of security, reducing awareness of other traffic. There are no speed regulations for cyclists. This combination inevitably leads to greater hazards to all road users.<br>• Despite the Council's claim that no parking amenities will be removed in the affected area, we note that there will be a number of parking spots near our property which will be sacrificed to accommodate a pedestrian crossing. Unfortunately, those spots are some of the few all day parking spots in our street. Parking is a critical issue for residents who have had to endure higher demands for street parking due to the building of residential flats with insufficient parking amenities. Many residences have no off-street parking. Many households such as ours have multiple cars which cannot be accommodated, even with resident parking permits. We are at a loss to understand the need for restricted 1 hour parking in our area which is entirely residential and NOT near a commercial centre. If the purpose is to restrict parking on race days, then the parking restrictions should apply to race days only. It has become increasingly difficult to allow for safe disembarkation of elderly family members and children when access to the property is so restricted.<br>We urge the Council to please consider the needs of its rate payers and local residents before implementing this proposal. We strongly believe that it will negatively impact on the amenities of local residents. We believe wider curbs are better than two way cycle lanes and allow for the safer sharing of our roads. We request that you acknowledge receipt of this email.<br>Yours sincerely, | Thank you for your comments.<br>Driveway access is a key consideration of the project and Council will continue to evaluate the many issues associated with this. As always, Council encourages the community to exercise caution and be mindful of other road users. A number of driveway crossings mean people in cars and people on bikes will have to wait where necessary, before continuing.<br>Doncaster Ave and Anzac Pde will continue to be a signalised crossing. Bike riders will likely cross in the same phase as pedestrians. Council is working with Roads and Maritime Services (RMS) on the detailed signal designs. We are also conscious of vehicle movements at intersections and seek to improve safety for all road users along the route.<br>Council acknowledges that there is high demand for on street parking in this area. Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces. On Doncaster Ave between Alison Rd and Todman Ave there is a loss of 8 spaces and 1 newly created.<br>We will refer your query about the 1 hour parking restrictions to the Traffic Team to be addressed separately.<br>The proposed design and inclusion of a dedicated cycleway provides physical separation and a safer environment to ride a bike. Separated cycleways are widely acknowledged to attract a broader cross section of the community, e.g. women, children and elderly people. |

| Submission | Council response |
|---|---|
| Dear Randwick Council,<br>Thanks for progressing this proposal to improve the bicycle lane along Doncaster Avenue at Kensington<br>I believe this is a useful community amenity. I live near the existing Doncaster Ave cycle path and I have seen a regular and steady increase in cycle traffic - both on the path and in the general Kensington area - since I have lived in the area (i.e. from 2015 to now)<br>The improvement of the Todman Avenue cycle path towards East Village Waterloo is also useful - it would be great if this were upgraded to a fully segregated cycle path as well. There is sufficient road space along Todman on the west side of Anzac Parade to allow for a segregated path without loss of automobile traffic or car parking amenity.<br>It would be safer for cyclists and motorists if the cycle ways were located next to the pedestrian path with car parking between the cycle path and car parking and traffic - as per the diagram below. It would be easier to install this type of configuration down Todman west of Anzac Parade than almost anywhere else in the Kensington area. | Thank you for your comments. Council is currently working on improvements to the bicycle shoulder lanes along Todman Ave. We will be approaching the NSW Government asking for the Todman Ave and Lenthall St route to be considered a 'Sydney Strategic Bicycle Corridor', as seen in the NSW Government document 'Sydney's Cycling Future'. If successful, this will assist with implementation and funding of this section. |
| I have received in the mail the above letter. I am concerned on the impact this will have at my residence. Currently there is a single bike lane outside of the on south facing street parking.<br>At my own residence which is on the junction of Tunstall and Doncaster Avenues, I have no off street parking and no immediate on street parking. Will the proposed two way bicycle lane take away some of the already rare on street resident parking available?<br>Similarly, will the Lycra Clad Bike Clubs who ride frequently down this route often abreast blocking the flow of motor traffic be using the bike lanes or continue to take further road space. As residents we are already impacted by the bike clubs, who travel in large groups making loud shouts and commands to each other early on Saturday & Sunday mornings as the lights change. They should be asked to travel in relative silence on residential streets or implement hand or light signals.<br>Resident<br>... Doncaster Avenue, Kensington | Thank you for your comments.<br>Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route. Overall there is a loss of 20 spaces along the full 2.6km length of the route, being a removal of 34 spaces and 14 newly created spaces.<br>Council acknowledges your concerns with the noise of road cyclists in the early hours. We have, in the past contacted local road cycling clubs asking that they minimise the noise they make - especially in the early hours. We will contact them again soon. Talking loudly or even yelling is not a behaviour which Council can control. Any unlawful behaviour is a matter for the police. |
| Dear Randwick Council -<br>Thanks for opportunity to comment on this proposal<br>I live at Unit ... Doncaster Avenue. Our building is at .... Our building can be seen at the upper middle of the image below ....<br>My main comment is that there is no need with this bicycle path arrangement for the segregated cycle traffic to stop at the Doncaster / Todman lights.<br>This stop light is unnecessary for cycle traffic under this arrangement and provides no safety value. Ideally the traffic light could be relocated to the western edge of the cycle way and the segregation retained through the intersection. Cycle traffic that wants to turn into Todman could rejoin Doncaster at breaks further along the street.<br>My proposed arrangement would have two advantages<br>1. Cycle traffic would flow more easily and faster<br>2. There is a potential benefit to local residents in reduced noise from cyclists<br>Under current arrangements - large groups of cyclists are usually stopped at the Doncaster / Todman lights in the morning. They usually chat and this noise is quite noticeable in the early morning. If my proposed arrangement were introduced there would be an incentive for groups of cyclists to flow single file via the path so as to avoid the lights. This may reduce this source of noise. (My guess is large groups of cyclists would continue to use the main road at Doncaster but my proposal would incent them to travel in smaller cohorts.)<br>regards | Thank you for your comments. There is limited width at this location and the intersection also needs to accommodate 3 pedestrian crossings. The future bicycle lanterns will stop people riding through this intersection to allow pedestrians to cross. During other phases, it is expected that bicycle riders will have a green signal. |
| I am writing to congratulate you and the council on the plans to extend the bike network in Randwick. This is a great initiative and as a family who rides bikes a great deal we really appreciate the commitment to create safe bike paths.<br>I ask that further bike paths be added.<br>• Can the council add a proper segregated bike path from cnr. Malabar Rd, down Torrington Rd, along Marine Pde the length of Maroubra beach and join with the existing marked lane on Fitzgerald Ave up to Anzac Pde? This would create a safe bike path for a key transport route and link several key local zones eg. the beach with Des Renford Centre<br>• A number of roads identified in the network plan are not proper bike paths. Several roads have a bike logo painted on the road, but there is no dedicated lane for bikes to ride along. This creates dangerous mixes of car and bike traffic. Of particular note is the Malabar Rd through to Mount St section. This is identified as an existing bike lane route, but in fact is a busy street with lots of traffic and no bike lane marked - only a token bike symbols painted in various places.<br>Many thanks, | Thank you for your comments.<br>1. Council conducted community consultation in 2015 to prioritise the construction of bike routes in the LGA. A map of the routes is on our website. http://www.randwick.nsw.gov.au/__data/assets/pdf_file/0004/24556/RCC-bicycle-route-construction-priority-map.pdf<br>Separated cycleways on Torrington Rd and Marine Pde aren't currently a focus for Council.<br>2. The cycle network in green on the 'project overview' pdf is a mix of shared paths and cycle routes, and largely originates from our Cycling and Walking Map. In the Cycling and Walking Map map the routes are noted as either 'on-road' or 'off-road'. |

| Submission | Council response |
|---|---|
| Hi there,<br>I am a resident of Sturt St Kingsford where the separated cycleway is proposed. I have no issue with the cycleway as such but ask that it not be a separated cycleway with a curb due to the number of driveways and impact on bins and so on. Any reason why it cannot be painted lines for the cycleway?<br>Many thanks, | Thank you for your comments. Separated cycleways are dedicated spaces located in between the lane used for street parking or traffic, and the footpath. They provide a travel lane (or lanes) for riding a bicycle that is separate from moving traffic and from the footpath. The physical separation also prevents cars from parking in the cycleway.<br>Physically separated cycleways that include a kerb, planting, or similar, are widely considered to be much safer than riding on the road. This makes the cycleway suitable for a wider range of ages and abilities than a road marked solution. |
| Hello<br>I wish to know if you can email the plans as a PDF file?<br>Thankyou, | Thank you for your interest in the project. As stated in a previous reply, please refer to the documents page:<br>https://www.yoursayrandwick.com.au/StreetscapeUpgradesKingsfordCentennial/documents |
| I applaud your planning proposals to make walking and cycling safer and accessible in our area<br>With the building of the Light Rail along Anzac Parade and with no plans it seems to include a cycle path, it has now<br>Become way too dangerous to cycle along this road<br>I would like to add that apart from the planned cycleway, that other areas where there are marked lines on the roads for cyclists on the alternative route to Anzac Parade and Todman Ave, that they are in desperate need of repainting. I also include the road that goes pass the Supercentre to Anzac Parade.<br>I am a regular user of this route and increasingly, cars are going into 'our space' as I feel they cannot see the lines anymore<br>Regards | Thank you for your comments. Council is currently working on linemarking improvements to the bicycle shoulder lanes along Todman Ave. We will be approaching the NSW Government asking for the Todman Ave and Lenthall St routes to be considered a 'Sydney Strategic Bicycle Corridor', as seen in the NSW Government document 'Sydney's Cycling Future'. If successful, this will assist with implementation and funding of this section. |
| Sirs, I am happy to see your plans to provide cycle ways in Doncaster Ave. and Houston Road.,Kensington. We need more of the same.<br>Keep up the good work, | Thank you for your comment and taking the time to make a submission. |
| To whom it may concern,<br>This looks like an excellent plan and should improve the safety and amenity for both cyclists and pedestrians. It is a shame that it is so short but it does contribute to the goal of a connected city wide separated cycle route.<br>It is also great to see that pedestrian safety and amenity has been considered.<br>It is essential that the speed limits for motorised transport is reduced-perhaps through the use of speed cushions and street furniture of various types. Unless this happens the environment will still be intimidating for pedestrians and cyclists.<br>It is also necessary that we take this opportunity to try to shift motorists perception that the roads are meant for them by encouraging them to think of themselves as guests on streets through through quieter residential areas. The Netherlands do this by putting up signs saying 'Car Is Guest' on these streets.<br>Pedestrians must be given more time to cross roads at intersections controlled by lights. This will encourage more people to walk.<br>The design of roundabouts need to be addressed. Ideally, cycle paths should be separated from the car lanes but if this is not possible, pinch points at which the cycle lane ends at the roundabout and cyclists are forced into the car lanes-as happens now on Doncaster and Todman Avenues-should be avoided.<br>Yours faithfully, | Thank you for your comments.<br>Improving safety for all road users is a key consideration of the project. Due to the addition of kerb extensions and separated cycleway, the available space for vehicle traffic will be narrower. This is acknowledged to result in lower average speeds.<br>All signalised intersections will be designed with pedestrians and bike riders in mind, and be developed in detail with Roads and Maritime Services (RMS). Council has sought to accommodate all users in the proposed design. The existing roundabouts are incompatible at intersections that include bi-directional separated cycleways, and will be replaced with priority intersections. |
| Another greenie mad idea.<br>Doncaster Avenue is not wide enough for your crazy plans. Have you thought of all the extra cars that will need to use Doncaster Ave, now that Anzac Pde is compromised with the light rail<br>You people dont live in the real world and of course we as ratepayers have to accept increases in rates to fund your madness.<br>I ride and cycle in the Kensington area and find it just fine,so please spend the money on something long overdue,like fixing the third world pavements that are everywhere in our area.<br>Very unhappy ratepayer | Thank you for your comments. Council acknowledges that Doncaster Ave is a well used road. This project aims to provide an environment that enables more people to ride and walk for local trips, which can help ease congestion and parking demands. Traffic lanes will be narrowed to 2.9m in each direction, but lane arrangements will be largely unchanged. Some intersections will be modified where necessary. |
| Dear Randwick Council,<br>I fully support the plans for an improved streetscape plans, including a separated cycleway along Doncaster Avenue and Houston Road, Kensington, to support active travel in Randwick.<br>This is a much-needed link in Sydney cycling network, allowing people to safely ride along what is an already busy – but presently relatively dangerous – cycle route.<br>More importantly, by providing a facility that ensures safe passage for everyone, it will encourage those who do not cycle now because of dangers from cars to consider cycling, which will provide social, environmental and economic benefits for all. Best of all, this infrastructure will provide protection and safe facilities to support people walking, people cycling, as well as people driving, meaning that everyone will benefit.<br>Quality landscaping along the route will also make the area a much more attractive place to live, work and play.<br>The route also provides a great cycle link to and from Centennial Park, and to the cycleways heading north from Doncaster Avenue towards the city and towards Bondi Junction.<br>(If applicable to you) I have often thought about cycling but am afraid to ride in traffic. With this new cycleway I will be much more likely to cycle in the future. | Thank you for your comment and taking the time to make a submission. |

| Submission | Council response |
|---|---|
| Subject: Sturt Street proposed cycle way - can you please upload or provide the diagrams that show the entire path to Avoca Street please<br>Kindest regards, | Thank you for your question. Council is currently developing plans for Walking and Cycling Improvements along a second route from Kingsford to South Coogee. It includes Sturt St (east of Anzac Pde), a short part of Avoca St, and all of Bundock St. Plans are being developed and are likely to be on public exhibition in the second half of 2018. |
| To Randwick Council,<br>Thank you, this absolutely fantastic news. I have lived on Doncaster all my life. When I attended Kensington Public School I was forbidden from riding my bike to school because it was considered too dangerous. I was similarly unable to ride to Sydney Boys' High; again, because of the perils of cars. This segregated cycle path is the best possible thing for Kensington. It should also encourage cycling, rather than driving, to UNSW. It has long bewildered me that Australia's largest university does not have a dedicated cycle way for its students.<br>Thank you for finally installing a safe cycle way. I am thrilled.<br>I do have one suggestion. The Roma Avenue to Koorinda Avenue section of Doncaster Avenue rises with the topography. Cars travelling south accelerate from the Anzac Parade lights. Cars travelling north tend to hit a higher speed too, as they come down the slope. Over the 58 years of living on Doncaster Avenue I have witnessed a number of accidents on this section. Clearly, speeding caused the acvidents. My suggestion is that traffic calming measures, specifically for this section, be installed as part of the cycling way construction.<br>I also hope you will take the opportunity to plant native trees in the nature boxes as part of your plan.<br>Thank you again, | Thank you for your comments.<br>Improving safety for all road users is a key consideration of the project. Due to the addition of the separated cycleway, the available space for vehicle traffic will be narrower. This is acknowledged to result in lower average speeds. The design proposes a number of kerb extensions, and Council will consider whether more can be added.<br>The Project Team is working closely with the Tree Management Team to select appropriate trees and plants along the route. |
| Thank you Randwick Council..<br>(I can't resist saying -)<br>Seems Randwick Council has the job of cleaning up the horror mess created by the Light Rail cutting through our suburbs..<br>Thanks.. | Thank you for your comment and taking the time to make a submission. |

# Appendix D

Preliminary Overland Flood Investigation Report – ACOR

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# Preliminary Overland Flood Investigation Report

## Randwick City Council Cycleways Link

**Prepared for: Randwick City Council**

**Document No: SY170790**

**Issue No: R01**

**Dated: 18/05/2018**

**Author: G Lyell**

**Reviewed: A Hall**

# Executive Summary

ACOR Consultants were engaged to provide preliminary hydraulic modelling analysis to ascertain the impact of cycleway construction on stormwater and flood levels. Two different construction scenarios of the cycleway were investigated, and the impact of each determined.

Scenario 1 included the implementation of a median strip separating the cycleway from the existing kerb/roadway. Scenario 2 included the implementation of a flush cycleway against the existing kerb and gutter which was then lifted to be flush with the existing footpath.

Results of the preliminary modelling showed an appreciable flood level increase due to the implementation of a flush cycleway, whereas the scenario utilising a median strip separation had minimal to negligible impact on flood levels.

Additional hydraulic modelling using HECRAS will be undertaken to ascertain impacts at specific areas along Doncaster Avenue and other identified locations in increased detail.

## 1.0 INTRODUCTION

ACOR Consultants have been engaged to prepare advice on impacts to flooding and overland flows for the proposed Randwick City Council Cycleway Links, including both the Centennial Park to Kingsford, and the Kingsford to South Coogee sections.

This report has been undertaken with the intention of providing advice with regards to the impact on flooding and overland flows due to the proposed installation of a bi-directional cycleway along the length of the above proposed Randwick Cycleway works. It is proposed that the cycleway would be one of, or a combination of the following cycleway types:

- median separated cycleway with a new 400mm wide concrete median built 2.4m from the existing kerb,
- double stepped cycleway with the introduction of a small height kerb 2.8m off the existing kerb and lifting the cycleway by approximately 80 to 100mm, or
- flush cycleway with the construction of a new kerb 2.8m from existing kerb and lifting the new cycleway to be flush with the existing footpath.

The proposed area of the works is covered by two separate Council flood models/studies, being Kensington – Centennial Park Flood Study (WMA Water 2013), and the recently completed Birds Gully and Bunnerong Road Catchment Flood Study (WMAWater 2018_Draft). For the purpose of this investigation, flow rates have been provided at critical locations by Randwick City Council from both the Kensington – Centennial Park Flood Study, and the Draft Birds Gully Bunnerong Flood Study.

This report is based on existing modelling information currently available for the Kensington-Centennial Park Catchment, including existing conditions and using Australian Rainfall Runoff 87 data.

New modelling is being prepared with consideration of recent changes associated with the Light Rail works, improvements to the Centennial Park levy, and to updated Australian Rainfall Runoff 2016 data. This new modelling information represents an improvement overall in the Kensington-Centennial Park catchment area and will be considered in the Design Development stage of this project.

## 2.0 SITE CHARACTERISTICS

### 2.1 Existing Site Conditions

The study area consists of multiple roadways located within the Randwick City Council area, including Doncaster Avenue, Day Avenue, Houston Road, General Bridges Crescent, Sturt Street, Avoca Street and Bundock Street. Upon reviewing the Kensington – Centennial Park Flood Study, it is apparent that Doncaster Avenue has significant flooding to various depths along its route, and as such this is where the sections were taken in this preliminary report to illustrate possible impacts on the cycleway (See Section 3.2).

Several sections of the site were analysed based upon outcomes of the meeting with Randwick City, Group GSA (Lead consultant for the project) and ACOR Consultants on 6 March 2018. Existing cross sections and road geometry at these locations were obtained using survey provided by Burton and Field (Ref 77155_S2), dated 03/11/2017. These cross sections were selected to represent the critical locations including 1) where neighbouring properties are inundated, 2) where flood levels are typically approaching boundary levels and 3) where flood

levels are approaching floor levels of adjacent properties. Only 3 sections in Doncaster were studied with additional sections to be studied later in the project. Flow rates were provided by Council from the TUFLOW models and were used in a pre-development catchment scenario where flow rates were run through the existing cross sections.

The cross sections were then altered for the post development scenarios. This includes both median separated cycleway with a median strip (200mm x 400mm located 2.4 m off the gutter invert), and a flush cycleway where the kerbs are relocated 2.8m from existing kerb and footpath levels lifted, in order to model the change in depth of flow/flooding that the construction of the cycleway would introduce. The double stepped cycleway option was not modelled, as it is assumed that the impacts on flooding would be similar, but slightly less than the flush cycleway option.

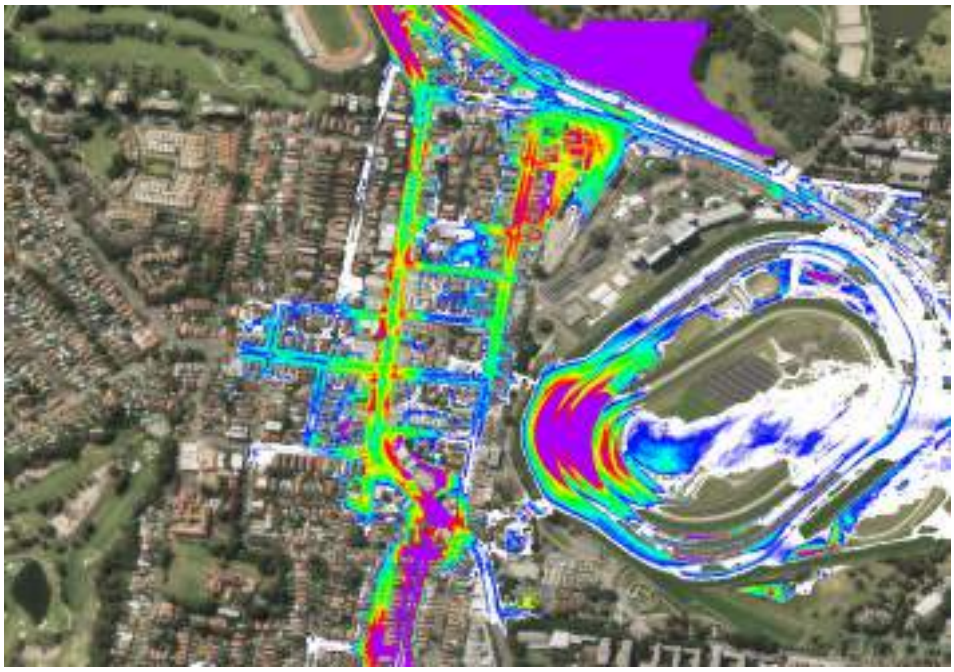


**Figure 1 Council Flood Study (top section), Randwick Council Lower Model - 2013, 100-year flood event.**

## 2.2 Post Development Cycleway Input

The post development scenario includes the modelling of the previously mentioned cycleway options in DRAINS hydraulic modelling software at 3 points along Doncaster Avenue. The sections were chosen due to their varying flood depths within the TUFLOW results, including depths of flow that were both close to inundation of front boundaries, and also inundation of floor levels in known storm events (100-year ARI).

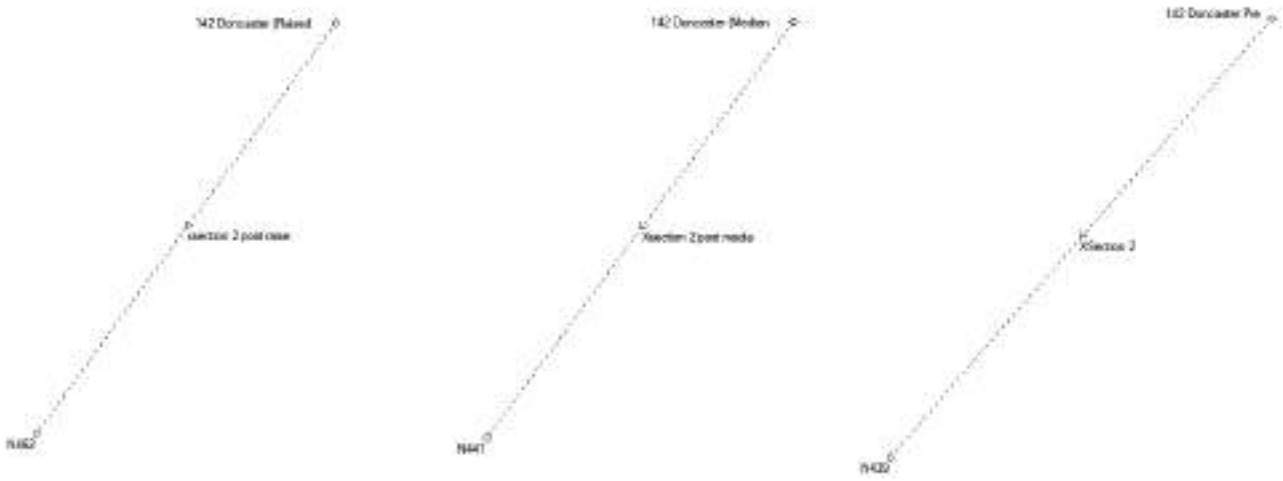


**Figure 2 Pre and Post DRAINS Scenarios for Three Cross Sections (2017)**

# 3.0 FLOOD INFORMATION

## 3.1 Flood Behaviour

The Randwick Cycleways development will be impacted by flooding. This report focuses on the impact of the 100-year ARI flood event. As part of the flood risk assessment, it was determined that the impact of the proposed cycleway should be modelled using 1d cross sections to ascertain possible impacts on adjacent properties. This included for both median island separated cycleway and the flush cycleway scenario.

Calibration between the Council TUFLOW model outputs and ACOR's proposed flood scenarios for the three cross sections was undertaken. Flow rates traversing the cross sections as well as depths of flows from the DRAINs modelling gave similar results to Councils model.


**Figure 3 Cross Section for pre development scenario**

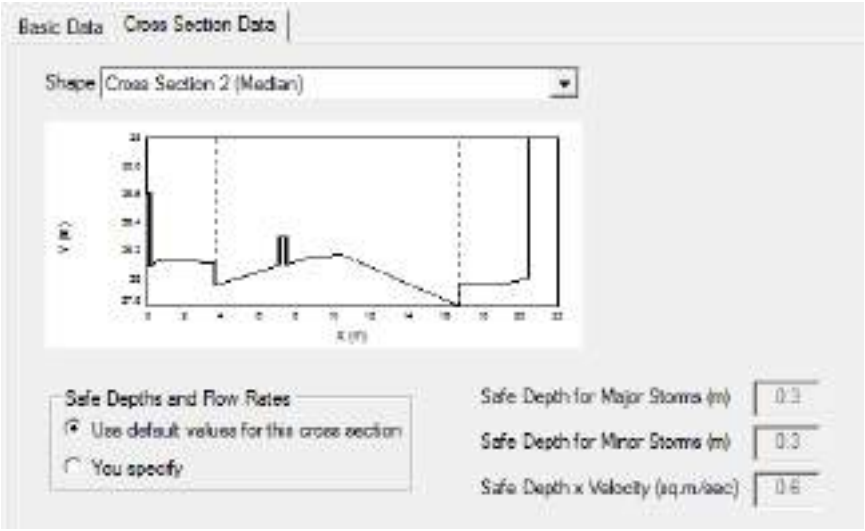



**Figure 4A Cross Section for post development median separated cycleway scenario**

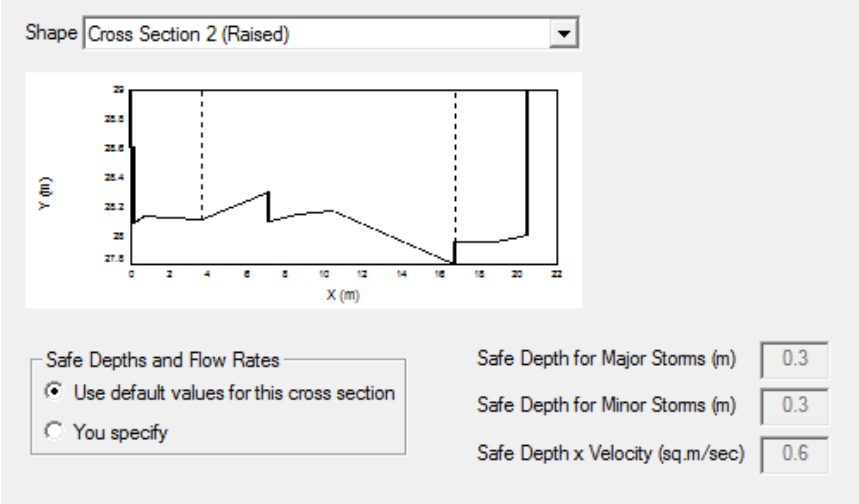



**Figure 4B Cross Section for post development flush cycleway scenario**

### 3.2 Flood Results and Impacts of New Median and Raised Cycleway

100-year ARI flood depths and levels have been calculated using DRAINS with the following comparisons being made between DRAINS and TUFLOW:

| Cross Section | Flow Rate from Council (m3/s) | Depth Increase from addition of Median (mm) | Depth Increase from Addition of Raised Cycleway |
|---|---|---|---|
| 28-30 Doncaster Road | 29.10 | 8.78 | 40.42 |
| 102 Doncaster Road | 15.7 | 8.64 | 30.1 |
| 142 Doncaster Road | 3.8 | 0.59 | 29.9 |

The results from the DRAINS modelling, provided similar depths of flows between both DRAINS and TUFLOW.

The impact of the median separated cycleway on the post development model showed an increase in depths of between 0.5 mm and 8.8 mm for the 100-year ARI events. These increases are considered minor and less than the anticipated level of accuracy (modelling tolerance) for flood modelling.

The increase in depth for the addition of a flush cycleway option (raised) with increases of 30 mm to 40 mm is considered significant. These increases have an observable impact on properties that are at or close to property inundation. Care should be taken when determining the final design of the cycleway if the option of flush cycleway construction is considered, especially at locations where existing flood levels are approaching current floor levels of adjacent properties.

### 3.2 Additional Investigation

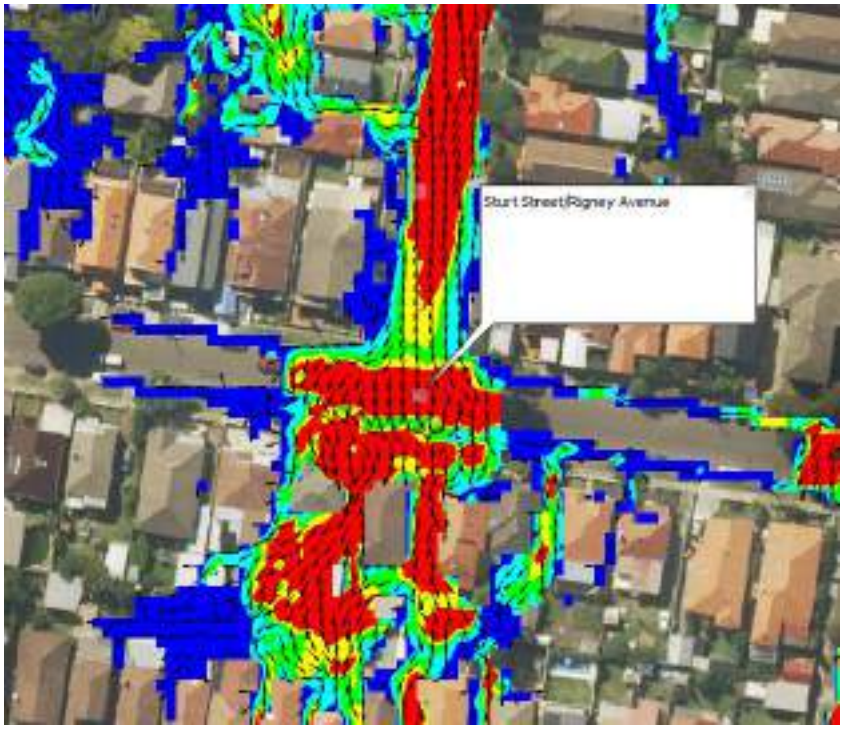
After the 6 March meeting with Council, several additional locations were outlined as flood levels being hazardous to properties. The locations were in parts of Houston Ave, Sturt Street/Rigney Avenue intersection and Bundock Street however for these scenarios it was noted that DRAINS modelling was considered a limiting factor as it would not accurately portray the two locations due to flow constraints.

The below image displays the 100-year flood velocity at 121 Houston Ave where the area in question has very low velocities varying between 0.1 – 0.2 m/s. The impact of cross sectional changes as a result of cycleway construction will be minimal due to these low velocities.

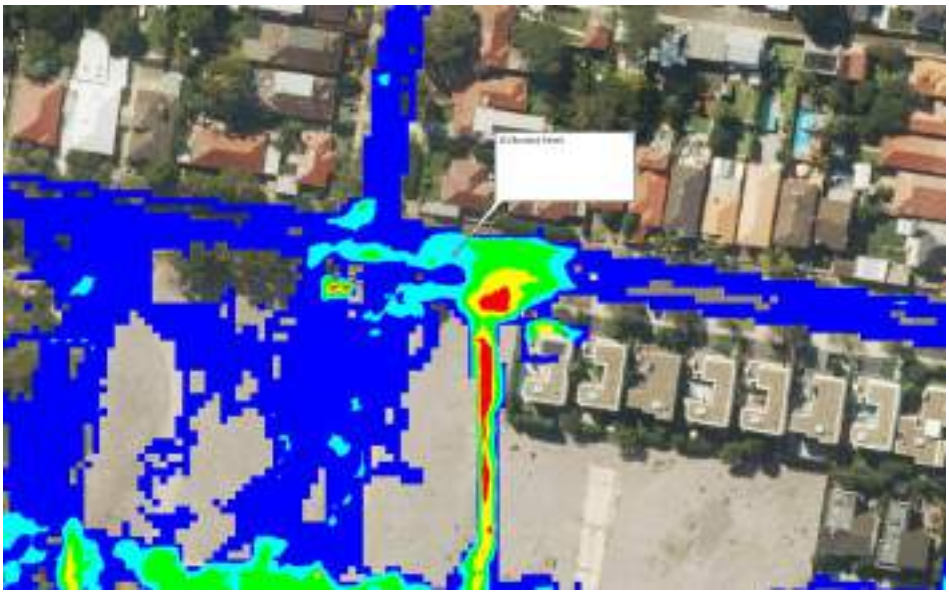
However, as the length of the flood affected area is a 246m stretch, installation of the median strip cycleway option over this length would result in a loss of flood storage of 19.68 m3 but result in negligible impact to existing flood conditions.

The installation of a flush cycleway option could take significantly more flood storage from this area, up to 90 m3. This loss of flood storage may have an impact on flood heights, and we need to further investigate/analyse this and the potential impact on flood levels.

The Sturt Street/Rigney Avenue Location below where flows are perpendicular to Sturt Street and breach the kerbs between houses is too complex to model via DRAINS. It is recommended that it is modelled in HECRAS to show the change in flood allowable area as the flows traverse from Rigney Avenue to Sturt Street. The 10-year storm velocity flood map below shows the flows traversing Sturt Street via Rigney Avenue. Further results will be determined upon additional investigation and modelling. Recommendations have been based on information available at the time of this report.



At 101 Bundock Street the existing, median scenario and raised scenario were all run, however the nature of the way the flows are contained (free flowing to the south with no fences included in the model) does not lend itself to being modelled in DRAINS, and we need to further investigate this area. Further investigation of the specific trouble spots will be undertaken using HECRAS modelling software as this software is more suitable to the detail required at these sections.



## 4.0 Summary

Based upon the modelling completed for the three critical cross sections along Doncaster Avenue, and the flooding hot spots identified by Council, the introduction of a raised median to separate cyclists from vehicles will typically increase flood levels by less than 10mm. Where the option of a flush cycleway was modelled, it was observed that up to 40mm increase in flood levels could occur in rainfall events up to the 100-year ARI event. Several discrete locations still need to be checked where local geometry or slow ponding water was observed to determine the impact on flooding.

Based on these findings, it is recommended that at locations where flood levels approach property inundation levels, the use of raised or flush cycleways are not utilised, or more thoroughly investigated.

We trust the above provides a preliminary assessment of flood impact of the Randwick Cycleways development in regard to the implementation of a median strip or flush cycleway along the existing roadway.

# Appendix E

Randwick Cycleways Centennial Park to Kingsford Intersection Analysis – GTA Consultants

GTAconsultants

# Randwick Cycleways
# Centennial Park to Kingsford
# Intersection Analysis

**Client //** Group GSA
**Office //** NSW
**Reference //** N138320
**Date //** 10/05/18

# Randwick Cycleways

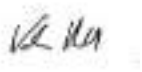
# Centennial Park to Kingsford

# Intersection Analysis

Issue: C 10/05/18

Client: Group GSA
Reference: N138320
GTA Consultants Office: NSW

**Quality Record**

| Issue | Date | Description | Prepared By | Checked By | Approved By | Signed |
|---|---|---|---|---|---|---|
| A | 23/03/18 | Final | Okka Maw/ John Duong | Volker Buhl | Volker Buhl | Volker Buhl |
| B | 09/05/18 | Final – amended for client comments | Okka Maw/ John Duong | Volker Buhl | Volker Buhl | Volker Buhl |
| C | 10/05/18 | Final – minor amendments for client comments | Okka Maw/ John Duong | Volker Buhl | Volker Buhl |  |





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# Table of Contents



**Appendices**



**Tables**

# 1. Introduction



The introduction of Sydney Light Rail will greatly improve the connectivity of Randwick and Kingsford to wider Sydney. The provision of a well-designed and safe cycleway will further reduce dependency on personal vehicles in the area and serve to relieve congestion on roads and enhance the street spaces of the area.

A cycleway between Centennial Park and Kingsford has been identified by Road and Maritime Services (RMS) as a priority connection. Construction of the cycleway is based on RMS funding.

GTA Consultants (GTA) consulted Transport for NSW for an AIMSUN model for the operational phase of Sydney Light Rail in 2021. Using the AIMSUN model provided, GTA Consultants extracted the intersection layouts, volumes and intersection phasing for further analysis using SIDRA INTERSECTION, a computer based modelling package which calculates intersection performance.

GTA noted the volumes extracted from the AIMSUN model were significantly lower than the intersection survey counts completed in 2016 for the same intersections. GTA have performed additional SIDRA analysis using the survey volumes as a conservative approach formulate an appropriate solution.

# 2. Intersection Analysis



## 2.1 Approach

The commonly used measure of intersection performance, as defined by the RMS, is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 1 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

**Table 1: SIDRA INTERSECTION Level of Service Criteria**

| Level of Service (LOS) | Average Delay per vehicle (secs/ veh) | Traffic Signals, Roundabout | Give Way & Stop Sign |
|---|---|---|---|
| A | Less than 14 | Good operation | Good operation |
| B | 15 to 28 | Good with acceptable delays and spare capacity | Acceptable delays and spare capacity |
| C | 29 to 42 | Satisfactory | Satisfactory, but accident study required |
| D | 43 to 56 | Near capacity | Near capacity, accident study required |
| E | 57 to 70 | At capacity, at signals incidents will cause excessive delays | At capacity, requires other control mode |
| F | Greater than 70 | Extra capacity required | Extreme delay, major treatment required |

## 2.2 Analysis based on Sydney Light Rail AIMSUN Volumes

Table 2 presents a summary of the operating conditions of the intersections in 2021 based on the volumes from the Sydney Light Rail AIMSUN model with Sydney Light Rail operational. The intersection layouts can be found in Attachment 1 and the full results of intersection analysis can be found in Attachment 2.

**Table 2: Intersection Operating Conditions without Proposed Cycleway (Existing Conditions) using AIMSUN volumes**

| Intersection | Intersection Type | Peak | Degree of Saturation (DOS) | Average Delay (sec)[1] | 95th Percentile Queue (m) | Level of Service (LOS) |
|---|---|---|---|---|---|---|
| Alison Road/ Doncaster Avenue | Signalised | AM | 0.57 | 18 | 141 | B |
| | | PM | 0.54 | 19 | 117 | B |
| Doncaster Avenue/ Ascot Avenue | Roundabout | AM | 0.47 | 10 | 29 | A |
| | | PM | 0.35 | 10 | 3 | A |
| Doncaster Avenue/ Todman Avenue | Signalised | AM | 0.41 | 20 | 62 | B |
| | | PM | 0.31 | 18 | 52 | B |
| Doncaster Avenue/ Anzac Parade | Signalised | AM | 0.67 | 22 | 147 | B |
| | | PM | 0.59 | 17 | 136 | B |
| Doncaster Avenue/ Day Avenue | Roundabout | AM | 0.10 | 6 | 4 | A |
| | | PM | 0.13 | 5 | 5 | A |
| Houston Road/ Barker Street | Roundabout | AM | 0.49 | 8 | 25 | A |
| | | PM | 0.24 | 6 | 10 | A |
| Houston Road/ Borrodale Road | Roundabout | AM | 0.19 | 5 | 7 | A |
| | | PM | 0.10 | 5 | 4 | A |
| Houston Road/ Gardeners Road/ General Bridges Crescent | Signalised | AM | 0.39 | 17 | 81 | B |
| | | PM | 0.33 | 10 | 58 | A |
| Bunnerong Road/ Sturt Street/ General Bridges Crescent | Priority – Give Way | AM | N/A | N/A | N/A | N/A |
| | | PM | N/A | N/A | N/A | N/A |

[1] delay and level of service reported for worst movement for unsignalized intersections

Table 3 presents a summary of the operating conditions of the intersections in 2021 based on the volumes from the Sydney Light Rail AIMSUN model with Sydney Light Rail operational and the proposed cycleway installed. The intersection layouts and phasing can be found in Attachment 3 and the full results of intersection analysis can be found in Attachment 4.

**Table 3: Intersection Operating Conditions with Proposed Cycleway using AIMSUN volumes**

| Intersection | Intersection Type | Peak | Degree of Saturation (DOS) | Average Delay (sec)[1] | 95th Percentile Queue (m) | Level of Service (LOS) |
|---|---|---|---|---|---|---|
| Alison Road/ Doncaster Avenue | Signalised | AM | 0.60 | 20 | 147 | B |
| | | PM | 0.57 | 21 | 124 | B |
| Doncaster Avenue/ Ascot Avenue | Signalised | AM | 0.54 | 8 | 83 | A |
| | | PM | 0.38 | 7 | 64 | A |
| Doncaster Avenue/ Todman Avenue | Signalised | AM | 0.44 | 20 | 61 | B |
| | | PM | 0.31 | 18 | 56 | B |
| Doncaster Avenue/ Anzac Parade | Signalised | AM | 0.69 | 22 | 152 | B |
| | | PM | 0.68 | 20 | 154 | B |
| Doncaster Avenue/ Day Avenue | Priority – Give Way | AM | 0.10 | 6 | 3 | A |
| | | PM | 0.01 | 5 | 3 | A |
| Houston Road/ Barker Street | Priority – Give Way | AM | 0.60 | 11 | 40 | A |
| | | PM | 0.24 | 7 | 6 | A |
| Houston Road/ Borrodale Road | Priority – Give Way | AM | 0.35 | 6 | 12 | A |
| | | PM | 0.27 | 5 | 9 | A |
| Houston Road/ Gardeners Road/ General Bridges Crescent | Signalised | AM | 0.39 | 16 | 81 | B |
| | | PM | 0.32 | 17 | 64 | B |
| Bunnerong Road/ Sturt Street/ General Bridges Crescent | Signalised | AM | 0.48 | 10 | 42 | A |
| | | PM | 0.25 | 8 | 28 | A |

[1] delay and level of service reported for worst movement for unsignalized intersections

The SIDRA analysis of the intersection with and without the proposed cycleway shows a minor impact of the cycleway on the intersection performances. However, the proposed cycleway does not worsen the operational Level of Service of any of the intersections and all intersections continue to operate on a satisfactory Level of Service A or B.

The preferred option for three intersections includes a conversion from roundabout to a priority-controlled intersection. This would provide a better and safer outcome for cyclists. The results of the intersection analysis demonstrate that the conversion is feasible and that the intersections would operate at a satisfactory level of service (LoS A). The SIDRA analysis for these intersections are shown in Attachment 5.

## 2.3 Analysis based on Intersection Survey Count Volumes

The AIMSUN model shows some significant reductions in traffic volumes along Doncaster Avenue and Houston Road in 2021 as a result of the introduction of light rail. A sensitivity test was carried out in order assess the intersection operation if traffic volumes stayed at today's levels.

Table 4 presents a summary of the operating conditions of the intersections in 2021 based on the volumes from intersection survey counts with Sydney Light Rail operational. The full results of intersection analysis can be found in Attachment 6. The layouts are shown in Attachment 1.

**Table 4: Intersection Operating Conditions without Proposed Cycleway (Existing Conditions) using 2016 Survey Volumes**

| Intersection | Intersection Type | Peak | Degree of Saturation (DOS) | Average Delay (sec)[1] | 95th Percentile Queue (m) | Level of Service (LOS) |
|---|---|---|---|---|---|---|
| Alison Road/ Doncaster Avenue | Signalised | AM | 0.80 | 22 | 244 | B |
| | | PM | 0.83 | 28 | 226 | B |
| Doncaster Avenue/ Ascot Avenue | Roundabout | AM | 0.20 | 10 | 9 | A |
| | | PM | 0.17 | 13 | 7 | B |
| Doncaster Avenue/ Todman Avenue | Signalised | AM | 0.83 | 25 | 166 | B |
| | | PM | 0.55 | 19 | 110 | B |
| Doncaster Avenue/ Anzac Parade | Signalised | AM | 0.84 | 29 | 225 | C |
| | | PM | 0.83 | 27 | 212 | B |
| Doncaster Avenue/ Day Avenue | Roundabout | AM | 0.10 | 10 | 5 | A |
| | | PM | 0.45 | 9 | 22 | A |
| Houston Road/ Barker Street | Roundabout | AM | 0.43 | 12 | 24 | A |
| | | PM | 0.36 | 8 | 15 | A |
| Houston Road/ Borrodale Road | Roundabout | AM | 0.59 | 15 | 40 | B |
| | | PM | 0.35 | 8 | 17 | A |
| Houston Road/ Gardeners Road/ General Bridges Crescent | Signalised | AM | 0.59 | 26 | 123 | B |
| | | PM | 0.78 | 28 | 185 | A |
| Bunnerong Road/ Sturt Street/ General Bridges Crescent | Priority – Give Way | AM | N/A | N/A | N/A | N/A |
| | | PM | N/A | N/A | N/A | N/A |

[1] delay and level of service reported for worst movement for unsignalized intersections

Table 5 presents a summary of the operating conditions of the intersections based on the volumes from 2016 intersection survey counts with Sydney Light Rail operational and the proposed cycleway installed. The full results of intersection analysis can be found in Attachment 7. The layouts and phasing are as they appear in Attachment 3.

Table 5 shows that all intersections can operate at a satisfactory level of service at all times with the traffic volumes observed in 2016.

**Table 5: Intersection Operating Conditions with Proposed Cycleway using 2016 Survey Volumes**

| Intersection | Intersection Type | Peak | Degree of Saturation (DOS) | Average Delay (sec)[1] | 95th Percentile Queue (m) | Level of Service (LOS) |
|---|---|---|---|---|---|---|
| Alison Road/ Doncaster Avenue | Signalised | AM | 0.81 | 24 | 248 | B |
| | | PM | 0.85 | 29 | 226 | C |
| Doncaster Avenue/ Ascot Avenue | Signalised | AM | 0.58 | 9 | 87 | A |
| | | PM | 0.61 | 8 | 117 | A |
| Doncaster Avenue/ Todman Avenue | Signalised | AM | 0.85 | 25 | 166 | B |
| | | PM | 0.61 | 19 | 109 | B |
| Doncaster Avenue/ Anzac Parade | Signalised | AM | 0.87 | 37 | 282 | C |
| | | PM | 0.90 | 36 | 265 | C |
| Doncaster Avenue/ Day Avenue | Priority – Give Way | AM | 0.35 | 6 | 12 | A |
| | | PM | 0.27 | 5 | 9 | A |
| Houston Road/ Barker Street | Priority – Give Way | AM | 1.10 | 146 | 259 | F |
| | | PM | 0.64 | 17 | 30 | B |
| Houston Road/ Borrodale Road | Priority – Give Way | AM | 1.08 | 139 | 213 | F |
| | | PM | 0.52 | 15 | 26 | C |
| Houston Road/ Gardeners Road/ General Bridges Crescent | Signalised | AM | 0.64 | 27 | 124 | B |
| | | PM | 0.78 | 28 | 185 | B |
| Bunnerong Road/ Sturt Street/ General Bridges Crescent | Signalised | AM | 0.40 | 7 | 50 | A |
| | | PM | 0.43 | 7 | 55 | A |

[1] delay and level of service reported for worst movement for unsignalized intersections

The intersections of Doncaster Avenue/ Day Avenue, Houston Road/ Barker Street and Houston Road/ Borrodale Road are proposed as priority give-way intersections instead of roundabouts in the proposed cycleway configuration. The SIDRA analysis using 2016 survey counts shows the intersections of Houston Road/ Barker Street and Houston Road/ Borrodale Road operating at unsatisfactory levels of service (LOS F).

Additionally, a signalised cyclist and pedestrian crossing is proposed at the location of Bunnerong Road/ Sturt Street/ General Bridges Crescent is proposed with pedestrian crossings on the east, west and south approaches. The intersection analysis shows a satisfactory level of service for these crossings.

The difference of the operation shown in Table 4 and Table 5 is due to traffic volumes on Houston Road modelled by the AIMSUN model and observed during the 2016 traffic surveys. The AIMSUN model forecasts a significant reduction of volumes along Houston Road which would enable the intersections to run at a satisfactory Level of Service as a priority-controlled intersection. Based on the 2016 traffic surveys volumes, the intersections will not operate on a satisfactory Level of Service.

GTA completed a sensitivity analysis on the intersections of Houston Road/ Barker Street and Houston Road/ Borrodale Road adopting two scenarios:

- Scenario 1: traffic volumes at 50% in between the volumes from the AIMSUN model and survey counts
- Scenario 2: traffic volumes at 75% in between the volumes from the AIMSUN model and survey counts (i.e. closer to the survey volumes).

The results of the SIDRA analysed are presented in Table 6 and can be found in Attachment 7.

**Table 6: Sensitivity Analysis - Intersection Operating Conditions with Proposed Cycleway using volumes based on the AIMSUN and survey volumes**

| Intersection | Sensitivity Volume | Intersection Type | Peak | Degree of Saturation (DOS) | Average Delay (sec)[1] | 95th Percentile Queue (m) | Level of Service (LOS) |
|---|---|---|---|---|---|---|---|
| Houston Road/ Barker Street | 50% | Priority – Give Way | AM | 0.76 | 23 | 49 | B |
| | | | PM | 0.34 | 10 | 13 | A |
| | 75% | | AM | 1.14 | 163 | 290 | F |
| | | | PM | 0.57 | 15 | 23 | A |
| Houston Road/ Borrodale Road | 50% | Priority – Give Way | AM | 0.58 | 13 | 30 | A |
| | | | PM | 0.32 | 8 | 11 | A |
| | 75% | | AM | 0.71 | 21 | 40 | B |
| | | | PM | 0.47 | 13 | 20 | A |

[1] delay and level of service reported for worst movement for unsignalized intersections

Under 50% sensitivity analysis, both the studied intersections operate on a satisfactory Level of Service A or B. However, under 75% sensitivity analysis, the Houston Road/ Barker Street intersection fails to operate at a satisfactory level of service due to the volume of traffic on Barker Street.

# 3. Conclusion



The intersections tested along the Randwick cycle route all operate at a satisfactory level of service in the current layouts and with traffic volumes based on 2016 survey data.

The proposed intersection layouts were tested with forecasted traffic volumes, based on the AIMSUN model, and all intersections operate at a satisfactory level of service.

As the traffic volumes between those surveyed in 2016 and those forecasted in the AIMSUN model differ at some intersections, all intersections were also tested in their proposed layouts using 2016 traffic volumes. The intersections Houston Road/ Barker Street and Houston Road/ Borrodale Road performed at an unsatisfactory level of service (LoS F) when tested with 2016 survey results.

Additional sensitivity tests were undertaken using traffic volumes greater than those forecasted in the AIMSUN model but lower than observed in the 2016 surveys. Those showed overall satisfactory operations at the intersection Houston Road/ Borrodale Road. The intersection Houston Road/ Barker Street operated at a satisfactory level of service in one test but at an unsatisfactory level of service in the second test.

# Appendix A



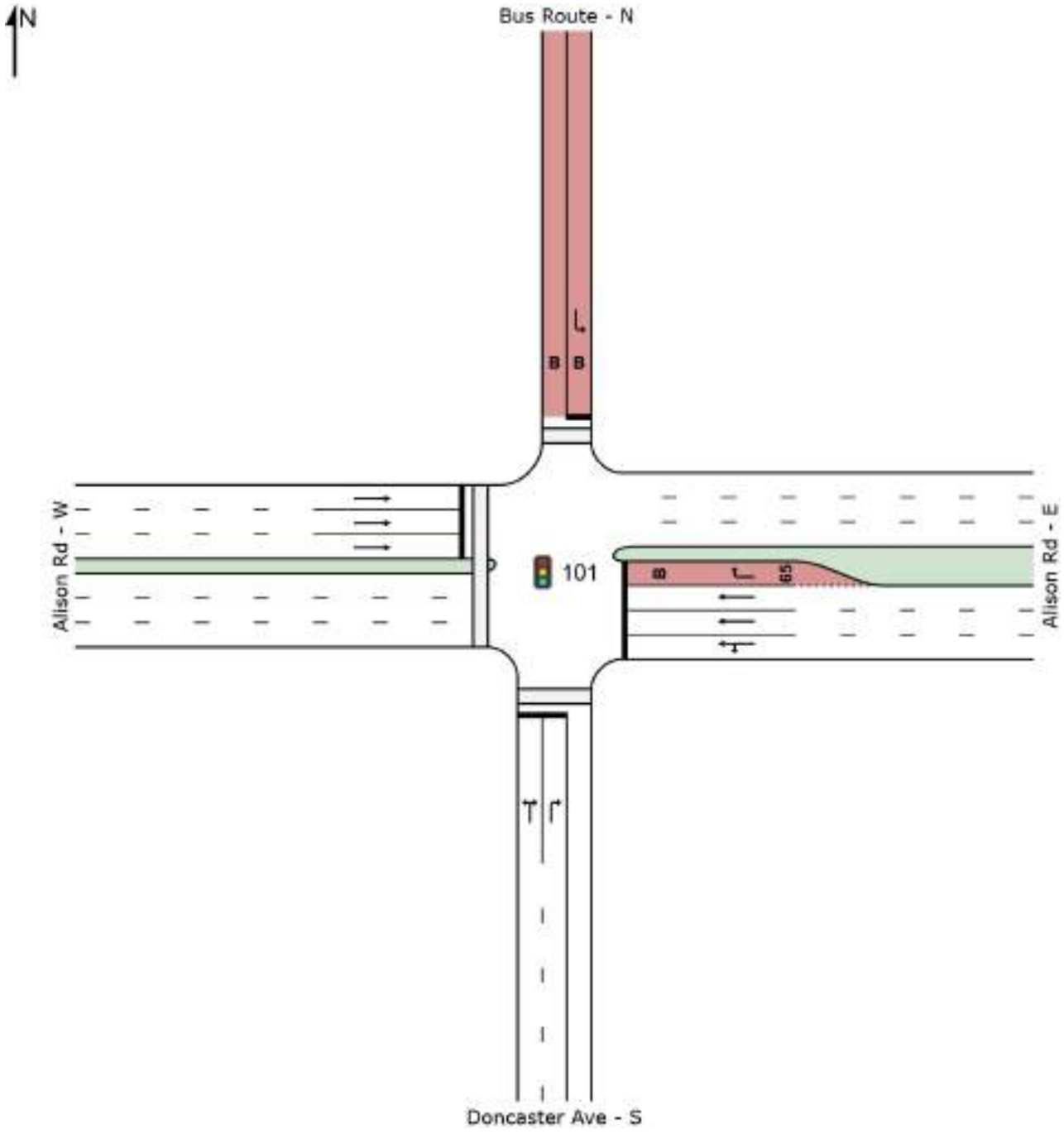
## Attachment 1 – Existing Intersection Layouts

# SITE LAYOUT

## Site: 101 [1. Alison Rd/ Doncaster Ave AM]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated

Existing layout



# PHASING SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave AM]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

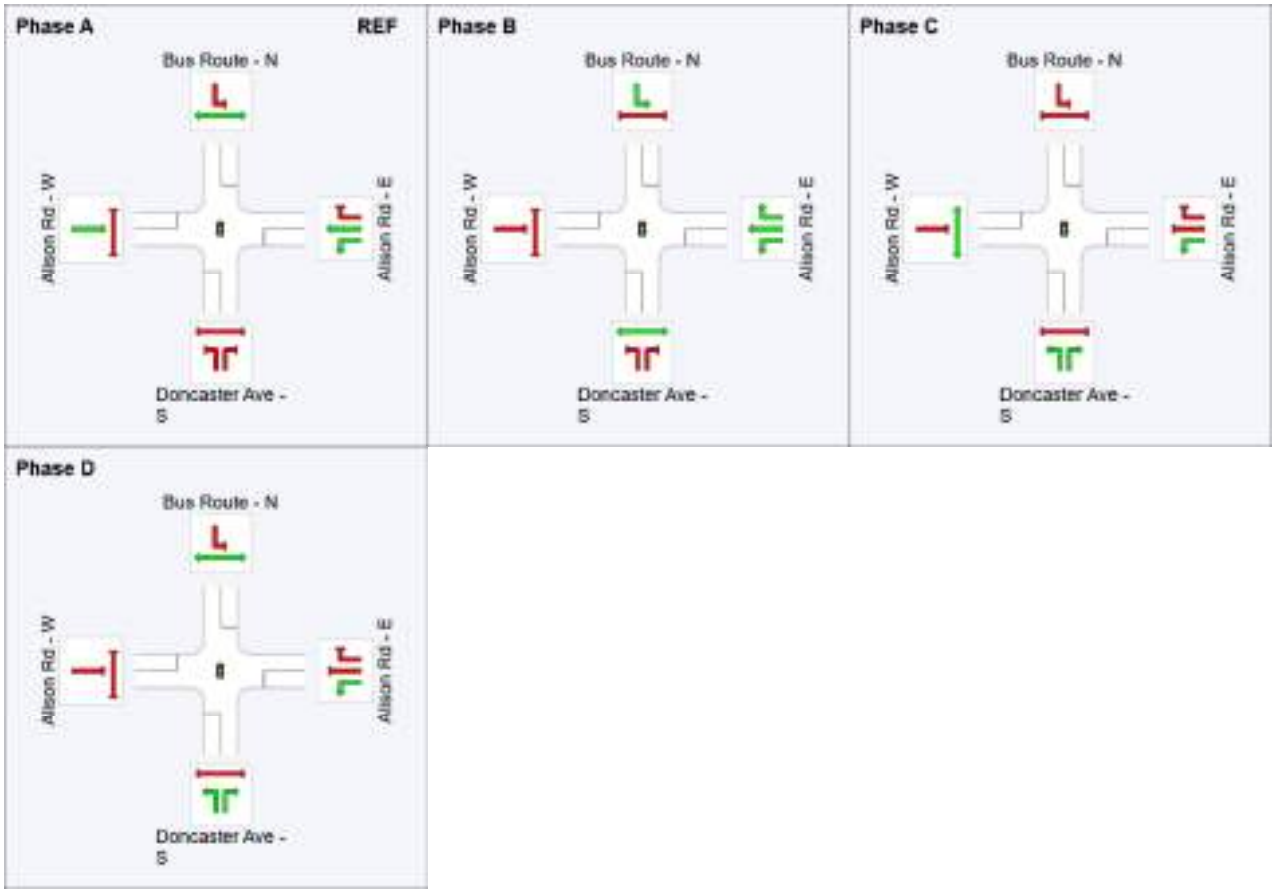
**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 0 | 57 | 72 | 104 |
| Green Time (sec) | 51 | 9 | 26 | *** |
| Phase Time (sec) | 57 | 15 | 31 | 2 |
| Phase Split | 54% | 14% | 30% | 2% |

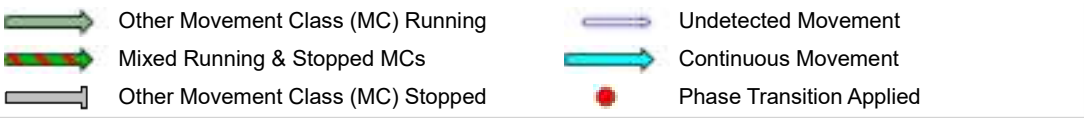
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |



# PHASING SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave PM]

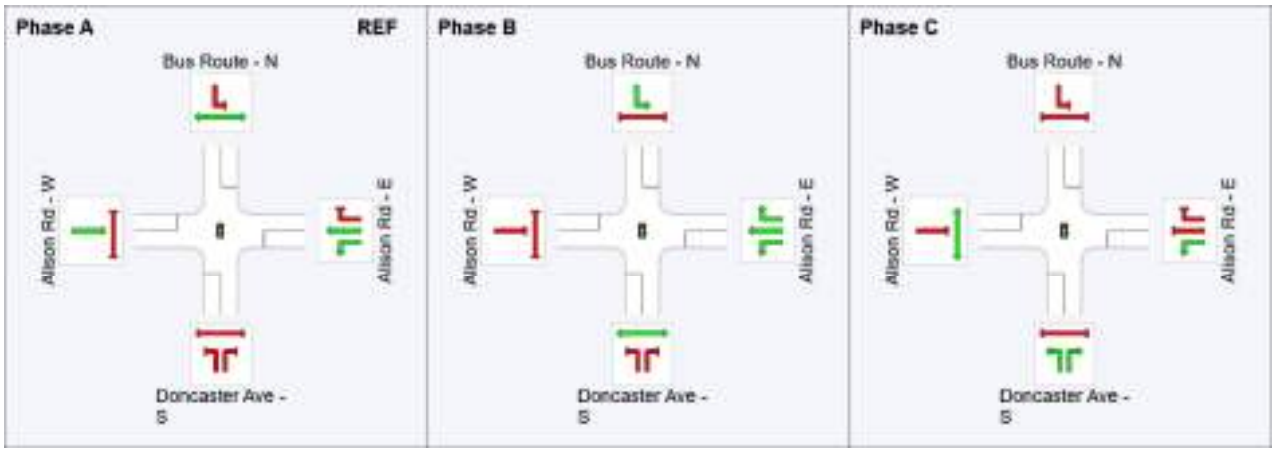
Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing (phase reduction applied)**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 0 | 53 | 68 |
| Green Time (sec) | 47 | 9 | 26 |
| Phase Time (sec) | 53 | 15 | 32 |
| Phase Split | 53% | 15% | 32% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

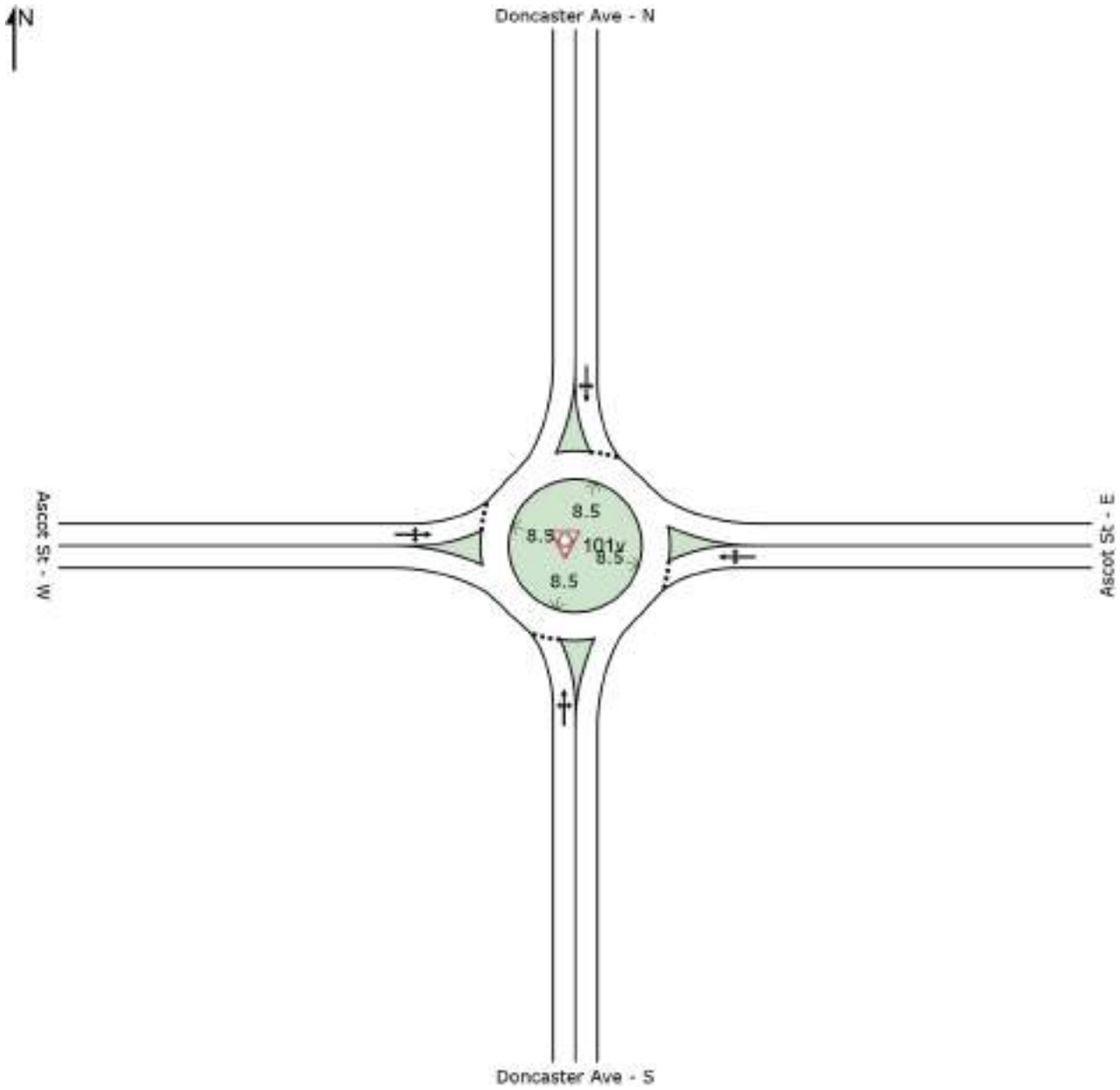
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101v [7. Doncaster Ave/ Ascot St AM]

Doncaster Avenue/ Ascot Street, Kensington
Roundabout

Existing layout

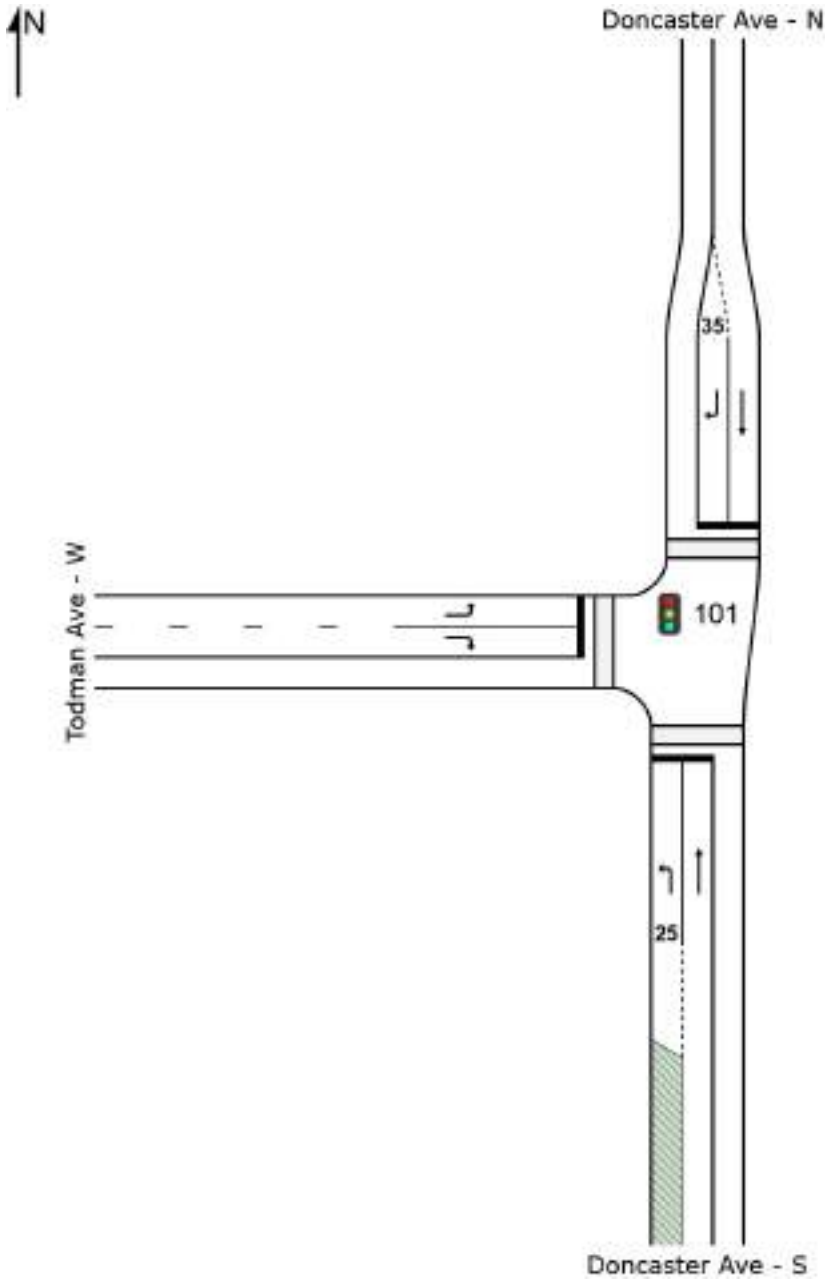


## SITE LAYOUT

### Site: 101 [2. Doncaster Ave/ Todman Ave AM]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated

Existing layout



# PHASING SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave AM]

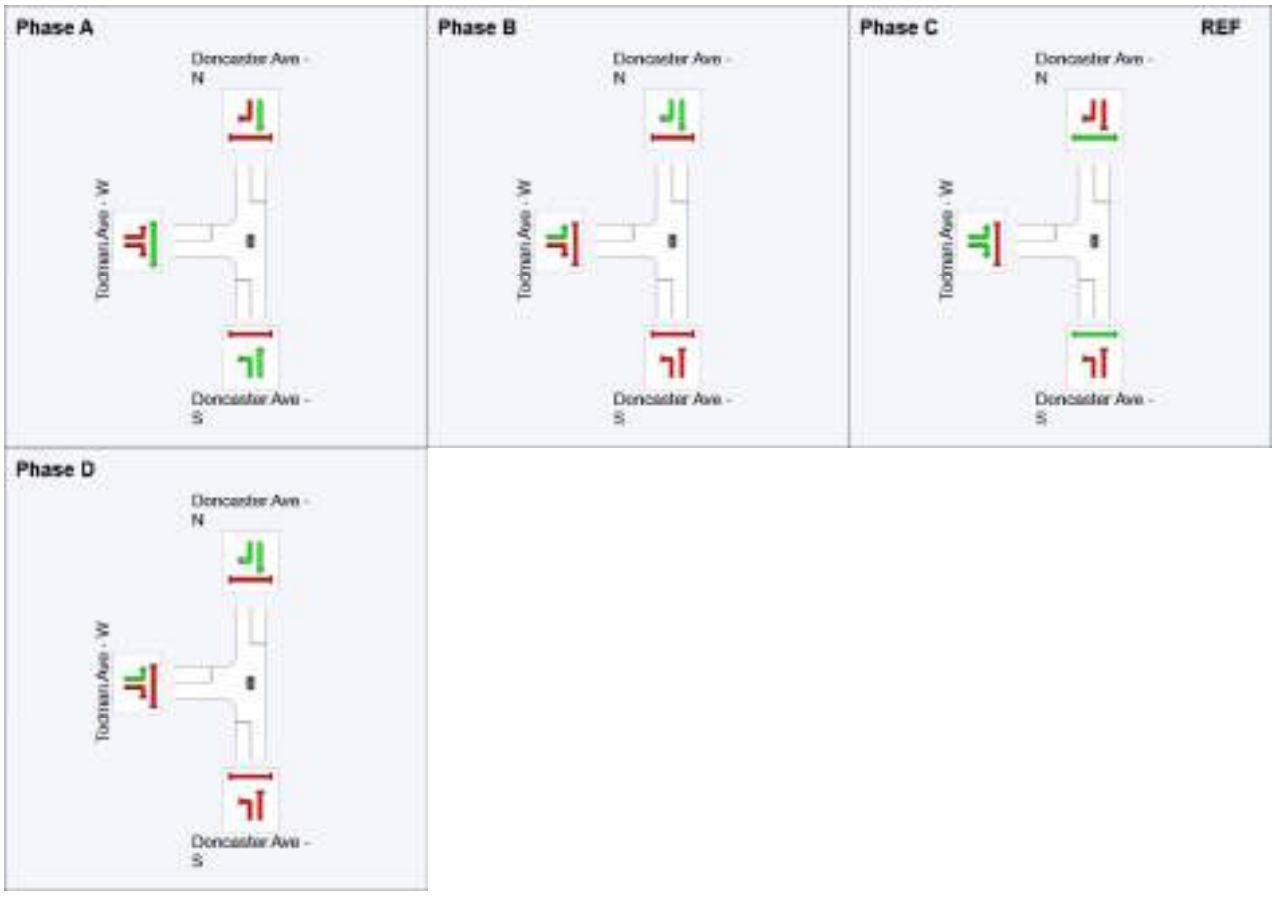
Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated  Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 33 | 69 | 0 | 15 |
| Green Time (sec) | 30 | 25 | 9 | 12 |
| Phase Time (sec) | 36 | 31 | 15 | 18 |
| Phase Split | 36% | 31% | 15% | 18% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave PM]

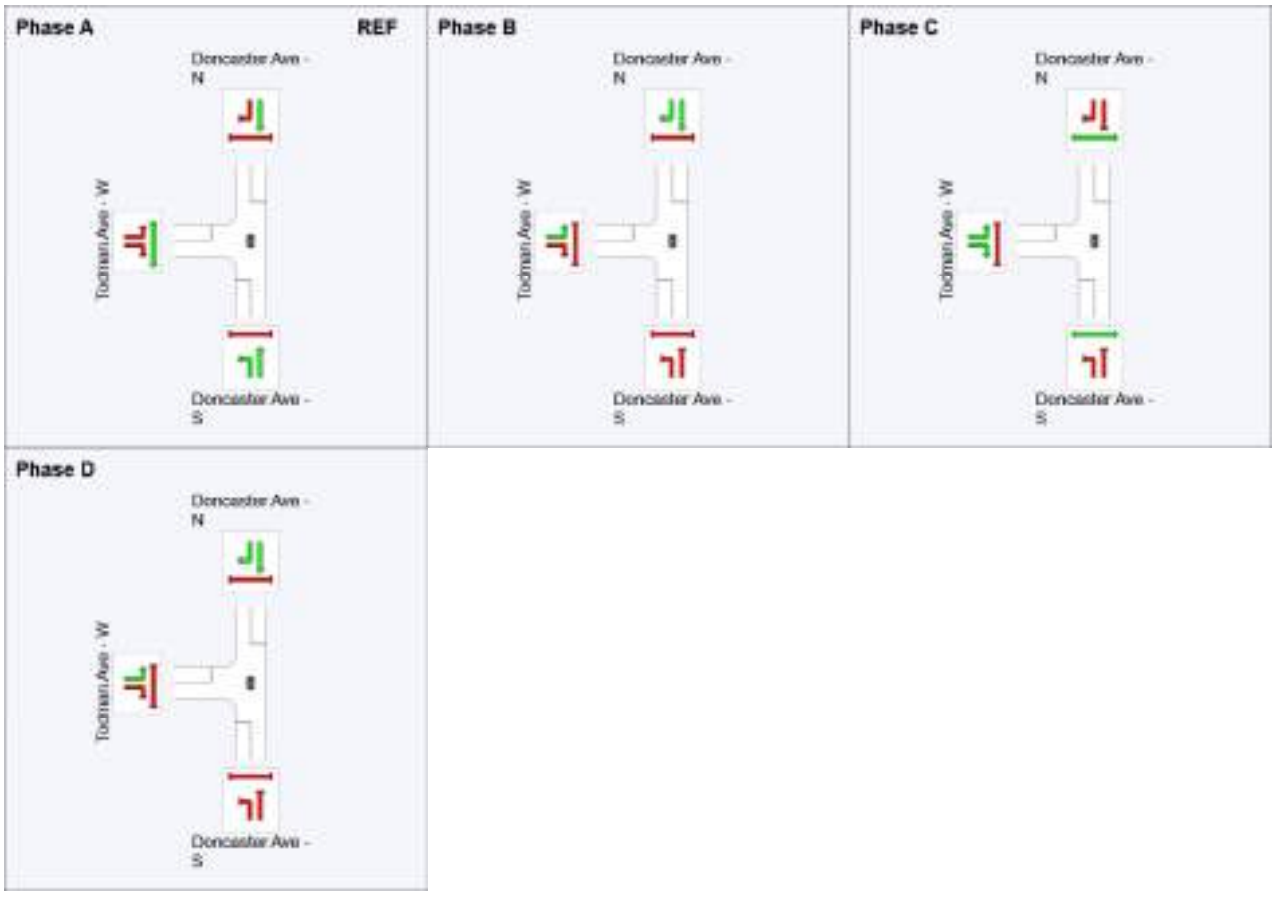
Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated  Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 0 | 28 | 58 | 72 |
| Green Time (sec) | 22 | 24 | 8 | 12 |
| Phase Time (sec) | 28 | 30 | 14 | 18 |
| Phase Split | 31% | 33% | 16% | 20% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

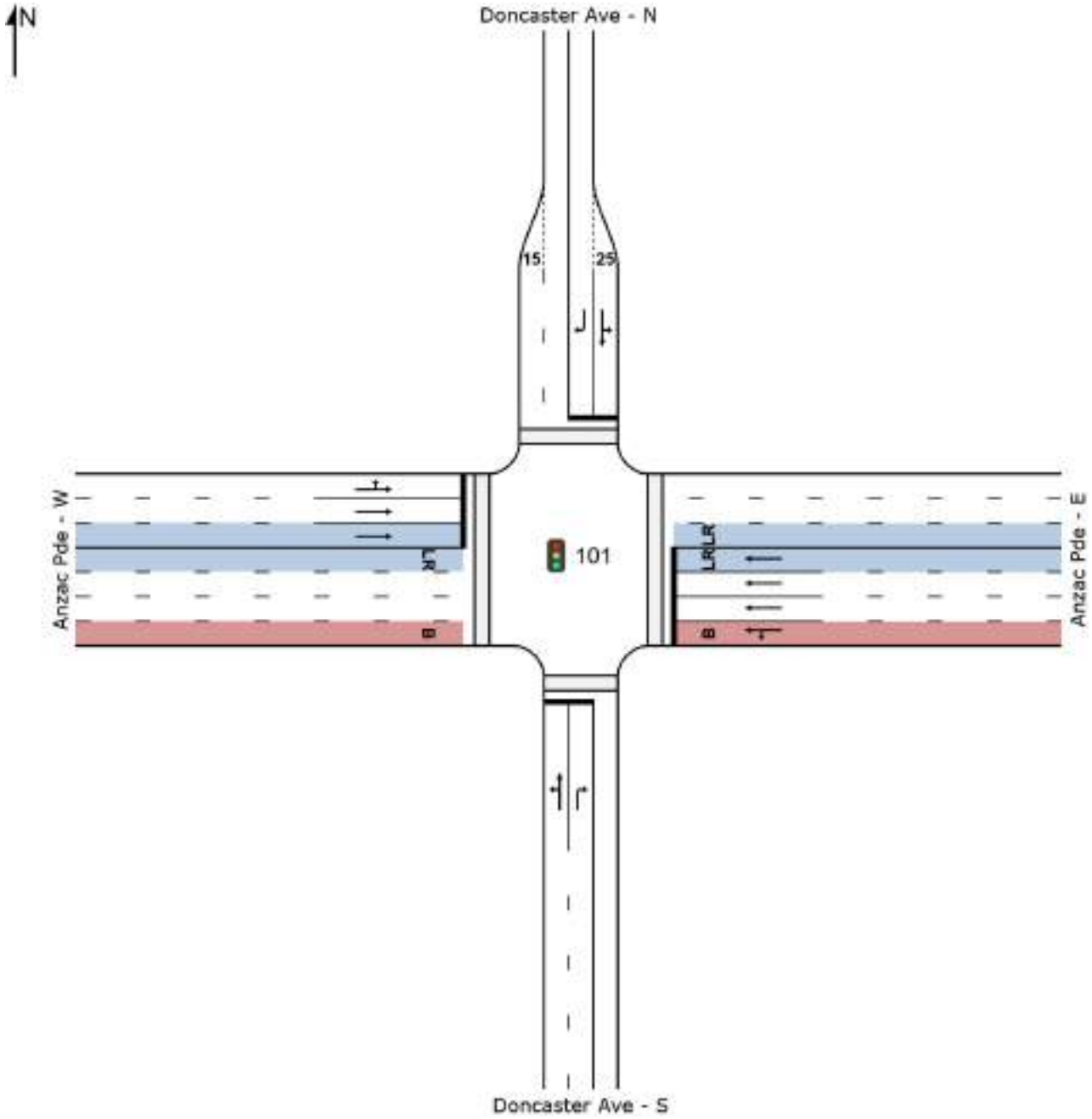
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated

Existing layout



# PHASING SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM]

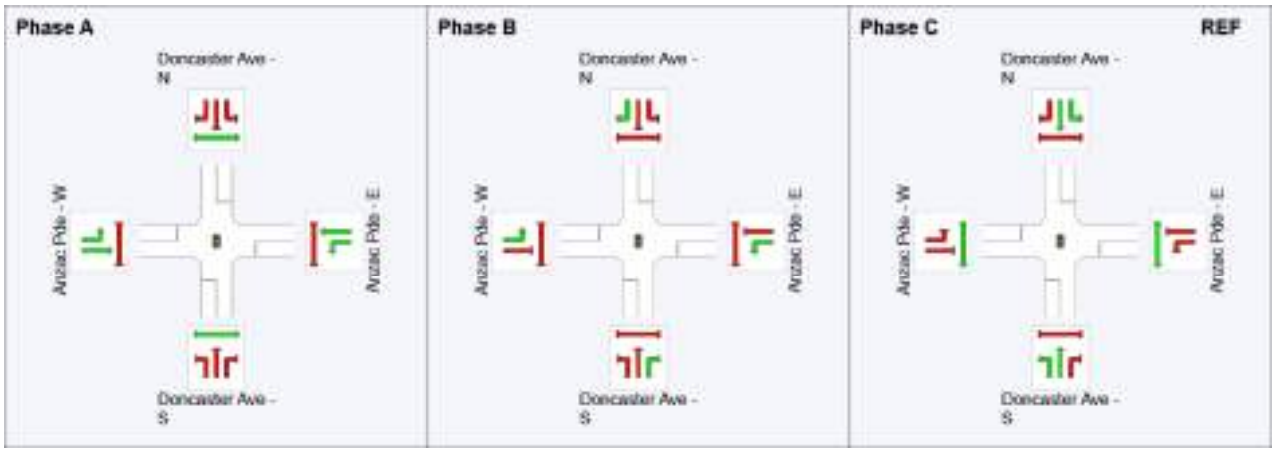
Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated  Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 23 | 73 | 0 |
| Green Time (sec) | 44 | 11 | 17 |
| Phase Time (sec) | 50 | 17 | 23 |
| Phase Split | 56% | 19% | 26% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade PM]

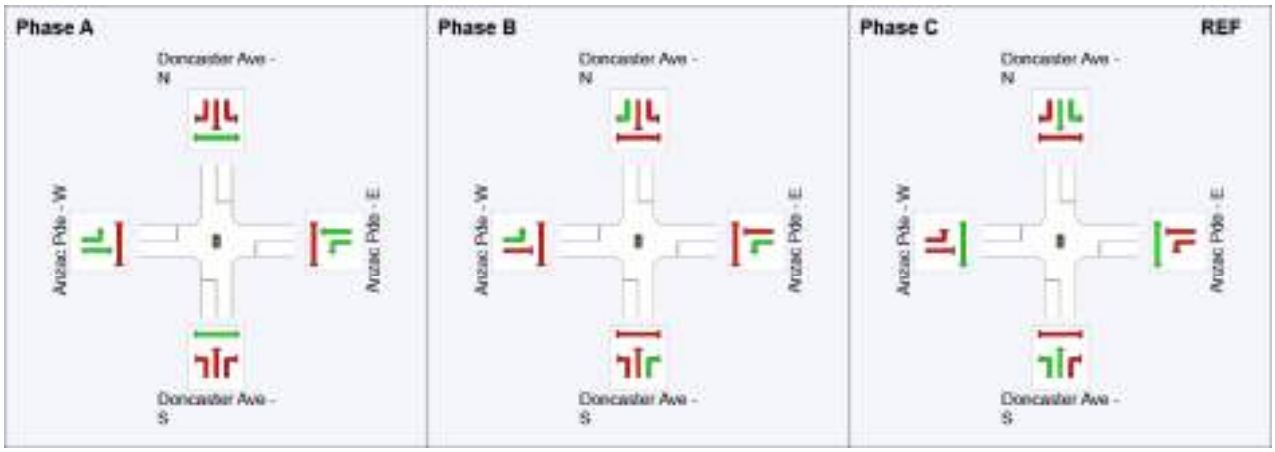
Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated  Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 22 | 83 | 0 |
| Green Time (sec) | 55 | 6 | 16 |
| Phase Time (sec) | 61 | 12 | 22 |
| Phase Split | 64% | 13% | 23% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

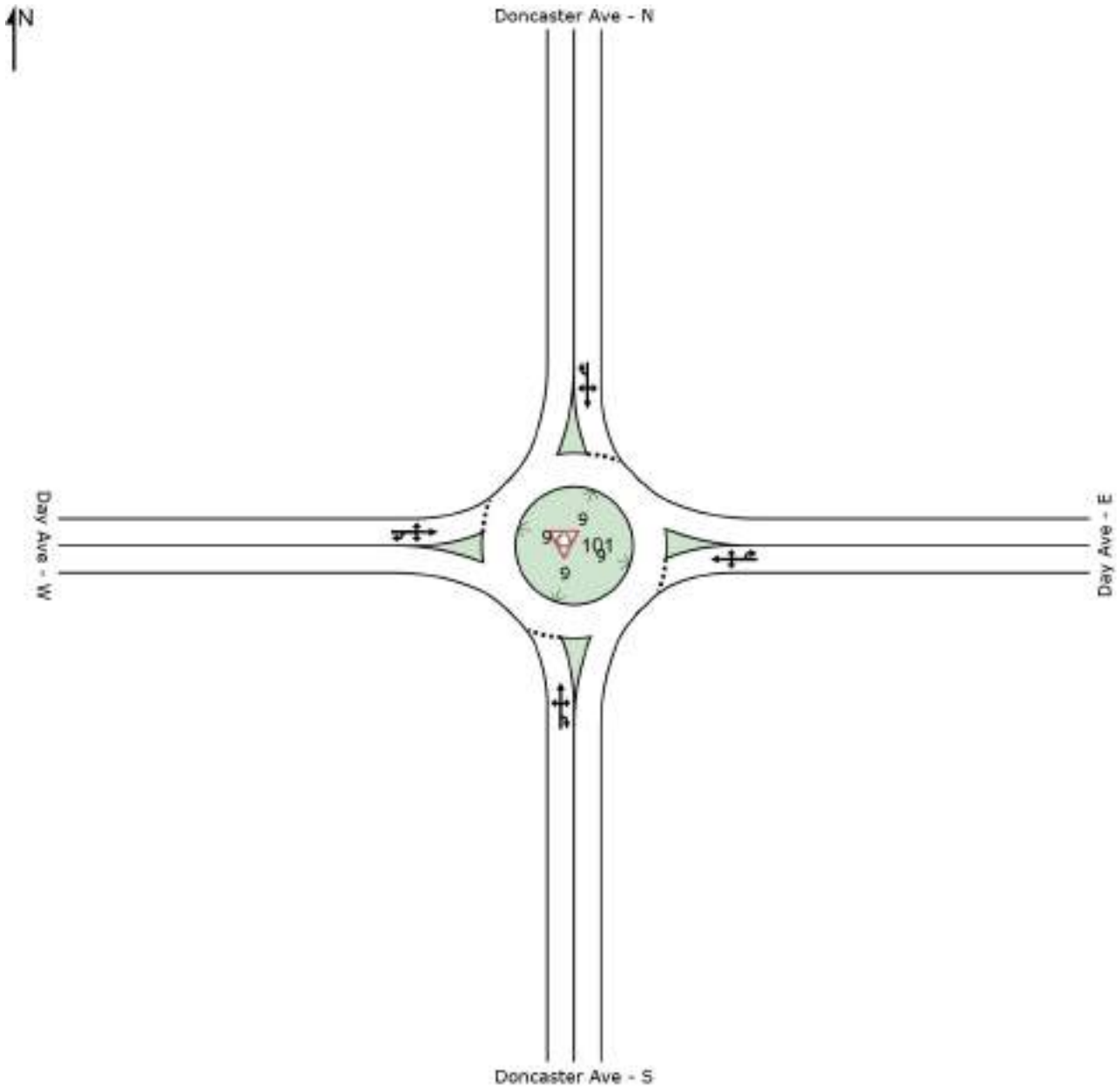
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101 [9. Doncaster Ave/ Day Ave AM]

Doncaster Avenue/ Day Avenue, Kensington
Roundabout

Existing layout



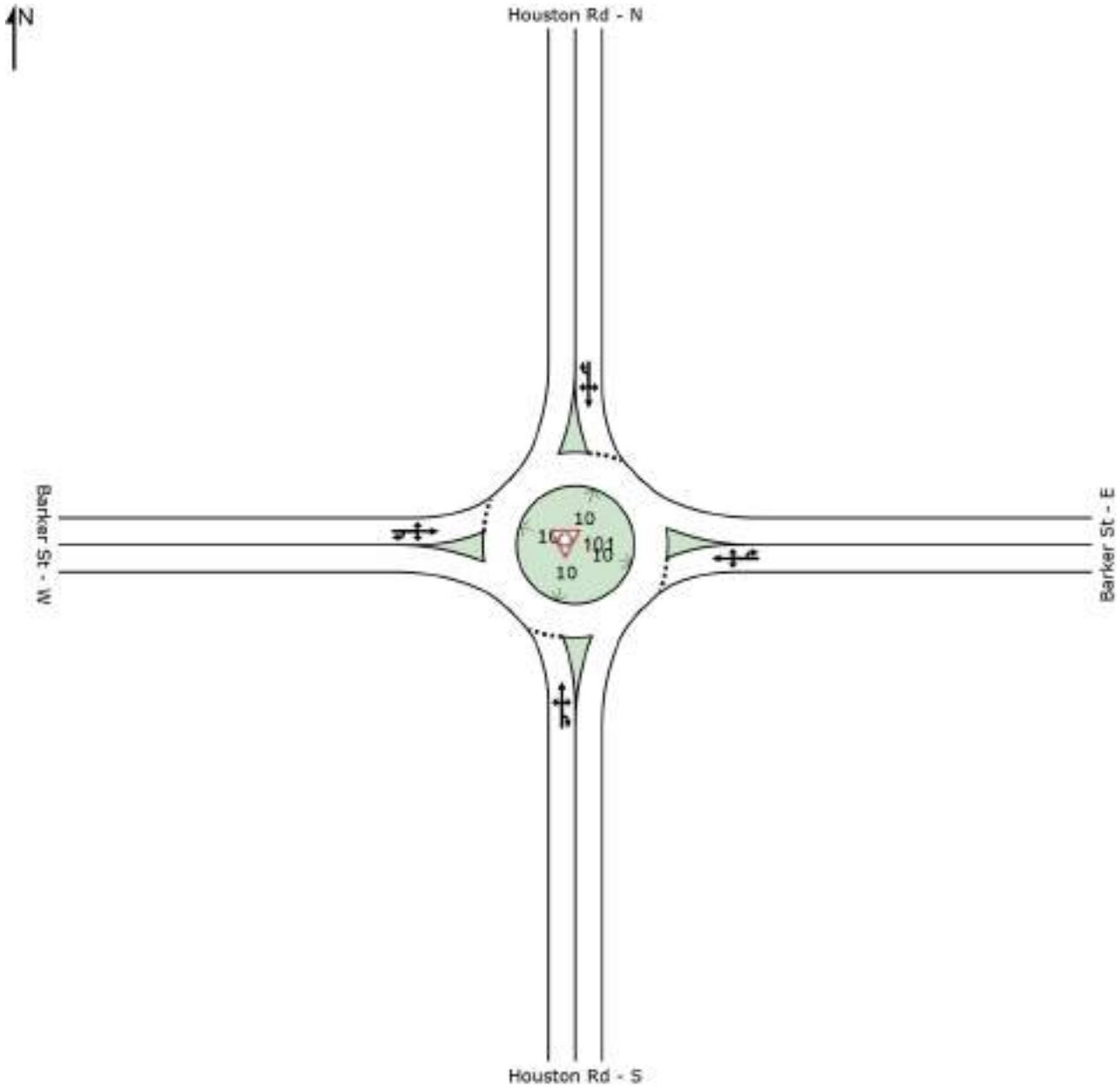
# SITE LAYOUT

## Site: 101 [4. Houston Rd/ Barker St AM]

Houston Rd/ Barker St, Kensington

Roundabout

Existing layout

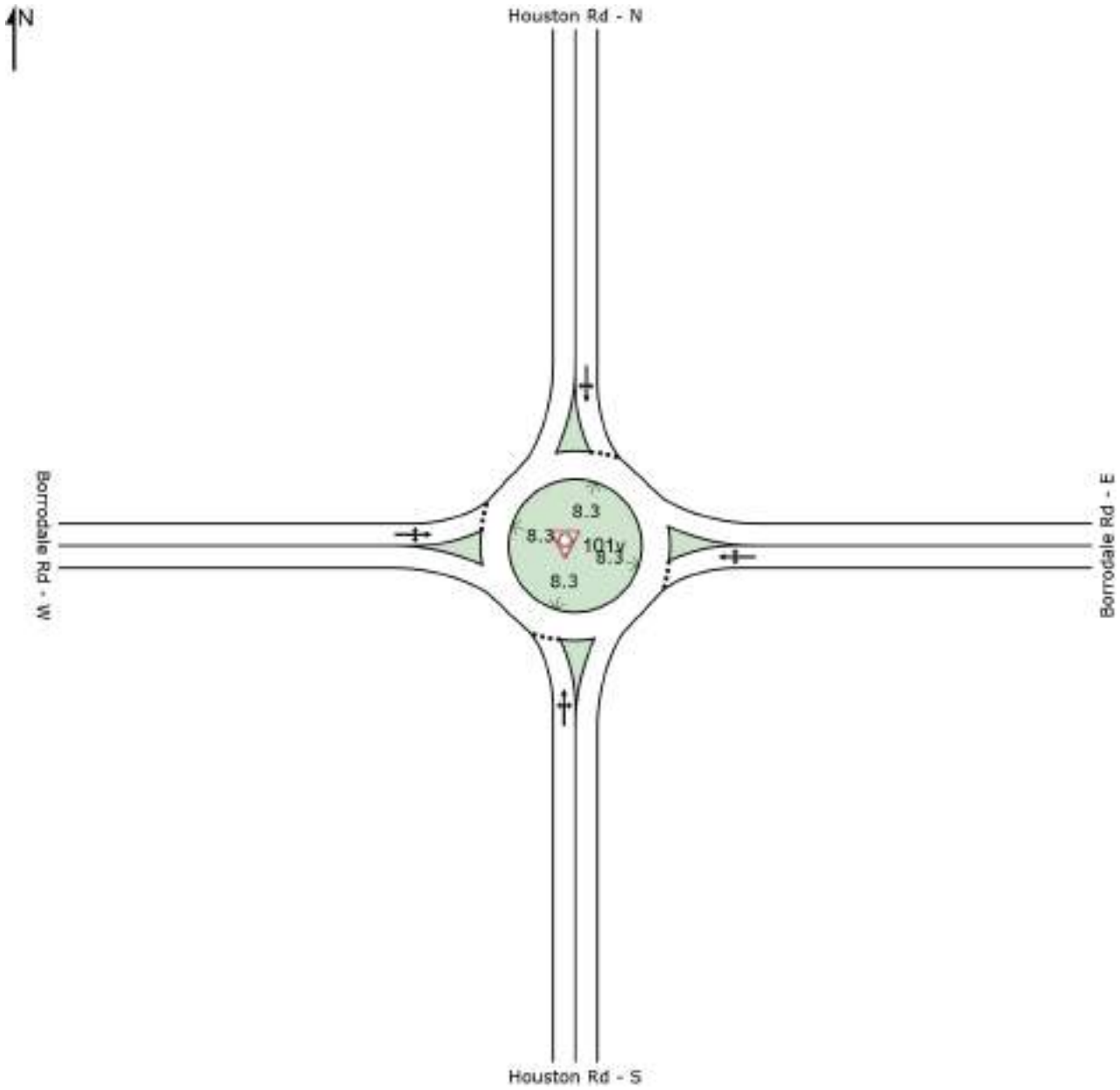


# SITE LAYOUT

## Site: 101v [8. Houston Rd/ Borrodale Rd AM]

Houston Road/ Borrodale Road, Kingsford
Roundabout

Existing layout

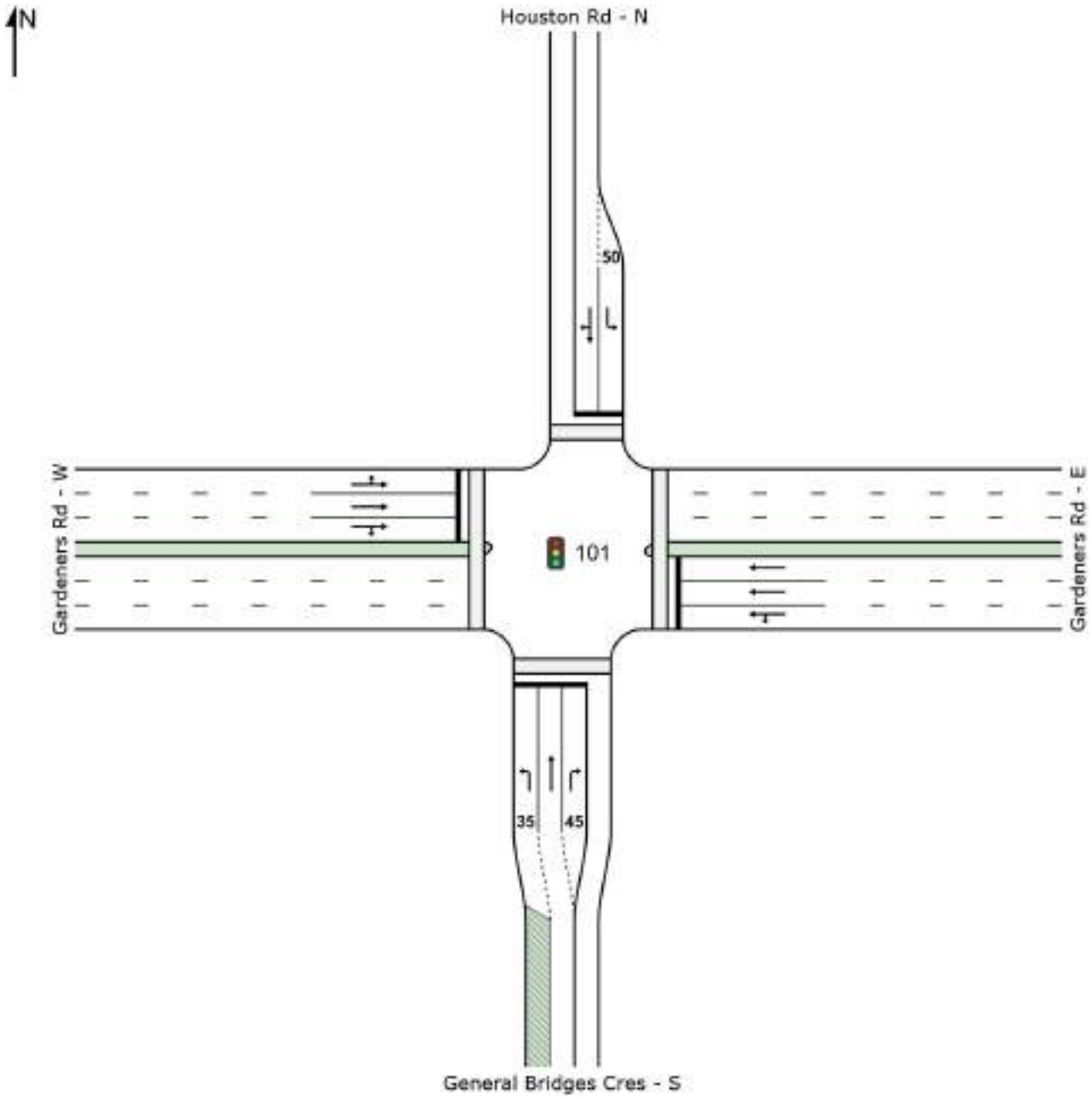


# SITE LAYOUT

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated

Existing layout



# PHASING SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM]

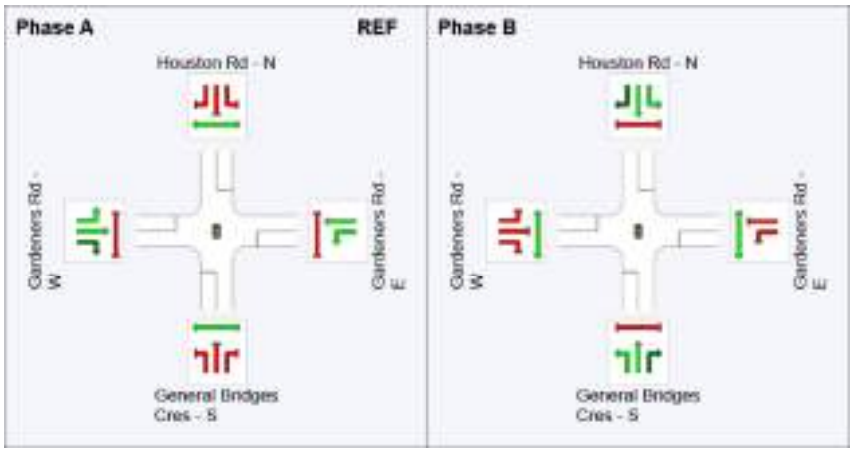
Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated  Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B**
**Output Phase Sequence: A, B**

**Phase Timing Results**

| Phase | A | B |
|---|---|---|
| Phase Change Time (sec) | 0 | 62 |
| Green Time (sec) | 56 | 32 |
| Phase Time (sec) | 62 | 38 |
| Phase Split | 62% | 38% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres PM]

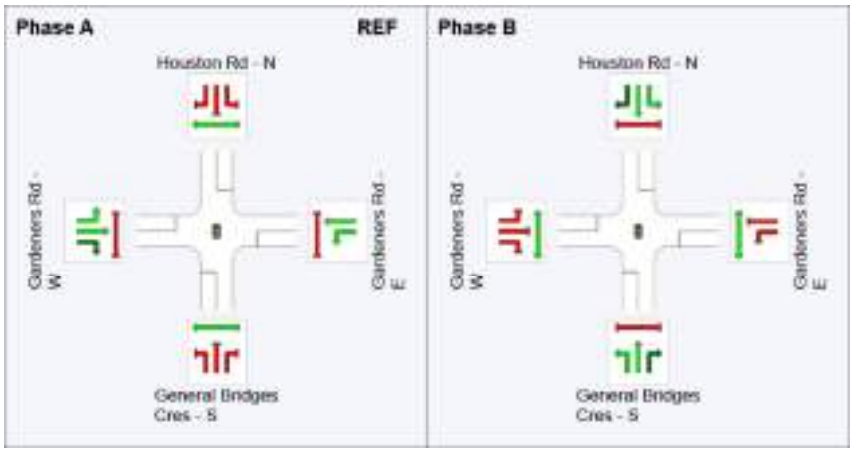
Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated  Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B**
**Output Phase Sequence: A, B**

**Phase Timing Results**

| Phase | A | B |
|---|---|---|
| Phase Change Time (sec) | 0 | 76 |
| Green Time (sec) | 70 | 18 |
| Phase Time (sec) | 76 | 24 |
| Phase Split | 76% | 24% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

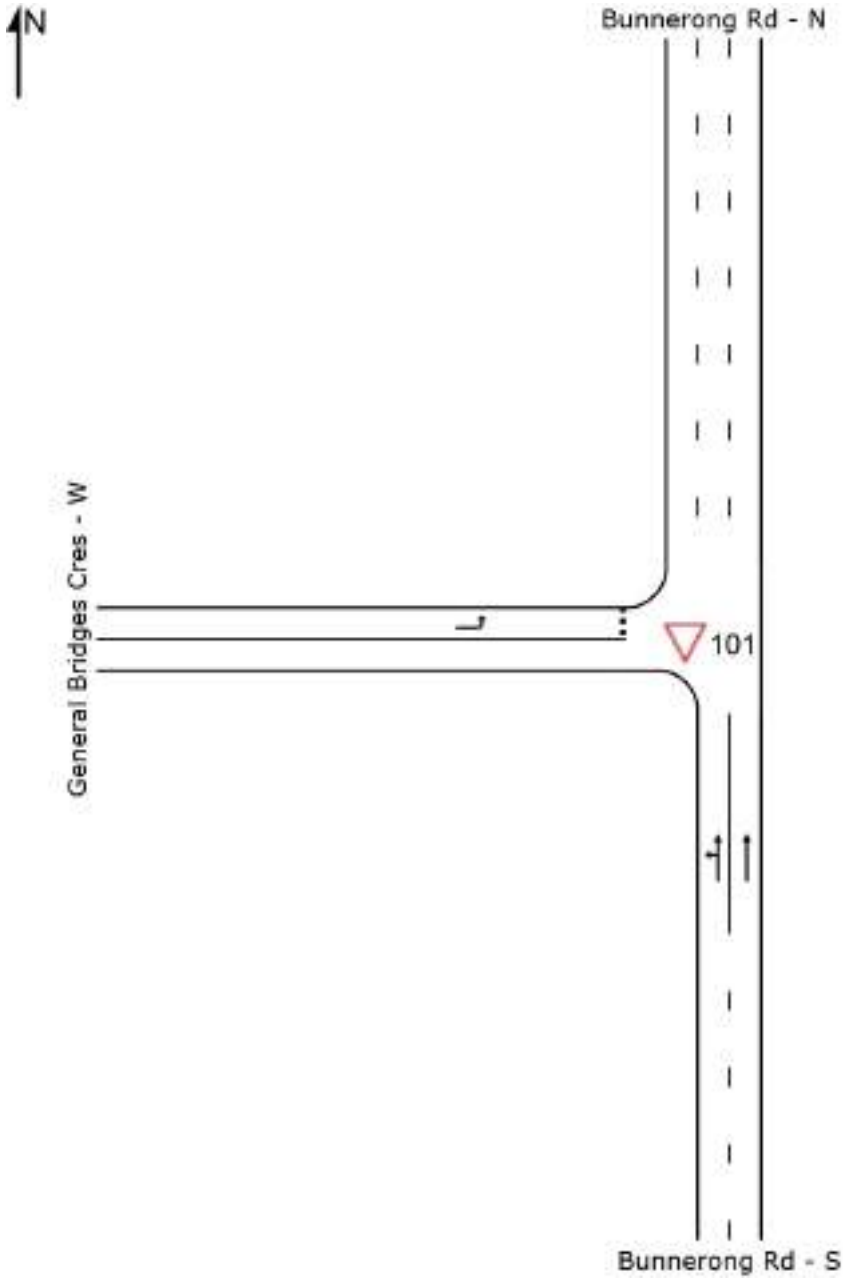
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

## SITE LAYOUT

### Site: 101 [6a. Bunnerong Rd/ General Bridges Cres AM ]

Bunnerong Rd/ General Bridges Cres, Kingsford
Giveway / Yield (Two-Way)

Existing layout

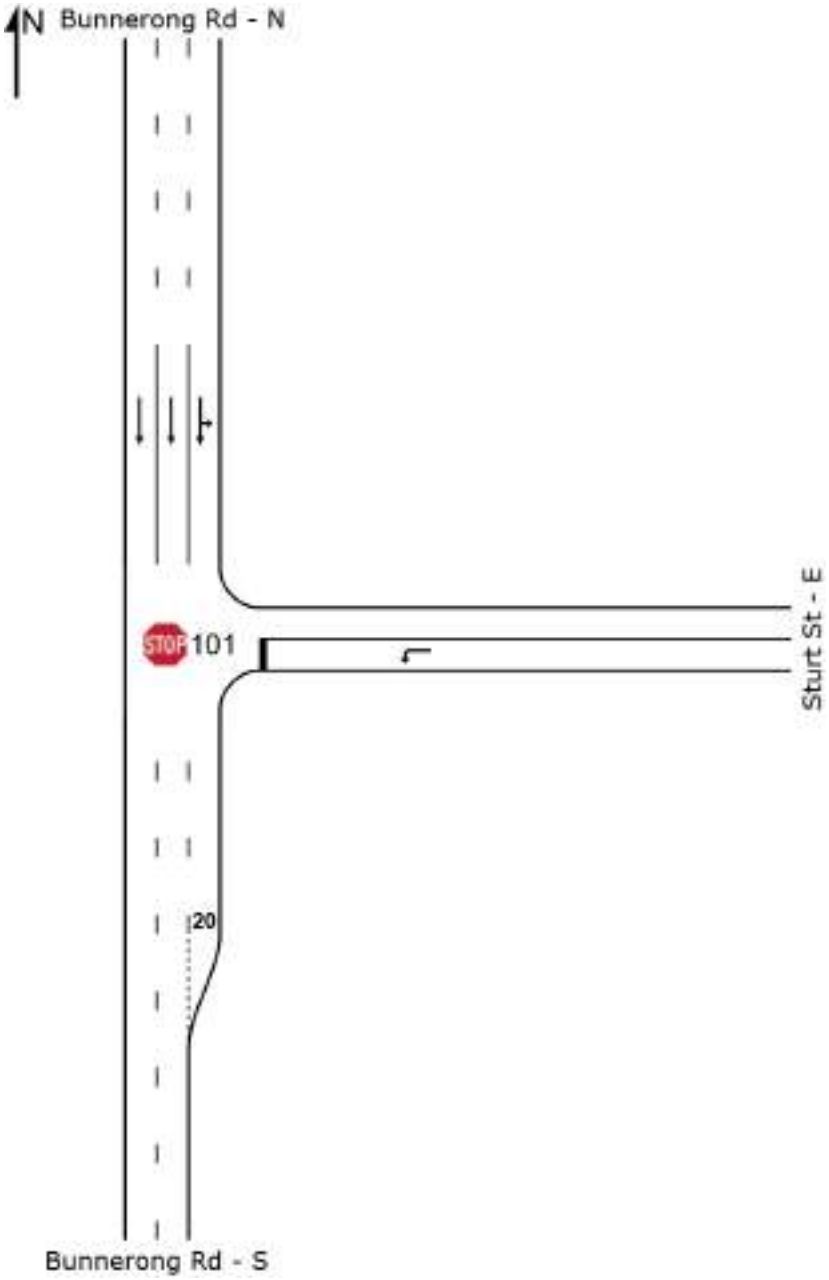


# SITE LAYOUT

## Site: 101 [6b. Bunnerong Rd/ Sturt St AM]

Bunnerong Rd/ Sturt St, Kingsford
Stop (Two-Way)

Existing layout



# Appendix B

## Attachment 2 – Existing Conditions Intersection Operation

# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave AM]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 71 | 0.0 | 0.558 | 41.4 | LOS C | 12.0 | 83.7 | 0.92 | 0.82 | 32.2 |
| 3 | R2 | 462 | 0.0 | 0.558 | 41.3 | LOS C | 12.0 | 83.7 | 0.92 | 0.82 | 32.9 |
| Approach | | 533 | 0.0 | 0.558 | 41.3 | LOS C | 12.0 | 83.7 | 0.92 | 0.82 | 32.8 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 585 | 0.0 | 0.565 | 13.4 | LOS A | 15.8 | 110.5 | 0.56 | 0.73 | 47.7 |
| 5 | T1 | 1500 | 0.0 | 0.565 | 11.5 | LOS A | 20.1 | 141.0 | 0.62 | 0.58 | 56.2 |
| 6 | R2 | 1 | 100.0 | 0.011 | 56.3 | LOS D | 0.1 | 0.7 | 0.93 | 0.61 | 30.4 |
| Approach | | 2086 | 0.1 | 0.565 | 12.1 | LOS A | 20.1 | 141.0 | 0.60 | 0.62 | 53.6 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.011 | 54.2 | LOS D | 0.1 | 0.7 | 0.93 | 0.60 | 30.1 |
| Approach | | 1 | 100.0 | 0.011 | 54.2 | LOS D | 0.1 | 0.7 | 0.93 | 0.60 | 30.1 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1014 | 0.0 | 0.357 | 17.9 | LOS B | 10.6 | 74.5 | 0.66 | 0.58 | 51.2 |
| Approach | | 1014 | 0.0 | 0.357 | 17.9 | LOS B | 10.6 | 74.5 | 0.66 | 0.58 | 51.2 |
| All Vehicles | | 3634 | 0.1 | 0.565 | 18.0 | LOS B | 20.1 | 141.0 | 0.67 | 0.64 | 48.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 46.8 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 15.5 | LOS B | 0.1 | 0.1 | 0.54 | 0.54 |
| P4 | West Full Crossing | 53 | 44.0 | LOS E | 0.1 | 0.1 | 0.92 | 0.92 |
| All Pedestrians | | 158 | 35.4 | LOS D | | | 0.80 | 0.80 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave PM]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 160 | 0.0 | 0.535 | 39.2 | LOS C | 11.0 | 76.8 | 0.91 | 0.81 | 32.9 |
| 3 | R2 | 357 | 0.0 | 0.535 | 39.2 | LOS C | 11.0 | 76.8 | 0.91 | 0.81 | 33.6 |
| Approach | | 517 | 0.0 | 0.535 | 39.2 | LOS C | 11.0 | 76.8 | 0.91 | 0.81 | 33.4 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 493 | 0.0 | 0.457 | 12.2 | LOS A | 10.9 | 76.0 | 0.50 | 0.70 | 48.5 |
| 5 | T1 | 1187 | 0.0 | 0.457 | 10.4 | LOS A | 14.1 | 98.8 | 0.57 | 0.52 | 57.3 |
| 6 | R2 | 1 | 100.0 | 0.011 | 53.5 | LOS D | 0.0 | 0.6 | 0.93 | 0.61 | 31.1 |
| Approach | | 1681 | 0.1 | 0.457 | 10.9 | LOS A | 14.1 | 98.8 | 0.55 | 0.58 | 54.5 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.011 | 51.4 | LOS D | 0.0 | 0.6 | 0.93 | 0.60 | 30.8 |
| Approach | | 1 | 100.0 | 0.011 | 51.4 | LOS D | 0.0 | 0.6 | 0.93 | 0.60 | 30.8 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1461 | 0.0 | 0.531 | 20.0 | LOS B | 16.7 | 116.7 | 0.76 | 0.67 | 49.6 |
| Approach | | 1461 | 0.0 | 0.531 | 20.0 | LOS B | 16.7 | 116.7 | 0.76 | 0.67 | 49.6 |
| All Vehicles | | 3660 | 0.1 | 0.535 | 18.6 | LOS B | 16.7 | 116.7 | 0.68 | 0.65 | 48.4 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 16.9 | LOS B | 0.1 | 0.1 | 0.58 | 0.58 |
| P4 | West Full Crossing | 53 | 41.5 | LOS E | 0.1 | 0.1 | 0.91 | 0.91 |
| All Pedestrians | | 158 | 34.2 | LOS D | | | 0.81 | 0.81 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101v [7. Doncaster Ave/ Ascot St AM]

Doncaster Avenue/ Ascot Street, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 1 | 0.0 | 0.472 | 3.9 | LOS A | 4.1 | 28.5 | 0.46 | 0.45 | 35.3 |
| 2 | T1 | 551 | 0.0 | 0.472 | 3.5 | LOS A | 4.1 | 28.5 | 0.46 | 0.45 | 37.5 |
| 3 | R2 | 26 | 0.0 | 0.472 | 6.5 | LOS A | 4.1 | 28.5 | 0.46 | 0.45 | 31.9 |
| Approach | | 578 | 0.0 | 0.472 | 3.7 | LOS A | 4.1 | 28.5 | 0.46 | 0.45 | 37.4 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 7 | 0.0 | 0.034 | 7.4 | LOS A | 0.2 | 1.4 | 0.70 | 0.67 | 29.5 |
| 5 | T1 | 5 | 0.0 | 0.034 | 7.1 | LOS A | 0.2 | 1.4 | 0.70 | 0.67 | 29.4 |
| 6 | R2 | 9 | 0.0 | 0.034 | 10.0 | LOS A | 0.2 | 1.4 | 0.70 | 0.67 | 33.7 |
| Approach | | 22 | 0.0 | 0.034 | 8.4 | LOS A | 0.2 | 1.4 | 0.70 | 0.67 | 31.8 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.465 | 3.4 | LOS A | 4.3 | 30.0 | 0.32 | 0.41 | 27.0 |
| 8 | T1 | 538 | 0.0 | 0.465 | 3.0 | LOS A | 4.3 | 30.0 | 0.32 | 0.41 | 37.7 |
| 9 | R2 | 98 | 0.0 | 0.465 | 5.9 | LOS A | 4.3 | 30.0 | 0.32 | 0.41 | 37.5 |
| Approach | | 638 | 0.0 | 0.465 | 3.4 | LOS A | 4.3 | 30.0 | 0.32 | 0.41 | 37.7 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 23 | 0.0 | 0.080 | 7.2 | LOS A | 0.5 | 3.3 | 0.70 | 0.69 | 34.8 |
| 11 | T1 | 17 | 0.0 | 0.080 | 6.8 | LOS A | 0.5 | 3.3 | 0.70 | 0.69 | 19.6 |
| 12 | R2 | 14 | 0.0 | 0.080 | 9.8 | LOS A | 0.5 | 3.3 | 0.70 | 0.69 | 33.5 |
| Approach | | 54 | 0.0 | 0.080 | 7.8 | LOS A | 0.5 | 3.3 | 0.70 | 0.69 | 30.6 |
| All Vehicles | | 1292 | 0.0 | 0.472 | 3.8 | LOS A | 4.3 | 30.0 | 0.41 | 0.44 | 37.2 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [7. Doncaster Ave/ Ascot St PM]

Doncaster Avenue/ Ascot Street, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 1 | 0.0 | 0.354 | 4.1 | LOS A | 2.7 | 18.7 | 0.19 | 0.42 | 41.8 |
| 2 | T1 | 508 | 0.0 | 0.354 | 3.9 | LOS A | 2.7 | 18.7 | 0.19 | 0.42 | 45.3 |
| 3 | R2 | 4 | 0.0 | 0.354 | 6.9 | LOS A | 2.7 | 18.7 | 0.19 | 0.42 | 37.1 |
| Approach | | 514 | 0.0 | 0.354 | 3.9 | LOS A | 2.7 | 18.7 | 0.19 | 0.42 | 45.3 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 14 | 0.0 | 0.026 | 6.2 | LOS A | 0.1 | 1.0 | 0.60 | 0.62 | 35.3 |
| 5 | T1 | 1 | 0.0 | 0.026 | 6.1 | LOS A | 0.1 | 1.0 | 0.60 | 0.62 | 35.2 |
| 6 | R2 | 5 | 0.0 | 0.026 | 8.8 | LOS A | 0.1 | 1.0 | 0.60 | 0.62 | 40.8 |
| Approach | | 20 | 0.0 | 0.026 | 6.9 | LOS A | 0.1 | 1.0 | 0.60 | 0.62 | 37.2 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.321 | 4.0 | LOS A | 2.6 | 18.3 | 0.14 | 0.43 | 33.6 |
| 8 | T1 | 460 | 0.0 | 0.321 | 3.8 | LOS A | 2.6 | 18.3 | 0.14 | 0.43 | 45.4 |
| 9 | R2 | 25 | 0.0 | 0.321 | 6.8 | LOS A | 2.6 | 18.3 | 0.14 | 0.43 | 44.8 |
| Approach | | 487 | 0.0 | 0.321 | 4.0 | LOS A | 2.6 | 18.3 | 0.14 | 0.43 | 45.3 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 32 | 0.0 | 0.060 | 7.6 | LOS A | 0.3 | 2.3 | 0.63 | 0.67 | 41.0 |
| 11 | T1 | 3 | 0.0 | 0.060 | 7.4 | LOS A | 0.3 | 2.3 | 0.63 | 0.67 | 23.7 |
| 12 | R2 | 11 | 0.0 | 0.060 | 10.4 | LOS B | 0.3 | 2.3 | 0.63 | 0.67 | 38.4 |
| Approach | | 45 | 0.0 | 0.060 | 8.2 | LOS A | 0.3 | 2.3 | 0.63 | 0.67 | 39.6 |
| All Vehicles | | 1066 | 0.0 | 0.354 | 4.2 | LOS A | 2.7 | 18.7 | 0.19 | 0.44 | 45.0 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave AM]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 111 | 0.0 | 0.198 | 32.6 | LOS C | 4.0 | 28.1 | 0.78 | 0.74 | 25.4 |
| 2 | T1 | 208 | 0.0 | 0.401 | 29.6 | LOS C | 8.0 | 55.9 | 0.83 | 0.69 | 27.5 |
| Approach | | 319 | 0.0 | 0.401 | 30.6 | LOS C | 8.0 | 55.9 | 0.81 | 0.71 | 26.8 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 193 | 0.0 | 0.125 | 2.6 | LOS A | 2.1 | 14.9 | 0.25 | 0.21 | 46.7 |
| 9 | R2 | 284 | 0.0 | 0.414 | 18.9 | LOS B | 7.0 | 48.9 | 0.79 | 0.78 | 29.3 |
| Approach | | 477 | 0.0 | 0.414 | 12.3 | LOS A | 7.0 | 48.9 | 0.57 | 0.55 | 35.6 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 355 | 0.0 | 0.329 | 17.1 | LOS B | 8.9 | 62.1 | 0.56 | 0.74 | 31.6 |
| 12 | R2 | 44 | 0.0 | 0.265 | 53.3 | LOS D | 2.1 | 14.7 | 0.97 | 0.74 | 19.5 |
| Approach | | 399 | 0.0 | 0.329 | 21.1 | LOS B | 8.9 | 62.1 | 0.60 | 0.74 | 29.2 |
| All Vehicles | | 1195 | 0.0 | 0.414 | 20.1 | LOS B | 8.9 | 62.1 | 0.65 | 0.66 | 30.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 29.7 | LOS C | 0.1 | 0.1 | 0.77 | 0.77 |
| All Pedestrians | | 158 | 39.4 | LOS D | | | 0.89 | 0.89 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave PM]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 89 | 0.0 | 0.197 | 33.9 | LOS C | 3.2 | 22.1 | 0.83 | 0.74 | 24.6 |
| 2 | T1 | 148 | 0.0 | 0.311 | 30.3 | LOS C | 5.4 | 37.8 | 0.86 | 0.70 | 28.5 |
| Approach | | 238 | 0.0 | 0.311 | 31.7 | LOS C | 5.4 | 37.8 | 0.85 | 0.72 | 27.0 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 212 | 0.0 | 0.140 | 2.6 | LOS A | 2.3 | 15.8 | 0.27 | 0.22 | 46.6 |
| 9 | R2 | 171 | 0.0 | 0.230 | 15.0 | LOS B | 3.2 | 22.1 | 0.70 | 0.73 | 32.0 |
| Approach | | 382 | 0.0 | 0.230 | 8.2 | LOS A | 3.2 | 22.1 | 0.46 | 0.45 | 39.8 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 362 | 0.0 | 0.313 | 14.0 | LOS A | 7.4 | 51.6 | 0.50 | 0.73 | 34.1 |
| 12 | R2 | 43 | 0.0 | 0.261 | 48.9 | LOS D | 1.9 | 13.1 | 0.97 | 0.73 | 20.5 |
| Approach | | 405 | 0.0 | 0.313 | 17.7 | LOS B | 7.4 | 51.6 | 0.55 | 0.73 | 31.4 |
| All Vehicles | | 1025 | 0.0 | 0.313 | 17.4 | LOS B | 7.4 | 51.6 | 0.59 | 0.62 | 32.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 31.3 | LOS D | 0.1 | 0.1 | 0.84 | 0.84 |
| All Pedestrians | | 158 | 36.6 | LOS D | | | 0.90 | 0.90 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 22 | 0.0 | 0.666 | 42.5 | LOS D | 10.3 | 72.4 | 0.98 | 0.84 | 31.3 |
| 2 | T1 | 222 | 0.0 | 0.666 | 38.0 | LOS C | 10.3 | 72.4 | 0.98 | 0.84 | 29.6 |
| 3 | R2 | 152 | 0.0 | 0.668 | 48.0 | LOS D | 6.8 | 47.5 | 1.00 | 0.84 | 24.9 |
| Approach | | 396 | 0.0 | 0.668 | 42.1 | LOS C | 10.3 | 72.4 | 0.99 | 0.84 | 27.9 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 8 | 12.5 | 0.380 | 20.5 | LOS B | 9.4 | 65.8 | 0.66 | 0.58 | 38.7 |
| 5 | T1 | 1071 | 0.6 | 0.380 | 15.2 | LOS B | 9.9 | 69.5 | 0.67 | 0.58 | 40.7 |
| Approach | | 1079 | 0.7 | 0.380 | 15.3 | LOS B | 9.9 | 69.5 | 0.67 | 0.58 | 40.7 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 42 | 2.5 | 0.382 | 39.8 | LOS C | 5.4 | 38.2 | 0.92 | 0.75 | 24.5 |
| 8 | T1 | 96 | 0.0 | 0.382 | 35.2 | LOS C | 5.4 | 38.2 | 0.92 | 0.75 | 30.2 |
| 9 | R2 | 52 | 0.0 | 0.227 | 44.4 | LOS D | 2.1 | 14.9 | 0.94 | 0.74 | 26.6 |
| Approach | | 189 | 0.6 | 0.382 | 38.7 | LOS C | 5.4 | 38.2 | 0.92 | 0.75 | 28.2 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 108 | 1.0 | 0.665 | 23.7 | LOS B | 20.0 | 140.1 | 0.81 | 0.74 | 37.7 |
| 11 | T1 | 1140 | 0.6 | 0.665 | 18.4 | LOS B | 21.0 | 147.1 | 0.81 | 0.73 | 37.9 |
| Approach | | 1248 | 0.6 | 0.665 | 18.9 | LOS B | 21.0 | 147.1 | 0.81 | 0.74 | 37.8 |
| All Vehicles | | 2913 | 0.5 | 0.668 | 22.0 | LOS B | 21.0 | 147.1 | 0.79 | 0.69 | 35.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 15.6 | LOS B | 0.1 | 0.1 | 0.59 | 0.59 |
| P2 | East Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 17.5 | LOS B | 0.1 | 0.1 | 0.62 | 0.62 |
| P4 | West Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 27.9 | LOS C | | | 0.77 | 0.77 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade PM]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 6 | 0.0 | 0.517 | 44.4 | LOS D | 7.4 | 51.5 | 0.96 | 0.78 | 27.2 |
| 2 | T1 | 163 | 0.0 | 0.517 | 39.8 | LOS C | 7.4 | 51.5 | 0.96 | 0.78 | 29.1 |
| 3 | R2 | 51 | 0.0 | 0.431 | 54.2 | LOS D | 2.4 | 17.0 | 1.00 | 0.74 | 23.4 |
| Approach | | 220 | 0.0 | 0.517 | 43.2 | LOS D | 7.4 | 51.5 | 0.97 | 0.77 | 27.7 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 25 | 0.0 | 0.399 | 16.7 | LOS B | 10.6 | 74.4 | 0.58 | 0.52 | 41.2 |
| 5 | T1 | 1314 | 0.5 | 0.399 | 11.5 | LOS A | 11.3 | 79.0 | 0.58 | 0.52 | 38.9 |
| Approach | | 1339 | 0.5 | 0.399 | 11.6 | LOS A | 11.3 | 79.0 | 0.58 | 0.52 | 39.0 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 86 | 1.2 | 0.544 | 44.6 | LOS D | 7.5 | 52.7 | 0.96 | 0.79 | 22.6 |
| 8 | T1 | 85 | 0.0 | 0.544 | 40.0 | LOS C | 7.5 | 52.7 | 0.96 | 0.79 | 28.4 |
| 9 | R2 | 6 | 0.0 | 0.054 | 51.8 | LOS D | 0.3 | 2.0 | 0.96 | 0.65 | 20.1 |
| Approach | | 178 | 0.6 | 0.544 | 42.7 | LOS D | 7.5 | 52.7 | 0.96 | 0.79 | 25.6 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 65 | 0.0 | 0.586 | 18.6 | LOS B | 18.3 | 128.1 | 0.68 | 0.63 | 37.0 |
| 11 | T1 | 1238 | 0.5 | 0.586 | 13.3 | LOS A | 19.4 | 135.6 | 0.68 | 0.62 | 36.7 |
| Approach | | 1303 | 0.5 | 0.586 | 13.6 | LOS A | 19.4 | 135.6 | 0.68 | 0.62 | 36.7 |
| All Vehicles | | 3040 | 0.5 | 0.586 | 16.5 | LOS B | 19.4 | 135.6 | 0.68 | 0.60 | 34.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 11.7 | LOS B | 0.1 | 0.1 | 0.50 | 0.50 |
| P2 | East Full Crossing | 53 | 41.8 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 13.2 | LOS B | 0.1 | 0.1 | 0.53 | 0.53 |
| P4 | West Full Crossing | 53 | 41.8 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 27.1 | LOS C | | | 0.73 | 0.73 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [9. Doncaster Ave/ Day Ave AM]

Doncaster Avenue/ Day Avenue, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 25 | 0.0 | 0.102 | 6.4 | LOS A | 0.5 | 3.7 | 0.54 | 0.62 | 40.4 |
| 2 | T1 | 57 | 0.0 | 0.102 | 6.1 | LOS A | 0.5 | 3.7 | 0.54 | 0.62 | 44.3 |
| 3 | R2 | 6 | 0.0 | 0.102 | 9.1 | LOS A | 0.5 | 3.7 | 0.54 | 0.62 | 41.2 |
| 3u | U | 1 | 0.0 | 0.102 | 10.5 | LOS A | 0.5 | 3.7 | 0.54 | 0.62 | 42.5 |
| Approach | | 89 | 0.0 | 0.102 | 6.4 | LOS A | 0.5 | 3.7 | 0.54 | 0.62 | 43.3 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 12 | 0.0 | 0.288 | 4.2 | LOS A | 1.8 | 12.4 | 0.21 | 0.50 | 41.6 |
| 5 | T1 | 255 | 0.0 | 0.288 | 3.9 | LOS A | 1.8 | 12.4 | 0.21 | 0.50 | 42.2 |
| 6 | R2 | 125 | 0.0 | 0.288 | 7.0 | LOS A | 1.8 | 12.4 | 0.21 | 0.50 | 44.6 |
| 6u | U | 1 | 0.0 | 0.288 | 8.4 | LOS A | 1.8 | 12.4 | 0.21 | 0.50 | 42.8 |
| Approach | | 393 | 0.0 | 0.288 | 4.9 | LOS A | 1.8 | 12.4 | 0.21 | 0.50 | 43.2 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 27 | 0.0 | 0.062 | 4.2 | LOS A | 0.3 | 2.2 | 0.19 | 0.54 | 43.7 |
| 8 | T1 | 11 | 0.0 | 0.062 | 3.9 | LOS A | 0.3 | 2.2 | 0.19 | 0.54 | 44.7 |
| 9 | R2 | 37 | 0.0 | 0.062 | 7.0 | LOS A | 0.3 | 2.2 | 0.19 | 0.54 | 44.2 |
| 9u | U | 1 | 0.0 | 0.062 | 8.4 | LOS A | 0.3 | 2.2 | 0.19 | 0.54 | 46.2 |
| Approach | | 76 | 0.0 | 0.062 | 5.6 | LOS A | 0.3 | 2.2 | 0.19 | 0.54 | 44.1 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 16 | 0.0 | 0.058 | 4.9 | LOS A | 0.3 | 2.0 | 0.36 | 0.50 | 44.0 |
| 11 | T1 | 42 | 0.0 | 0.058 | 4.7 | LOS A | 0.3 | 2.0 | 0.36 | 0.50 | 42.2 |
| 12 | R2 | 2 | 0.0 | 0.058 | 7.7 | LOS A | 0.3 | 2.0 | 0.36 | 0.50 | 42.3 |
| 12u | U | 1 | 0.0 | 0.058 | 9.1 | LOS A | 0.3 | 2.0 | 0.36 | 0.50 | 42.6 |
| Approach | | 61 | 0.0 | 0.058 | 4.9 | LOS A | 0.3 | 2.0 | 0.36 | 0.50 | 42.8 |
| All Vehicles | | 619 | 0.0 | 0.288 | 5.2 | LOS A | 1.8 | 12.4 | 0.27 | 0.52 | 43.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [9. Doncaster Ave/ Day Ave PM]

Doncaster Avenue/ Day Avenue, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 4 | 0.0 | 0.017 | 4.9 | LOS A | 0.1 | 0.5 | 0.34 | 0.49 | 41.3 |
| 2 | T1 | 12 | 0.0 | 0.017 | 4.6 | LOS A | 0.1 | 0.5 | 0.34 | 0.49 | 45.0 |
| 3 | R2 | 1 | 0.0 | 0.017 | 7.6 | LOS A | 0.1 | 0.5 | 0.34 | 0.49 | 42.2 |
| 3u | U | 1 | 0.0 | 0.017 | 9.1 | LOS A | 0.1 | 0.5 | 0.34 | 0.49 | 43.4 |
| Approach | | 18 | 0.0 | 0.017 | 5.1 | LOS A | 0.1 | 0.5 | 0.34 | 0.49 | 44.1 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 8 | 0.0 | 0.133 | 4.1 | LOS A | 0.7 | 4.8 | 0.14 | 0.50 | 41.8 |
| 5 | T1 | 109 | 0.0 | 0.133 | 3.8 | LOS A | 0.7 | 4.8 | 0.14 | 0.50 | 42.5 |
| 6 | R2 | 62 | 0.0 | 0.133 | 6.8 | LOS A | 0.7 | 4.8 | 0.14 | 0.50 | 44.8 |
| 6u | U | 1 | 0.0 | 0.133 | 8.3 | LOS A | 0.7 | 4.8 | 0.14 | 0.50 | 43.1 |
| Approach | | 181 | 0.0 | 0.133 | 4.9 | LOS A | 0.7 | 4.8 | 0.14 | 0.50 | 43.5 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 20 | 0.0 | 0.039 | 4.2 | LOS A | 0.2 | 1.3 | 0.18 | 0.53 | 43.9 |
| 8 | T1 | 8 | 0.0 | 0.039 | 3.9 | LOS A | 0.2 | 1.3 | 0.18 | 0.53 | 45.0 |
| 9 | R2 | 18 | 0.0 | 0.039 | 6.9 | LOS A | 0.2 | 1.3 | 0.18 | 0.53 | 44.5 |
| 9u | U | 1 | 0.0 | 0.039 | 8.4 | LOS A | 0.2 | 1.3 | 0.18 | 0.53 | 46.4 |
| Approach | | 47 | 0.0 | 0.039 | 5.3 | LOS A | 0.2 | 1.3 | 0.18 | 0.53 | 44.4 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 16 | 0.0 | 0.055 | 4.3 | LOS A | 0.3 | 1.8 | 0.22 | 0.46 | 44.5 |
| 11 | T1 | 45 | 0.0 | 0.055 | 4.0 | LOS A | 0.3 | 1.8 | 0.22 | 0.46 | 43.0 |
| 12 | R2 | 2 | 0.0 | 0.055 | 7.1 | LOS A | 0.3 | 1.8 | 0.22 | 0.46 | 43.0 |
| 12u | U | 1 | 0.0 | 0.055 | 8.5 | LOS A | 0.3 | 1.8 | 0.22 | 0.46 | 43.4 |
| Approach | | 64 | 0.0 | 0.055 | 4.3 | LOS A | 0.3 | 1.8 | 0.22 | 0.46 | 43.5 |
| All Vehicles | | 311 | 0.0 | 0.133 | 4.8 | LOS A | 0.7 | 4.8 | 0.17 | 0.50 | 43.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St AM]

Houston Rd/ Barker St, Kensington

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 14 | 0.0 | 0.292 | 4.5 | LOS A | 2.1 | 14.5 | 0.34 | 0.52 | 44.3 |
| 2 | T1 | 222 | 0.0 | 0.292 | 4.4 | LOS A | 2.1 | 14.5 | 0.34 | 0.52 | 44.0 |
| 3 | R2 | 116 | 0.0 | 0.292 | 7.6 | LOS A | 2.1 | 14.5 | 0.34 | 0.52 | 42.9 |
| 3u | U | 8 | 0.0 | 0.292 | 9.1 | LOS A | 2.1 | 14.5 | 0.34 | 0.52 | 48.3 |
| Approach | | 361 | 0.0 | 0.292 | 5.5 | LOS A | 2.1 | 14.5 | 0.34 | 0.52 | 43.8 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 38 | 0.0 | 0.135 | 4.5 | LOS A | 0.6 | 4.3 | 0.25 | 0.55 | 42.1 |
| 5 | T1 | 52 | 0.0 | 0.135 | 4.4 | LOS A | 0.6 | 4.3 | 0.25 | 0.55 | 43.0 |
| 6 | R2 | 60 | 0.0 | 0.135 | 7.6 | LOS A | 0.6 | 4.3 | 0.25 | 0.55 | 39.7 |
| 6u | U | 3 | 0.0 | 0.135 | 9.1 | LOS A | 0.6 | 4.3 | 0.25 | 0.55 | 18.4 |
| Approach | | 152 | 0.0 | 0.135 | 5.8 | LOS A | 0.6 | 4.3 | 0.25 | 0.55 | 41.1 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 24 | 0.0 | 0.117 | 6.9 | LOS A | 0.7 | 4.7 | 0.65 | 0.68 | 36.9 |
| 8 | T1 | 62 | 0.0 | 0.117 | 6.8 | LOS A | 0.7 | 4.7 | 0.65 | 0.68 | 43.1 |
| 9 | R2 | 4 | 0.0 | 0.117 | 10.1 | LOS A | 0.7 | 4.7 | 0.65 | 0.68 | 42.5 |
| 9u | U | 1 | 0.0 | 0.117 | 11.5 | LOS A | 0.7 | 4.7 | 0.65 | 0.68 | 42.1 |
| Approach | | 90 | 0.0 | 0.117 | 7.0 | LOS A | 0.7 | 4.7 | 0.65 | 0.68 | 41.9 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 23 | 0.0 | 0.487 | 7.2 | LOS A | 3.6 | 25.0 | 0.71 | 0.74 | 41.2 |
| 11 | T1 | 351 | 0.0 | 0.487 | 7.1 | LOS A | 3.6 | 25.0 | 0.71 | 0.74 | 41.3 |
| 12 | R2 | 63 | 0.0 | 0.487 | 10.3 | LOS A | 3.6 | 25.0 | 0.71 | 0.74 | 43.9 |
| 12u | U | 1 | 0.0 | 0.487 | 11.8 | LOS A | 3.6 | 25.0 | 0.71 | 0.74 | 46.6 |
| Approach | | 438 | 0.0 | 0.487 | 7.6 | LOS A | 3.6 | 25.0 | 0.71 | 0.74 | 41.8 |
| All Vehicles | | 1041 | 0.0 | 0.487 | 6.6 | LOS A | 3.6 | 25.0 | 0.51 | 0.63 | 42.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St PM]

Houston Rd/ Barker St, Kensington

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 4 | 0.0 | 0.107 | 4.5 | LOS A | 0.6 | 4.4 | 0.33 | 0.50 | 44.4 |
| 2 | T1 | 84 | 0.0 | 0.107 | 4.4 | LOS A | 0.6 | 4.4 | 0.33 | 0.50 | 44.2 |
| 3 | R2 | 31 | 0.0 | 0.107 | 7.6 | LOS A | 0.6 | 4.4 | 0.33 | 0.50 | 43.2 |
| 3u | U | 2 | 0.0 | 0.107 | 9.1 | LOS A | 0.6 | 4.4 | 0.33 | 0.50 | 48.5 |
| Approach | | 121 | 0.0 | 0.107 | 5.3 | LOS A | 0.6 | 4.4 | 0.33 | 0.50 | 44.1 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 76 | 0.0 | 0.196 | 4.8 | LOS A | 0.9 | 6.4 | 0.29 | 0.56 | 42.1 |
| 5 | T1 | 67 | 0.0 | 0.196 | 4.7 | LOS A | 0.9 | 6.4 | 0.29 | 0.56 | 43.0 |
| 6 | R2 | 59 | 0.0 | 0.196 | 7.9 | LOS A | 0.9 | 6.4 | 0.29 | 0.56 | 39.7 |
| 6u | U | 12 | 0.0 | 0.196 | 9.4 | LOS A | 0.9 | 6.4 | 0.29 | 0.56 | 18.4 |
| Approach | | 214 | 0.0 | 0.196 | 5.9 | LOS A | 0.9 | 6.4 | 0.29 | 0.56 | 40.3 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 26 | 0.0 | 0.121 | 5.3 | LOS A | 0.6 | 4.5 | 0.47 | 0.55 | 38.4 |
| 8 | T1 | 91 | 0.0 | 0.121 | 5.2 | LOS A | 0.6 | 4.5 | 0.47 | 0.55 | 44.1 |
| 9 | R2 | 1 | 0.0 | 0.121 | 8.4 | LOS A | 0.6 | 4.5 | 0.47 | 0.55 | 43.6 |
| 9u | U | 2 | 0.0 | 0.121 | 9.9 | LOS A | 0.6 | 4.5 | 0.47 | 0.55 | 43.6 |
| Approach | | 120 | 0.0 | 0.121 | 5.3 | LOS A | 0.6 | 4.5 | 0.47 | 0.55 | 43.3 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 24 | 0.0 | 0.241 | 4.9 | LOS A | 1.4 | 10.1 | 0.41 | 0.56 | 42.4 |
| 11 | T1 | 158 | 0.0 | 0.241 | 4.8 | LOS A | 1.4 | 10.1 | 0.41 | 0.56 | 42.7 |
| 12 | R2 | 74 | 0.0 | 0.241 | 8.0 | LOS A | 1.4 | 10.1 | 0.41 | 0.56 | 44.8 |
| 12u | U | 9 | 0.0 | 0.241 | 9.5 | LOS A | 1.4 | 10.1 | 0.41 | 0.56 | 47.7 |
| Approach | | 265 | 0.0 | 0.241 | 5.9 | LOS A | 1.4 | 10.1 | 0.41 | 0.56 | 43.6 |
| All Vehicles | | 720 | 0.0 | 0.241 | 5.7 | LOS A | 1.4 | 10.1 | 0.37 | 0.55 | 42.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [8. Houston Rd/ Borrodale Rd AM]

Houston Road/ Borrodale Road, Kingsford
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 20 | 0.0 | 0.190 | 4.0 | LOS A | 1.0 | 7.2 | 0.29 | 0.44 | 48.3 |
| 2 | T1 | 181 | 0.0 | 0.190 | 4.1 | LOS A | 1.0 | 7.2 | 0.29 | 0.44 | 54.4 |
| 3 | R2 | 33 | 0.0 | 0.190 | 9.8 | LOS A | 1.0 | 7.2 | 0.29 | 0.44 | 44.5 |
| Approach | | 234 | 0.0 | 0.190 | 4.9 | LOS A | 1.0 | 7.2 | 0.29 | 0.44 | 52.7 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 60 | 0.0 | 0.133 | 2.6 | LOS A | 0.7 | 4.9 | 0.24 | 0.40 | 46.4 |
| 5 | T1 | 63 | 0.0 | 0.133 | 2.4 | LOS A | 0.7 | 4.9 | 0.24 | 0.40 | 48.4 |
| 6 | R2 | 44 | 0.0 | 0.133 | 7.8 | LOS A | 0.7 | 4.9 | 0.24 | 0.40 | 53.1 |
| Approach | | 167 | 0.0 | 0.133 | 3.9 | LOS A | 0.7 | 4.9 | 0.24 | 0.40 | 49.0 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 5 | 0.0 | 0.030 | 4.5 | LOS A | 0.2 | 1.1 | 0.41 | 0.47 | 49.3 |
| 8 | T1 | 23 | 0.0 | 0.030 | 4.7 | LOS A | 0.2 | 1.1 | 0.41 | 0.47 | 53.8 |
| 9 | R2 | 3 | 0.0 | 0.030 | 10.4 | LOS B | 0.2 | 1.1 | 0.41 | 0.47 | 52.1 |
| Approach | | 32 | 0.0 | 0.030 | 5.2 | LOS A | 0.2 | 1.1 | 0.41 | 0.47 | 52.9 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 108 | 0.0 | 0.312 | 3.9 | LOS A | 1.9 | 13.0 | 0.49 | 0.50 | 49.2 |
| 11 | T1 | 164 | 0.0 | 0.312 | 3.6 | LOS A | 1.9 | 13.0 | 0.49 | 0.50 | 47.5 |
| 12 | R2 | 55 | 0.0 | 0.312 | 9.1 | LOS A | 1.9 | 13.0 | 0.49 | 0.50 | 49.5 |
| Approach | | 327 | 0.0 | 0.312 | 4.6 | LOS A | 1.9 | 13.0 | 0.49 | 0.50 | 48.5 |
| All Vehicles | | 760 | 0.0 | 0.312 | 4.6 | LOS A | 1.9 | 13.0 | 0.37 | 0.46 | 49.9 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [8. Houston Rd/ Borrodale Rd PM]

Houston Road/ Borrodale Road, Kingsford
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 15 | 0.0 | 0.104 | 3.5 | LOS A | 0.5 | 3.7 | 0.14 | 0.42 | 48.8 |
| 2 | T1 | 99 | 0.0 | 0.104 | 3.7 | LOS A | 0.5 | 3.7 | 0.14 | 0.42 | 55.2 |
| 3 | R2 | 28 | 0.0 | 0.104 | 9.3 | LOS A | 0.5 | 3.7 | 0.14 | 0.42 | 45.4 |
| Approach | | 142 | 0.0 | 0.104 | 4.8 | LOS A | 0.5 | 3.7 | 0.14 | 0.42 | 52.8 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 35 | 0.0 | 0.057 | 2.6 | LOS A | 0.3 | 1.9 | 0.23 | 0.39 | 46.9 |
| 5 | T1 | 20 | 0.0 | 0.057 | 2.4 | LOS A | 0.3 | 1.9 | 0.23 | 0.39 | 48.7 |
| 6 | R2 | 14 | 0.0 | 0.057 | 7.9 | LOS A | 0.3 | 1.9 | 0.23 | 0.39 | 53.8 |
| Approach | | 68 | 0.0 | 0.057 | 3.6 | LOS A | 0.3 | 1.9 | 0.23 | 0.39 | 49.0 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 5 | 0.0 | 0.023 | 4.4 | LOS A | 0.1 | 0.9 | 0.38 | 0.42 | 49.7 |
| 8 | T1 | 44 | 0.0 | 0.023 | 2.8 | LOS A | 0.1 | 0.9 | 0.38 | 0.32 | 45.7 |
| 9 | R2 | 1 | 0.0 | 0.023 | 10.1 | LOS B | 0.1 | 0.9 | 0.38 | 0.42 | 52.5 |
| Approach | | 51 | 0.0 | 0.023 | 3.1 | LOS A | 0.1 | 0.9 | 0.38 | 0.33 | 44.5 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 100 | 0.0 | 0.242 | 3.0 | LOS A | 1.3 | 9.4 | 0.34 | 0.42 | 49.7 |
| 11 | T1 | 137 | 0.0 | 0.242 | 2.8 | LOS A | 1.3 | 9.4 | 0.34 | 0.42 | 48.2 |
| 12 | R2 | 54 | 0.0 | 0.242 | 8.2 | LOS A | 1.3 | 9.4 | 0.34 | 0.42 | 50.2 |
| Approach | | 291 | 0.0 | 0.242 | 3.9 | LOS A | 1.3 | 9.4 | 0.34 | 0.42 | 49.2 |
| All Vehicles | | 552 | 0.0 | 0.242 | 4.0 | LOS A | 1.3 | 9.4 | 0.28 | 0.41 | 49.5 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 34 | 0.0 | 0.057 | 29.7 | LOS C | 1.1 | 7.9 | 0.72 | 0.69 | 24.5 |
| 2 | T1 | 212 | 0.0 | 0.339 | 27.9 | LOS B | 7.9 | 55.2 | 0.81 | 0.67 | 28.4 |
| 3 | R2 | 139 | 0.8 | 0.383 | 38.8 | LOS C | 5.7 | 40.5 | 0.88 | 0.78 | 17.7 |
| Approach | | 384 | 0.3 | 0.383 | 32.0 | LOS C | 7.9 | 55.2 | 0.82 | 0.71 | 23.9 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 16 | 0.0 | 0.392 | 18.5 | LOS B | 11.2 | 78.3 | 0.60 | 0.54 | 31.6 |
| 5 | T1 | 1252 | 0.0 | 0.392 | 13.2 | LOS A | 11.6 | 81.3 | 0.60 | 0.53 | 33.1 |
| Approach | | 1267 | 0.0 | 0.392 | 13.2 | LOS A | 11.6 | 81.3 | 0.60 | 0.53 | 33.1 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 11 | 10.0 | 0.019 | 30.3 | LOS C | 0.3 | 2.6 | 0.71 | 0.66 | 21.9 |
| 8 | T1 | 20 | 0.0 | 0.213 | 33.8 | LOS C | 2.9 | 20.0 | 0.83 | 0.74 | 24.0 |
| 9 | R2 | 53 | 0.0 | 0.213 | 38.1 | LOS C | 2.9 | 20.0 | 0.83 | 0.74 | 23.1 |
| Approach | | 83 | 1.3 | 0.213 | 36.1 | LOS C | 2.9 | 20.0 | 0.82 | 0.73 | 23.2 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 26 | 0.0 | 0.211 | 17.2 | LOS B | 5.5 | 38.4 | 0.53 | 0.48 | 38.0 |
| 11 | T1 | 656 | 0.0 | 0.211 | 11.6 | LOS A | 5.5 | 38.6 | 0.53 | 0.46 | 34.8 |
| 12 | R2 | 1 | 100.0 | 0.211 | 17.7 | LOS B | 5.4 | 37.7 | 0.53 | 0.45 | 37.1 |
| Approach | | 683 | 0.2 | 0.211 | 11.9 | LOS A | 5.5 | 38.6 | 0.53 | 0.46 | 34.9 |
| All Vehicles | | 2418 | 0.1 | 0.392 | 16.6 | LOS B | 11.6 | 81.3 | 0.63 | 0.55 | 30.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 14.6 | LOS B | 0.1 | 0.1 | 0.54 | 0.54 |
| P2 | East Full Crossing | 53 | 36.2 | LOS D | 0.1 | 0.1 | 0.85 | 0.85 |
| P3 | North Full Crossing | 53 | 13.0 | LOS B | 0.1 | 0.1 | 0.51 | 0.51 |
| P4 | West Full Crossing | 53 | 36.2 | LOS D | 0.1 | 0.1 | 0.85 | 0.85 |
| All Pedestrians | | 211 | 25.0 | LOS C | | | 0.69 | 0.69 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres PM]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 21 | 0.0 | 0.065 | 41.5 | LOS C | 0.9 | 6.0 | 0.86 | 0.69 | 20.3 |
| 2 | T1 | 87 | 0.0 | 0.249 | 38.5 | LOS C | 3.7 | 26.0 | 0.90 | 0.70 | 23.9 |
| 3 | R2 | 21 | 0.0 | 0.087 | 43.9 | LOS D | 0.9 | 6.3 | 0.88 | 0.70 | 16.3 |
| Approach | | 129 | 0.0 | 0.249 | 39.9 | LOS C | 3.7 | 26.0 | 0.89 | 0.70 | 22.1 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 46 | 0.0 | 0.065 | 10.3 | LOS A | 1.3 | 9.1 | 0.33 | 0.48 | 37.6 |
| 5 | T1 | 921 | 0.0 | 0.323 | 6.1 | LOS A | 8.2 | 57.2 | 0.41 | 0.37 | 43.4 |
| Approach | | 967 | 0.0 | 0.323 | 6.3 | LOS A | 8.2 | 57.2 | 0.41 | 0.38 | 43.1 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 7 | 14.3 | 0.024 | 42.2 | LOS C | 0.3 | 2.3 | 0.85 | 0.66 | 17.8 |
| 8 | T1 | 38 | 0.0 | 0.311 | 41.7 | LOS C | 3.5 | 24.7 | 0.92 | 0.75 | 21.7 |
| 9 | R2 | 42 | 0.0 | 0.311 | 46.0 | LOS D | 3.5 | 24.7 | 0.92 | 0.75 | 20.9 |
| Approach | | 87 | 1.2 | 0.311 | 43.8 | LOS D | 3.5 | 24.7 | 0.91 | 0.75 | 21.0 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 47 | 0.0 | 0.236 | 11.2 | LOS A | 5.5 | 38.5 | 0.38 | 0.39 | 44.8 |
| 11 | T1 | 911 | 0.0 | 0.236 | 5.7 | LOS A | 5.5 | 38.7 | 0.38 | 0.35 | 44.0 |
| 12 | R2 | 1 | 100.0 | 0.236 | 11.7 | LOS A | 5.4 | 38.2 | 0.38 | 0.34 | 44.0 |
| Approach | | 959 | 0.1 | 0.236 | 6.0 | LOS A | 5.5 | 38.7 | 0.38 | 0.35 | 44.0 |
| All Vehicles | | 2143 | 0.1 | 0.323 | 9.7 | LOS A | 8.2 | 57.2 | 0.45 | 0.40 | 38.0 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 8.0 | LOS A | 0.1 | 0.1 | 0.40 | 0.40 |
| P2 | East Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 6.9 | LOS A | 0.1 | 0.1 | 0.37 | 0.37 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 25.9 | LOS C | | | 0.66 | 0.66 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [6a. Bunnerong Rd/ General Bridges Cres AM ]

Bunnerong Rd/ General Bridges Cres, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Bunnerong Rd - S | | | | | | | | | | | |
| 1 | L2 | 75 | 0.0 | 0.136 | 5.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.17 | 35.0 |
| 2 | T1 | 454 | 0.0 | 0.136 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.07 | 57.6 |
| Approach | | 528 | 0.0 | 0.136 | 0.8 | NA | 0.0 | 0.0 | 0.00 | 0.08 | 53.4 |
| West: General Bridges Cres - W | | | | | | | | | | | |
| 10 | L2 | 285 | 0.0 | 0.205 | 4.8 | LOS A | 0.9 | 6.5 | 0.31 | 0.54 | 32.0 |
| Approach | | 285 | 0.0 | 0.205 | 4.8 | LOS A | 0.9 | 6.5 | 0.31 | 0.54 | 32.0 |
| All Vehicles | | 814 | 0.0 | 0.205 | 2.2 | NA | 0.9 | 6.5 | 0.11 | 0.25 | 45.6 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [6a. Bunnerong Rd/ General Bridges Cres PM]

Bunnerong Rd/ General Bridges Cres, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Bunnerong Rd - S | | | | | | | | | | | |
| 1 | L2 | 75 | 0.0 | 0.136 | 5.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.17 | 35.0 |
| 2 | T1 | 454 | 0.0 | 0.136 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.07 | 57.6 |
| Approach | | 528 | 0.0 | 0.136 | 0.8 | NA | 0.0 | 0.0 | 0.00 | 0.08 | 53.4 |
| West: General Bridges Cres - W | | | | | | | | | | | |
| 10 | L2 | 285 | 0.0 | 0.205 | 4.8 | LOS A | 0.9 | 6.5 | 0.31 | 0.54 | 32.0 |
| Approach | | 285 | 0.0 | 0.205 | 4.8 | LOS A | 0.9 | 6.5 | 0.31 | 0.54 | 32.0 |
| All Vehicles | | 814 | 0.0 | 0.205 | 2.2 | NA | 0.9 | 6.5 | 0.11 | 0.25 | 45.6 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [6b. Bunnerong Rd/ Sturt St AM]

Bunnerong Rd/ Sturt St, Kingsford
Stop (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| East: Sturt St - E | | | | | | | | | | | |
| 4 | L2 | 21 | 0.0 | 0.015 | 7.5 | LOS A | 0.1 | 0.4 | 0.07 | 0.94 | 44.7 |
| Approach | | 21 | 0.0 | 0.015 | 7.5 | LOS A | 0.1 | 0.4 | 0.07 | 0.94 | 44.7 |
| North: Bunnerong Rd - N | | | | | | | | | | | |
| 7 | L2 | 21 | 0.0 | 0.021 | 5.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.31 | 47.0 |
| 8 | T1 | 428 | 0.0 | 0.105 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 59.7 |
| Approach | | 449 | 0.0 | 0.105 | 0.3 | NA | 0.0 | 0.0 | 0.00 | 0.03 | 59.3 |
| All Vehicles | | 471 | 0.0 | 0.105 | 0.6 | NA | 0.1 | 0.4 | 0.00 | 0.07 | 58.3 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [6b. Bunnerong Rd/ Sturt St PM]

Bunnerong Rd/ Sturt St, Kingsford
Stop (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| East: Sturt St - E | | | | | | | | | | | |
| 4 | L2 | 21 | 0.0 | 0.015 | 7.6 | LOS A | 0.1 | 0.4 | 0.12 | 0.91 | 44.7 |
| Approach | | 21 | 0.0 | 0.015 | 7.6 | LOS A | 0.1 | 0.4 | 0.12 | 0.91 | 44.7 |
| North: Bunnerong Rd - N | | | | | | | | | | | |
| 7 | L2 | 21 | 0.0 | 0.032 | 5.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.20 | 49.4 |
| 8 | T1 | 675 | 0.0 | 0.162 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 59.7 |
| Approach | | 696 | 0.0 | 0.162 | 0.2 | NA | 0.0 | 0.0 | 0.00 | 0.02 | 59.5 |
| All Vehicles | | 717 | 0.0 | 0.162 | 0.4 | NA | 0.1 | 0.4 | 0.00 | 0.04 | 58.8 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# Appendix C

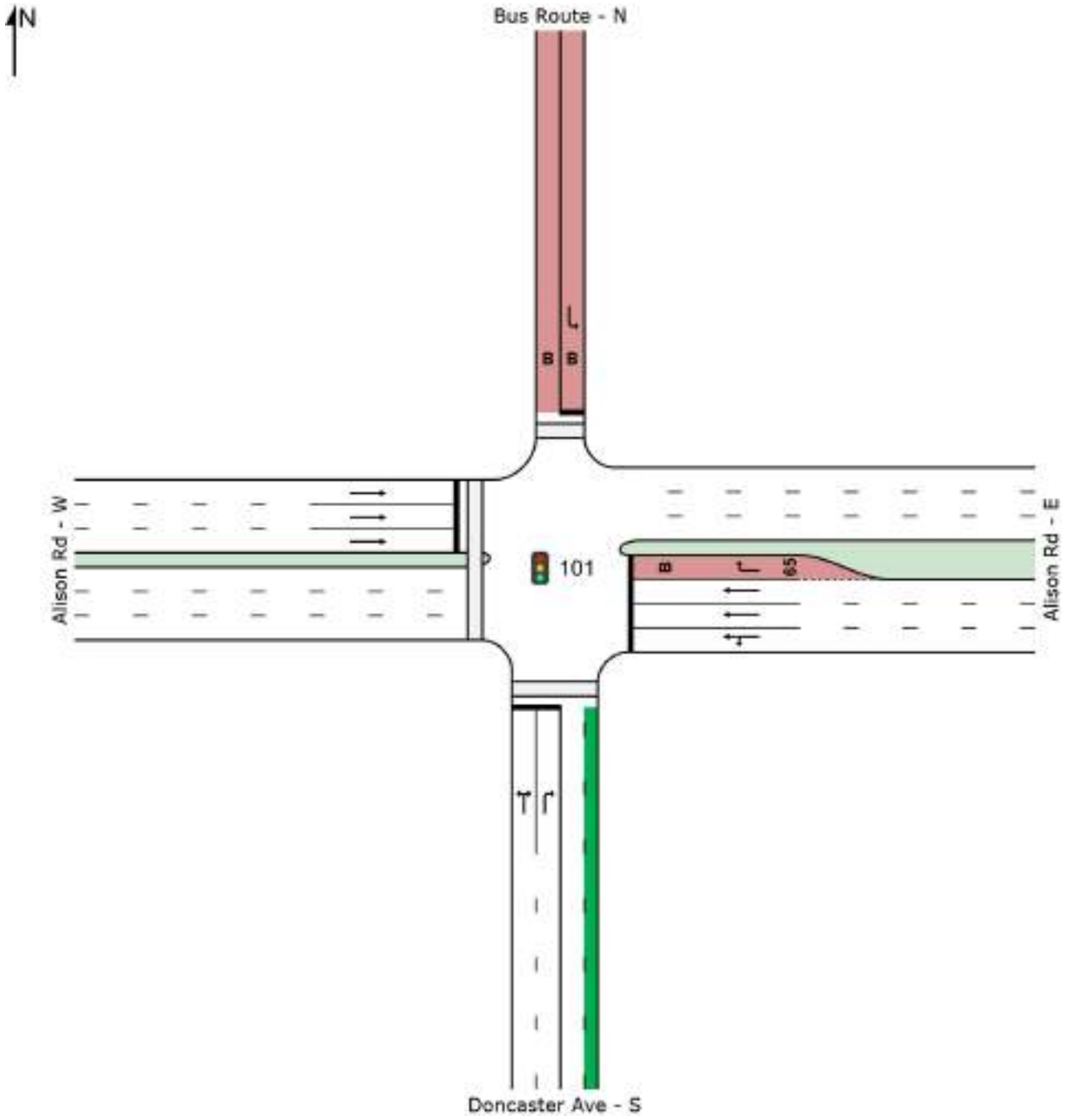
## Attachment 3 – AIMSUN Volumes Layouts and Phasing

# SITE LAYOUT

## Site: 101 [1. Alison Rd/ Doncaster Ave AM - Design]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated

Proposed Layout



# PHASING SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave AM - Design]

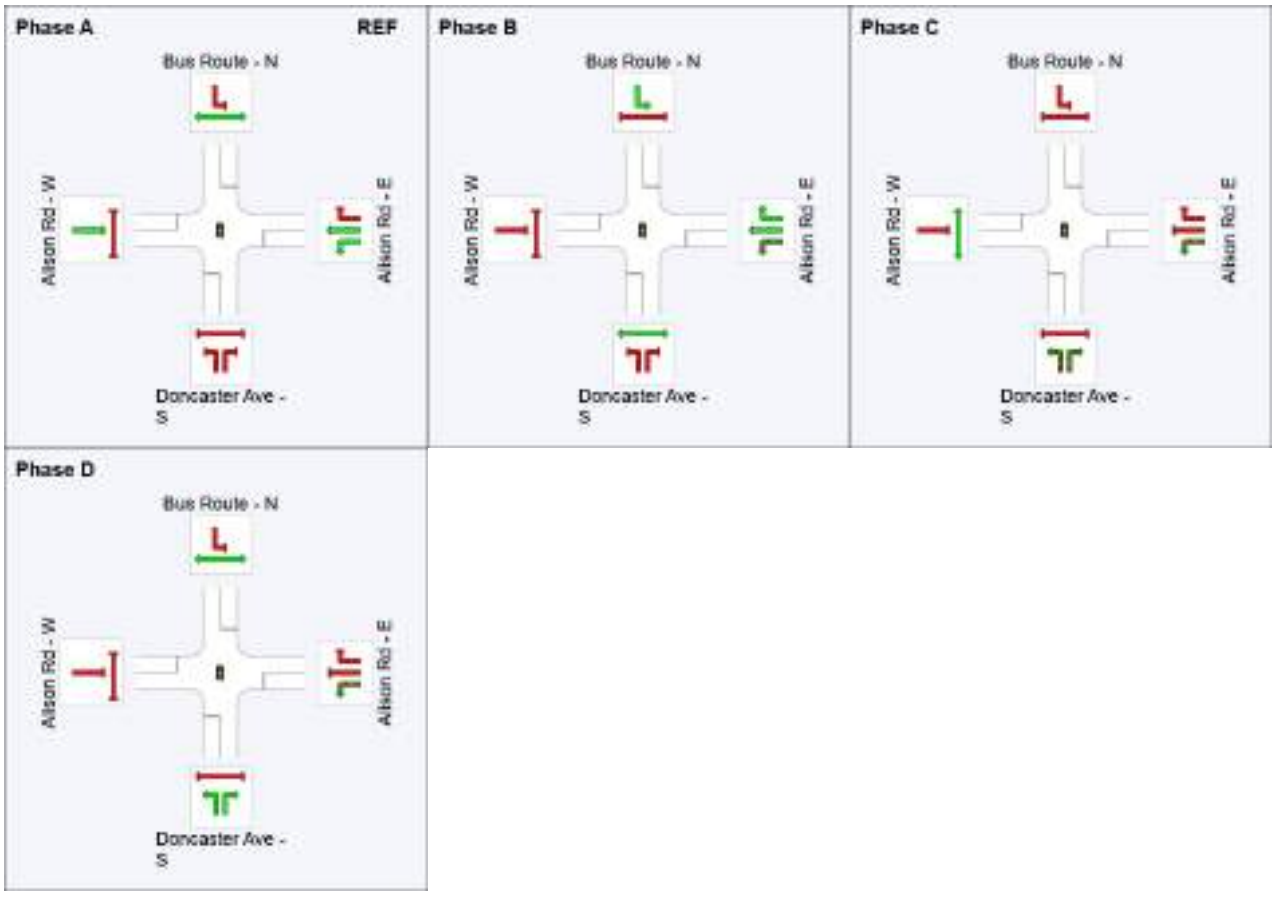
Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 0 | 50 | 66 | 88 |
| Green Time (sec) | 44 | 10 | 16 | 6 |
| Phase Time (sec) | 50 | 16 | 22 | 12 |
| Phase Split | 50% | 16% | 22% | 12% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave PM - Design]

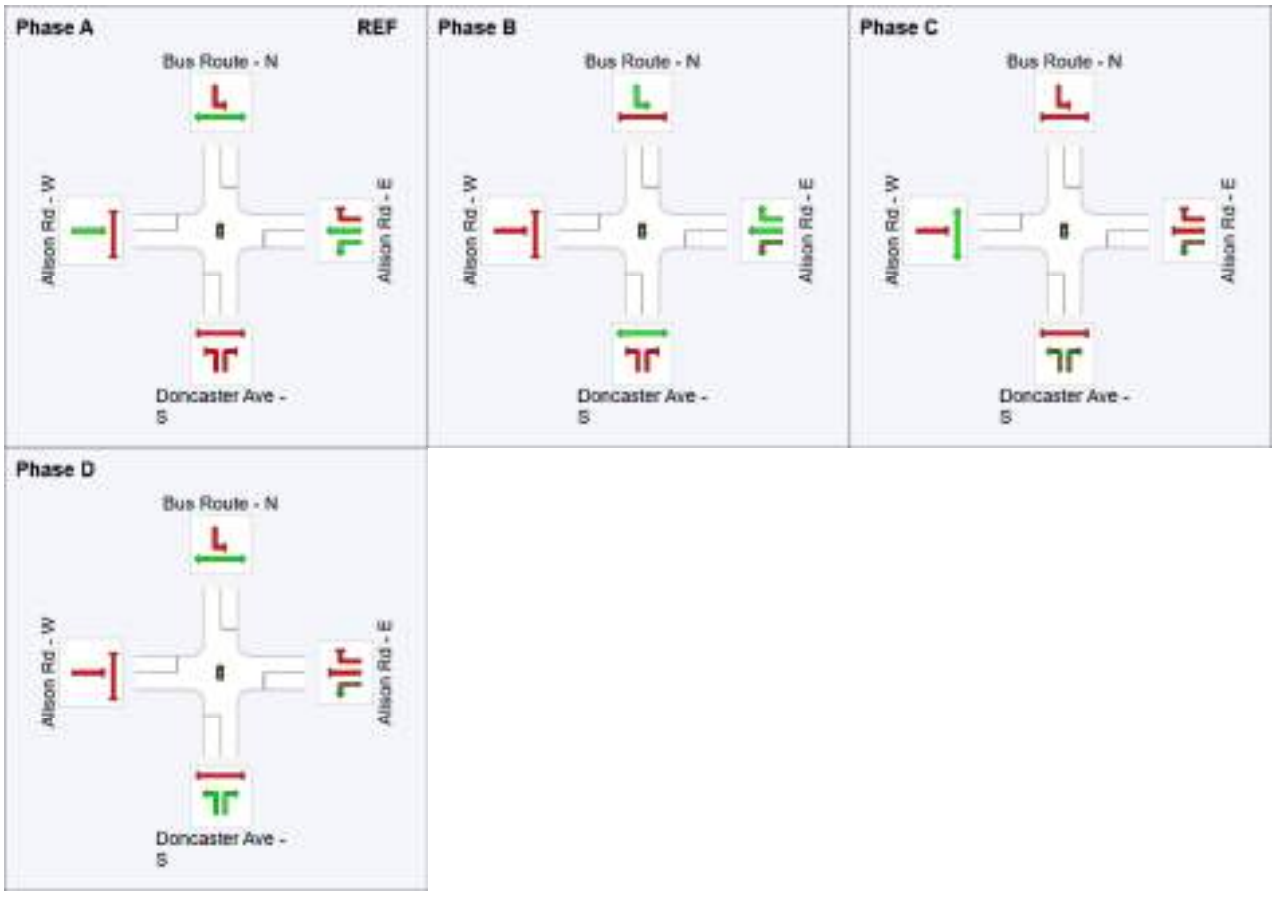
Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 0 | 50 | 66 | 88 |
| Green Time (sec) | 44 | 10 | 16 | 6 |
| Phase Time (sec) | 50 | 16 | 22 | 12 |
| Phase Split | 50% | 16% | 22% | 12% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



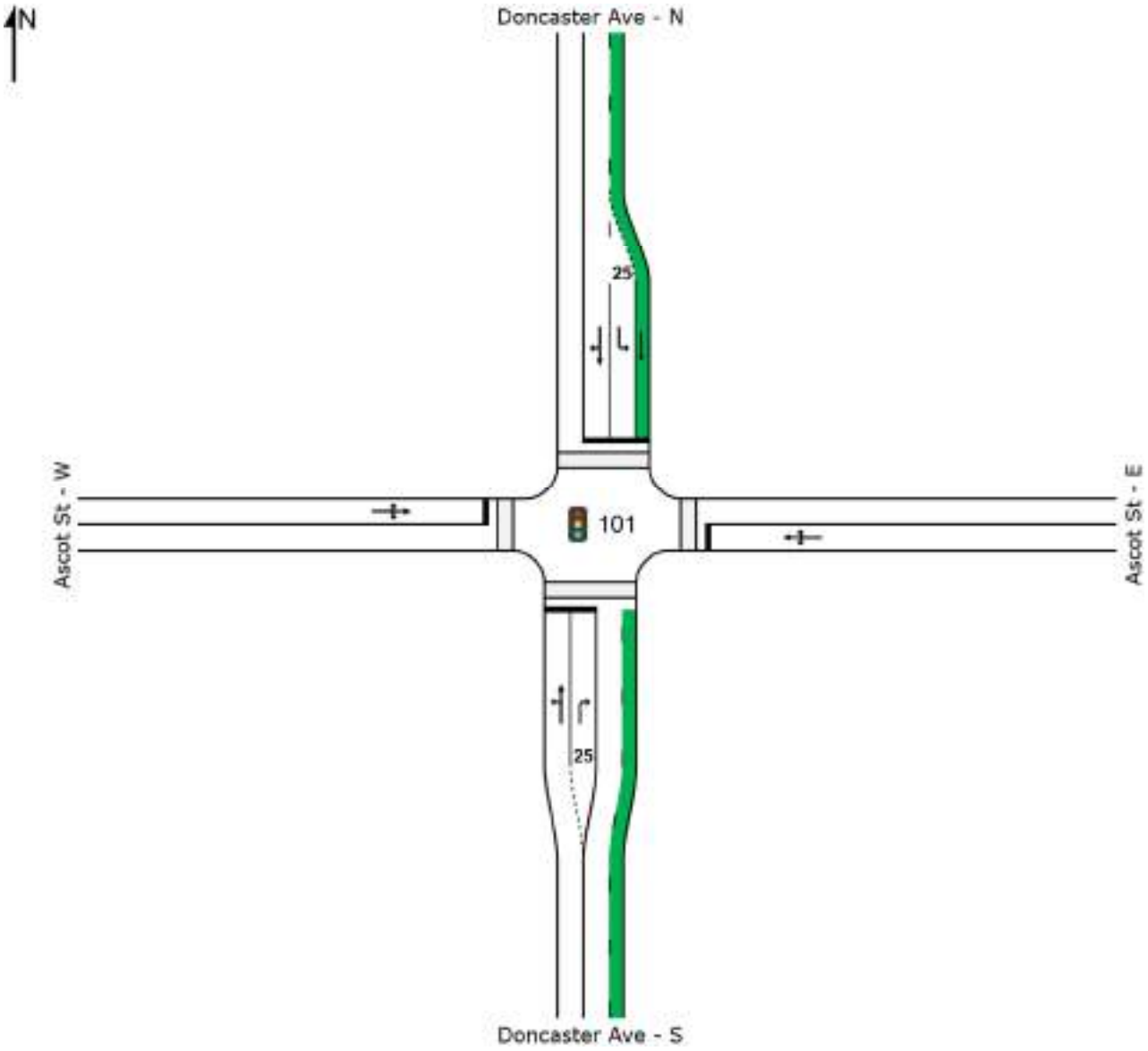

REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101 [7. Doncaster Ave/ Ascot St AM - Design]

Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated



# PHASING SUMMARY

## Site: 101 [7. Doncaster Ave/ Ascot St AM - Design]

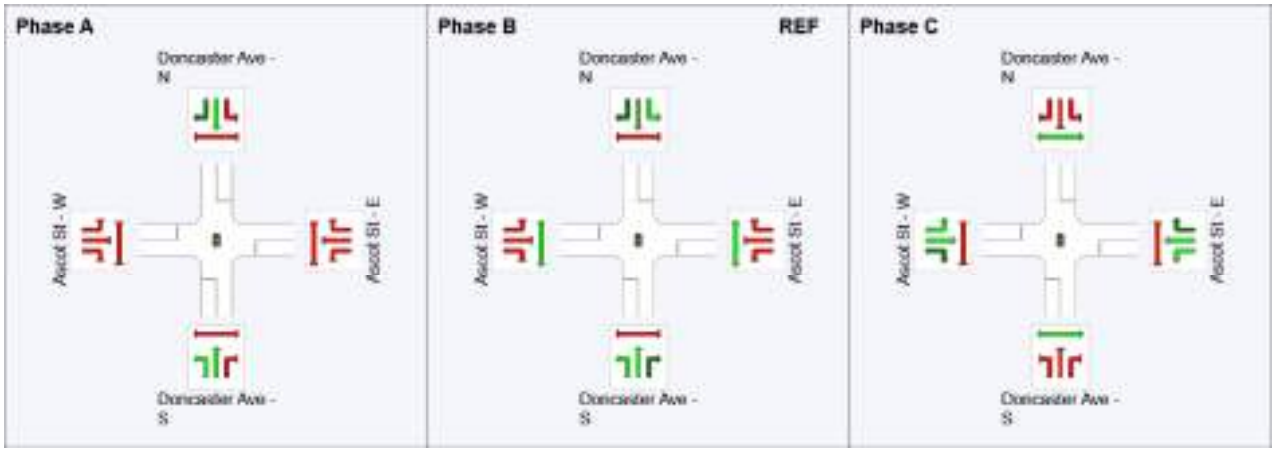
Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Phase Times)

**Phase Times specified by the user**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase B**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 33 | 0 | 16 |
| Green Time (sec) | 53 | 10 | 11 |
| Phase Time (sec) | 59 | 16 | 15 |
| Phase Split | 66% | 18% | 17% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [7. Doncaster Ave/ Ascot St PM - Design]

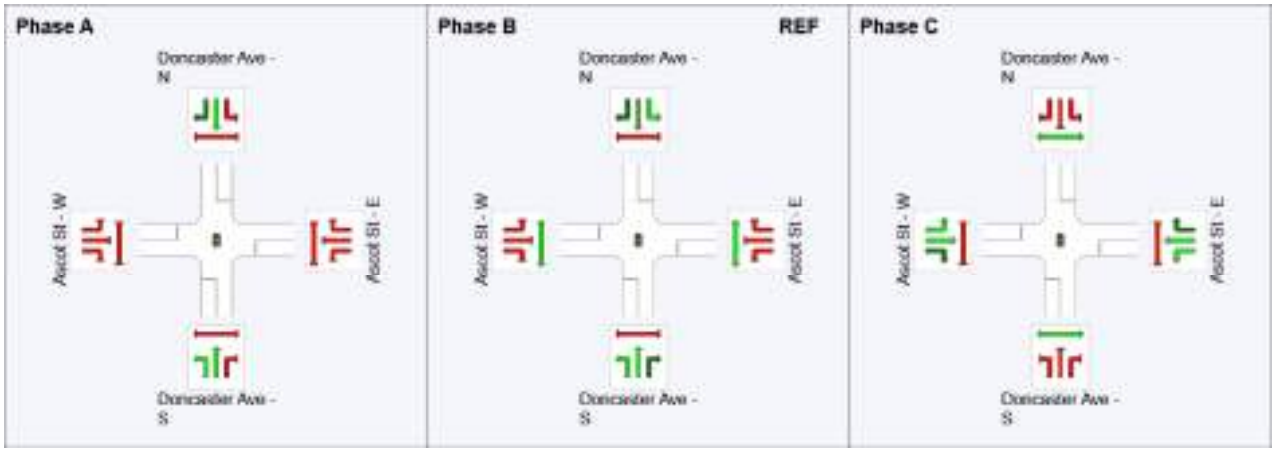
Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase B**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 59 | 0 | 44 |
| Green Time (sec) | 25 | 38 | 9 |
| Phase Time (sec) | 31 | 44 | 15 |
| Phase Split | 34% | 49% | 17% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



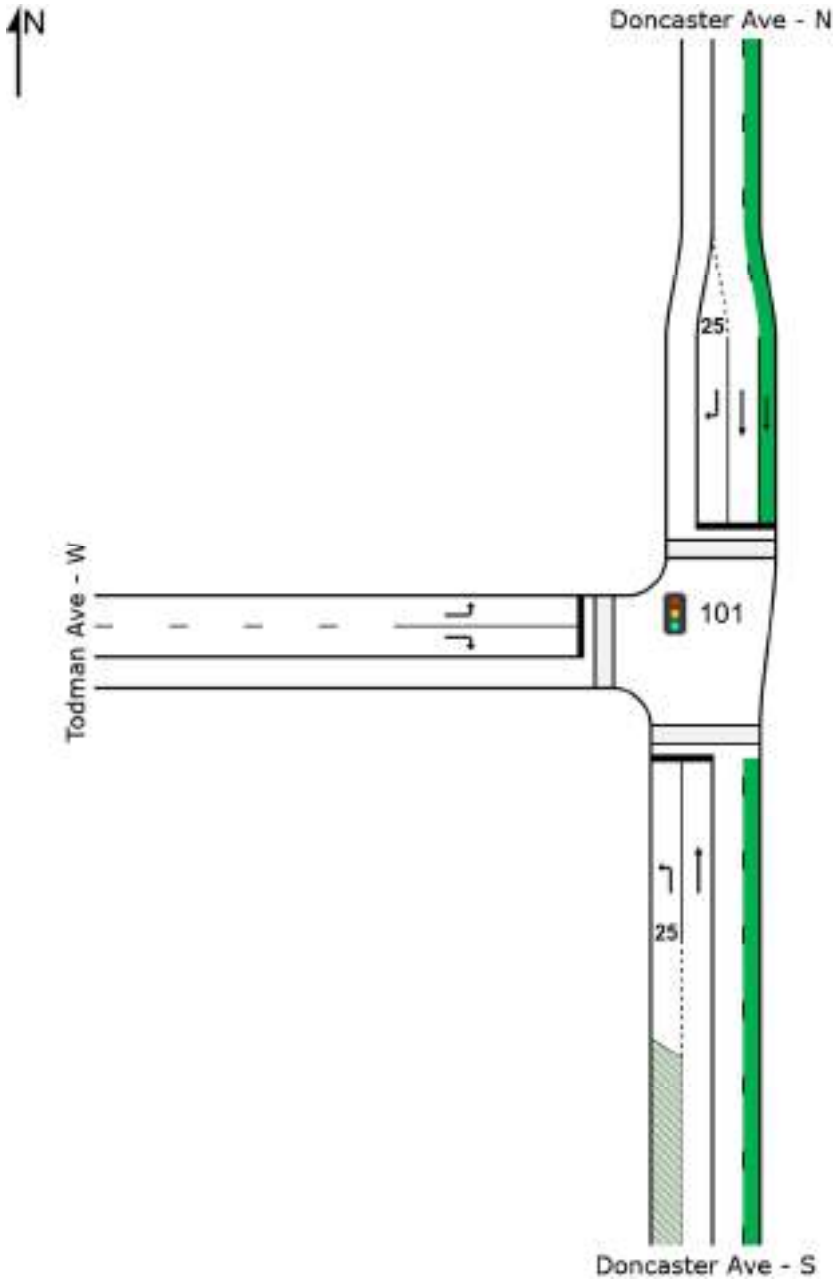

REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101 [2. Doncaster Ave/ Todman Ave AM - Design]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated



# PHASING SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave AM - Design]

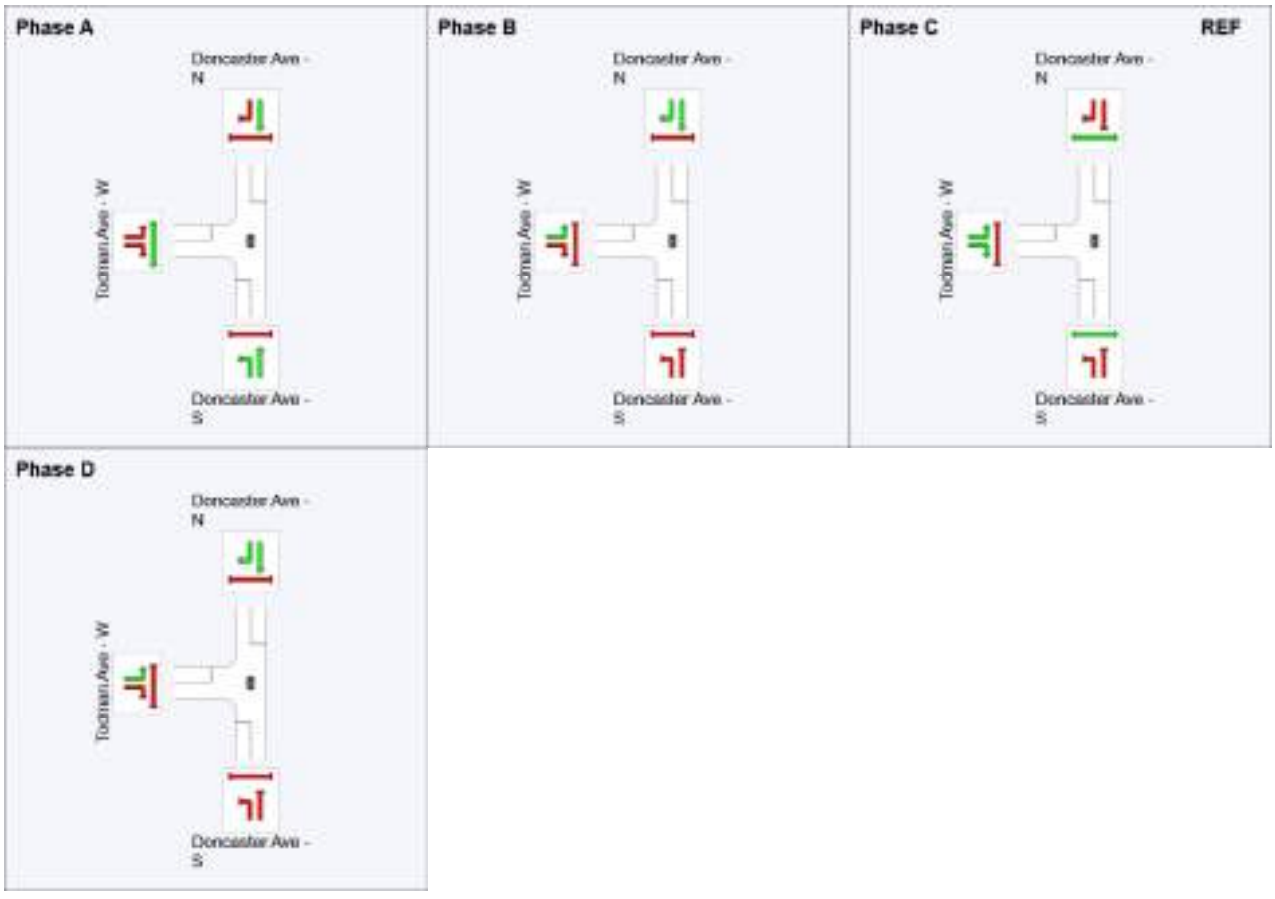
Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 35 | 70 | 0 | 16 |
| Green Time (sec) | 29 | 24 | 10 | 13 |
| Phase Time (sec) | 35 | 30 | 16 | 19 |
| Phase Split | 35% | 30% | 16% | 19% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave PM - Design]

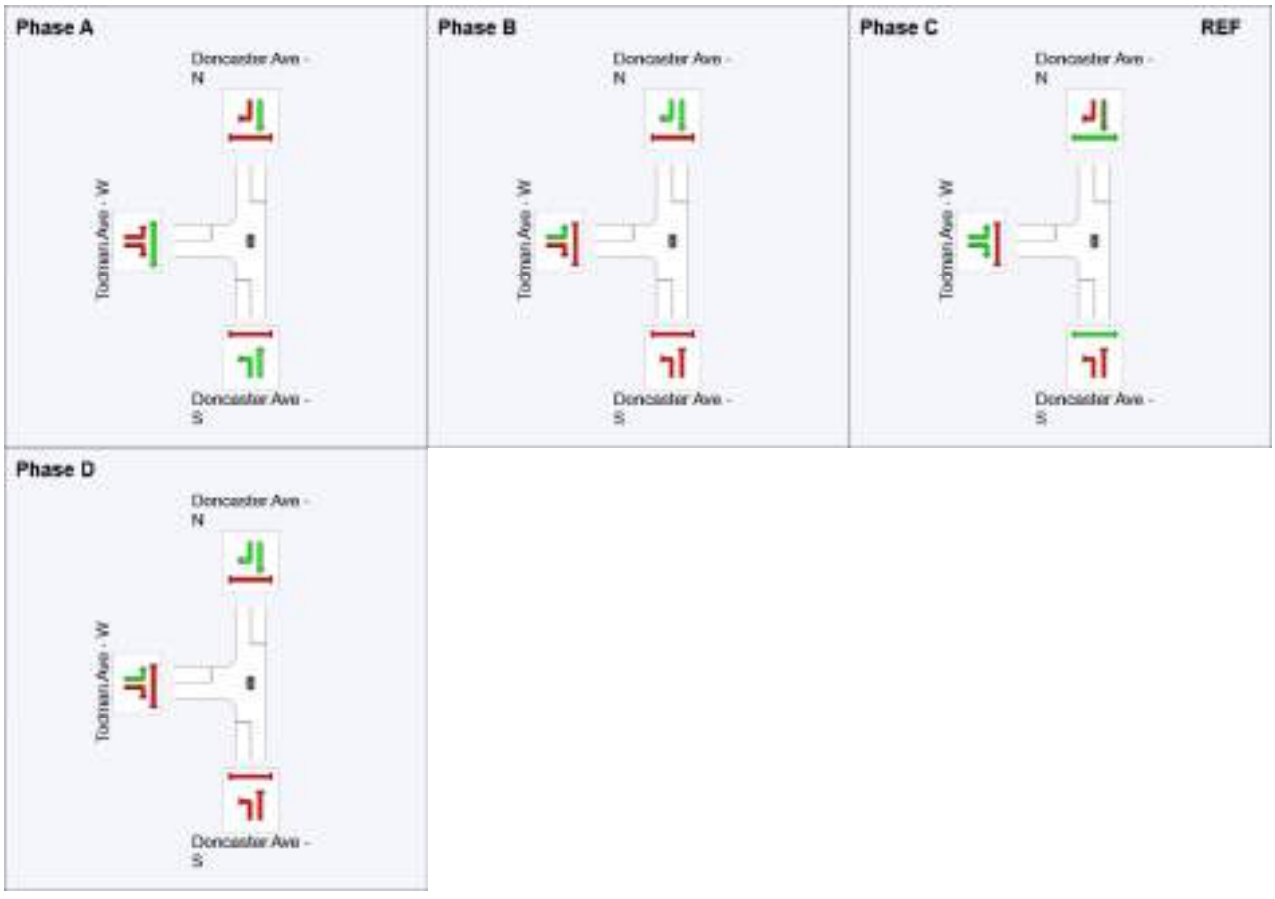
Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 35 | 66 | 0 | 16 |
| Green Time (sec) | 25 | 28 | 10 | 13 |
| Phase Time (sec) | 31 | 34 | 16 | 19 |
| Phase Split | 31% | 34% | 16% | 19% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

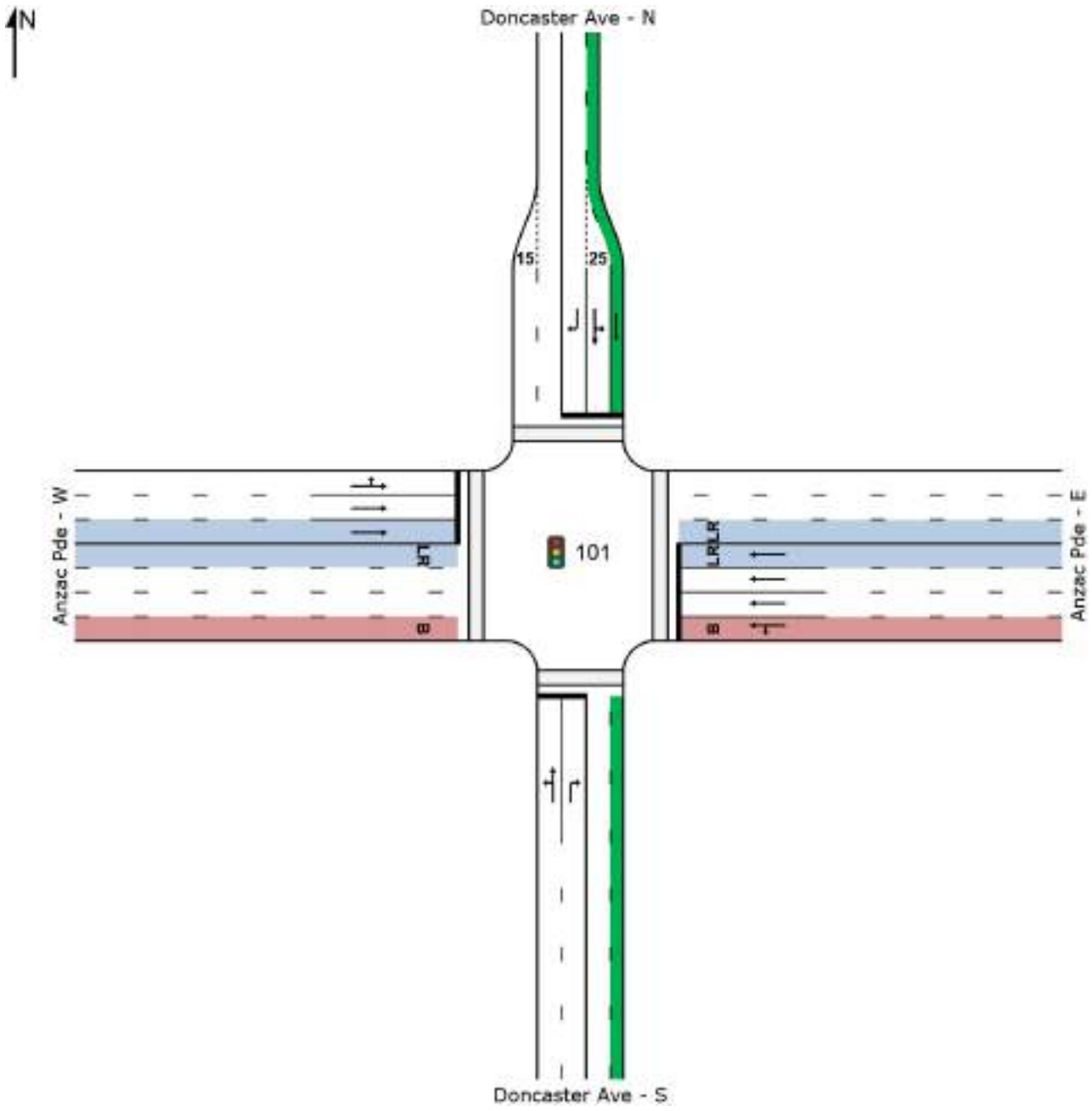
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM - Design]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated

Proposed Layout



# PHASING SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM - Design]

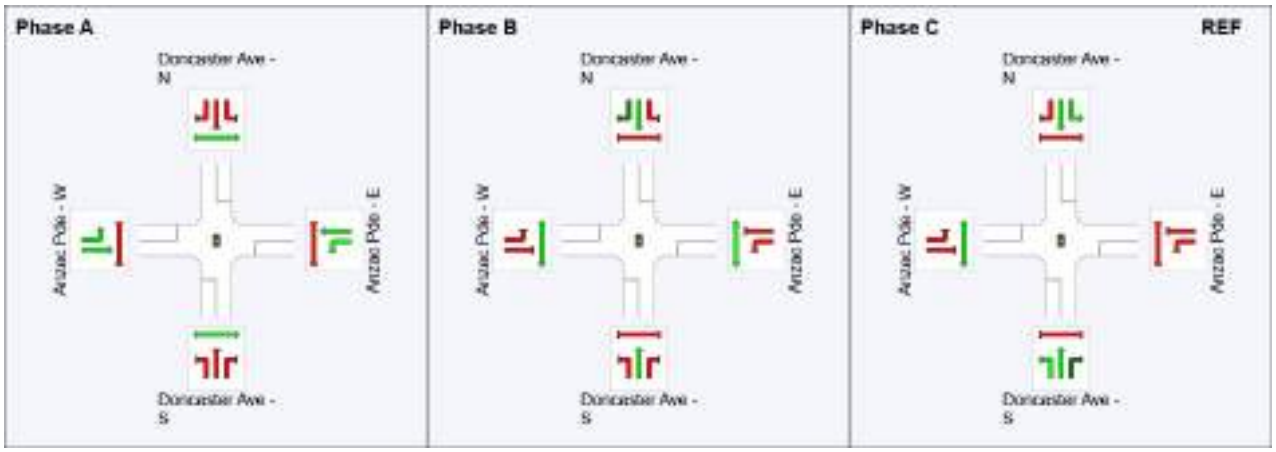
Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 19 | 68 | 0 |
| Green Time (sec) | 43 | 16 | 13 |
| Phase Time (sec) | 49 | 22 | 19 |
| Phase Split | 54% | 24% | 21% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade PM - Design]

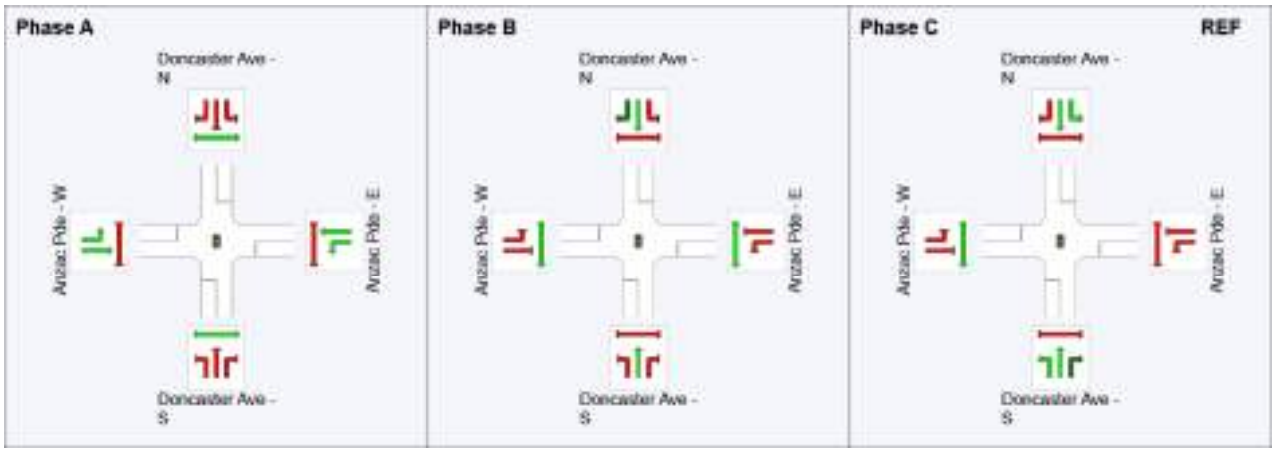
Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated  Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 15 | 68 | 0 |
| Green Time (sec) | 47 | 16 | 9 |
| Phase Time (sec) | 53 | 22 | 15 |
| Phase Split | 59% | 24% | 17% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

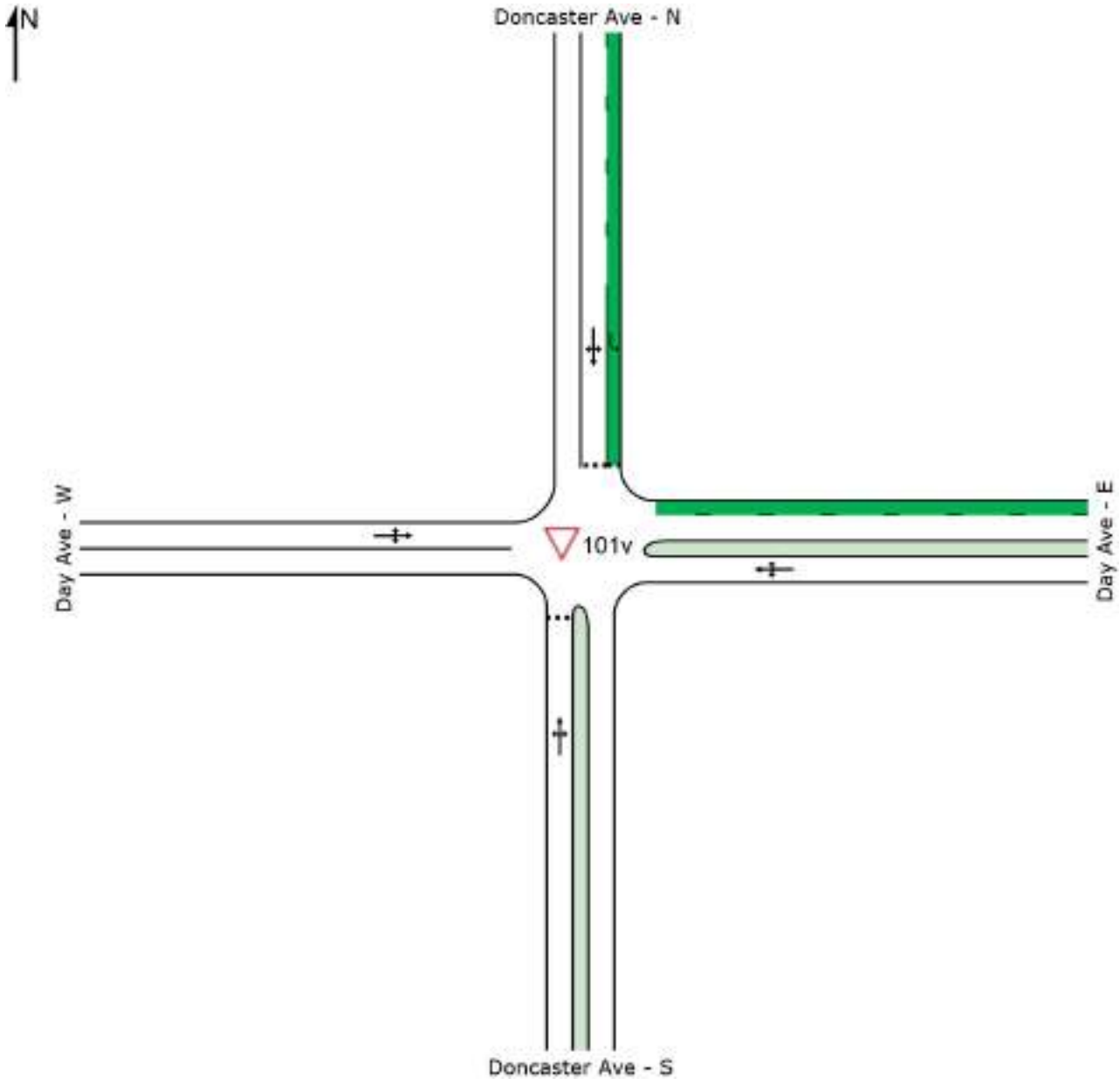
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101v [9. Doncaster Ave/ Day Ave AM - Design - Priority]

Doncaster Avenue/ Day Avenue, Kensington
Giveway / Yield (Two-Way)

Proposed Layout





Organisation: GTA CONSULTANTS | Created: Thursday, 1 March 2018 10:33:56 AM
Project: P:\N13800-13899\N138320 Randwick Cycleways - Centennial Park to Kingsford\Modelling\180228sid-N138320 Randwick Cycleways Base SIDRAs - Survey Volumes.sip7

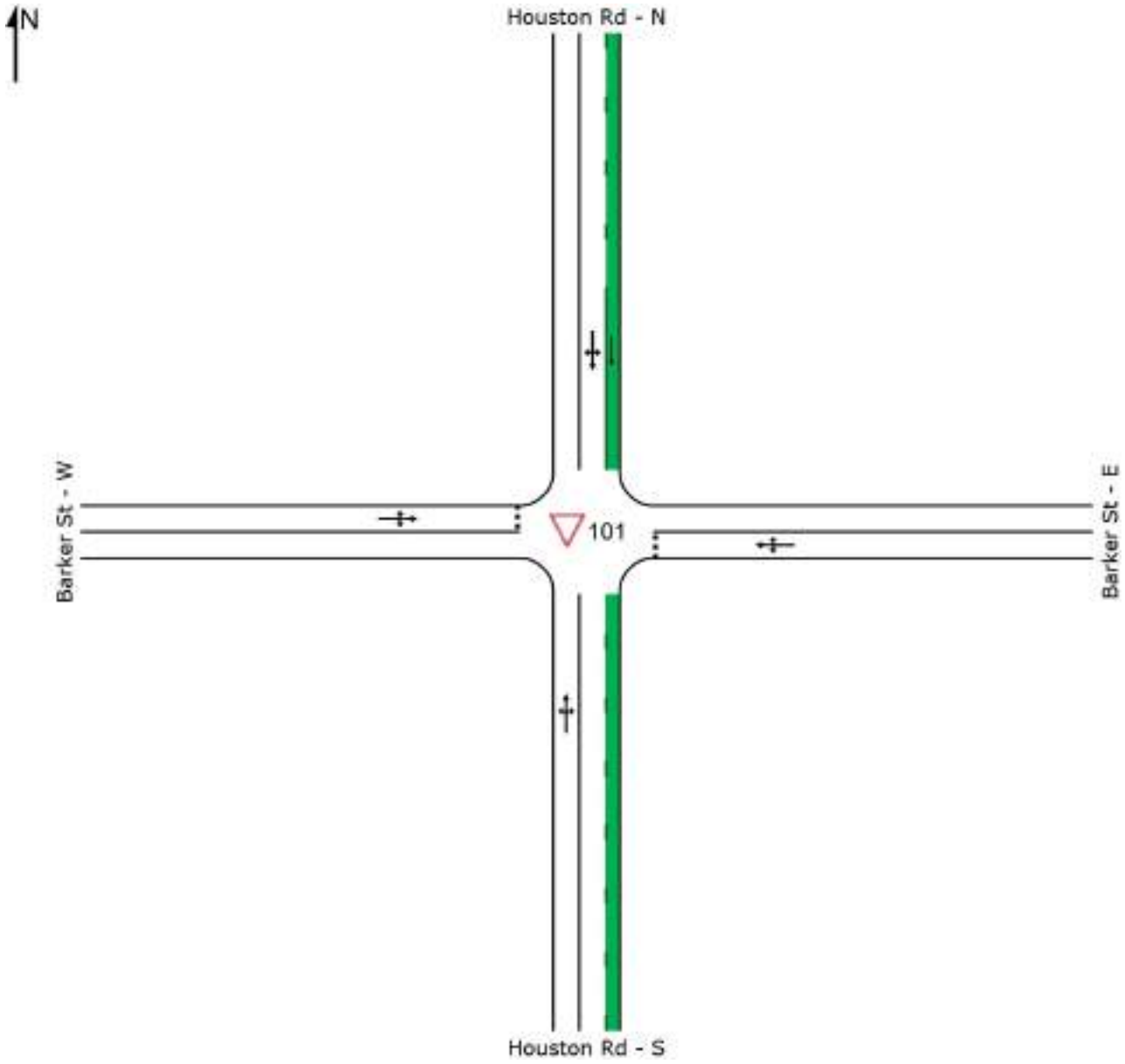
# SITE LAYOUT

## Site: 101 [4. Houston Rd/ Barker St AM - Design - Priority]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

Proposed Layout

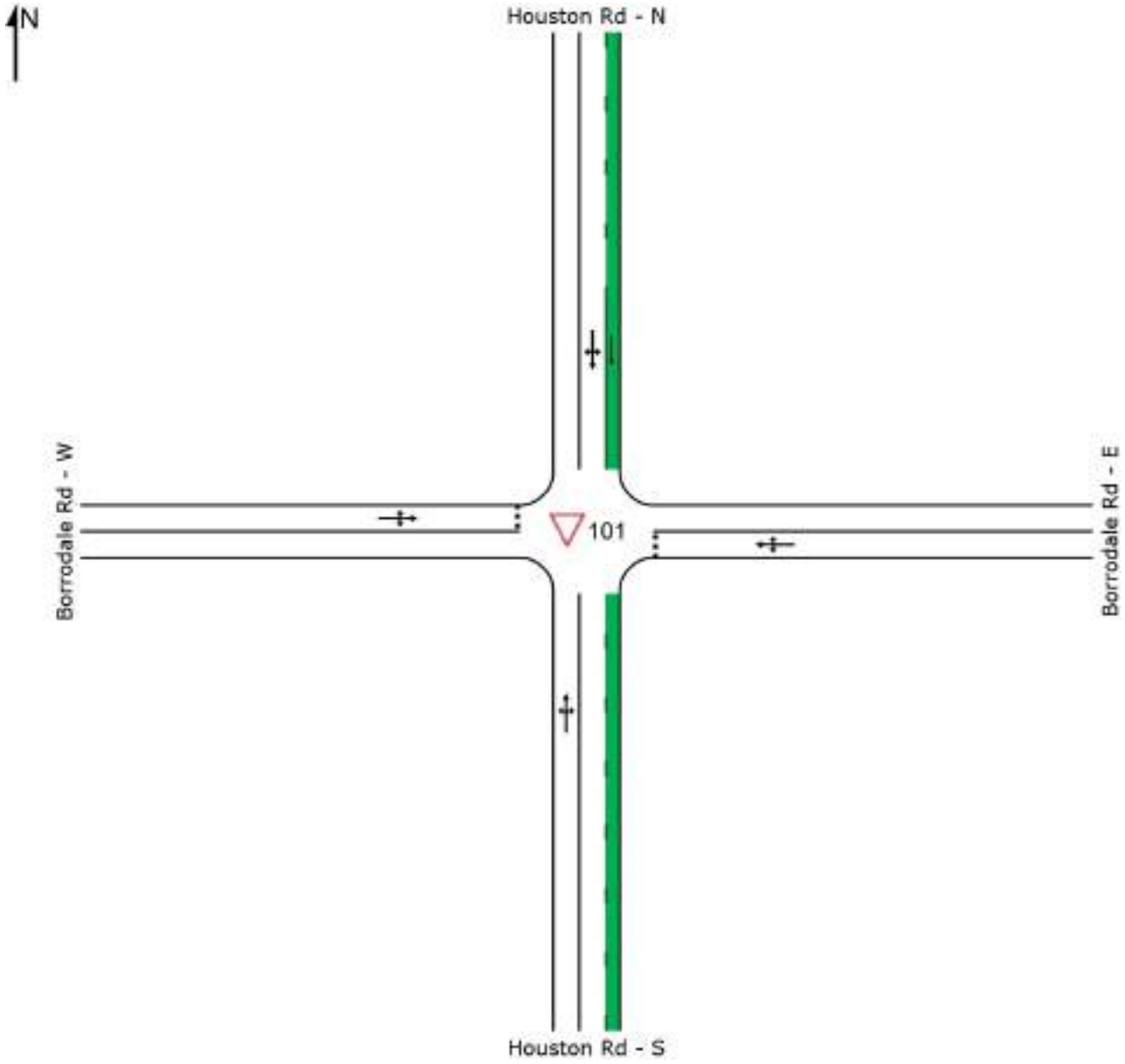


# SITE LAYOUT

## Site: 101 [8. Houston Rd/ Borrodale Rd AM - Design - Priority]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

Proposed Layout



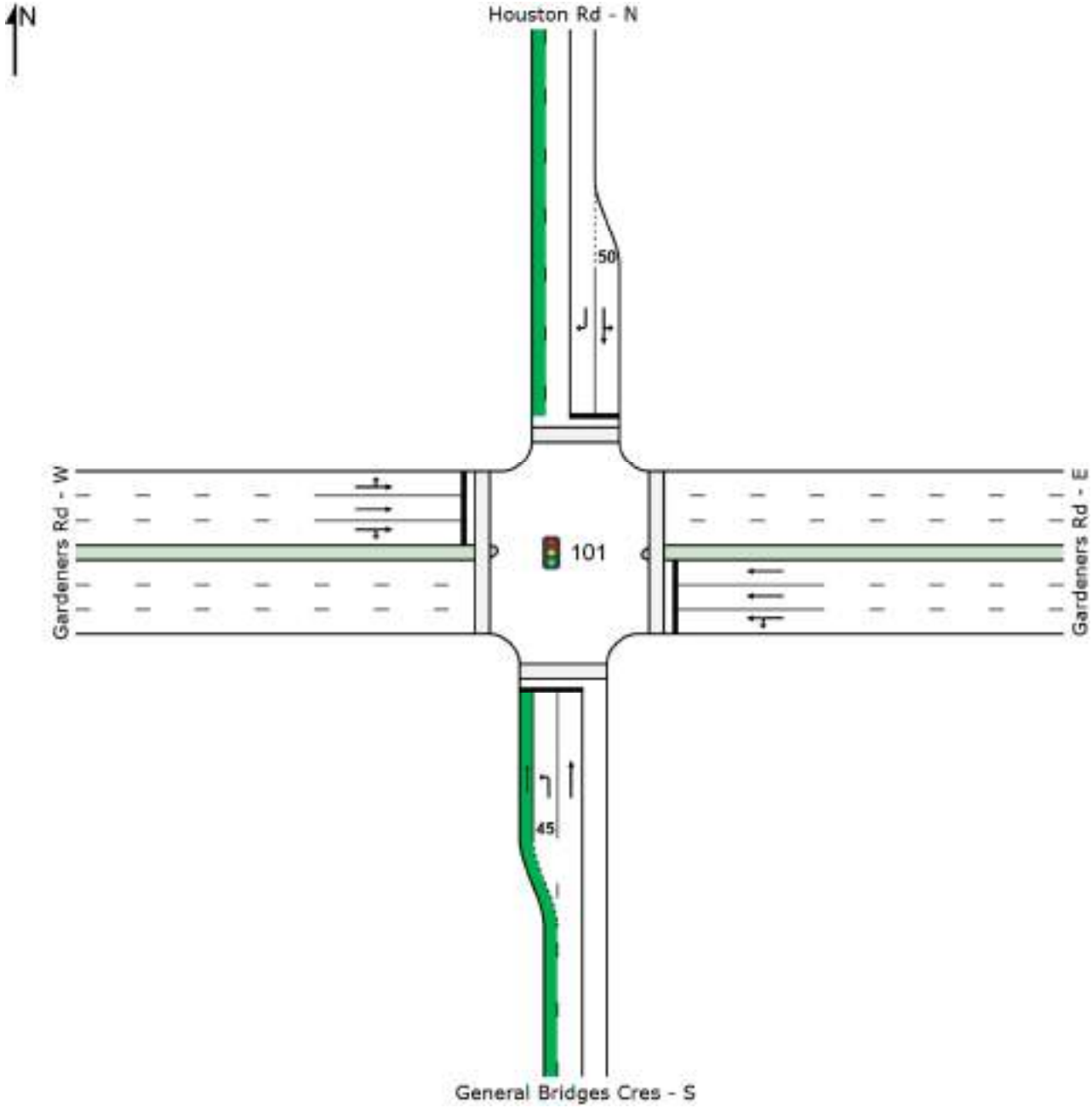


Organisation: GTA CONSULTANTS | Created: Monday, 19 February 2018 6:43:12 PM
Project: P:\N13800-13899\N138320 Randwick Cycleways - Centennial Park to Kingsford\Modelling\180219sid-N138320 Randwick Cycleways Base SIDRAs - Survey Volumes.sip7

# SITE LAYOUT

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM - Design]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated



# PHASING SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM - Design]

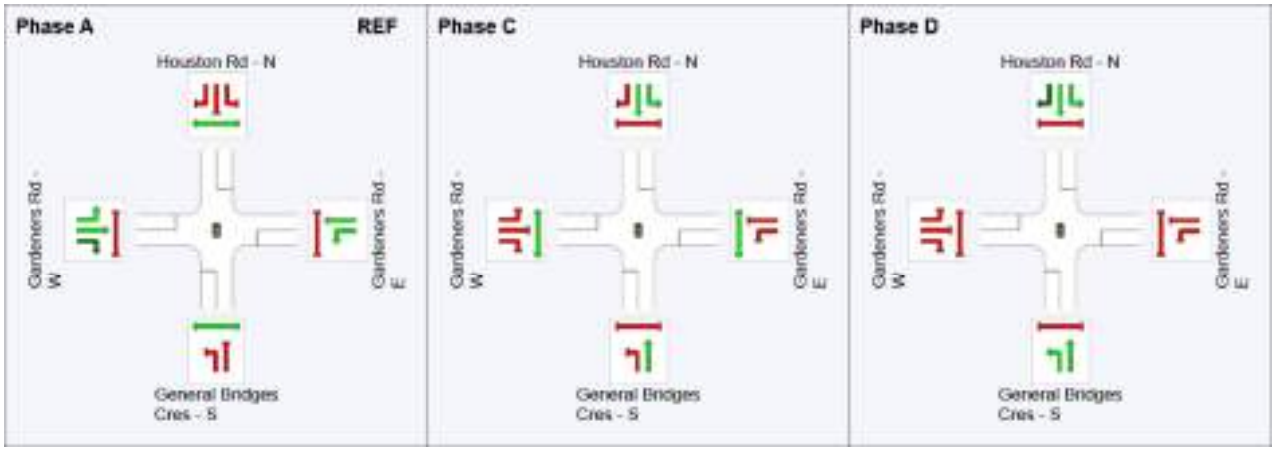
Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B*, C, D**
**Output Phase Sequence: A, C, D**
(* Variable Phase)

**Phase Timing Results**

| Phase | A | C | D |
|---|---|---|---|
| Phase Change Time (sec) | 0 | 62 | 84 |
| Green Time (sec) | 56 | 16 | 10 |
| Phase Time (sec) | 62 | 22 | 16 |
| Phase Split | 62% | 22% | 16% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres PM - Design]

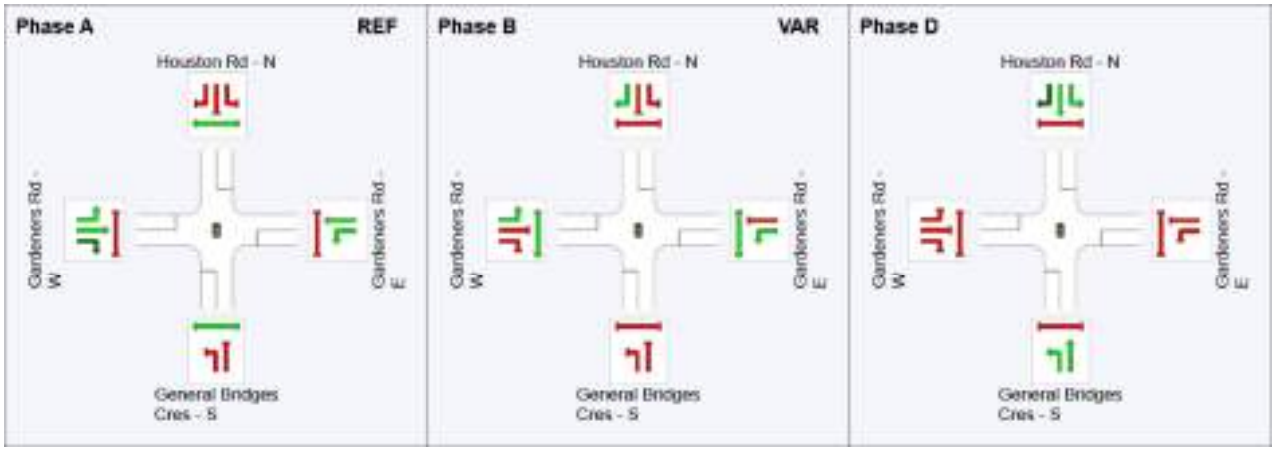
Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated  Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B*, C, D**
**Output Phase Sequence: A, B*, D**
(* Variable Phase)

**Phase Timing Results**

| Phase | A | B | D |
|---|---|---|---|
| Phase Change Time (sec) | 0 | 58 | 80 |
| Green Time (sec) | 52 | 16 | 14 |
| Phase Time (sec) | 58 | 22 | 20 |
| Phase Split | 58% | 22% | 20% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



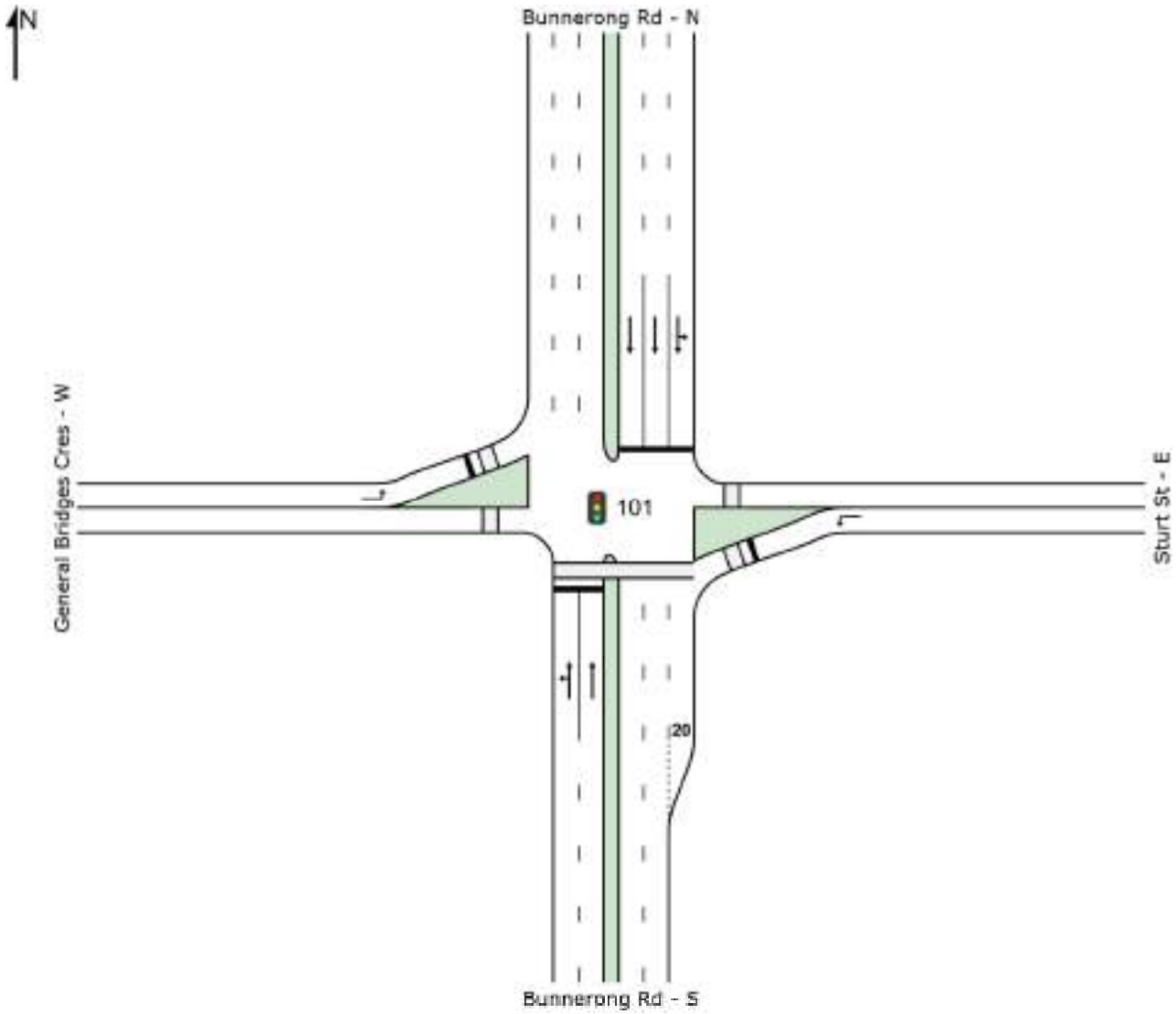

REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101 [6. Bunnerong Rd/ General Bridges Cres/ Sturt St AM - Design - Pedestrian Test]

Bunnerong Rd/ Sturt St/ General Bridges Cres, Kingsford
Signals - Fixed Time Isolated



# PHASING SUMMARY

## Site: 101 [6. Bunnerong Rd/ General Bridges Cres/ Sturt St AM - Design - Pedestrian Test]

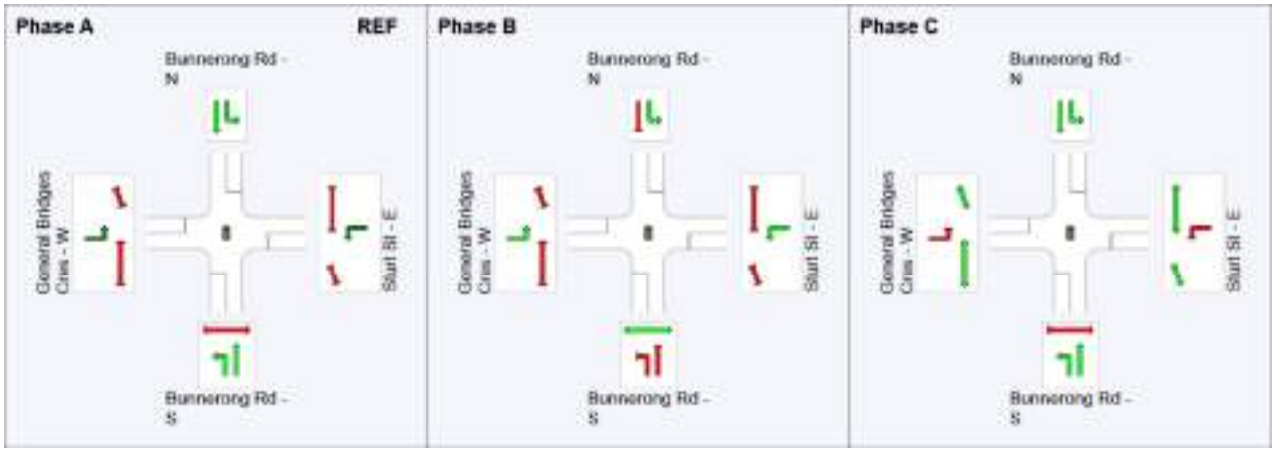
Bunnerong Rd/ Sturt St/ General Bridges Cres, Kingsford
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 0 | 12 | 52 |
| Green Time (sec) | 6 | 34 | 2 |
| Phase Time (sec) | 12 | 40 | 8 |
| Phase Split | 20% | 67% | 13% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [6. Bunnerong Rd/ General Bridges Cres/ Sturt St PM - Design - Pedestrian Test]

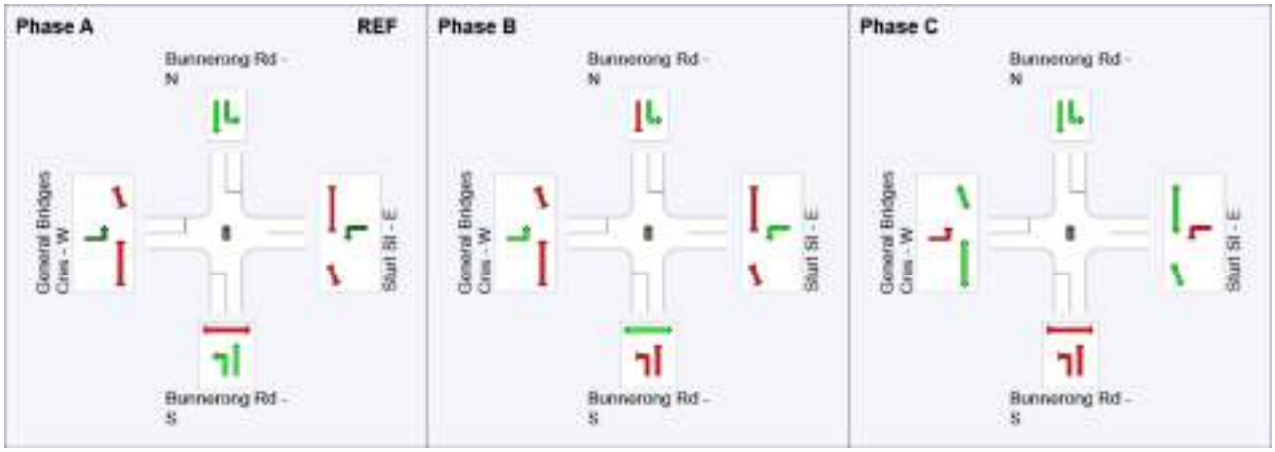
Bunnerong Rd/ Sturt St/ General Bridges Cres, Kingsford
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 0 | 33 | 48 |
| Green Time (sec) | 27 | 9 | 6 |
| Phase Time (sec) | 33 | 15 | 12 |
| Phase Split | 55% | 25% | 20% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# Appendix D

## Attachment 4 – AIMSUN Volumes with Proposed Cycleway Intersection Operation

# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave AM - Design]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 71 | 0.0 | 0.512 | 37.4 | LOS C | 11.0 | 77.2 | 0.89 | 0.81 | 33.5 |
| 3 | R2 | 462 | 0.0 | 0.512 | 37.4 | LOS C | 11.0 | 77.2 | 0.89 | 0.81 | 34.3 |
| Approach | | 533 | 0.0 | 0.512 | 37.4 | LOS C | 11.0 | 77.2 | 0.89 | 0.81 | 34.2 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 606 | 0.0 | 0.596 | 18.0 | LOS B | 20.3 | 139.8 | 0.64 | 0.77 | 44.7 |
| 5 | T1 | 1500 | 0.0 | 0.596 | 13.1 | LOS A | 21.0 | 146.7 | 0.67 | 0.62 | 54.8 |
| 6 | R2 | 1 | 100.0 | 0.010 | 52.2 | LOS D | 0.0 | 0.6 | 0.92 | 0.61 | 31.4 |
| Approach | | 2107 | 0.0 | 0.596 | 14.6 | LOS B | 21.0 | 146.7 | 0.66 | 0.66 | 51.6 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| Approach | | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1014 | 0.0 | 0.394 | 20.3 | LOS B | 11.1 | 77.6 | 0.72 | 0.62 | 49.4 |
| Approach | | 1014 | 0.0 | 0.394 | 20.3 | LOS B | 11.1 | 77.6 | 0.72 | 0.62 | 49.4 |
| All Vehicles | | 3655 | 0.1 | 0.596 | 19.5 | LOS B | 21.0 | 146.7 | 0.71 | 0.67 | 47.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 12.0 | LOS B | 0.1 | 0.1 | 0.49 | 0.49 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 158 | 33.5 | LOS D | | | 0.79 | 0.79 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave PM - Design]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 160 | 0.0 | 0.497 | 37.3 | LOS C | 10.6 | 74.5 | 0.89 | 0.81 | 33.6 |
| 3 | R2 | 357 | 0.0 | 0.497 | 37.2 | LOS C | 10.6 | 74.5 | 0.89 | 0.81 | 34.4 |
| Approach | | 517 | 0.0 | 0.497 | 37.3 | LOS C | 10.6 | 74.5 | 0.89 | 0.81 | 34.1 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 514 | 0.0 | 0.478 | 15.8 | LOS B | 14.2 | 97.4 | 0.55 | 0.74 | 46.0 |
| 5 | T1 | 1187 | 0.0 | 0.478 | 11.8 | LOS A | 15.1 | 105.7 | 0.60 | 0.55 | 56.1 |
| 6 | R2 | 1 | 100.0 | 0.010 | 52.2 | LOS D | 0.0 | 0.6 | 0.92 | 0.61 | 31.4 |
| Approach | | 1702 | 0.1 | 0.478 | 13.0 | LOS A | 15.1 | 105.7 | 0.59 | 0.61 | 52.7 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| Approach | | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1461 | 0.0 | 0.568 | 22.4 | LOS B | 17.7 | 123.6 | 0.80 | 0.71 | 47.9 |
| Approach | | 1461 | 0.0 | 0.568 | 22.4 | LOS B | 17.7 | 123.6 | 0.80 | 0.71 | 47.9 |
| All Vehicles | | 3681 | 0.1 | 0.568 | 20.1 | LOS B | 17.7 | 123.6 | 0.71 | 0.68 | 47.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 12.0 | LOS B | 0.1 | 0.1 | 0.49 | 0.49 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 158 | 33.5 | LOS D | | | 0.79 | 0.79 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [7. Doncaster Ave/ Ascot St AM - Design]

Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Phase Times)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 1 | 0.0 | 0.392 | 7.0 | LOS A | 7.7 | 54.2 | 0.35 | 0.31 | 36.6 |
| 2 | T1 | 551 | 0.0 | 0.392 | 3.6 | LOS A | 7.7 | 54.2 | 0.35 | 0.31 | 37.6 |
| 3 | R2 | 26 | 0.0 | 0.179 | 44.9 | LOS D | 1.1 | 7.8 | 0.94 | 0.72 | 13.5 |
| Approach | | 578 | 0.0 | 0.392 | 5.5 | LOS A | 7.7 | 54.2 | 0.38 | 0.33 | 36.3 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 7 | 0.0 | 0.113 | 42.5 | LOS C | 0.9 | 6.3 | 0.92 | 0.69 | 14.6 |
| 5 | T1 | 5 | 0.0 | 0.113 | 39.3 | LOS C | 0.9 | 6.3 | 0.92 | 0.69 | 13.3 |
| 6 | R2 | 9 | 0.0 | 0.113 | 42.5 | LOS C | 0.9 | 6.3 | 0.92 | 0.69 | 19.9 |
| Approach | | 22 | 0.0 | 0.113 | 41.7 | LOS C | 0.9 | 6.3 | 0.92 | 0.69 | 16.9 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.010 | 42.2 | LOS C | 0.1 | 0.6 | 0.91 | 0.60 | 19.5 |
| 8 | T1 | 559 | 0.0 | 0.537 | 5.3 | LOS A | 11.8 | 82.5 | 0.46 | 0.46 | 36.2 |
| 9 | R2 | 98 | 0.0 | 0.537 | 8.8 | LOS A | 11.8 | 82.5 | 0.46 | 0.46 | 35.8 |
| Approach | | 659 | 0.0 | 0.537 | 6.0 | LOS A | 11.8 | 82.5 | 0.46 | 0.46 | 36.1 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 23 | 0.0 | 0.255 | 43.6 | LOS D | 2.2 | 15.6 | 0.94 | 0.73 | 22.3 |
| 11 | T1 | 17 | 0.0 | 0.255 | 40.2 | LOS C | 2.2 | 15.6 | 0.94 | 0.73 | 13.1 |
| 12 | R2 | 14 | 0.0 | 0.255 | 43.7 | LOS D | 2.2 | 15.6 | 0.94 | 0.73 | 18.3 |
| Approach | | 54 | 0.0 | 0.255 | 42.6 | LOS D | 2.2 | 15.6 | 0.94 | 0.73 | 19.0 |
| All Vehicles | | 1313 | 0.0 | 0.537 | 7.9 | LOS A | 11.8 | 82.5 | 0.45 | 0.42 | 34.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P2 | East Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 39.3 | LOS D | | | 0.94 | 0.94 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [7. Doncaster Ave/ Ascot St PM - Design]

Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Phase Times)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 1 | 0.0 | 0.379 | 10.4 | LOS A | 9.1 | 63.5 | 0.44 | 0.39 | 40.6 |
| 2 | T1 | 508 | 0.0 | 0.379 | 5.8 | LOS A | 9.1 | 63.5 | 0.44 | 0.39 | 44.2 |
| 3 | R2 | 4 | 0.0 | 0.379 | 10.4 | LOS A | 9.1 | 63.5 | 0.44 | 0.39 | 35.2 |
| Approach | | 514 | 0.0 | 0.379 | 5.9 | LOS A | 9.1 | 63.5 | 0.44 | 0.39 | 44.1 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 14 | 0.0 | 0.098 | 42.5 | LOS D | 0.8 | 5.7 | 0.92 | 0.69 | 15.4 |
| 5 | T1 | 1 | 0.0 | 0.098 | 39.1 | LOS C | 0.8 | 5.7 | 0.92 | 0.69 | 14.1 |
| 6 | R2 | 5 | 0.0 | 0.098 | 42.5 | LOS D | 0.8 | 5.7 | 0.92 | 0.69 | 21.6 |
| Approach | | 20 | 0.0 | 0.098 | 42.3 | LOS C | 0.8 | 5.7 | 0.92 | 0.69 | 17.2 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.013 | 45.7 | LOS D | 0.1 | 0.6 | 0.93 | 0.61 | 20.4 |
| 8 | T1 | 481 | 0.0 | 0.337 | 3.3 | LOS A | 6.3 | 44.2 | 0.33 | 0.31 | 46.3 |
| 9 | R2 | 25 | 0.0 | 0.337 | 7.7 | LOS A | 6.3 | 44.2 | 0.32 | 0.31 | 44.8 |
| Approach | | 508 | 0.0 | 0.337 | 3.7 | LOS A | 6.3 | 44.2 | 0.33 | 0.31 | 46.1 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 32 | 0.0 | 0.217 | 44.5 | LOS D | 1.9 | 13.1 | 0.94 | 0.73 | 24.3 |
| 11 | T1 | 3 | 0.0 | 0.217 | 40.0 | LOS C | 1.9 | 13.1 | 0.94 | 0.73 | 13.6 |
| 12 | R2 | 11 | 0.0 | 0.217 | 44.6 | LOS D | 1.9 | 13.1 | 0.94 | 0.73 | 19.3 |
| Approach | | 45 | 0.0 | 0.217 | 44.2 | LOS D | 1.9 | 13.1 | 0.94 | 0.73 | 22.7 |
| All Vehicles | | 1087 | 0.0 | 0.379 | 7.1 | LOS A | 9.1 | 63.5 | 0.42 | 0.37 | 42.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P2 | East Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 39.3 | LOS D | | | 0.94 | 0.94 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave AM - Design]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 111 | 0.0 | 0.205 | 33.5 | LOS C | 4.1 | 28.5 | 0.79 | 0.75 | 25.1 |
| 2 | T1 | 208 | 0.0 | 0.417 | 30.5 | LOS C | 8.1 | 56.8 | 0.84 | 0.70 | 27.1 |
| Approach | | 319 | 0.0 | 0.417 | 31.5 | LOS C | 8.1 | 56.8 | 0.83 | 0.71 | 26.4 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 214 | 0.0 | 0.127 | 2.8 | LOS A | 2.2 | 15.7 | 0.26 | 0.21 | 46.4 |
| 9 | R2 | 284 | 0.0 | 0.443 | 18.6 | LOS B | 6.8 | 47.8 | 0.79 | 0.78 | 29.5 |
| Approach | | 498 | 0.0 | 0.443 | 11.8 | LOS A | 6.8 | 47.8 | 0.56 | 0.54 | 36.1 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 355 | 0.0 | 0.324 | 16.6 | LOS B | 8.7 | 60.6 | 0.54 | 0.74 | 32.0 |
| 12 | R2 | 44 | 0.0 | 0.238 | 52.0 | LOS D | 2.1 | 14.5 | 0.96 | 0.74 | 19.7 |
| Approach | | 399 | 0.0 | 0.324 | 20.5 | LOS B | 8.7 | 60.6 | 0.59 | 0.74 | 29.6 |
| All Vehicles | | 1216 | 0.0 | 0.443 | 19.8 | LOS B | 8.7 | 60.6 | 0.64 | 0.65 | 30.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 30.5 | LOS D | 0.1 | 0.1 | 0.78 | 0.78 |
| All Pedestrians | | 158 | 39.7 | LOS D | | | 0.89 | 0.89 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave PM - Design]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 89 | 0.0 | 0.193 | 36.5 | LOS C | 3.5 | 24.2 | 0.83 | 0.74 | 24.0 |
| 2 | T1 | 148 | 0.0 | 0.304 | 33.0 | LOS C | 5.9 | 41.4 | 0.86 | 0.70 | 26.2 |
| Approach | | 238 | 0.0 | 0.304 | 34.3 | LOS C | 5.9 | 41.4 | 0.84 | 0.71 | 25.3 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 233 | 0.0 | 0.139 | 2.6 | LOS A | 2.5 | 17.4 | 0.25 | 0.21 | 46.6 |
| 9 | R2 | 171 | 0.0 | 0.224 | 15.7 | LOS B | 3.4 | 23.9 | 0.69 | 0.73 | 31.5 |
| Approach | | 403 | 0.0 | 0.224 | 8.2 | LOS A | 3.4 | 23.9 | 0.43 | 0.43 | 39.9 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 362 | 0.0 | 0.309 | 14.6 | LOS B | 8.0 | 56.0 | 0.49 | 0.72 | 33.6 |
| 12 | R2 | 43 | 0.0 | 0.232 | 52.0 | LOS D | 2.0 | 14.1 | 0.96 | 0.74 | 19.7 |
| Approach | | 405 | 0.0 | 0.309 | 18.5 | LOS B | 8.0 | 56.0 | 0.54 | 0.72 | 30.9 |
| All Vehicles | | 1046 | 0.0 | 0.309 | 18.1 | LOS B | 8.0 | 56.0 | 0.57 | 0.61 | 32.0 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 33.7 | LOS D | 0.1 | 0.1 | 0.82 | 0.82 |
| All Pedestrians | | 158 | 40.7 | LOS E | | | 0.90 | 0.90 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM - Design]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 22 | 0.0 | 0.442 | 32.9 | LOS C | 8.8 | 61.8 | 0.86 | 0.73 | 30.0 |
| 2 | T1 | 222 | 0.0 | 0.442 | 28.4 | LOS B | 8.8 | 61.8 | 0.86 | 0.73 | 27.4 |
| 3 | R2 | 152 | 0.0 | 0.679 | 47.1 | LOS D | 6.8 | 47.6 | 1.00 | 0.86 | 18.0 |
| Approach | | 396 | 0.0 | 0.679 | 35.8 | LOS C | 8.8 | 61.8 | 0.92 | 0.78 | 23.7 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 8 | 12.5 | 0.389 | 21.8 | LOS B | 9.7 | 68.3 | 0.69 | 0.60 | 31.8 |
| 5 | T1 | 1071 | 0.6 | 0.389 | 16.1 | LOS B | 10.2 | 71.1 | 0.68 | 0.59 | 40.0 |
| Approach | | 1079 | 0.7 | 0.389 | 16.2 | LOS B | 10.2 | 71.1 | 0.68 | 0.59 | 40.0 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 42 | 2.5 | 0.377 | 38.9 | LOS C | 5.4 | 37.8 | 0.91 | 0.75 | 24.8 |
| 8 | T1 | 117 | 0.0 | 0.377 | 31.3 | LOS C | 5.4 | 37.8 | 0.86 | 0.69 | 26.3 |
| 9 | R2 | 52 | 0.0 | 0.179 | 39.3 | LOS C | 2.0 | 13.8 | 0.89 | 0.73 | 28.3 |
| Approach | | 211 | 0.5 | 0.377 | 34.8 | LOS C | 5.4 | 37.8 | 0.88 | 0.71 | 26.4 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 108 | 1.0 | 0.684 | 25.2 | LOS B | 20.6 | 144.4 | 0.83 | 0.76 | 36.9 |
| 11 | T1 | 1140 | 0.6 | 0.684 | 19.6 | LOS B | 21.6 | 151.5 | 0.83 | 0.75 | 37.1 |
| Approach | | 1248 | 0.6 | 0.684 | 20.0 | LOS B | 21.6 | 151.5 | 0.83 | 0.75 | 37.1 |
| All Vehicles | | 2934 | 0.5 | 0.684 | 21.8 | LOS B | 21.6 | 151.5 | 0.79 | 0.70 | 34.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 17.5 | LOS B | 0.1 | 0.1 | 0.62 | 0.62 |
| P2 | East Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 19.4 | LOS B | 0.1 | 0.1 | 0.66 | 0.66 |
| P4 | West Full Crossing | 53 | 29.7 | LOS C | 0.1 | 0.1 | 0.81 | 0.81 |
| All Pedestrians | | 211 | 26.4 | LOS C | | | 0.76 | 0.76 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade PM - Design]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 6 | 0.0 | 0.276 | 29.1 | LOS C | 5.6 | 38.9 | 0.79 | 0.65 | 33.0 |
| 2 | T1 | 163 | 0.0 | 0.276 | 24.5 | LOS B | 5.6 | 38.9 | 0.79 | 0.65 | 34.7 |
| 3 | R2 | 51 | 0.0 | 0.434 | 51.5 | LOS D | 2.3 | 16.2 | 1.00 | 0.74 | 24.0 |
| Approach | | 220 | 0.0 | 0.434 | 30.8 | LOS C | 5.6 | 38.9 | 0.83 | 0.67 | 31.8 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 25 | 0.0 | 0.462 | 21.2 | LOS B | 12.3 | 85.8 | 0.70 | 0.62 | 38.2 |
| 5 | T1 | 1314 | 0.5 | 0.462 | 15.6 | LOS B | 12.8 | 89.5 | 0.70 | 0.61 | 34.7 |
| Approach | | 1339 | 0.5 | 0.462 | 15.8 | LOS B | 12.8 | 89.5 | 0.70 | 0.61 | 34.8 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 87 | 1.2 | 0.642 | 45.7 | LOS D | 7.5 | 52.9 | 0.99 | 0.83 | 22.3 |
| 8 | T1 | 106 | 0.0 | 0.642 | 36.7 | LOS C | 7.5 | 52.9 | 0.93 | 0.76 | 29.9 |
| 9 | R2 | 6 | 0.0 | 0.031 | 42.9 | LOS D | 0.3 | 1.8 | 0.90 | 0.65 | 22.4 |
| Approach | | 200 | 0.5 | 0.642 | 40.8 | LOS C | 7.5 | 52.9 | 0.95 | 0.79 | 26.5 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 65 | 0.0 | 0.680 | 23.9 | LOS B | 21.0 | 147.3 | 0.82 | 0.74 | 33.3 |
| 11 | T1 | 1238 | 0.5 | 0.680 | 18.3 | LOS B | 22.0 | 154.0 | 0.81 | 0.74 | 32.2 |
| Approach | | 1303 | 0.5 | 0.680 | 18.6 | LOS B | 22.0 | 154.0 | 0.82 | 0.74 | 32.3 |
| All Vehicles | | 3062 | 0.4 | 0.680 | 19.7 | LOS B | 22.0 | 154.0 | 0.77 | 0.68 | 32.4 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 16.2 | LOS B | 0.1 | 0.1 | 0.60 | 0.60 |
| P2 | East Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 18.1 | LOS B | 0.1 | 0.1 | 0.63 | 0.63 |
| P4 | West Full Crossing | 53 | 31.3 | LOS D | 0.1 | 0.1 | 0.84 | 0.84 |
| All Pedestrians | | 211 | 26.2 | LOS C | | | 0.75 | 0.75 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101v [9. Doncaster Ave/ Day Ave AM - Design - Priority]

Doncaster Avenue/ Day Avenue, Kensington
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 25 | 0.0 | 0.096 | 5.4 | LOS A | 0.4 | 2.5 | 0.41 | 0.61 | 41.6 |
| 2 | T1 | 57 | 0.0 | 0.096 | 5.5 | LOS A | 0.4 | 2.5 | 0.41 | 0.61 | 44.6 |
| 3 | R2 | 6 | 0.0 | 0.096 | 7.6 | LOS A | 0.4 | 2.5 | 0.41 | 0.61 | 40.8 |
| Approach | | 88 | 0.0 | 0.096 | 5.6 | LOS A | 0.4 | 2.5 | 0.41 | 0.61 | 43.7 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 12 | 0.0 | 0.212 | 4.8 | LOS A | 0.8 | 5.7 | 0.11 | 0.18 | 46.0 |
| 5 | T1 | 255 | 0.0 | 0.212 | 0.1 | LOS A | 0.8 | 5.7 | 0.11 | 0.18 | 46.7 |
| 6 | R2 | 125 | 0.0 | 0.212 | 4.8 | LOS A | 0.8 | 5.7 | 0.11 | 0.18 | 47.0 |
| Approach | | 392 | 0.0 | 0.212 | 1.7 | NA | 0.8 | 5.7 | 0.11 | 0.18 | 46.8 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 48 | 0.0 | 0.088 | 4.6 | LOS A | 0.3 | 2.2 | 0.10 | 0.55 | 44.2 |
| 8 | T1 | 11 | 0.0 | 0.088 | 5.5 | LOS A | 0.3 | 2.2 | 0.18 | 0.56 | 44.0 |
| 9 | R2 | 37 | 0.0 | 0.088 | 7.8 | LOS A | 0.3 | 2.2 | 0.18 | 0.56 | 43.0 |
| Approach | | 96 | 0.0 | 0.088 | 6.0 | LOS A | 0.3 | 2.2 | 0.14 | 0.55 | 43.7 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 16 | 0.0 | 0.032 | 4.7 | LOS A | 0.0 | 0.2 | 0.04 | 0.16 | 47.7 |
| 11 | T1 | 42 | 0.0 | 0.032 | 0.1 | LOS A | 0.0 | 0.2 | 0.04 | 0.16 | 47.5 |
| 12 | R2 | 2 | 0.0 | 0.032 | 5.4 | LOS A | 0.0 | 0.2 | 0.04 | 0.16 | 45.7 |
| Approach | | 60 | 0.0 | 0.032 | 1.5 | NA | 0.0 | 0.2 | 0.04 | 0.16 | 47.5 |
| All Vehicles | | 636 | 0.0 | 0.212 | 2.9 | NA | 0.8 | 5.7 | 0.15 | 0.30 | 45.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [9. Doncaster Ave/ Day Ave PM - Design - Priority]

Doncaster Avenue/ Day Avenue, Kensington
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 4 | 0.0 | 0.015 | 4.9 | LOS A | 0.1 | 0.4 | 0.26 | 0.49 | 42.6 |
| 2 | T1 | 12 | 0.0 | 0.015 | 4.2 | LOS A | 0.1 | 0.4 | 0.26 | 0.49 | 45.3 |
| 3 | R2 | 1 | 0.0 | 0.015 | 5.8 | LOS A | 0.1 | 0.4 | 0.26 | 0.49 | 41.8 |
| Approach | | 17 | 0.0 | 0.015 | 4.5 | LOS A | 0.1 | 0.4 | 0.26 | 0.49 | 44.6 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 8 | 0.0 | 0.098 | 4.7 | LOS A | 0.4 | 2.5 | 0.11 | 0.20 | 45.7 |
| 5 | T1 | 109 | 0.0 | 0.098 | 0.1 | LOS A | 0.4 | 2.5 | 0.11 | 0.20 | 46.4 |
| 6 | R2 | 62 | 0.0 | 0.098 | 4.8 | LOS A | 0.4 | 2.5 | 0.11 | 0.20 | 46.8 |
| Approach | | 180 | 0.0 | 0.098 | 1.9 | NA | 0.4 | 2.5 | 0.11 | 0.20 | 46.6 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 41 | 0.0 | 0.041 | 4.6 | LOS A | 0.1 | 1.0 | 0.08 | 0.52 | 44.9 |
| 8 | T1 | 8 | 0.0 | 0.041 | 4.3 | LOS A | 0.1 | 1.0 | 0.16 | 0.52 | 45.1 |
| 9 | R2 | 18 | 0.0 | 0.041 | 5.8 | LOS A | 0.1 | 1.0 | 0.16 | 0.52 | 44.0 |
| Approach | | 67 | 0.0 | 0.041 | 4.9 | LOS A | 0.1 | 1.0 | 0.11 | 0.52 | 44.7 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 16 | 0.0 | 0.033 | 4.6 | LOS A | 0.0 | 0.1 | 0.02 | 0.15 | 47.9 |
| 11 | T1 | 45 | 0.0 | 0.033 | 0.0 | LOS A | 0.0 | 0.1 | 0.02 | 0.15 | 47.7 |
| 12 | R2 | 2 | 0.0 | 0.033 | 4.9 | LOS A | 0.0 | 0.1 | 0.02 | 0.15 | 45.9 |
| Approach | | 63 | 0.0 | 0.033 | 1.3 | NA | 0.0 | 0.1 | 0.02 | 0.15 | 47.7 |
| All Vehicles | | 327 | 0.0 | 0.098 | 2.5 | NA | 0.4 | 2.5 | 0.10 | 0.27 | 46.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St AM - Design - Priority]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 14 | 0.0 | 0.208 | 5.8 | LOS A | 0.8 | 5.9 | 0.11 | 0.21 | 51.4 |
| 2 | T1 | 222 | 0.0 | 0.208 | 0.1 | LOS A | 0.8 | 5.9 | 0.11 | 0.21 | 56.0 |
| 3 | R2 | 116 | 0.0 | 0.208 | 5.7 | LOS A | 0.8 | 5.9 | 0.11 | 0.21 | 51.3 |
| Approach | | 353 | 0.0 | 0.208 | 2.2 | NA | 0.8 | 5.9 | 0.11 | 0.21 | 54.3 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 38 | 0.0 | 0.265 | 4.7 | LOS A | 0.9 | 6.5 | 0.09 | 0.53 | 42.3 |
| 5 | T1 | 52 | 0.0 | 0.265 | 6.7 | LOS A | 0.9 | 6.5 | 0.09 | 0.53 | 38.7 |
| 6 | R2 | 60 | 0.0 | 0.265 | 14.9 | LOS B | 0.9 | 6.5 | 0.09 | 0.53 | 35.1 |
| Approach | | 149 | 0.0 | 0.265 | 9.5 | LOS A | 0.9 | 6.5 | 0.09 | 0.53 | 38.5 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 3 | 0.0 | 0.025 | 6.0 | LOS A | 0.0 | 0.2 | 0.07 | 0.08 | 51.3 |
| 8 | T1 | 62 | 0.0 | 0.025 | 0.1 | LOS A | 0.0 | 0.2 | 0.05 | 0.05 | 58.8 |
| 9 | R2 | 4 | 0.0 | 0.025 | 6.2 | LOS A | 0.0 | 0.2 | 0.07 | 0.08 | 49.8 |
| Approach | | 68 | 0.0 | 0.025 | 0.6 | NA | 0.0 | 0.2 | 0.05 | 0.06 | 58.1 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 23 | 0.0 | 0.605 | 8.3 | LOS A | 5.6 | 39.2 | 0.70 | 1.03 | 39.6 |
| 11 | T1 | 351 | 0.0 | 0.605 | 10.5 | LOS A | 5.6 | 39.2 | 0.70 | 1.03 | 37.5 |
| 12 | R2 | 63 | 0.0 | 0.605 | 14.1 | LOS A | 5.6 | 39.2 | 0.70 | 1.03 | 42.9 |
| Approach | | 437 | 0.0 | 0.605 | 10.9 | LOS A | 5.6 | 39.2 | 0.70 | 1.03 | 38.6 |
| All Vehicles | | 1006 | 0.0 | 0.605 | 7.0 | NA | 5.6 | 39.2 | 0.36 | 0.61 | 44.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St PM - Design - Priority]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 4 | 0.0 | 0.076 | 7.1 | LOS A | 0.3 | 2.0 | 0.26 | 0.18 | 51.2 |
| 2 | T1 | 84 | 0.0 | 0.076 | 0.7 | LOS A | 0.3 | 2.0 | 0.26 | 0.18 | 55.6 |
| 3 | R2 | 31 | 0.0 | 0.076 | 7.1 | LOS A | 0.3 | 2.0 | 0.26 | 0.18 | 51.0 |
| Approach | | 119 | 0.0 | 0.076 | 2.6 | NA | 0.3 | 2.0 | 0.26 | 0.18 | 54.3 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 76 | 0.0 | 0.239 | 4.6 | LOS A | 0.9 | 6.3 | 0.05 | 0.52 | 45.3 |
| 5 | T1 | 67 | 0.0 | 0.239 | 5.9 | LOS A | 0.9 | 6.3 | 0.05 | 0.52 | 41.4 |
| 6 | R2 | 59 | 0.0 | 0.239 | 10.0 | LOS A | 0.9 | 6.3 | 0.05 | 0.52 | 38.7 |
| Approach | | 202 | 0.0 | 0.239 | 6.6 | LOS A | 0.9 | 6.3 | 0.05 | 0.52 | 42.4 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 271 | 0.0 | 0.182 | 5.5 | LOS A | 0.0 | 0.1 | 0.00 | 0.46 | 44.5 |
| 8 | T1 | 91 | 0.0 | 0.182 | 0.0 | LOS A | 0.0 | 0.1 | 0.00 | 0.36 | 54.8 |
| 9 | R2 | 1 | 0.0 | 0.182 | 5.8 | LOS A | 0.0 | 0.1 | 0.00 | 0.46 | 46.0 |
| Approach | | 362 | 0.0 | 0.182 | 4.2 | NA | 0.0 | 0.1 | 0.00 | 0.44 | 47.9 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 24 | 0.0 | 0.352 | 5.4 | LOS A | 1.9 | 13.6 | 0.50 | 0.73 | 42.0 |
| 11 | T1 | 158 | 0.0 | 0.352 | 8.3 | LOS A | 1.9 | 13.6 | 0.50 | 0.73 | 40.1 |
| 12 | R2 | 74 | 0.0 | 0.352 | 8.2 | LOS A | 1.9 | 13.6 | 0.50 | 0.73 | 45.0 |
| Approach | | 256 | 0.0 | 0.352 | 8.0 | LOS A | 1.9 | 13.6 | 0.50 | 0.73 | 42.0 |
| All Vehicles | | 939 | 0.0 | 0.352 | 5.5 | NA | 1.9 | 13.6 | 0.18 | 0.50 | 45.4 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [8. Houston Rd/ Borrodale Rd AM - Design - Priority]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 20 | 0.0 | 0.128 | 5.7 | LOS A | 0.3 | 1.9 | 0.05 | 0.13 | 50.6 |
| 2 | T1 | 181 | 0.0 | 0.128 | 0.0 | LOS A | 0.3 | 1.9 | 0.05 | 0.13 | 57.7 |
| 3 | R2 | 33 | 0.0 | 0.128 | 5.6 | LOS A | 0.3 | 1.9 | 0.05 | 0.13 | 50.1 |
| Approach | | 234 | 0.0 | 0.128 | 1.3 | NA | 0.3 | 1.9 | 0.05 | 0.13 | 56.2 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 60 | 0.0 | 0.194 | 4.6 | LOS A | 0.8 | 5.8 | 0.06 | 0.51 | 41.2 |
| 5 | T1 | 63 | 0.0 | 0.194 | 5.3 | LOS A | 0.8 | 5.8 | 0.06 | 0.51 | 43.6 |
| 6 | R2 | 44 | 0.0 | 0.194 | 10.2 | LOS B | 0.8 | 5.8 | 0.06 | 0.51 | 45.2 |
| Approach | | 167 | 0.0 | 0.194 | 6.3 | LOS A | 0.8 | 5.8 | 0.06 | 0.51 | 43.4 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 5 | 0.0 | 0.017 | 5.8 | LOS A | 0.0 | 0.2 | 0.09 | 0.15 | 53.1 |
| 8 | T1 | 44 | 0.0 | 0.017 | 0.1 | LOS A | 0.0 | 0.2 | 0.05 | 0.08 | 47.4 |
| 9 | R2 | 3 | 0.0 | 0.017 | 6.0 | LOS A | 0.0 | 0.2 | 0.09 | 0.15 | 51.1 |
| Approach | | 53 | 0.0 | 0.017 | 1.0 | NA | 0.0 | 0.2 | 0.05 | 0.09 | 46.1 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 108 | 0.0 | 0.346 | 5.3 | LOS A | 1.8 | 12.3 | 0.45 | 0.62 | 47.7 |
| 11 | T1 | 164 | 0.0 | 0.346 | 5.6 | LOS A | 1.8 | 12.3 | 0.45 | 0.62 | 43.8 |
| 12 | R2 | 55 | 0.0 | 0.346 | 8.9 | LOS A | 1.8 | 12.3 | 0.45 | 0.62 | 45.0 |
| Approach | | 327 | 0.0 | 0.346 | 6.1 | LOS A | 1.8 | 12.3 | 0.45 | 0.62 | 45.5 |
| All Vehicles | | 781 | 0.0 | 0.346 | 4.4 | NA | 1.8 | 12.3 | 0.22 | 0.42 | 47.6 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [8. Houston Rd/ Borrodale Rd PM - Design - Priority]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 15 | 0.0 | 0.080 | 5.7 | LOS A | 0.2 | 1.5 | 0.06 | 0.18 | 50.1 |
| 2 | T1 | 99 | 0.0 | 0.080 | 0.0 | LOS A | 0.2 | 1.5 | 0.06 | 0.18 | 57.0 |
| 3 | R2 | 28 | 0.0 | 0.080 | 5.6 | LOS A | 0.2 | 1.5 | 0.06 | 0.18 | 49.2 |
| Approach | | 142 | 0.0 | 0.080 | 1.7 | NA | 0.2 | 1.5 | 0.06 | 0.18 | 54.9 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 35 | 0.0 | 0.063 | 4.6 | LOS A | 0.3 | 1.8 | 0.04 | 0.51 | 42.7 |
| 5 | T1 | 20 | 0.0 | 0.063 | 4.4 | LOS A | 0.3 | 1.8 | 0.04 | 0.51 | 44.5 |
| 6 | R2 | 14 | 0.0 | 0.063 | 8.0 | LOS A | 0.3 | 1.8 | 0.04 | 0.51 | 46.5 |
| Approach | | 68 | 0.0 | 0.063 | 5.2 | LOS A | 0.3 | 1.8 | 0.04 | 0.51 | 44.2 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 5 | 0.0 | 0.015 | 5.6 | LOS A | 0.0 | 0.1 | 0.02 | 0.13 | 54.0 |
| 8 | T1 | 44 | 0.0 | 0.015 | 0.0 | LOS A | 0.0 | 0.1 | 0.01 | 0.07 | 47.8 |
| 9 | R2 | 1 | 0.0 | 0.015 | 5.8 | LOS A | 0.0 | 0.1 | 0.02 | 0.13 | 51.6 |
| Approach | | 51 | 0.0 | 0.015 | 0.7 | NA | 0.0 | 0.1 | 0.01 | 0.07 | 46.2 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 100 | 0.0 | 0.269 | 4.9 | LOS A | 1.3 | 9.3 | 0.32 | 0.54 | 48.2 |
| 11 | T1 | 137 | 0.0 | 0.269 | 4.7 | LOS A | 1.3 | 9.3 | 0.32 | 0.54 | 44.5 |
| 12 | R2 | 54 | 0.0 | 0.269 | 6.7 | LOS A | 1.3 | 9.3 | 0.32 | 0.54 | 45.7 |
| Approach | | 291 | 0.0 | 0.269 | 5.1 | LOS A | 1.3 | 9.3 | 0.32 | 0.54 | 46.2 |
| All Vehicles | | 552 | 0.0 | 0.269 | 3.9 | NA | 1.3 | 9.3 | 0.19 | 0.40 | 47.7 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM - Design]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 34 | 0.0 | 0.181 | 50.7 | LOS D | 1.6 | 11.0 | 0.95 | 0.72 | 17.9 |
| 2 | T1 | 233 | 0.0 | 0.339 | 27.8 | LOS B | 7.9 | 55.2 | 0.80 | 0.67 | 28.5 |
| Approach | | 266 | 0.0 | 0.339 | 30.7 | LOS C | 7.9 | 55.2 | 0.82 | 0.67 | 26.7 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 16 | 0.0 | 0.392 | 18.5 | LOS B | 11.2 | 78.3 | 0.60 | 0.54 | 31.5 |
| 5 | T1 | 1252 | 0.0 | 0.392 | 13.2 | LOS A | 11.6 | 81.3 | 0.60 | 0.53 | 33.0 |
| Approach | | 1267 | 0.0 | 0.392 | 13.2 | LOS A | 11.6 | 81.3 | 0.60 | 0.53 | 33.0 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 11 | 10.0 | 0.051 | 30.7 | LOS C | 1.0 | 7.3 | 0.72 | 0.63 | 17.9 |
| 8 | T1 | 20 | 0.0 | 0.051 | 26.3 | LOS B | 1.0 | 7.3 | 0.72 | 0.63 | 28.1 |
| 9 | R2 | 53 | 0.0 | 0.384 | 54.7 | LOS D | 2.6 | 18.0 | 0.98 | 0.75 | 18.0 |
| Approach | | 83 | 1.3 | 0.384 | 44.8 | LOS D | 2.6 | 18.0 | 0.89 | 0.71 | 19.9 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 26 | 0.0 | 0.211 | 17.2 | LOS B | 5.5 | 38.4 | 0.53 | 0.48 | 38.0 |
| 11 | T1 | 656 | 0.0 | 0.211 | 11.6 | LOS A | 5.5 | 38.6 | 0.53 | 0.46 | 34.7 |
| 12 | R2 | 1 | 100.0 | 0.211 | 17.7 | LOS B | 5.4 | 37.7 | 0.53 | 0.45 | 37.0 |
| Approach | | 683 | 0.2 | 0.211 | 11.9 | LOS A | 5.5 | 38.6 | 0.53 | 0.46 | 34.9 |
| All Vehicles | | 2300 | 0.1 | 0.392 | 16.0 | LOS B | 11.6 | 81.3 | 0.62 | 0.54 | 31.2 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 14.1 | LOS B | 0.1 | 0.1 | 0.53 | 0.53 |
| P2 | East Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 14.1 | LOS B | 0.1 | 0.1 | 0.53 | 0.53 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 29.2 | LOS C | | | 0.74 | 0.74 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres PM - Design]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 21 | 0.0 | 0.081 | 45.5 | LOS D | 0.9 | 6.4 | 0.90 | 0.70 | 19.2 |
| 2 | T1 | 108 | 0.0 | 0.320 | 42.7 | LOS D | 3.9 | 27.6 | 0.93 | 0.72 | 22.5 |
| Approach | | 129 | 0.0 | 0.320 | 43.1 | LOS D | 3.9 | 27.6 | 0.93 | 0.71 | 22.0 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 46 | 0.0 | 0.322 | 19.5 | LOS B | 8.6 | 60.2 | 0.61 | 0.56 | 30.2 |
| 5 | T1 | 921 | 0.0 | 0.322 | 14.6 | LOS B | 9.1 | 63.5 | 0.61 | 0.54 | 31.4 |
| Approach | | 967 | 0.0 | 0.322 | 14.8 | LOS B | 9.1 | 63.5 | 0.61 | 0.54 | 31.3 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 7 | 14.3 | 0.170 | 47.4 | LOS D | 2.0 | 14.2 | 0.92 | 0.71 | 14.4 |
| 8 | T1 | 38 | 0.0 | 0.170 | 42.9 | LOS D | 2.0 | 14.2 | 0.92 | 0.71 | 21.9 |
| 9 | R2 | 42 | 0.0 | 0.091 | 29.1 | LOS C | 1.4 | 9.6 | 0.79 | 0.71 | 26.4 |
| Approach | | 87 | 1.2 | 0.170 | 36.6 | LOS C | 2.0 | 14.2 | 0.85 | 0.71 | 23.0 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 47 | 0.0 | 0.317 | 19.7 | LOS B | 8.7 | 61.2 | 0.60 | 0.56 | 35.5 |
| 11 | T1 | 911 | 0.0 | 0.317 | 14.5 | LOS A | 8.9 | 62.3 | 0.61 | 0.54 | 31.4 |
| 12 | R2 | 1 | 100.0 | 0.317 | 20.7 | LOS B | 8.8 | 61.6 | 0.61 | 0.53 | 34.2 |
| Approach | | 959 | 0.1 | 0.317 | 14.8 | LOS B | 8.9 | 62.3 | 0.61 | 0.54 | 31.7 |
| All Vehicles | | 2143 | 0.1 | 0.322 | 17.4 | LOS B | 9.1 | 63.5 | 0.64 | 0.56 | 29.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 16.3 | LOS B | 0.1 | 0.1 | 0.57 | 0.57 |
| P2 | East Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 16.3 | LOS B | 0.1 | 0.1 | 0.57 | 0.57 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 30.3 | LOS D | | | 0.76 | 0.76 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [6. Bunnerong Rd/ General Bridges Cres/ Sturt St AM - Design - Pedestrian Test]

Bunnerong Rd/ Sturt St/ General Bridges Cres, Kingsford
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Bunnerong Rd - S | | | | | | | | | | | |
| 1 | L2 | 71 | 0.0 | 0.207 | 28.9 | LOS C | 1.8 | 12.8 | 0.89 | 0.74 | 37.9 |
| 2 | T1 | 1 | 0.0 | 0.002 | 18.9 | LOS B | 0.0 | 0.2 | 0.78 | 0.47 | 45.8 |
| Approach | | 72 | 0.0 | 0.207 | 28.7 | LOS C | 1.8 | 12.8 | 0.88 | 0.74 | 38.0 |
| East: Sturt St - E | | | | | | | | | | | |
| 4 | L2 | 585 | 0.0 | 0.482 | 8.0 | LOS A | 5.9 | 41.5 | 0.54 | 0.70 | 48.1 |
| Approach | | 585 | 0.0 | 0.482 | 8.0 | LOS A | 5.9 | 41.5 | 0.54 | 0.70 | 48.1 |
| North: Bunnerong Rd - N | | | | | | | | | | | |
| 7 | L2 | 2 | 50.0 | 0.002 | 7.1 | LOS A | 0.0 | 0.1 | 0.26 | 0.58 | 48.9 |
| 8 | T1 | 1 | 0.0 | 0.001 | 18.8 | LOS B | 0.0 | 0.1 | 0.78 | 0.45 | 45.8 |
| Approach | | 3 | 33.3 | 0.002 | 11.0 | LOS A | 0.0 | 0.1 | 0.43 | 0.54 | 47.9 |
| West: General Bridges Cres - W | | | | | | | | | | | |
| 10 | L2 | 1 | 0.0 | 0.001 | 6.6 | LOS A | 0.0 | 0.1 | 0.34 | 0.53 | 48.9 |
| Approach | | 1 | 0.0 | 0.001 | 6.6 | LOS A | 0.0 | 0.1 | 0.34 | 0.53 | 48.9 |
| All Vehicles | | 661 | 0.2 | 0.482 | 10.2 | LOS A | 5.9 | 41.5 | 0.58 | 0.70 | 46.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 14.0 | LOS B | 0.1 | 0.1 | 0.68 | 0.68 |
| P2 | East Full Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P2S | East Slip/Bypass Lane Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P4 | West Full Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P4S | West Slip/Bypass Lane Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| All Pedestrians | | 263 | 22.3 | LOS C | | | 0.86 | 0.86 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [6. Bunnerong Rd/ General Bridges Cres/ Sturt St PM - Design - Pedestrian Test]

Bunnerong Rd/ Sturt St/ General Bridges Cres, Kingsford
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Bunnerong Rd - S | | | | | | | | | | | |
| 1 | L2 | 58 | 0.0 | 0.248 | 16.6 | LOS B | 3.9 | 27.5 | 0.66 | 0.60 | 45.5 |
| 2 | T1 | 375 | 0.0 | 0.248 | 11.1 | LOS A | 4.0 | 27.8 | 0.66 | 0.57 | 50.3 |
| Approach | | 433 | 0.0 | 0.248 | 11.8 | LOS A | 4.0 | 27.8 | 0.66 | 0.57 | 49.6 |
| East: Sturt St - E | | | | | | | | | | | |
| 4 | L2 | 21 | 0.0 | 0.030 | 8.1 | LOS A | 0.2 | 1.3 | 0.46 | 0.60 | 48.0 |
| Approach | | 21 | 0.0 | 0.030 | 8.1 | LOS A | 0.2 | 1.3 | 0.46 | 0.60 | 48.0 |
| North: Bunnerong Rd - N | | | | | | | | | | | |
| 7 | L2 | 21 | 0.0 | 0.050 | 8.0 | LOS A | 0.5 | 3.2 | 0.38 | 0.41 | 50.7 |
| 8 | T1 | 675 | 0.0 | 0.250 | 4.6 | LOS A | 3.9 | 27.0 | 0.44 | 0.38 | 55.7 |
| Approach | | 696 | 0.0 | 0.250 | 4.7 | LOS A | 3.9 | 27.0 | 0.44 | 0.38 | 55.5 |
| West: General Bridges Cres - W | | | | | | | | | | | |
| 10 | L2 | 125 | 0.0 | 0.159 | 9.8 | LOS A | 1.5 | 10.7 | 0.54 | 0.66 | 46.9 |
| Approach | | 125 | 0.0 | 0.159 | 9.8 | LOS A | 1.5 | 10.7 | 0.54 | 0.66 | 46.9 |
| All Vehicles | | 1275 | 0.0 | 0.250 | 7.7 | LOS A | 4.0 | 27.8 | 0.52 | 0.48 | 52.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P2 | East Full Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P2S | East Slip/Bypass Lane Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P4 | West Full Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P4S | West Slip/Bypass Lane Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| All Pedestrians | | 263 | 24.4 | LOS C | | | 0.90 | 0.90 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# Appendix E

## Attachment 5 – Existing Survey Volumes Intersection Operation

# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave AM]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 79 | 0.0 | 0.785 | 43.7 | LOS D | 19.7 | 137.6 | 0.99 | 0.91 | 31.4 |
| 3 | R2 | 738 | 0.0 | 0.785 | 43.7 | LOS D | 19.7 | 137.6 | 0.99 | 0.91 | 32.1 |
| Approach | | 817 | 0.0 | 0.785 | 43.7 | LOS D | 19.7 | 137.6 | 0.99 | 0.91 | 32.1 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 722 | 0.0 | 0.802 | 18.3 | LOS B | 29.3 | 205.3 | 0.81 | 0.83 | 44.7 |
| 5 | T1 | 2075 | 0.0 | 0.802 | 16.0 | LOS B | 34.9 | 244.3 | 0.83 | 0.78 | 52.3 |
| 6 | R2 | 1 | 100.0 | 0.011 | 53.5 | LOS D | 0.0 | 0.6 | 0.93 | 0.61 | 31.1 |
| Approach | | 2798 | 0.0 | 0.802 | 16.6 | LOS B | 34.9 | 244.3 | 0.83 | 0.79 | 50.2 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.011 | 51.4 | LOS D | 0.0 | 0.6 | 0.93 | 0.60 | 30.8 |
| Approach | | 1 | 100.0 | 0.011 | 51.4 | LOS D | 0.0 | 0.6 | 0.93 | 0.60 | 30.8 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1460 | 0.0 | 0.555 | 21.6 | LOS B | 17.3 | 121.2 | 0.79 | 0.69 | 48.4 |
| Approach | | 1460 | 0.0 | 0.555 | 21.6 | LOS B | 17.3 | 121.2 | 0.79 | 0.69 | 48.4 |
| All Vehicles | | 5076 | 0.0 | 0.802 | 22.4 | LOS B | 34.9 | 244.3 | 0.84 | 0.78 | 45.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 16.9 | LOS B | 0.1 | 0.1 | 0.58 | 0.58 |
| P4 | West Full Crossing | 53 | 40.6 | LOS E | 0.1 | 0.1 | 0.90 | 0.90 |
| All Pedestrians | | 158 | 33.9 | LOS D | | | 0.81 | 0.81 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave PM]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 48 | 0.0 | 0.794 | 41.8 | LOS C | 24.2 | 169.3 | 0.97 | 0.90 | 32.0 |
| 3 | R2 | 935 | 0.0 | 0.794 | 41.7 | LOS C | 24.2 | 169.3 | 0.97 | 0.90 | 32.8 |
| Approach | | 983 | 0.0 | 0.794 | 41.7 | LOS C | 24.2 | 169.3 | 0.97 | 0.90 | 32.7 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 687 | 0.0 | 0.714 | 17.6 | LOS B | 24.1 | 168.4 | 0.72 | 0.80 | 44.9 |
| 5 | T1 | 1652 | 0.0 | 0.714 | 18.0 | LOS B | 28.8 | 201.6 | 0.79 | 0.73 | 50.8 |
| 6 | R2 | 1 | 100.0 | 0.011 | 56.3 | LOS D | 0.1 | 0.7 | 0.93 | 0.61 | 30.4 |
| Approach | | 2340 | 0.0 | 0.714 | 17.9 | LOS B | 28.8 | 201.6 | 0.77 | 0.75 | 48.9 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.011 | 54.2 | LOS D | 0.1 | 0.7 | 0.93 | 0.60 | 30.1 |
| Approach | | 1 | 100.0 | 0.011 | 54.2 | LOS D | 0.1 | 0.7 | 0.93 | 0.60 | 30.1 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1978 | 0.0 | 0.826 | 33.4 | LOS C | 32.2 | 225.5 | 0.96 | 0.92 | 41.4 |
| Approach | | 1978 | 0.0 | 0.826 | 33.4 | LOS C | 32.2 | 225.5 | 0.96 | 0.92 | 41.4 |
| All Vehicles | | 5302 | 0.0 | 0.826 | 28.1 | LOS B | 32.2 | 225.5 | 0.88 | 0.84 | 42.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 46.8 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 21.4 | LOS C | 0.1 | 0.1 | 0.64 | 0.64 |
| P4 | West Full Crossing | 53 | 36.1 | LOS D | 0.1 | 0.1 | 0.83 | 0.83 |
| All Pedestrians | | 158 | 34.8 | LOS D | | | 0.80 | 0.80 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101v [7. Doncaster Ave/ Ascot St AM]

Doncaster Avenue/ Ascot Street, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 37 | 0.0 | 0.511 | 3.2 | LOS A | 5.1 | 35.6 | 0.26 | 0.36 | 36.1 |
| 2 | T1 | 685 | 0.0 | 0.511 | 2.8 | LOS A | 5.1 | 35.6 | 0.26 | 0.36 | 38.1 |
| 3 | R2 | 26 | 0.0 | 0.511 | 5.7 | LOS A | 5.1 | 35.6 | 0.26 | 0.36 | 32.9 |
| Approach | | 748 | 0.0 | 0.511 | 2.9 | LOS A | 5.1 | 35.6 | 0.26 | 0.36 | 37.9 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 7 | 0.0 | 0.039 | 8.6 | LOS A | 0.2 | 1.6 | 0.77 | 0.71 | 28.5 |
| 5 | T1 | 5 | 0.0 | 0.039 | 8.2 | LOS A | 0.2 | 1.6 | 0.77 | 0.71 | 28.3 |
| 6 | R2 | 9 | 0.0 | 0.039 | 11.1 | LOS B | 0.2 | 1.6 | 0.77 | 0.71 | 33.0 |
| Approach | | 22 | 0.0 | 0.039 | 9.6 | LOS A | 0.2 | 1.6 | 0.77 | 0.71 | 30.9 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.548 | 3.7 | LOS A | 5.8 | 40.3 | 0.45 | 0.42 | 26.8 |
| 8 | T1 | 698 | 0.0 | 0.548 | 3.3 | LOS A | 5.8 | 40.3 | 0.45 | 0.42 | 37.6 |
| 9 | R2 | 21 | 0.0 | 0.548 | 6.2 | LOS A | 5.8 | 40.3 | 0.45 | 0.42 | 37.3 |
| Approach | | 721 | 0.0 | 0.548 | 3.4 | LOS A | 5.8 | 40.3 | 0.45 | 0.42 | 37.5 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 68 | 0.0 | 0.198 | 9.2 | LOS A | 1.2 | 8.5 | 0.77 | 0.81 | 33.7 |
| 11 | T1 | 17 | 0.0 | 0.198 | 8.8 | LOS A | 1.2 | 8.5 | 0.77 | 0.81 | 18.7 |
| 12 | R2 | 36 | 0.0 | 0.198 | 11.7 | LOS B | 1.2 | 8.5 | 0.77 | 0.81 | 32.0 |
| Approach | | 121 | 0.0 | 0.198 | 9.8 | LOS A | 1.2 | 8.5 | 0.77 | 0.81 | 31.6 |
| All Vehicles | | 1613 | 0.0 | 0.548 | 3.7 | LOS A | 5.8 | 40.3 | 0.39 | 0.42 | 37.2 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [7. Doncaster Ave/ Ascot St PM]

Doncaster Avenue/ Ascot Street, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 22 | 0.0 | 0.613 | 4.4 | LOS A | 7.2 | 50.2 | 0.32 | 0.42 | 41.1 |
| 2 | T1 | 873 | 0.0 | 0.613 | 4.1 | LOS A | 7.2 | 50.2 | 0.32 | 0.42 | 44.7 |
| 3 | R2 | 4 | 0.0 | 0.613 | 7.1 | LOS A | 7.2 | 50.2 | 0.32 | 0.42 | 36.3 |
| Approach | | 899 | 0.0 | 0.613 | 4.2 | LOS A | 7.2 | 50.2 | 0.32 | 0.42 | 44.7 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 14 | 0.0 | 0.033 | 8.4 | LOS A | 0.2 | 1.3 | 0.73 | 0.69 | 32.6 |
| 5 | T1 | 1 | 0.0 | 0.033 | 8.3 | LOS A | 0.2 | 1.3 | 0.73 | 0.69 | 32.1 |
| 6 | R2 | 5 | 0.0 | 0.033 | 11.0 | LOS B | 0.2 | 1.3 | 0.73 | 0.69 | 38.7 |
| Approach | | 20 | 0.0 | 0.033 | 9.1 | LOS A | 0.2 | 1.3 | 0.73 | 0.69 | 34.7 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.485 | 4.3 | LOS A | 5.1 | 36.0 | 0.31 | 0.43 | 33.1 |
| 8 | T1 | 657 | 0.0 | 0.485 | 4.0 | LOS A | 5.1 | 36.0 | 0.31 | 0.43 | 44.7 |
| 9 | R2 | 34 | 0.0 | 0.485 | 7.0 | LOS A | 5.1 | 36.0 | 0.31 | 0.43 | 44.1 |
| Approach | | 693 | 0.0 | 0.485 | 4.2 | LOS A | 5.1 | 36.0 | 0.31 | 0.43 | 44.7 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 46 | 0.0 | 0.165 | 12.3 | LOS B | 1.0 | 7.3 | 0.84 | 0.86 | 37.3 |
| 11 | T1 | 3 | 0.0 | 0.165 | 12.1 | LOS B | 1.0 | 7.3 | 0.84 | 0.86 | 20.7 |
| 12 | R2 | 34 | 0.0 | 0.165 | 15.0 | LOS B | 1.0 | 7.3 | 0.84 | 0.86 | 33.8 |
| Approach | | 83 | 0.0 | 0.165 | 13.4 | LOS B | 1.0 | 7.3 | 0.84 | 0.86 | 35.6 |
| All Vehicles | | 1695 | 0.0 | 0.613 | 4.7 | LOS A | 7.2 | 50.2 | 0.35 | 0.45 | 44.1 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave AM]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 52 | 0.0 | 0.084 | 29.2 | LOS C | 1.7 | 12.0 | 0.72 | 0.70 | 26.8 |
| 2 | T1 | 493 | 0.0 | 0.826 | 37.7 | LOS C | 23.8 | 166.3 | 0.96 | 0.94 | 24.5 |
| Approach | | 544 | 0.0 | 0.826 | 36.9 | LOS C | 23.8 | 166.3 | 0.94 | 0.92 | 24.7 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 312 | 0.0 | 0.202 | 2.8 | LOS A | 3.7 | 26.0 | 0.27 | 0.23 | 46.5 |
| 9 | R2 | 442 | 0.0 | 0.831 | 29.0 | LOS C | 15.3 | 107.4 | 0.92 | 0.90 | 24.0 |
| Approach | | 754 | 0.0 | 0.831 | 18.2 | LOS B | 15.3 | 107.4 | 0.65 | 0.63 | 31.4 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 322 | 0.0 | 0.315 | 18.6 | LOS B | 8.5 | 59.2 | 0.58 | 0.74 | 30.6 |
| 12 | R2 | 33 | 0.0 | 0.195 | 52.9 | LOS D | 1.5 | 10.8 | 0.96 | 0.72 | 19.6 |
| Approach | | 355 | 0.0 | 0.315 | 21.7 | LOS B | 8.5 | 59.2 | 0.62 | 0.74 | 28.8 |
| All Vehicles | | 1653 | 0.0 | 0.831 | 25.1 | LOS B | 23.8 | 166.3 | 0.74 | 0.75 | 28.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 27.4 | LOS C | 0.1 | 0.1 | 0.74 | 0.74 |
| All Pedestrians | | 158 | 38.7 | LOS D | | | 0.88 | 0.88 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave PM]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 33 | 0.0 | 0.049 | 24.8 | LOS B | 0.9 | 6.5 | 0.68 | 0.68 | 28.4 |
| 2 | T1 | 362 | 0.0 | 0.547 | 24.8 | LOS B | 12.6 | 88.5 | 0.84 | 0.73 | 31.2 |
| Approach | | 395 | 0.0 | 0.547 | 24.8 | LOS B | 12.6 | 88.5 | 0.83 | 0.72 | 31.0 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 412 | 0.0 | 0.271 | 3.0 | LOS A | 5.0 | 35.0 | 0.30 | 0.27 | 46.2 |
| 9 | R2 | 282 | 0.0 | 0.526 | 21.7 | LOS B | 7.4 | 51.5 | 0.89 | 0.80 | 27.6 |
| Approach | | 694 | 0.0 | 0.526 | 10.6 | LOS A | 7.4 | 51.5 | 0.54 | 0.48 | 37.7 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 526 | 0.0 | 0.554 | 21.6 | LOS B | 15.7 | 110.0 | 0.73 | 0.81 | 28.6 |
| 12 | R2 | 46 | 0.0 | 0.281 | 49.0 | LOS D | 2.0 | 14.0 | 0.97 | 0.74 | 20.5 |
| Approach | | 573 | 0.0 | 0.554 | 23.9 | LOS B | 15.7 | 110.0 | 0.75 | 0.80 | 27.5 |
| All Vehicles | | 1661 | 0.0 | 0.554 | 18.5 | LOS B | 15.7 | 110.0 | 0.68 | 0.65 | 32.2 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 23.5 | LOS C | 0.1 | 0.1 | 0.72 | 0.72 |
| All Pedestrians | | 158 | 34.0 | LOS D | | | 0.86 | 0.86 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 162 | 0.0 | 0.832 | 42.7 | LOS D | 24.1 | 168.7 | 0.99 | 0.97 | 30.9 |
| 2 | T1 | 342 | 0.0 | 0.832 | 38.1 | LOS C | 24.1 | 168.7 | 0.99 | 0.97 | 29.2 |
| 3 | R2 | 42 | 0.0 | 0.359 | 53.8 | LOS D | 2.0 | 14.1 | 0.99 | 0.73 | 23.4 |
| Approach | | 546 | 0.0 | 0.832 | 40.7 | LOS C | 24.1 | 168.7 | 0.99 | 0.95 | 29.2 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 52 | 2.0 | 0.645 | 27.8 | LOS B | 18.8 | 131.9 | 0.84 | 0.75 | 34.3 |
| 5 | T1 | 1560 | 0.4 | 0.645 | 22.6 | LOS B | 19.8 | 138.4 | 0.84 | 0.75 | 35.1 |
| Approach | | 1612 | 0.5 | 0.645 | 22.8 | LOS B | 19.8 | 138.4 | 0.84 | 0.75 | 35.1 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 118 | 0.9 | 0.590 | 33.9 | LOS C | 13.3 | 93.4 | 0.89 | 0.78 | 26.6 |
| 8 | T1 | 224 | 0.0 | 0.590 | 29.4 | LOS C | 13.3 | 93.4 | 0.89 | 0.78 | 32.1 |
| 9 | R2 | 18 | 0.0 | 0.153 | 52.7 | LOS D | 0.8 | 5.8 | 0.98 | 0.69 | 24.4 |
| Approach | | 360 | 0.3 | 0.590 | 32.0 | LOS C | 13.3 | 93.4 | 0.89 | 0.78 | 30.2 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 25 | 4.2 | 0.839 | 36.4 | LOS C | 31.0 | 217.3 | 0.96 | 0.94 | 31.7 |
| 11 | T1 | 1364 | 0.5 | 0.839 | 30.8 | LOS C | 32.2 | 225.1 | 0.96 | 0.94 | 30.6 |
| Approach | | 1389 | 0.5 | 0.839 | 30.9 | LOS C | 32.2 | 225.1 | 0.96 | 0.94 | 30.6 |
| All Vehicles | | 3907 | 0.4 | 0.839 | 29.0 | LOS C | 32.2 | 225.1 | 0.91 | 0.85 | 31.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 19.6 | LOS B | 0.1 | 0.1 | 0.64 | 0.64 |
| P2 | East Full Crossing | 53 | 36.3 | LOS D | 0.1 | 0.1 | 0.88 | 0.88 |
| P3 | North Full Crossing | 53 | 21.6 | LOS C | 0.1 | 0.1 | 0.68 | 0.68 |
| P4 | West Full Crossing | 53 | 36.3 | LOS D | 0.1 | 0.1 | 0.88 | 0.88 |
| All Pedestrians | | 211 | 28.5 | LOS C | | | 0.77 | 0.77 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade PM]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 136 | 0.0 | 0.622 | 34.1 | LOS C | 13.6 | 95.5 | 0.92 | 0.80 | 30.2 |
| 2 | T1 | 221 | 0.0 | 0.622 | 29.5 | LOS C | 13.6 | 95.5 | 0.92 | 0.80 | 32.0 |
| 3 | R2 | 33 | 0.0 | 0.264 | 50.5 | LOS D | 1.5 | 10.2 | 0.98 | 0.72 | 24.2 |
| Approach | | 389 | 0.0 | 0.622 | 32.9 | LOS C | 13.6 | 95.5 | 0.92 | 0.80 | 30.7 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 51 | 0.0 | 0.600 | 26.0 | LOS B | 16.2 | 113.6 | 0.81 | 0.73 | 35.3 |
| 5 | T1 | 1457 | 0.4 | 0.600 | 20.8 | LOS B | 17.0 | 119.3 | 0.82 | 0.72 | 30.3 |
| Approach | | 1507 | 0.4 | 0.600 | 21.0 | LOS B | 17.0 | 119.3 | 0.82 | 0.72 | 30.5 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 174 | 0.6 | 0.812 | 40.5 | LOS C | 20.3 | 142.2 | 0.98 | 0.95 | 24.1 |
| 8 | T1 | 282 | 0.0 | 0.812 | 35.9 | LOS C | 20.3 | 142.2 | 0.98 | 0.95 | 29.8 |
| 9 | R2 | 13 | 0.0 | 0.102 | 49.5 | LOS D | 0.6 | 3.9 | 0.97 | 0.68 | 20.7 |
| Approach | | 468 | 0.2 | 0.812 | 38.0 | LOS C | 20.3 | 142.2 | 0.98 | 0.94 | 27.8 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 22 | 0.0 | 0.833 | 34.5 | LOS C | 29.2 | 204.5 | 0.95 | 0.94 | 27.7 |
| 11 | T1 | 1364 | 0.5 | 0.833 | 29.0 | LOS C | 30.3 | 211.9 | 0.95 | 0.93 | 25.4 |
| Approach | | 1386 | 0.5 | 0.833 | 29.1 | LOS C | 30.3 | 211.9 | 0.95 | 0.93 | 25.5 |
| All Vehicles | | 3752 | 0.4 | 0.833 | 27.3 | LOS B | 30.3 | 211.9 | 0.90 | 0.84 | 28.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 18.7 | LOS B | 0.1 | 0.1 | 0.65 | 0.65 |
| P2 | East Full Crossing | 53 | 36.5 | LOS D | 0.1 | 0.1 | 0.90 | 0.90 |
| P3 | North Full Crossing | 53 | 20.7 | LOS C | 0.1 | 0.1 | 0.68 | 0.68 |
| P4 | West Full Crossing | 53 | 36.5 | LOS D | 0.1 | 0.1 | 0.90 | 0.90 |
| All Pedestrians | | 211 | 28.1 | LOS C | | | 0.78 | 0.78 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [9. Doncaster Ave/ Day Ave AM]

Doncaster Avenue/ Day Avenue, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 19 | 0.0 | 0.103 | 9.6 | LOS A | 0.6 | 4.3 | 0.78 | 0.77 | 37.3 |
| 2 | T1 | 35 | 0.0 | 0.103 | 9.3 | LOS A | 0.6 | 4.3 | 0.78 | 0.77 | 42.0 |
| 3 | R2 | 4 | 0.0 | 0.103 | 12.3 | LOS A | 0.6 | 4.3 | 0.78 | 0.77 | 38.1 |
| 3u | U | 1 | 0.0 | 0.103 | 13.7 | LOS A | 0.6 | 4.3 | 0.78 | 0.77 | 39.3 |
| Approach | | 59 | 0.0 | 0.103 | 9.7 | LOS A | 0.6 | 4.3 | 0.78 | 0.77 | 40.5 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 23 | 4.5 | 0.610 | 5.6 | LOS A | 5.8 | 40.7 | 0.62 | 0.61 | 39.7 |
| 5 | T1 | 448 | 0.7 | 0.610 | 5.3 | LOS A | 5.8 | 40.7 | 0.62 | 0.61 | 40.3 |
| 6 | R2 | 223 | 0.5 | 0.610 | 8.3 | LOS A | 5.8 | 40.7 | 0.62 | 0.61 | 43.3 |
| 6u | U | 7 | 14.3 | 0.610 | 10.1 | LOS A | 5.8 | 40.7 | 0.62 | 0.61 | 40.4 |
| Approach | | 702 | 0.9 | 0.610 | 6.3 | LOS A | 5.8 | 40.7 | 0.62 | 0.61 | 41.5 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 81 | 0.0 | 0.283 | 7.1 | LOS A | 1.8 | 12.6 | 0.69 | 0.77 | 41.8 |
| 8 | T1 | 34 | 0.0 | 0.283 | 6.9 | LOS A | 1.8 | 12.6 | 0.69 | 0.77 | 42.8 |
| 9 | R2 | 104 | 0.0 | 0.283 | 9.9 | LOS A | 1.8 | 12.6 | 0.69 | 0.77 | 42.3 |
| 9u | U | 2 | 0.0 | 0.283 | 11.3 | LOS A | 1.8 | 12.6 | 0.69 | 0.77 | 44.6 |
| Approach | | 221 | 0.0 | 0.283 | 8.5 | LOS A | 1.8 | 12.6 | 0.69 | 0.77 | 42.2 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 165 | 0.6 | 0.621 | 7.2 | LOS A | 5.9 | 42.2 | 0.73 | 0.72 | 42.6 |
| 11 | T1 | 427 | 2.5 | 0.621 | 6.9 | LOS A | 5.9 | 42.2 | 0.73 | 0.72 | 40.1 |
| 12 | R2 | 18 | 0.0 | 0.621 | 9.9 | LOS A | 5.9 | 42.2 | 0.73 | 0.72 | 40.3 |
| 12u | U | 9 | 0.0 | 0.621 | 11.3 | LOS A | 5.9 | 42.2 | 0.73 | 0.72 | 40.5 |
| Approach | | 620 | 1.9 | 0.621 | 7.2 | LOS A | 5.9 | 42.2 | 0.73 | 0.72 | 41.0 |
| All Vehicles | | 1602 | 1.1 | 0.621 | 7.0 | LOS A | 5.9 | 42.2 | 0.68 | 0.68 | 41.4 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [9. Doncaster Ave/ Day Ave PM]

Doncaster Avenue/ Day Avenue, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 9 | 0.0 | 0.065 | 8.1 | LOS A | 0.4 | 2.5 | 0.68 | 0.70 | 38.5 |
| 2 | T1 | 28 | 0.0 | 0.065 | 7.9 | LOS A | 0.4 | 2.5 | 0.68 | 0.70 | 42.9 |
| 3 | R2 | 5 | 0.0 | 0.065 | 10.9 | LOS A | 0.4 | 2.5 | 0.68 | 0.70 | 39.3 |
| 3u | U | 1 | 0.0 | 0.065 | 12.3 | LOS A | 0.4 | 2.5 | 0.68 | 0.70 | 40.5 |
| Approach | | 44 | 0.0 | 0.065 | 8.4 | LOS A | 0.4 | 2.5 | 0.68 | 0.70 | 41.8 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 27 | 0.0 | 0.467 | 6.4 | LOS A | 3.4 | 24.3 | 0.66 | 0.70 | 39.4 |
| 5 | T1 | 266 | 2.8 | 0.467 | 6.2 | LOS A | 3.4 | 24.3 | 0.66 | 0.70 | 39.8 |
| 6 | R2 | 123 | 0.0 | 0.467 | 9.1 | LOS A | 3.4 | 24.3 | 0.66 | 0.70 | 43.0 |
| 6u | U | 18 | 0.0 | 0.467 | 10.6 | LOS A | 3.4 | 24.3 | 0.66 | 0.70 | 40.4 |
| Approach | | 435 | 1.7 | 0.467 | 7.2 | LOS A | 3.4 | 24.3 | 0.66 | 0.70 | 41.0 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 109 | 0.0 | 0.446 | 6.8 | LOS A | 3.1 | 21.9 | 0.69 | 0.77 | 41.3 |
| 8 | T1 | 24 | 0.0 | 0.446 | 6.6 | LOS A | 3.1 | 21.9 | 0.69 | 0.77 | 42.4 |
| 9 | R2 | 129 | 0.0 | 0.446 | 9.6 | LOS A | 3.1 | 21.9 | 0.69 | 0.77 | 41.8 |
| 9u | U | 127 | 0.0 | 0.446 | 11.0 | LOS A | 3.1 | 21.9 | 0.69 | 0.77 | 44.2 |
| Approach | | 391 | 0.0 | 0.446 | 9.1 | LOS A | 3.1 | 21.9 | 0.69 | 0.77 | 42.7 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 127 | 0.0 | 0.487 | 6.4 | LOS A | 3.5 | 24.3 | 0.64 | 0.68 | 43.0 |
| 11 | T1 | 323 | 0.3 | 0.487 | 6.2 | LOS A | 3.5 | 24.3 | 0.64 | 0.68 | 40.7 |
| 12 | R2 | 19 | 0.0 | 0.487 | 9.2 | LOS A | 3.5 | 24.3 | 0.64 | 0.68 | 40.9 |
| 12u | U | 4 | 0.0 | 0.487 | 10.6 | LOS A | 3.5 | 24.3 | 0.64 | 0.68 | 41.1 |
| Approach | | 474 | 0.2 | 0.487 | 6.4 | LOS A | 3.5 | 24.3 | 0.64 | 0.68 | 41.5 |
| All Vehicles | | 1343 | 0.6 | 0.487 | 7.5 | LOS A | 3.5 | 24.3 | 0.66 | 0.71 | 41.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St AM]

Houston Rd/ Barker St, Kensington

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 27 | 0.0 | 0.659 | 6.2 | LOS A | 7.1 | 49.7 | 0.75 | 0.67 | 43.0 |
| 2 | T1 | 475 | 0.0 | 0.659 | 6.1 | LOS A | 7.1 | 49.7 | 0.75 | 0.67 | 42.4 |
| 3 | R2 | 209 | 0.0 | 0.659 | 9.3 | LOS A | 7.1 | 49.7 | 0.75 | 0.67 | 41.2 |
| 3u | U | 8 | 0.0 | 0.659 | 10.8 | LOS A | 7.1 | 49.7 | 0.75 | 0.67 | 46.9 |
| Approach | | 720 | 0.0 | 0.659 | 7.1 | LOS A | 7.1 | 49.7 | 0.75 | 0.67 | 42.2 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 628 | 0.0 | 0.825 | 10.3 | LOS A | 12.2 | 85.7 | 0.69 | 0.82 | 37.8 |
| 5 | T1 | 111 | 0.0 | 0.825 | 10.2 | LOS A | 12.2 | 85.7 | 0.69 | 0.82 | 38.3 |
| 6 | R2 | 105 | 0.0 | 0.825 | 13.4 | LOS A | 12.2 | 85.7 | 0.69 | 0.82 | 33.8 |
| 6u | U | 3 | 0.0 | 0.825 | 14.9 | LOS B | 12.2 | 85.7 | 0.69 | 0.82 | 16.4 |
| Approach | | 847 | 0.0 | 0.825 | 10.7 | LOS A | 12.2 | 85.7 | 0.69 | 0.82 | 37.4 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 85 | 0.0 | 0.390 | 7.0 | LOS A | 2.6 | 17.9 | 0.69 | 0.73 | 36.8 |
| 8 | T1 | 233 | 0.0 | 0.390 | 6.9 | LOS A | 2.6 | 17.9 | 0.69 | 0.73 | 43.0 |
| 9 | R2 | 11 | 0.0 | 0.390 | 10.1 | LOS A | 2.6 | 17.9 | 0.69 | 0.73 | 42.4 |
| 9u | U | 1 | 0.0 | 0.390 | 11.6 | LOS A | 2.6 | 17.9 | 0.69 | 0.73 | 41.9 |
| Approach | | 329 | 0.0 | 0.390 | 7.0 | LOS A | 2.6 | 17.9 | 0.69 | 0.73 | 41.9 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 15 | 0.0 | 0.434 | 11.4 | LOS A | 3.3 | 23.4 | 0.91 | 0.97 | 37.9 |
| 11 | T1 | 193 | 0.0 | 0.434 | 11.3 | LOS A | 3.3 | 23.4 | 0.91 | 0.97 | 37.5 |
| 12 | R2 | 36 | 0.0 | 0.434 | 14.5 | LOS B | 3.3 | 23.4 | 0.91 | 0.97 | 41.0 |
| 12u | U | 1 | 0.0 | 0.434 | 16.0 | LOS B | 3.3 | 23.4 | 0.91 | 0.97 | 43.3 |
| Approach | | 244 | 0.0 | 0.434 | 11.8 | LOS A | 3.3 | 23.4 | 0.91 | 0.97 | 38.3 |
| All Vehicles | | 2141 | 0.0 | 0.825 | 9.0 | LOS A | 12.2 | 85.7 | 0.74 | 0.77 | 39.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St PM]

Houston Rd/ Barker St, Kensington

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 19 | 0.0 | 0.376 | 5.3 | LOS A | 2.8 | 19.9 | 0.52 | 0.58 | 43.7 |
| 2 | T1 | 263 | 0.0 | 0.376 | 5.1 | LOS A | 2.8 | 19.9 | 0.52 | 0.58 | 43.3 |
| 3 | R2 | 125 | 0.0 | 0.376 | 8.4 | LOS A | 2.8 | 19.9 | 0.52 | 0.58 | 42.2 |
| 3u | U | 2 | 0.0 | 0.376 | 9.9 | LOS A | 2.8 | 19.9 | 0.52 | 0.58 | 47.7 |
| Approach | | 409 | 0.0 | 0.376 | 6.2 | LOS A | 2.8 | 19.9 | 0.52 | 0.58 | 43.1 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 117 | 0.0 | 0.364 | 6.6 | LOS A | 2.0 | 14.3 | 0.49 | 0.68 | 40.6 |
| 5 | T1 | 105 | 0.0 | 0.364 | 6.5 | LOS A | 2.0 | 14.3 | 0.49 | 0.68 | 41.3 |
| 6 | R2 | 85 | 0.0 | 0.364 | 9.7 | LOS A | 2.0 | 14.3 | 0.49 | 0.68 | 37.5 |
| 6u | U | 12 | 0.0 | 0.364 | 11.2 | LOS A | 2.0 | 14.3 | 0.49 | 0.68 | 17.7 |
| Approach | | 319 | 0.0 | 0.364 | 7.6 | LOS A | 2.0 | 14.3 | 0.49 | 0.68 | 39.2 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 102 | 0.0 | 0.449 | 5.8 | LOS A | 3.1 | 21.9 | 0.59 | 0.63 | 37.7 |
| 8 | T1 | 352 | 0.0 | 0.449 | 5.7 | LOS A | 3.1 | 21.9 | 0.59 | 0.63 | 43.6 |
| 9 | R2 | 3 | 0.0 | 0.449 | 8.9 | LOS A | 3.1 | 21.9 | 0.59 | 0.63 | 43.1 |
| 9u | U | 2 | 0.0 | 0.449 | 10.4 | LOS A | 3.1 | 21.9 | 0.59 | 0.63 | 42.9 |
| Approach | | 459 | 0.0 | 0.449 | 5.8 | LOS A | 3.1 | 21.9 | 0.59 | 0.63 | 42.7 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 14 | 0.0 | 0.181 | 6.8 | LOS A | 1.1 | 7.5 | 0.63 | 0.70 | 41.3 |
| 11 | T1 | 89 | 0.0 | 0.181 | 6.7 | LOS A | 1.1 | 7.5 | 0.63 | 0.70 | 41.4 |
| 12 | R2 | 37 | 0.0 | 0.181 | 9.9 | LOS A | 1.1 | 7.5 | 0.63 | 0.70 | 43.9 |
| 12u | U | 9 | 0.0 | 0.181 | 11.4 | LOS A | 1.1 | 7.5 | 0.63 | 0.70 | 46.6 |
| Approach | | 149 | 0.0 | 0.181 | 7.8 | LOS A | 1.1 | 7.5 | 0.63 | 0.70 | 42.5 |
| All Vehicles | | 1337 | 0.0 | 0.449 | 6.5 | LOS A | 3.1 | 21.9 | 0.55 | 0.63 | 42.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [8. Houston Rd/ Borrodale Rd AM]

Houston Road/ Borrodale Road, Kingsford
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 55 | 0.0 | 0.594 | 6.9 | LOS A | 5.8 | 40.9 | 0.69 | 0.64 | 44.6 |
| 2 | T1 | 503 | 0.0 | 0.594 | 7.0 | LOS A | 5.8 | 40.9 | 0.69 | 0.64 | 48.0 |
| 3 | R2 | 91 | 0.0 | 0.594 | 9.9 | LOS A | 5.8 | 40.9 | 0.69 | 0.64 | 40.8 |
| Approach | | 648 | 0.0 | 0.594 | 7.4 | LOS A | 5.8 | 40.9 | 0.69 | 0.64 | 47.0 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 82 | 0.0 | 0.287 | 6.7 | LOS A | 1.9 | 13.6 | 0.65 | 0.69 | 39.4 |
| 5 | T1 | 97 | 0.0 | 0.287 | 6.6 | LOS A | 1.9 | 13.6 | 0.65 | 0.69 | 43.0 |
| 6 | R2 | 69 | 0.0 | 0.287 | 9.5 | LOS A | 1.9 | 13.6 | 0.65 | 0.69 | 44.7 |
| Approach | | 248 | 0.0 | 0.287 | 7.4 | LOS A | 1.9 | 13.6 | 0.65 | 0.69 | 42.6 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 68 | 0.0 | 0.409 | 7.8 | LOS A | 3.1 | 21.6 | 0.71 | 0.72 | 44.4 |
| 8 | T1 | 259 | 0.0 | 0.409 | 7.8 | LOS A | 3.1 | 21.6 | 0.71 | 0.72 | 48.0 |
| 9 | R2 | 28 | 0.0 | 0.409 | 10.8 | LOS B | 3.1 | 21.6 | 0.71 | 0.72 | 47.2 |
| Approach | | 356 | 0.0 | 0.409 | 8.1 | LOS A | 3.1 | 21.6 | 0.71 | 0.72 | 47.3 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 116 | 0.0 | 0.587 | 14.2 | LOS B | 5.7 | 40.0 | 0.95 | 1.08 | 42.2 |
| 11 | T1 | 183 | 0.0 | 0.587 | 14.1 | LOS B | 5.7 | 40.0 | 0.95 | 1.08 | 38.0 |
| 12 | R2 | 59 | 0.0 | 0.587 | 17.1 | LOS B | 5.7 | 40.0 | 0.95 | 1.08 | 40.0 |
| Approach | | 358 | 0.0 | 0.587 | 14.7 | LOS B | 5.7 | 40.0 | 0.95 | 1.08 | 39.9 |
| All Vehicles | | 1611 | 0.0 | 0.594 | 9.2 | LOS A | 5.8 | 40.9 | 0.75 | 0.76 | 44.4 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [8. Houston Rd/ Borrodale Rd PM]

Houston Road/ Borrodale Road, Kingsford
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 41 | 0.0 | 0.357 | 6.0 | LOS A | 2.8 | 19.7 | 0.49 | 0.58 | 45.2 |
| 2 | T1 | 279 | 0.0 | 0.357 | 6.1 | LOS A | 2.8 | 19.7 | 0.49 | 0.58 | 48.9 |
| 3 | R2 | 82 | 0.0 | 0.357 | 9.0 | LOS A | 2.8 | 19.7 | 0.49 | 0.58 | 41.9 |
| Approach | | 402 | 0.0 | 0.357 | 6.7 | LOS A | 2.8 | 19.7 | 0.49 | 0.58 | 47.4 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 141 | 0.0 | 0.350 | 7.7 | LOS A | 2.4 | 17.0 | 0.74 | 0.77 | 38.5 |
| 5 | T1 | 78 | 0.0 | 0.350 | 7.6 | LOS A | 2.4 | 17.0 | 0.74 | 0.77 | 42.5 |
| 6 | R2 | 55 | 0.0 | 0.350 | 10.6 | LOS B | 2.4 | 17.0 | 0.74 | 0.77 | 43.9 |
| Approach | | 274 | 0.0 | 0.350 | 8.3 | LOS A | 2.4 | 17.0 | 0.74 | 0.77 | 41.1 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 85 | 0.0 | 0.461 | 6.5 | LOS A | 3.8 | 26.4 | 0.57 | 0.60 | 45.3 |
| 8 | T1 | 403 | 0.0 | 0.461 | 6.6 | LOS A | 3.8 | 26.4 | 0.57 | 0.60 | 48.9 |
| 9 | R2 | 18 | 0.0 | 0.461 | 9.6 | LOS A | 3.8 | 26.4 | 0.57 | 0.60 | 47.8 |
| Approach | | 506 | 0.0 | 0.461 | 6.7 | LOS A | 3.8 | 26.4 | 0.57 | 0.60 | 48.3 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 44 | 0.0 | 0.181 | 7.0 | LOS A | 1.1 | 7.8 | 0.64 | 0.68 | 46.5 |
| 11 | T1 | 76 | 0.0 | 0.181 | 6.9 | LOS A | 1.1 | 7.8 | 0.64 | 0.68 | 43.1 |
| 12 | R2 | 28 | 0.0 | 0.181 | 9.8 | LOS A | 1.1 | 7.8 | 0.64 | 0.68 | 44.8 |
| Approach | | 148 | 0.0 | 0.181 | 7.5 | LOS A | 1.1 | 7.8 | 0.64 | 0.68 | 44.6 |
| All Vehicles | | 1331 | 0.0 | 0.461 | 7.1 | LOS A | 3.8 | 26.4 | 0.59 | 0.64 | 46.2 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 62 | 0.0 | 0.067 | 18.2 | LOS B | 1.5 | 10.8 | 0.54 | 0.67 | 30.6 |
| 2 | T1 | 529 | 0.0 | 0.578 | 18.3 | LOS B | 17.6 | 123.1 | 0.74 | 0.66 | 34.3 |
| 3 | R2 | 23 | 4.5 | 0.065 | 31.7 | LOS C | 0.8 | 5.9 | 0.74 | 0.69 | 19.9 |
| Approach | | 615 | 0.2 | 0.578 | 18.8 | LOS B | 17.6 | 123.1 | 0.72 | 0.66 | 33.3 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 29 | 0.0 | 0.591 | 32.1 | LOS C | 16.4 | 114.9 | 0.86 | 0.75 | 22.7 |
| 5 | T1 | 1266 | 0.0 | 0.591 | 26.7 | LOS B | 17.1 | 119.5 | 0.86 | 0.75 | 22.7 |
| Approach | | 1296 | 0.0 | 0.591 | 26.8 | LOS B | 17.1 | 119.5 | 0.86 | 0.75 | 22.7 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 92 | 1.1 | 0.099 | 19.5 | LOS B | 2.3 | 16.3 | 0.55 | 0.70 | 27.7 |
| 8 | T1 | 148 | 0.0 | 0.572 | 30.2 | LOS C | 10.3 | 71.8 | 0.87 | 0.79 | 26.0 |
| 9 | R2 | 105 | 0.0 | 0.572 | 34.5 | LOS C | 10.3 | 71.8 | 0.87 | 0.79 | 25.2 |
| Approach | | 345 | 0.3 | 0.572 | 28.7 | LOS C | 10.3 | 71.8 | 0.78 | 0.77 | 26.1 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 178 | 0.0 | 0.520 | 31.3 | LOS C | 14.2 | 99.4 | 0.83 | 0.76 | 26.7 |
| 11 | T1 | 937 | 0.0 | 0.520 | 26.0 | LOS B | 14.5 | 101.6 | 0.83 | 0.73 | 22.8 |
| 12 | R2 | 5 | 100.0 | 0.520 | 32.5 | LOS C | 13.6 | 96.7 | 0.83 | 0.72 | 26.6 |
| Approach | | 1120 | 0.5 | 0.520 | 26.9 | LOS B | 14.5 | 101.6 | 0.83 | 0.73 | 23.5 |
| All Vehicles | | 3376 | 0.2 | 0.591 | 25.6 | LOS B | 17.6 | 123.1 | 0.81 | 0.73 | 25.4 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 26.0 | LOS C | 0.1 | 0.1 | 0.72 | 0.72 |
| P2 | East Full Crossing | 53 | 22.5 | LOS C | 0.1 | 0.1 | 0.67 | 0.67 |
| P3 | North Full Crossing | 53 | 23.9 | LOS C | 0.1 | 0.1 | 0.69 | 0.69 |
| P4 | West Full Crossing | 53 | 22.5 | LOS C | 0.1 | 0.1 | 0.67 | 0.67 |
| All Pedestrians | | 211 | 23.7 | LOS C | | | 0.69 | 0.69 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres PM]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 80 | 0.0 | 0.091 | 19.0 | LOS B | 2.1 | 14.4 | 0.56 | 0.68 | 30.1 |
| 2 | T1 | 221 | 0.0 | 0.231 | 15.6 | LOS B | 6.1 | 42.9 | 0.61 | 0.52 | 36.5 |
| 3 | R2 | 21 | 0.0 | 0.054 | 26.5 | LOS B | 0.7 | 4.6 | 0.67 | 0.67 | 22.0 |
| Approach | | 322 | 0.0 | 0.231 | 17.1 | LOS B | 6.1 | 42.9 | 0.60 | 0.57 | 33.8 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 31 | 0.0 | 0.102 | 26.0 | LOS B | 2.3 | 16.3 | 0.67 | 0.60 | 24.9 |
| 5 | T1 | 813 | 0.0 | 0.504 | 24.6 | LOS B | 14.2 | 99.2 | 0.80 | 0.70 | 23.8 |
| Approach | | 843 | 0.0 | 0.504 | 24.7 | LOS B | 14.2 | 99.2 | 0.80 | 0.70 | 23.9 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 179 | 0.6 | 0.197 | 20.9 | LOS B | 4.9 | 34.3 | 0.60 | 0.73 | 26.8 |
| 8 | T1 | 216 | 0.0 | 0.776 | 28.7 | LOS C | 18.9 | 132.0 | 0.87 | 0.87 | 26.5 |
| 9 | R2 | 226 | 0.0 | 0.776 | 33.0 | LOS C | 18.9 | 132.0 | 0.87 | 0.87 | 25.6 |
| Approach | | 621 | 0.2 | 0.776 | 28.0 | LOS B | 18.9 | 132.0 | 0.79 | 0.83 | 26.2 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 181 | 0.0 | 0.784 | 36.2 | LOS C | 26.1 | 183.0 | 0.94 | 0.88 | 24.8 |
| 11 | T1 | 1561 | 0.0 | 0.784 | 30.7 | LOS C | 26.5 | 185.4 | 0.94 | 0.88 | 20.6 |
| 12 | R2 | 7 | 100.0 | 0.784 | 37.0 | LOS C | 25.4 | 179.6 | 0.94 | 0.88 | 24.6 |
| Approach | | 1749 | 0.4 | 0.784 | 31.3 | LOS C | 26.5 | 185.4 | 0.94 | 0.88 | 21.1 |
| All Vehicles | | 3536 | 0.2 | 0.784 | 27.9 | LOS B | 26.5 | 185.4 | 0.85 | 0.80 | 23.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 25.3 | LOS C | 0.1 | 0.1 | 0.71 | 0.71 |
| P2 | East Full Crossing | 53 | 23.2 | LOS C | 0.1 | 0.1 | 0.68 | 0.68 |
| P3 | North Full Crossing | 53 | 23.2 | LOS C | 0.1 | 0.1 | 0.68 | 0.68 |
| P4 | West Full Crossing | 53 | 23.2 | LOS C | 0.1 | 0.1 | 0.68 | 0.68 |
| All Pedestrians | | 211 | 23.7 | LOS C | | | 0.69 | 0.69 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# Appendix F

## Attachment 6 – Survey Volumes with Proposed Cycleway Intersection Operation

# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave AM - Design]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 79 | 0.0 | 0.785 | 43.7 | LOS D | 19.7 | 137.6 | 0.99 | 0.91 | 31.4 |
| 3 | R2 | 738 | 0.0 | 0.785 | 43.7 | LOS D | 19.7 | 137.6 | 0.99 | 0.91 | 32.2 |
| Approach | | 817 | 0.0 | 0.785 | 43.7 | LOS D | 19.7 | 137.6 | 0.99 | 0.91 | 32.1 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 743 | 0.0 | 0.805 | 22.0 | LOS B | 34.5 | 238.1 | 0.82 | 0.85 | 42.6 |
| 5 | T1 | 2075 | 0.0 | 0.805 | 16.6 | LOS B | 35.4 | 247.7 | 0.84 | 0.78 | 51.8 |
| 6 | R2 | 1 | 100.0 | 0.010 | 52.2 | LOS D | 0.0 | 0.6 | 0.92 | 0.61 | 31.4 |
| Approach | | 2819 | 0.0 | 0.805 | 18.0 | LOS B | 35.4 | 247.7 | 0.83 | 0.80 | 49.1 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| Approach | | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1460 | 0.0 | 0.567 | 22.4 | LOS B | 17.6 | 123.5 | 0.80 | 0.71 | 47.9 |
| Approach | | 1460 | 0.0 | 0.567 | 22.4 | LOS B | 17.6 | 123.5 | 0.80 | 0.71 | 47.9 |
| All Vehicles | | 5097 | 0.0 | 0.805 | 23.4 | LOS B | 35.4 | 247.7 | 0.85 | 0.79 | 45.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 12.0 | LOS B | 0.1 | 0.1 | 0.49 | 0.49 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 158 | 33.5 | LOS D | | | 0.79 | 0.79 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave PM - Design]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 48 | 0.0 | 0.827 | 43.8 | LOS D | 24.4 | 171.1 | 0.99 | 0.94 | 31.4 |
| 3 | R2 | 935 | 0.0 | 0.827 | 43.8 | LOS D | 24.4 | 171.1 | 0.99 | 0.94 | 32.1 |
| Approach | | 983 | 0.0 | 0.827 | 43.8 | LOS D | 24.4 | 171.1 | 0.99 | 0.94 | 32.1 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 708 | 0.0 | 0.709 | 20.6 | LOS B | 27.0 | 185.8 | 0.74 | 0.82 | 43.1 |
| 5 | T1 | 1652 | 0.0 | 0.709 | 16.9 | LOS B | 27.3 | 191.1 | 0.79 | 0.73 | 51.6 |
| 6 | R2 | 1 | 100.0 | 0.010 | 52.2 | LOS D | 0.0 | 0.6 | 0.92 | 0.61 | 31.4 |
| Approach | | 2361 | 0.0 | 0.709 | 18.1 | LOS B | 27.3 | 191.1 | 0.77 | 0.75 | 48.8 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| Approach | | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1978 | 0.0 | 0.845 | 34.9 | LOS C | 32.3 | 225.9 | 0.98 | 0.95 | 40.7 |
| Approach | | 1978 | 0.0 | 0.845 | 34.9 | LOS C | 32.3 | 225.9 | 0.98 | 0.95 | 40.7 |
| All Vehicles | | 5323 | 0.0 | 0.845 | 29.1 | LOS C | 32.3 | 225.9 | 0.89 | 0.86 | 41.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 14.1 | LOS B | 0.1 | 0.1 | 0.53 | 0.53 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 158 | 34.2 | LOS D | | | 0.81 | 0.81 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [7. Doncaster Ave/ Ascot St AM - Design]

Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Phase Times)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 37 | 0.0 | 0.507 | 7.5 | LOS A | 11.6 | 81.1 | 0.40 | 0.38 | 36.0 |
| 2 | T1 | 685 | 0.0 | 0.507 | 4.1 | LOS A | 11.6 | 81.1 | 0.40 | 0.38 | 37.1 |
| 3 | R2 | 26 | 0.0 | 0.219 | 47.5 | LOS D | 1.2 | 8.1 | 0.96 | 0.72 | 13.0 |
| Approach | | 748 | 0.0 | 0.507 | 5.8 | LOS A | 11.6 | 81.1 | 0.42 | 0.39 | 36.1 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 7 | 0.0 | 0.127 | 43.7 | LOS D | 0.9 | 6.4 | 0.93 | 0.69 | 14.4 |
| 5 | T1 | 5 | 0.0 | 0.127 | 40.6 | LOS C | 0.9 | 6.4 | 0.93 | 0.69 | 13.0 |
| 6 | R2 | 9 | 0.0 | 0.127 | 43.7 | LOS D | 0.9 | 6.4 | 0.93 | 0.69 | 19.6 |
| Approach | | 22 | 0.0 | 0.127 | 43.0 | LOS D | 0.9 | 6.4 | 0.93 | 0.69 | 16.7 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.013 | 44.5 | LOS D | 0.1 | 0.6 | 0.93 | 0.61 | 18.9 |
| 8 | T1 | 719 | 0.0 | 0.517 | 4.8 | LOS A | 12.5 | 87.4 | 0.43 | 0.40 | 36.8 |
| 9 | R2 | 21 | 0.0 | 0.517 | 8.2 | LOS A | 12.5 | 87.4 | 0.43 | 0.40 | 36.4 |
| Approach | | 742 | 0.0 | 0.517 | 5.0 | LOS A | 12.5 | 87.4 | 0.44 | 0.40 | 36.7 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 68 | 0.0 | 0.581 | 45.9 | LOS D | 5.3 | 37.2 | 0.99 | 0.80 | 21.6 |
| 11 | T1 | 17 | 0.0 | 0.581 | 42.5 | LOS C | 5.3 | 37.2 | 0.99 | 0.80 | 12.5 |
| 12 | R2 | 36 | 0.0 | 0.581 | 46.0 | LOS D | 5.3 | 37.2 | 0.99 | 0.80 | 17.6 |
| Approach | | 121 | 0.0 | 0.581 | 45.4 | LOS D | 5.3 | 37.2 | 0.99 | 0.80 | 19.6 |
| All Vehicles | | 1634 | 0.0 | 0.581 | 8.9 | LOS A | 12.5 | 87.4 | 0.48 | 0.43 | 34.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P2 | East Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 39.3 | LOS D | | | 0.94 | 0.94 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [7. Doncaster Ave/ Ascot St PM - Design]

Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 22 | 0.0 | 0.605 | 9.4 | LOS A | 16.7 | 117.0 | 0.47 | 0.44 | 41.7 |
| 2 | T1 | 873 | 0.0 | 0.605 | 4.8 | LOS A | 16.7 | 117.0 | 0.47 | 0.44 | 45.0 |
| 3 | R2 | 4 | 0.0 | 0.013 | 20.9 | LOS B | 0.1 | 0.8 | 0.60 | 0.63 | 22.6 |
| Approach | | 899 | 0.0 | 0.605 | 5.0 | LOS A | 16.7 | 117.0 | 0.47 | 0.44 | 44.9 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 14 | 0.0 | 0.123 | 45.0 | LOS D | 0.8 | 5.9 | 0.94 | 0.70 | 14.8 |
| 5 | T1 | 1 | 0.0 | 0.123 | 41.6 | LOS C | 0.8 | 5.9 | 0.94 | 0.70 | 13.5 |
| 6 | R2 | 5 | 0.0 | 0.123 | 45.0 | LOS D | 0.8 | 5.9 | 0.94 | 0.70 | 20.9 |
| Approach | | 20 | 0.0 | 0.123 | 44.8 | LOS D | 0.8 | 5.9 | 0.94 | 0.70 | 16.6 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.003 | 20.3 | LOS B | 0.1 | 0.4 | 0.59 | 0.59 | 29.9 |
| 8 | T1 | 678 | 0.0 | 0.550 | 6.3 | LOS A | 13.4 | 93.9 | 0.49 | 0.46 | 43.8 |
| 9 | R2 | 34 | 0.0 | 0.550 | 10.3 | LOS A | 13.4 | 93.9 | 0.48 | 0.46 | 42.5 |
| Approach | | 714 | 0.0 | 0.550 | 6.5 | LOS A | 13.4 | 93.9 | 0.49 | 0.46 | 43.5 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 46 | 0.0 | 0.506 | 48.6 | LOS D | 3.7 | 25.8 | 0.99 | 0.77 | 23.2 |
| 11 | T1 | 3 | 0.0 | 0.506 | 44.0 | LOS D | 3.7 | 25.8 | 0.99 | 0.77 | 12.7 |
| 12 | R2 | 34 | 0.0 | 0.506 | 48.6 | LOS D | 3.7 | 25.8 | 0.99 | 0.77 | 18.4 |
| Approach | | 83 | 0.0 | 0.506 | 48.4 | LOS D | 3.7 | 25.8 | 0.99 | 0.77 | 21.1 |
| All Vehicles | | 1716 | 0.0 | 0.605 | 8.2 | LOS A | 16.7 | 117.0 | 0.51 | 0.47 | 42.0 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P2 | East Full Crossing | 53 | 18.1 | LOS B | 0.1 | 0.1 | 0.63 | 0.63 |
| P3 | North Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 18.1 | LOS B | 0.1 | 0.1 | 0.63 | 0.63 |
| All Pedestrians | | 211 | 28.7 | LOS C | | | 0.79 | 0.79 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave AM - Design]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 52 | 0.0 | 0.084 | 29.2 | LOS C | 1.7 | 12.0 | 0.72 | 0.70 | 26.8 |
| 2 | T1 | 493 | 0.0 | 0.826 | 37.7 | LOS C | 23.8 | 166.3 | 0.96 | 0.94 | 24.5 |
| Approach | | 544 | 0.0 | 0.826 | 36.9 | LOS C | 23.8 | 166.3 | 0.94 | 0.92 | 24.7 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 333 | 0.0 | 0.205 | 3.0 | LOS A | 3.9 | 27.2 | 0.28 | 0.24 | 46.2 |
| 9 | R2 | 442 | 0.0 | 0.846 | 30.8 | LOS C | 15.9 | 111.0 | 0.94 | 0.92 | 23.3 |
| Approach | | 775 | 0.0 | 0.846 | 18.8 | LOS B | 15.9 | 111.0 | 0.65 | 0.63 | 31.0 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 322 | 0.0 | 0.315 | 18.6 | LOS B | 8.5 | 59.2 | 0.58 | 0.74 | 30.6 |
| 12 | R2 | 33 | 0.0 | 0.176 | 51.6 | LOS D | 1.5 | 10.6 | 0.95 | 0.72 | 19.8 |
| Approach | | 355 | 0.0 | 0.315 | 21.6 | LOS B | 8.5 | 59.2 | 0.62 | 0.74 | 28.8 |
| All Vehicles | | 1674 | 0.0 | 0.846 | 25.3 | LOS B | 23.8 | 166.3 | 0.74 | 0.75 | 28.0 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 27.4 | LOS C | 0.1 | 0.1 | 0.74 | 0.74 |
| All Pedestrians | | 158 | 38.7 | LOS D | | | 0.88 | 0.88 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave PM - Design]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 33 | 0.0 | 0.055 | 29.6 | LOS C | 1.1 | 7.6 | 0.72 | 0.69 | 26.6 |
| 2 | T1 | 362 | 0.0 | 0.612 | 30.7 | LOS C | 14.8 | 103.7 | 0.89 | 0.77 | 27.1 |
| Approach | | 395 | 0.0 | 0.612 | 30.6 | LOS C | 14.8 | 103.7 | 0.88 | 0.76 | 27.0 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 433 | 0.0 | 0.271 | 3.1 | LOS A | 5.5 | 38.3 | 0.29 | 0.26 | 46.1 |
| 9 | R2 | 282 | 0.0 | 0.602 | 20.3 | LOS B | 7.3 | 51.0 | 0.82 | 0.78 | 28.4 |
| Approach | | 715 | 0.0 | 0.602 | 9.9 | LOS A | 7.3 | 51.0 | 0.50 | 0.46 | 38.3 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 526 | 0.0 | 0.506 | 19.9 | LOS B | 15.6 | 109.3 | 0.66 | 0.79 | 29.7 |
| 12 | R2 | 46 | 0.0 | 0.249 | 52.1 | LOS D | 2.2 | 15.2 | 0.96 | 0.74 | 19.7 |
| Approach | | 573 | 0.0 | 0.506 | 22.5 | LOS B | 15.6 | 109.3 | 0.68 | 0.78 | 28.3 |
| All Vehicles | | 1682 | 0.0 | 0.612 | 19.1 | LOS B | 15.6 | 109.3 | 0.65 | 0.64 | 31.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 28.2 | LOS C | 0.1 | 0.1 | 0.75 | 0.75 |
| All Pedestrians | | 158 | 38.9 | LOS D | | | 0.88 | 0.88 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM - Design]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 115 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 162 | 0.0 | 0.865 | 53.6 | LOS D | 30.1 | 210.5 | 1.00 | 0.99 | 22.5 |
| 2 | T1 | 342 | 0.0 | 0.865 | 49.0 | LOS D | 30.1 | 210.5 | 1.00 | 0.99 | 20.4 |
| 3 | R2 | 42 | 0.0 | 0.222 | 51.8 | LOS D | 2.1 | 15.0 | 0.91 | 0.74 | 16.9 |
| Approach | | 546 | 0.0 | 0.865 | 50.6 | LOS D | 30.1 | 210.5 | 0.99 | 0.97 | 20.8 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 52 | 2.0 | 0.668 | 34.5 | LOS C | 23.4 | 163.9 | 0.87 | 0.78 | 24.0 |
| 5 | T1 | 1560 | 0.4 | 0.668 | 28.9 | LOS C | 24.5 | 171.2 | 0.87 | 0.77 | 31.6 |
| Approach | | 1612 | 0.5 | 0.668 | 29.1 | LOS C | 24.5 | 171.2 | 0.87 | 0.77 | 31.4 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 118 | 0.9 | 0.620 | 41.2 | LOS C | 16.3 | 114.7 | 0.91 | 0.80 | 23.9 |
| 8 | T1 | 245 | 0.0 | 0.620 | 34.9 | LOS C | 16.3 | 114.7 | 0.87 | 0.76 | 24.7 |
| 9 | R2 | 18 | 0.0 | 0.072 | 49.7 | LOS D | 0.9 | 6.1 | 0.88 | 0.69 | 25.1 |
| Approach | | 381 | 0.3 | 0.620 | 37.5 | LOS C | 16.3 | 114.7 | 0.88 | 0.77 | 24.3 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 25 | 4.2 | 0.868 | 46.3 | LOS D | 38.9 | 272.7 | 0.99 | 0.98 | 28.0 |
| 11 | T1 | 1364 | 0.5 | 0.868 | 40.3 | LOS C | 40.3 | 282.2 | 0.98 | 0.98 | 26.7 |
| Approach | | 1389 | 0.5 | 0.868 | 40.4 | LOS C | 40.3 | 282.2 | 0.98 | 0.98 | 26.7 |
| All Vehicles | | 3928 | 0.4 | 0.868 | 36.9 | LOS C | 40.3 | 282.2 | 0.93 | 0.87 | 27.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 25.2 | LOS C | 0.1 | 0.1 | 0.66 | 0.66 |
| P2 | East Full Crossing | 53 | 51.8 | LOS E | 0.2 | 0.2 | 0.95 | 0.95 |
| P3 | North Full Crossing | 53 | 27.2 | LOS C | 0.1 | 0.1 | 0.69 | 0.69 |
| P4 | West Full Crossing | 53 | 26.5 | LOS C | 0.1 | 0.1 | 0.68 | 0.68 |
| All Pedestrians | | 211 | 32.7 | LOS D | | | 0.75 | 0.75 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade PM - Design]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 136 | 0.0 | 0.680 | 38.2 | LOS C | 15.0 | 104.9 | 0.95 | 0.83 | 28.6 |
| 2 | T1 | 221 | 0.0 | 0.680 | 33.6 | LOS C | 15.0 | 104.9 | 0.95 | 0.83 | 30.6 |
| 3 | R2 | 33 | 0.0 | 0.340 | 55.2 | LOS D | 1.6 | 11.1 | 1.00 | 0.72 | 23.1 |
| Approach | | 389 | 0.0 | 0.680 | 37.0 | LOS C | 15.0 | 104.9 | 0.95 | 0.82 | 29.2 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 51 | 0.0 | 0.651 | 30.5 | LOS C | 18.3 | 128.0 | 0.87 | 0.77 | 33.0 |
| 5 | T1 | 1457 | 0.4 | 0.651 | 24.9 | LOS B | 19.1 | 133.8 | 0.87 | 0.77 | 27.7 |
| Approach | | 1507 | 0.4 | 0.651 | 25.1 | LOS B | 19.1 | 133.8 | 0.87 | 0.77 | 28.0 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 174 | 0.6 | 0.891 | 52.4 | LOS D | 24.3 | 170.7 | 1.00 | 1.06 | 20.7 |
| 8 | T1 | 303 | 0.0 | 0.891 | 45.4 | LOS D | 24.3 | 170.7 | 0.97 | 1.02 | 27.4 |
| 9 | R2 | 13 | 0.0 | 0.046 | 40.7 | LOS C | 0.5 | 3.5 | 0.87 | 0.67 | 23.1 |
| Approach | | 489 | 0.2 | 0.891 | 47.8 | LOS D | 24.3 | 170.7 | 0.98 | 1.02 | 25.0 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 22 | 0.0 | 0.903 | 48.6 | LOS D | 36.6 | 256.0 | 1.00 | 1.09 | 22.6 |
| 11 | T1 | 1364 | 0.5 | 0.903 | 42.7 | LOS D | 37.9 | 265.1 | 1.00 | 1.08 | 20.1 |
| Approach | | 1386 | 0.5 | 0.903 | 42.8 | LOS D | 37.9 | 265.1 | 1.00 | 1.08 | 20.1 |
| All Vehicles | | 3773 | 0.4 | 0.903 | 35.8 | LOS C | 37.9 | 265.1 | 0.94 | 0.92 | 24.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 23.0 | LOS C | 0.1 | 0.1 | 0.70 | 0.70 |
| P2 | East Full Crossing | 53 | 41.8 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 25.1 | LOS C | 0.1 | 0.1 | 0.73 | 0.73 |
| P4 | West Full Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.72 | 0.72 |
| All Pedestrians | | 211 | 28.6 | LOS C | | | 0.77 | 0.77 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101v [9. Doncaster Ave/ Day Ave AM - Design - Priority]

Doncaster Avenue/ Day Avenue, Kensington
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 19 | 0.0 | 0.139 | 6.3 | LOS A | 0.5 | 3.2 | 0.67 | 0.79 | 36.2 |
| 2 | T1 | 35 | 0.0 | 0.139 | 13.9 | LOS A | 0.5 | 3.2 | 0.67 | 0.79 | 40.6 |
| 3 | R2 | 4 | 0.0 | 0.139 | 12.1 | LOS A | 0.5 | 3.2 | 0.67 | 0.79 | 35.7 |
| Approach | | 58 | 0.0 | 0.139 | 11.3 | LOS A | 0.5 | 3.2 | 0.67 | 0.79 | 39.1 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 24 | 4.3 | 0.444 | 7.7 | LOS A | 3.4 | 23.9 | 0.48 | 0.26 | 43.4 |
| 5 | T1 | 448 | 0.7 | 0.444 | 2.0 | LOS A | 3.4 | 23.9 | 0.48 | 0.26 | 44.0 |
| 6 | R2 | 224 | 0.5 | 0.444 | 7.8 | LOS A | 3.4 | 23.9 | 0.48 | 0.26 | 45.2 |
| Approach | | 697 | 0.8 | 0.444 | 4.0 | NA | 3.4 | 23.9 | 0.48 | 0.26 | 44.5 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 102 | 0.0 | 0.463 | 7.0 | LOS A | 2.3 | 15.9 | 0.46 | 0.78 | 39.8 |
| 8 | T1 | 34 | 0.0 | 0.463 | 14.2 | LOS A | 2.3 | 15.9 | 0.58 | 0.85 | 39.0 |
| 9 | R2 | 104 | 0.0 | 0.463 | 18.2 | LOS B | 2.3 | 15.9 | 0.58 | 0.85 | 38.0 |
| Approach | | 240 | 0.0 | 0.463 | 12.9 | LOS A | 2.3 | 15.9 | 0.53 | 0.82 | 38.8 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 427 | 2.5 | 0.252 | 4.7 | LOS A | 0.1 | 1.1 | 0.04 | 0.49 | 45.0 |
| 11 | T1 | 18 | 0.0 | 0.252 | 1.1 | LOS A | 0.1 | 1.1 | 0.04 | 0.49 | 43.3 |
| 12 | R2 | 9 | 0.0 | 0.252 | 7.0 | LOS A | 0.1 | 1.1 | 0.04 | 0.49 | 42.0 |
| Approach | | 455 | 2.3 | 0.252 | 4.6 | NA | 0.1 | 1.1 | 0.04 | 0.49 | 44.9 |
| All Vehicles | | 1449 | 1.1 | 0.463 | 6.0 | NA | 3.4 | 23.9 | 0.36 | 0.45 | 43.2 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [9. Doncaster Ave/ Day Ave PM - Design - Priority]

Doncaster Avenue/ Day Avenue, Kensington
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 9 | 0.0 | 0.079 | 5.5 | LOS A | 0.3 | 1.9 | 0.54 | 0.72 | 38.5 |
| 2 | T1 | 28 | 0.0 | 0.079 | 9.1 | LOS A | 0.3 | 1.9 | 0.54 | 0.72 | 42.3 |
| 3 | R2 | 5 | 0.0 | 0.079 | 12.0 | LOS A | 0.3 | 1.9 | 0.54 | 0.72 | 37.9 |
| Approach | | 43 | 0.0 | 0.079 | 8.7 | LOS A | 0.3 | 1.9 | 0.54 | 0.72 | 41.3 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 27 | 0.0 | 0.266 | 6.6 | LOS A | 1.3 | 9.0 | 0.39 | 0.22 | 44.4 |
| 5 | T1 | 274 | 2.7 | 0.266 | 1.1 | LOS A | 1.3 | 9.0 | 0.39 | 0.22 | 45.0 |
| 6 | R2 | 123 | 0.0 | 0.266 | 6.8 | LOS A | 1.3 | 9.0 | 0.39 | 0.22 | 45.9 |
| Approach | | 424 | 1.7 | 0.266 | 3.1 | NA | 1.3 | 9.0 | 0.39 | 0.22 | 45.3 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 131 | 0.0 | 0.451 | 7.2 | LOS A | 2.3 | 16.4 | 0.52 | 0.84 | 40.8 |
| 8 | T1 | 24 | 0.0 | 0.451 | 11.4 | LOS A | 2.3 | 16.4 | 0.62 | 0.89 | 40.4 |
| 9 | R2 | 129 | 0.0 | 0.451 | 14.5 | LOS B | 2.3 | 16.4 | 0.62 | 0.89 | 39.4 |
| Approach | | 284 | 0.0 | 0.451 | 10.9 | LOS A | 2.3 | 16.4 | 0.57 | 0.87 | 40.1 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 127 | 0.0 | 0.249 | 4.8 | LOS A | 0.2 | 1.7 | 0.06 | 0.16 | 47.6 |
| 11 | T1 | 323 | 0.3 | 0.249 | 0.1 | LOS A | 0.2 | 1.7 | 0.06 | 0.16 | 47.3 |
| 12 | R2 | 19 | 0.0 | 0.249 | 5.9 | LOS A | 0.2 | 1.7 | 0.06 | 0.16 | 45.5 |
| Approach | | 469 | 0.2 | 0.249 | 1.6 | NA | 0.2 | 1.7 | 0.06 | 0.16 | 47.3 |
| All Vehicles | | 1221 | 0.7 | 0.451 | 4.6 | NA | 2.3 | 16.4 | 0.31 | 0.36 | 44.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St AM - Design - Priority]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 27 | 0.0 | 0.465 | 8.3 | LOS A | 3.5 | 24.7 | 0.40 | 0.23 | 50.1 |
| 2 | T1 | 475 | 0.0 | 0.465 | 1.7 | LOS A | 3.5 | 24.7 | 0.40 | 0.23 | 53.9 |
| 3 | R2 | 209 | 0.0 | 0.465 | 8.4 | LOS A | 3.5 | 24.7 | 0.40 | 0.23 | 49.3 |
| Approach | | 712 | 0.0 | 0.465 | 3.9 | NA | 3.5 | 24.7 | 0.40 | 0.23 | 52.4 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 62 | 0.0 | 1.360 | 348.8 | LOS F | 67.2 | 470.3 | 1.00 | 1.72 | 3.8 |
| 5 | T1 | 111 | 0.0 | 1.360 | 401.3 | LOS F | 67.2 | 470.3 | 1.00 | 1.72 | 3.6 |
| 6 | R2 | 105 | 0.0 | 1.360 | 474.9 | LOS F | 67.2 | 470.3 | 1.00 | 1.72 | 2.4 |
| Approach | | 278 | 0.0 | 1.360 | 417.4 | LOS F | 67.2 | 470.3 | 1.00 | 1.72 | 3.2 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 85 | 0.0 | 0.175 | 5.9 | LOS A | 0.2 | 1.2 | 0.07 | 0.16 | 49.4 |
| 8 | T1 | 254 | 0.0 | 0.175 | 0.2 | LOS A | 0.2 | 1.2 | 0.06 | 0.15 | 57.1 |
| 9 | R2 | 11 | 0.0 | 0.175 | 7.8 | LOS A | 0.2 | 1.2 | 0.07 | 0.16 | 48.8 |
| Approach | | 349 | 0.0 | 0.175 | 1.8 | NA | 0.2 | 1.2 | 0.06 | 0.15 | 55.5 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 156 | 0.0 | 1.106 | 135.2 | LOS F | 37.0 | 259.1 | 1.00 | 3.76 | 10.6 |
| 11 | T1 | 193 | 0.0 | 1.106 | 151.1 | LOS F | 37.0 | 259.1 | 1.00 | 3.76 | 9.4 |
| 12 | R2 | 36 | 0.0 | 1.106 | 160.3 | LOS F | 37.0 | 259.1 | 1.00 | 3.76 | 13.5 |
| Approach | | 384 | 0.0 | 1.106 | 145.5 | LOS F | 37.0 | 259.1 | 1.00 | 3.76 | 10.3 |
| All Vehicles | | 1723 | 0.0 | 1.360 | 101.7 | NA | 67.2 | 470.3 | 0.56 | 1.24 | 13.4 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St PM - Design - Priority]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 19 | 0.0 | 0.291 | 8.5 | LOS A | 1.6 | 11.5 | 0.42 | 0.25 | 49.8 |
| 2 | T1 | 263 | 0.0 | 0.291 | 1.8 | LOS A | 1.6 | 11.5 | 0.42 | 0.25 | 53.5 |
| 3 | R2 | 125 | 0.0 | 0.291 | 8.6 | LOS A | 1.6 | 11.5 | 0.42 | 0.25 | 48.9 |
| Approach | | 407 | 0.0 | 0.291 | 4.2 | NA | 1.6 | 11.5 | 0.42 | 0.25 | 51.9 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 117 | 0.0 | 0.643 | 9.5 | LOS A | 4.3 | 29.9 | 0.08 | 0.55 | 35.7 |
| 5 | T1 | 105 | 0.0 | 0.643 | 19.3 | LOS B | 4.3 | 29.9 | 0.08 | 0.55 | 32.8 |
| 6 | R2 | 85 | 0.0 | 0.643 | 25.9 | LOS B | 4.3 | 29.9 | 0.08 | 0.55 | 28.1 |
| Approach | | 307 | 0.0 | 0.643 | 17.4 | LOS B | 4.3 | 29.9 | 0.08 | 0.55 | 32.9 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 102 | 0.0 | 0.238 | 5.6 | LOS A | 0.0 | 0.3 | 0.01 | 0.14 | 50.7 |
| 8 | T1 | 373 | 0.0 | 0.238 | 0.0 | LOS A | 0.0 | 0.3 | 0.01 | 0.13 | 57.9 |
| 9 | R2 | 3 | 0.0 | 0.238 | 6.7 | LOS A | 0.0 | 0.3 | 0.01 | 0.14 | 49.5 |
| Approach | | 478 | 0.0 | 0.238 | 1.2 | NA | 0.0 | 0.3 | 0.01 | 0.13 | 56.8 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 14 | 0.0 | 0.390 | 7.7 | LOS A | 1.8 | 12.8 | 0.76 | 0.94 | 35.5 |
| 11 | T1 | 89 | 0.0 | 0.390 | 15.9 | LOS B | 1.8 | 12.8 | 0.76 | 0.94 | 33.3 |
| 12 | R2 | 37 | 0.0 | 0.390 | 21.4 | LOS B | 1.8 | 12.8 | 0.76 | 0.94 | 39.4 |
| Approach | | 140 | 0.0 | 0.390 | 16.5 | LOS B | 1.8 | 12.8 | 0.76 | 0.94 | 35.5 |
| All Vehicles | | 1333 | 0.0 | 0.643 | 7.5 | NA | 4.3 | 29.9 | 0.23 | 0.35 | 45.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [8. Houston Rd/ Borrodale Rd AM - Design - Priority]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 55 | 0.0 | 0.378 | 7.5 | LOS A | 1.6 | 11.1 | 0.22 | 0.13 | 49.8 |
| 2 | T1 | 503 | 0.0 | 0.378 | 0.7 | LOS A | 1.6 | 11.1 | 0.22 | 0.13 | 56.5 |
| 3 | R2 | 91 | 0.0 | 0.378 | 7.9 | LOS A | 1.6 | 11.1 | 0.22 | 0.13 | 48.5 |
| Approach | | 648 | 0.0 | 0.378 | 2.3 | NA | 1.6 | 11.1 | 0.22 | 0.13 | 54.9 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 82 | 0.0 | 0.853 | 34.8 | LOS D | 8.8 | 61.8 | 0.13 | 0.65 | 17.1 |
| 5 | T1 | 97 | 0.0 | 0.853 | 49.3 | LOS E | 8.8 | 61.8 | 0.13 | 0.65 | 24.1 |
| 6 | R2 | 69 | 0.0 | 0.853 | 65.8 | LOS F | 8.8 | 61.8 | 0.13 | 0.65 | 22.0 |
| Approach | | 248 | 0.0 | 0.853 | 49.1 | LOS E | 8.8 | 61.8 | 0.13 | 0.65 | 21.5 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 68 | 0.0 | 0.198 | 6.7 | LOS A | 0.5 | 3.3 | 0.17 | 0.15 | 52.4 |
| 8 | T1 | 280 | 0.0 | 0.198 | 0.4 | LOS A | 0.5 | 3.3 | 0.16 | 0.14 | 55.0 |
| 9 | R2 | 28 | 0.0 | 0.198 | 8.3 | LOS A | 0.5 | 3.3 | 0.17 | 0.15 | 50.7 |
| Approach | | 377 | 0.0 | 0.198 | 2.2 | NA | 0.5 | 3.3 | 0.16 | 0.14 | 53.5 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 116 | 0.0 | 1.077 | 114.9 | LOS F | 30.4 | 212.8 | 1.00 | 3.32 | 17.2 |
| 11 | T1 | 183 | 0.0 | 1.077 | 128.0 | LOS F | 30.4 | 212.8 | 1.00 | 3.32 | 13.3 |
| 12 | R2 | 59 | 0.0 | 1.077 | 139.1 | LOS F | 30.4 | 212.8 | 1.00 | 3.32 | 14.9 |
| Approach | | 358 | 0.0 | 1.077 | 125.6 | LOS F | 30.4 | 212.8 | 1.00 | 3.32 | 14.9 |
| All Vehicles | | 1632 | 0.0 | 1.077 | 36.4 | NA | 30.4 | 212.8 | 0.37 | 0.91 | 28.7 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [8. Houston Rd/ Borrodale Rd PM - Design - Priority ]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 41 | 0.0 | 0.265 | 8.4 | LOS A | 1.3 | 9.1 | 0.35 | 0.19 | 48.5 |
| 2 | T1 | 279 | 0.0 | 0.265 | 1.4 | LOS A | 1.3 | 9.1 | 0.35 | 0.19 | 54.6 |
| 3 | R2 | 82 | 0.0 | 0.265 | 8.8 | LOS A | 1.3 | 9.1 | 0.35 | 0.19 | 46.0 |
| Approach | | 402 | 0.0 | 0.265 | 3.7 | NA | 1.3 | 9.1 | 0.35 | 0.19 | 52.5 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 141 | 0.0 | 0.520 | 8.4 | LOS A | 3.7 | 25.7 | 0.06 | 0.53 | 32.1 |
| 5 | T1 | 78 | 0.0 | 0.520 | 19.1 | LOS C | 3.7 | 25.7 | 0.06 | 0.53 | 37.4 |
| 6 | R2 | 55 | 0.0 | 0.520 | 26.0 | LOS D | 3.7 | 25.7 | 0.06 | 0.53 | 37.2 |
| Approach | | 274 | 0.0 | 0.520 | 15.0 | LOS C | 3.7 | 25.7 | 0.06 | 0.53 | 35.1 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 85 | 0.0 | 0.266 | 5.8 | LOS A | 0.2 | 1.7 | 0.06 | 0.12 | 53.8 |
| 8 | T1 | 424 | 0.0 | 0.266 | 0.1 | LOS A | 0.2 | 1.7 | 0.05 | 0.11 | 56.8 |
| 9 | R2 | 18 | 0.0 | 0.266 | 6.9 | LOS A | 0.2 | 1.7 | 0.06 | 0.12 | 51.5 |
| Approach | | 527 | 0.0 | 0.266 | 1.2 | NA | 0.2 | 1.7 | 0.06 | 0.11 | 55.6 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 44 | 0.0 | 0.380 | 7.6 | LOS A | 1.8 | 12.5 | 0.68 | 0.87 | 41.9 |
| 11 | T1 | 76 | 0.0 | 0.380 | 16.7 | LOS C | 1.8 | 12.5 | 0.68 | 0.87 | 37.1 |
| 12 | R2 | 28 | 0.0 | 0.380 | 24.4 | LOS C | 1.8 | 12.5 | 0.68 | 0.87 | 38.9 |
| Approach | | 148 | 0.0 | 0.380 | 15.5 | LOS C | 1.8 | 12.5 | 0.68 | 0.87 | 39.1 |
| All Vehicles | | 1352 | 0.0 | 0.520 | 6.3 | NA | 3.7 | 25.7 | 0.21 | 0.30 | 47.5 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM - Design]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 62 | 0.0 | 0.111 | 31.7 | LOS C | 2.2 | 15.3 | 0.76 | 0.72 | 23.6 |
| 2 | T1 | 551 | 0.0 | 0.522 | 16.8 | LOS B | 16.9 | 118.0 | 0.70 | 0.63 | 35.5 |
| Approach | | 613 | 0.0 | 0.522 | 18.3 | LOS B | 16.9 | 118.0 | 0.71 | 0.64 | 34.0 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 29 | 0.0 | 0.623 | 33.9 | LOS C | 17.0 | 118.9 | 0.88 | 0.78 | 21.8 |
| 5 | T1 | 1266 | 0.0 | 0.623 | 28.5 | LOS B | 17.7 | 123.6 | 0.88 | 0.77 | 21.7 |
| Approach | | 1296 | 0.0 | 0.623 | 28.6 | LOS C | 17.7 | 123.6 | 0.88 | 0.77 | 21.7 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 92 | 1.1 | 0.096 | 18.4 | LOS B | 2.2 | 15.7 | 0.53 | 0.70 | 28.4 |
| 8 | T1 | 148 | 0.0 | 0.635 | 33.9 | LOS C | 10.9 | 76.2 | 0.91 | 0.81 | 24.6 |
| 9 | R2 | 105 | 0.0 | 0.635 | 38.2 | LOS C | 10.9 | 76.2 | 0.91 | 0.81 | 23.7 |
| Approach | | 345 | 0.3 | 0.635 | 31.1 | LOS C | 10.9 | 76.2 | 0.81 | 0.78 | 25.0 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 178 | 0.0 | 0.549 | 33.1 | LOS C | 14.7 | 102.7 | 0.85 | 0.78 | 25.8 |
| 11 | T1 | 937 | 0.0 | 0.549 | 27.8 | LOS B | 15.0 | 105.0 | 0.85 | 0.75 | 21.8 |
| 12 | R2 | 5 | 100.0 | 0.549 | 34.3 | LOS C | 14.1 | 100.0 | 0.86 | 0.74 | 25.7 |
| Approach | | 1120 | 0.5 | 0.549 | 28.7 | LOS C | 15.0 | 105.0 | 0.85 | 0.75 | 22.6 |
| All Vehicles | | 3374 | 0.2 | 0.635 | 27.0 | LOS B | 17.7 | 123.6 | 0.83 | 0.74 | 24.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 26.7 | LOS C | 0.1 | 0.1 | 0.73 | 0.73 |
| P2 | East Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 26.7 | LOS C | 0.1 | 0.1 | 0.73 | 0.73 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 35.5 | LOS D | | | 0.84 | 0.84 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres PM - Design]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 80 | 0.0 | 0.160 | 34.6 | LOS C | 3.0 | 20.9 | 0.80 | 0.73 | 22.5 |
| 2 | T1 | 242 | 0.0 | 0.231 | 15.7 | LOS B | 6.1 | 42.9 | 0.60 | 0.52 | 36.4 |
| Approach | | 322 | 0.0 | 0.231 | 20.4 | LOS B | 6.1 | 42.9 | 0.65 | 0.57 | 32.0 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 31 | 0.0 | 0.375 | 28.7 | LOS C | 9.5 | 66.5 | 0.76 | 0.66 | 24.2 |
| 5 | T1 | 813 | 0.0 | 0.375 | 23.4 | LOS B | 9.9 | 69.2 | 0.76 | 0.65 | 24.5 |
| Approach | | 843 | 0.0 | 0.375 | 23.6 | LOS B | 9.9 | 69.2 | 0.76 | 0.65 | 24.5 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 179 | 0.6 | 0.423 | 23.1 | LOS B | 12.3 | 86.2 | 0.69 | 0.72 | 20.1 |
| 8 | T1 | 216 | 0.0 | 0.423 | 18.7 | LOS B | 12.3 | 86.2 | 0.69 | 0.72 | 32.0 |
| 9 | R2 | 226 | 0.0 | 0.777 | 49.8 | LOS D | 11.5 | 80.7 | 0.99 | 0.92 | 19.2 |
| Approach | | 621 | 0.2 | 0.777 | 31.3 | LOS C | 12.3 | 86.2 | 0.80 | 0.79 | 23.0 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 181 | 0.0 | 0.782 | 36.1 | LOS C | 26.0 | 182.3 | 0.94 | 0.88 | 24.9 |
| 11 | T1 | 1561 | 0.0 | 0.782 | 30.6 | LOS C | 26.4 | 184.7 | 0.94 | 0.87 | 20.6 |
| 12 | R2 | 7 | 100.0 | 0.782 | 36.8 | LOS C | 25.4 | 179.7 | 0.94 | 0.87 | 24.6 |
| Approach | | 1749 | 0.4 | 0.782 | 31.2 | LOS C | 26.4 | 184.7 | 0.94 | 0.87 | 21.1 |
| All Vehicles | | 3536 | 0.2 | 0.782 | 28.4 | LOS B | 26.4 | 184.7 | 0.85 | 0.78 | 23.2 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 24.6 | LOS C | 0.1 | 0.1 | 0.70 | 0.70 |
| P2 | East Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 24.6 | LOS C | 0.1 | 0.1 | 0.70 | 0.70 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 34.4 | LOS D | | | 0.82 | 0.82 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [6. Bunnerong Rd/ General Bridges Cres/ Sturt St AM - Design - Pedestrian Test]

Bunnerong Rd/ Sturt St/ General Bridges Cres, Kingsford
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Bunnerong Rd - S | | | | | | | | | | | |
| 1 | L2 | 275 | 0.0 | 0.404 | 11.4 | LOS A | 6.8 | 47.8 | 0.53 | 0.63 | 47.6 |
| 2 | T1 | 709 | 0.0 | 0.404 | 5.5 | LOS A | 7.1 | 49.8 | 0.51 | 0.50 | 54.3 |
| Approach | | 984 | 0.0 | 0.404 | 7.1 | LOS A | 7.1 | 49.8 | 0.52 | 0.53 | 52.2 |
| East: Sturt St - E | | | | | | | | | | | |
| 4 | L2 | 26 | 0.0 | 0.065 | 19.8 | LOS B | 0.5 | 3.8 | 0.82 | 0.67 | 41.7 |
| Approach | | 26 | 0.0 | 0.065 | 19.8 | LOS B | 0.5 | 3.8 | 0.82 | 0.67 | 41.7 |
| North: Bunnerong Rd - N | | | | | | | | | | | |
| 7 | L2 | 88 | 0.0 | 0.063 | 6.7 | LOS A | 0.4 | 2.8 | 0.28 | 0.63 | 49.1 |
| 8 | T1 | 663 | 0.0 | 0.262 | 4.8 | LOS A | 4.1 | 28.6 | 0.45 | 0.39 | 55.6 |
| Approach | | 752 | 0.0 | 0.262 | 5.0 | LOS A | 4.1 | 28.6 | 0.43 | 0.42 | 54.8 |
| West: General Bridges Cres - W | | | | | | | | | | | |
| 10 | L2 | 27 | 0.0 | 0.059 | 19.6 | LOS B | 0.6 | 3.9 | 0.79 | 0.67 | 41.7 |
| Approach | | 27 | 0.0 | 0.059 | 19.6 | LOS B | 0.6 | 3.9 | 0.79 | 0.67 | 41.7 |
| All Vehicles | | 1789 | 0.0 | 0.404 | 6.6 | LOS A | 7.1 | 49.8 | 0.49 | 0.49 | 52.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P2 | East Full Crossing | 53 | 10.2 | LOS B | 0.1 | 0.1 | 0.58 | 0.58 |
| P2S | East Slip/Bypass Lane Crossing | 53 | 10.2 | LOS B | 0.1 | 0.1 | 0.58 | 0.58 |
| P4 | West Full Crossing | 53 | 10.2 | LOS B | 0.1 | 0.1 | 0.58 | 0.58 |
| P4S | West Slip/Bypass Lane Crossing | 53 | 10.2 | LOS B | 0.1 | 0.1 | 0.58 | 0.58 |
| All Pedestrians | | 263 | 13.1 | LOS B | | | 0.65 | 0.65 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [6. Bunnerong Rd/ General Bridges Cres/ Sturt St PM - Design - Pedestrian Test]

Bunnerong Rd/ Sturt St/ General Bridges Cres, Kingsford
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Bunnerong Rd - S | | | | | | | | | | | |
| 1 | L2 | 102 | 0.0 | 0.333 | 14.7 | LOS B | 5.7 | 39.8 | 0.62 | 0.60 | 46.5 |
| 2 | T1 | 564 | 0.0 | 0.333 | 9.2 | LOS A | 5.8 | 40.4 | 0.62 | 0.56 | 51.6 |
| Approach | | 666 | 0.0 | 0.333 | 10.0 | LOS A | 5.8 | 40.4 | 0.62 | 0.57 | 50.8 |
| East: Sturt St - E | | | | | | | | | | | |
| 4 | L2 | 48 | 0.0 | 0.082 | 7.1 | LOS A | 0.4 | 2.6 | 0.40 | 0.61 | 48.7 |
| Approach | | 48 | 0.0 | 0.082 | 7.1 | LOS A | 0.4 | 2.6 | 0.40 | 0.61 | 48.7 |
| North: Bunnerong Rd - N | | | | | | | | | | | |
| 7 | L2 | 94 | 0.0 | 0.087 | 7.1 | LOS A | 0.6 | 4.5 | 0.32 | 0.58 | 49.5 |
| 8 | T1 | 1119 | 0.0 | 0.433 | 5.4 | LOS A | 7.8 | 54.9 | 0.52 | 0.47 | 55.0 |
| Approach | | 1213 | 0.0 | 0.433 | 5.6 | LOS A | 7.8 | 54.9 | 0.50 | 0.47 | 54.5 |
| West: General Bridges Cres - W | | | | | | | | | | | |
| 10 | L2 | 35 | 0.0 | 0.046 | 8.6 | LOS A | 0.4 | 2.5 | 0.46 | 0.61 | 47.7 |
| Approach | | 35 | 0.0 | 0.046 | 8.6 | LOS A | 0.4 | 2.5 | 0.46 | 0.61 | 47.7 |
| All Vehicles | | 1962 | 0.0 | 0.433 | 7.2 | LOS A | 7.8 | 54.9 | 0.54 | 0.51 | 52.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P2 | East Full Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P2S | East Slip/Bypass Lane Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P4 | West Full Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| P4S | West Slip/Bypass Lane Crossing | 53 | 24.4 | LOS C | 0.1 | 0.1 | 0.90 | 0.90 |
| All Pedestrians | | 263 | 24.4 | LOS C | | | 0.90 | 0.90 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# Appendix G

## Attachment 7 – Sensitivity Test Results

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St AM - Design - Priority - Sensivity Test 50%]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 21 | 0.0 | 0.329 | 6.6 | LOS A | 1.6 | 10.9 | 0.26 | 0.21 | 51.0 |
| 2 | T1 | 348 | 0.0 | 0.329 | 0.6 | LOS A | 1.6 | 10.9 | 0.26 | 0.21 | 55.2 |
| 3 | R2 | 163 | 0.0 | 0.329 | 6.6 | LOS A | 1.6 | 10.9 | 0.26 | 0.21 | 50.6 |
| Approach | | 533 | 0.0 | 0.329 | 2.6 | NA | 1.6 | 10.9 | 0.26 | 0.21 | 53.7 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 51 | 0.0 | 0.554 | 8.3 | LOS A | 2.7 | 19.2 | 0.14 | 0.58 | 35.4 |
| 5 | T1 | 81 | 0.0 | 0.554 | 15.2 | LOS B | 2.7 | 19.2 | 0.14 | 0.58 | 32.5 |
| 6 | R2 | 83 | 0.0 | 0.554 | 26.2 | LOS B | 2.7 | 19.2 | 0.14 | 0.58 | 27.8 |
| Approach | | 215 | 0.0 | 0.554 | 17.9 | LOS B | 2.7 | 19.2 | 0.14 | 0.58 | 31.7 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 55 | 0.0 | 0.100 | 5.7 | LOS A | 0.1 | 0.6 | 0.06 | 0.19 | 49.0 |
| 8 | T1 | 147 | 0.0 | 0.100 | 0.1 | LOS A | 0.1 | 0.6 | 0.05 | 0.16 | 57.1 |
| 9 | R2 | 7 | 0.0 | 0.100 | 6.9 | LOS A | 0.1 | 0.6 | 0.06 | 0.19 | 48.6 |
| Approach | | 209 | 0.0 | 0.100 | 1.8 | NA | 0.1 | 0.6 | 0.05 | 0.17 | 55.3 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 19 | 0.0 | 0.762 | 15.4 | LOS B | 6.9 | 48.6 | 0.86 | 1.37 | 32.0 |
| 11 | T1 | 272 | 0.0 | 0.762 | 22.3 | LOS B | 6.9 | 48.6 | 0.86 | 1.37 | 29.8 |
| 12 | R2 | 49 | 0.0 | 0.762 | 27.4 | LOS B | 6.9 | 48.6 | 0.86 | 1.37 | 36.1 |
| Approach | | 340 | 0.0 | 0.762 | 22.6 | LOS B | 6.9 | 48.6 | 0.86 | 1.37 | 31.0 |
| All Vehicles | | 1297 | 0.0 | 0.762 | 10.3 | NA | 6.9 | 48.6 | 0.36 | 0.57 | 41.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St PM - Design - Priority - Sensivity Test 50%]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 12 | 0.0 | 0.170 | 6.9 | LOS A | 0.7 | 5.0 | 0.28 | 0.21 | 50.9 |
| 2 | T1 | 174 | 0.0 | 0.170 | 0.8 | LOS A | 0.7 | 5.0 | 0.28 | 0.21 | 55.1 |
| 3 | R2 | 78 | 0.0 | 0.170 | 6.9 | LOS A | 0.7 | 5.0 | 0.28 | 0.21 | 50.5 |
| Approach | | 263 | 0.0 | 0.170 | 2.9 | NA | 0.7 | 5.0 | 0.28 | 0.21 | 53.6 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 97 | 0.0 | 0.367 | 5.1 | LOS A | 1.7 | 11.7 | 0.06 | 0.53 | 43.0 |
| 5 | T1 | 86 | 0.0 | 0.367 | 8.9 | LOS A | 1.7 | 11.7 | 0.06 | 0.53 | 39.3 |
| 6 | R2 | 73 | 0.0 | 0.367 | 13.6 | LOS A | 1.7 | 11.7 | 0.06 | 0.53 | 35.9 |
| Approach | | 256 | 0.0 | 0.367 | 8.8 | LOS A | 1.7 | 11.7 | 0.06 | 0.53 | 40.0 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 65 | 0.0 | 0.150 | 5.6 | LOS A | 0.0 | 0.2 | 0.01 | 0.14 | 50.7 |
| 8 | T1 | 242 | 0.0 | 0.150 | 0.0 | LOS A | 0.0 | 0.2 | 0.01 | 0.13 | 58.0 |
| 9 | R2 | 2 | 0.0 | 0.150 | 6.1 | LOS A | 0.0 | 0.2 | 0.01 | 0.14 | 49.5 |
| Approach | | 309 | 0.0 | 0.150 | 1.2 | NA | 0.0 | 0.2 | 0.01 | 0.13 | 56.9 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 19 | 0.0 | 0.344 | 6.0 | LOS A | 1.8 | 12.4 | 0.61 | 0.83 | 40.2 |
| 11 | T1 | 124 | 0.0 | 0.344 | 9.3 | LOS A | 1.8 | 12.4 | 0.61 | 0.83 | 38.2 |
| 12 | R2 | 56 | 0.0 | 0.344 | 13.1 | LOS A | 1.8 | 12.4 | 0.61 | 0.83 | 43.5 |
| Approach | | 199 | 0.0 | 0.344 | 10.1 | LOS A | 1.8 | 12.4 | 0.61 | 0.83 | 40.2 |
| All Vehicles | | 1027 | 0.0 | 0.367 | 5.2 | NA | 1.8 | 12.4 | 0.21 | 0.38 | 47.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St AM - Design - Priority - Sensivity Test 75%]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 24 | 0.0 | 0.393 | 7.2 | LOS A | 2.2 | 15.3 | 0.32 | 0.21 | 50.7 |
| 2 | T1 | 412 | 0.0 | 0.393 | 0.9 | LOS A | 2.2 | 15.3 | 0.32 | 0.21 | 54.9 |
| 3 | R2 | 186 | 0.0 | 0.393 | 7.2 | LOS A | 2.2 | 15.3 | 0.32 | 0.21 | 50.3 |
| Approach | | 622 | 0.0 | 0.393 | 3.0 | NA | 2.2 | 15.3 | 0.32 | 0.21 | 53.4 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 56 | 0.0 | 0.860 | 26.9 | LOS B | 6.9 | 48.0 | 0.18 | 0.68 | 24.1 |
| 5 | T1 | 96 | 0.0 | 0.860 | 37.6 | LOS C | 6.9 | 48.0 | 0.18 | 0.68 | 22.4 |
| 6 | R2 | 94 | 0.0 | 0.860 | 54.6 | LOS D | 6.9 | 48.0 | 0.18 | 0.68 | 17.4 |
| Approach | | 245 | 0.0 | 0.860 | 41.7 | LOS C | 6.9 | 48.0 | 0.18 | 0.68 | 21.1 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 71 | 0.0 | 0.133 | 5.8 | LOS A | 0.1 | 0.9 | 0.07 | 0.18 | 49.1 |
| 8 | T1 | 191 | 0.0 | 0.133 | 0.1 | LOS A | 0.1 | 0.9 | 0.06 | 0.16 | 57.0 |
| 9 | R2 | 9 | 0.0 | 0.133 | 7.3 | LOS A | 0.1 | 0.9 | 0.07 | 0.18 | 48.6 |
| Approach | | 271 | 0.0 | 0.133 | 1.9 | NA | 0.1 | 0.9 | 0.06 | 0.17 | 55.2 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 21 | 0.0 | 1.135 | 153.3 | LOS F | 41.4 | 289.5 | 1.00 | 3.81 | 9.7 |
| 11 | T1 | 312 | 0.0 | 1.135 | 162.7 | LOS F | 41.4 | 289.5 | 1.00 | 3.81 | 8.5 |
| 12 | R2 | 57 | 0.0 | 1.135 | 168.9 | LOS F | 41.4 | 289.5 | 1.00 | 3.81 | 12.4 |
| Approach | | 389 | 0.0 | 1.135 | 163.1 | LOS F | 41.4 | 289.5 | 1.00 | 3.81 | 9.2 |
| All Vehicles | | 1527 | 0.0 | 1.135 | 49.9 | NA | 41.4 | 289.5 | 0.43 | 1.20 | 22.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St PM - Design - Priority - Sensivity Test 75%]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 16 | 0.0 | 0.228 | 7.6 | LOS A | 1.1 | 7.6 | 0.35 | 0.23 | 50.5 |
| 2 | T1 | 219 | 0.0 | 0.228 | 1.2 | LOS A | 1.1 | 7.6 | 0.35 | 0.23 | 54.5 |
| 3 | R2 | 102 | 0.0 | 0.228 | 7.6 | LOS A | 1.1 | 7.6 | 0.35 | 0.23 | 49.9 |
| Approach | | 337 | 0.0 | 0.228 | 3.4 | NA | 1.1 | 7.6 | 0.35 | 0.23 | 52.9 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 79 | 0.0 | 0.570 | 7.7 | LOS A | 3.3 | 23.0 | 0.10 | 0.56 | 37.6 |
| 5 | T1 | 96 | 0.0 | 0.570 | 14.1 | LOS A | 3.3 | 23.0 | 0.10 | 0.56 | 34.5 |
| 6 | R2 | 107 | 0.0 | 0.570 | 20.8 | LOS B | 3.3 | 23.0 | 0.10 | 0.56 | 30.0 |
| Approach | | 282 | 0.0 | 0.570 | 14.9 | LOS B | 3.3 | 23.0 | 0.10 | 0.56 | 34.0 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 84 | 0.0 | 0.194 | 5.6 | LOS A | 0.0 | 0.3 | 0.01 | 0.14 | 50.7 |
| 8 | T1 | 307 | 0.0 | 0.194 | 0.0 | LOS A | 0.0 | 0.3 | 0.01 | 0.13 | 57.9 |
| 9 | R2 | 3 | 0.0 | 0.194 | 6.4 | LOS A | 0.0 | 0.3 | 0.01 | 0.14 | 49.5 |
| Approach | | 395 | 0.0 | 0.194 | 1.3 | NA | 0.0 | 0.3 | 0.01 | 0.13 | 56.8 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 22 | 0.0 | 0.495 | 8.2 | LOS A | 2.9 | 20.5 | 0.71 | 0.98 | 36.7 |
| 11 | T1 | 141 | 0.0 | 0.495 | 14.1 | LOS A | 2.9 | 20.5 | 0.71 | 0.98 | 34.5 |
| 12 | R2 | 65 | 0.0 | 0.495 | 18.4 | LOS B | 2.9 | 20.5 | 0.71 | 0.98 | 40.4 |
| Approach | | 228 | 0.0 | 0.495 | 14.8 | LOS B | 2.9 | 20.5 | 0.71 | 0.98 | 36.8 |
| All Vehicles | | 1242 | 0.0 | 0.570 | 7.4 | NA | 3.3 | 23.0 | 0.25 | 0.41 | 45.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [8. Houston Rd/ Borrodale Rd AM - Design - Priority - Sensivity Test 50%]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 38 | 0.0 | 0.249 | 6.3 | LOS A | 0.7 | 4.8 | 0.14 | 0.13 | 50.2 |
| 2 | T1 | 342 | 0.0 | 0.249 | 0.2 | LOS A | 0.7 | 4.8 | 0.14 | 0.13 | 57.1 |
| 3 | R2 | 62 | 0.0 | 0.249 | 6.5 | LOS A | 0.7 | 4.8 | 0.14 | 0.13 | 49.3 |
| Approach | | 442 | 0.0 | 0.249 | 1.6 | NA | 0.7 | 4.8 | 0.14 | 0.13 | 55.6 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 72 | 0.0 | 0.389 | 6.1 | LOS A | 2.1 | 14.6 | 0.08 | 0.54 | 34.9 |
| 5 | T1 | 80 | 0.0 | 0.389 | 11.3 | LOS A | 2.1 | 14.6 | 0.08 | 0.54 | 39.5 |
| 6 | R2 | 57 | 0.0 | 0.389 | 19.8 | LOS B | 2.1 | 14.6 | 0.08 | 0.54 | 39.8 |
| Approach | | 208 | 0.0 | 0.389 | 11.8 | LOS A | 2.1 | 14.6 | 0.08 | 0.54 | 38.4 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 38 | 0.0 | 0.106 | 6.1 | LOS A | 0.2 | 1.3 | 0.12 | 0.15 | 52.8 |
| 8 | T1 | 162 | 0.0 | 0.106 | 0.2 | LOS A | 0.2 | 1.3 | 0.11 | 0.13 | 54.2 |
| 9 | R2 | 16 | 0.0 | 0.106 | 6.9 | LOS A | 0.2 | 1.3 | 0.12 | 0.15 | 50.9 |
| Approach | | 216 | 0.0 | 0.106 | 1.7 | NA | 0.2 | 1.3 | 0.11 | 0.14 | 52.8 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 113 | 0.0 | 0.577 | 9.3 | LOS A | 4.3 | 30.1 | 0.70 | 1.03 | 43.0 |
| 11 | T1 | 174 | 0.0 | 0.577 | 13.9 | LOS A | 4.3 | 30.1 | 0.70 | 1.03 | 38.4 |
| 12 | R2 | 57 | 0.0 | 0.577 | 19.7 | LOS B | 4.3 | 30.1 | 0.70 | 1.03 | 40.1 |
| Approach | | 343 | 0.0 | 0.577 | 13.4 | LOS A | 4.3 | 30.1 | 0.70 | 1.03 | 40.4 |
| All Vehicles | | 1209 | 0.0 | 0.577 | 6.7 | NA | 4.3 | 30.1 | 0.28 | 0.46 | 46.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [8. Houston Rd/ Borrodale Rd PM - Design - Priority - Sensivity Test 50%]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 28 | 0.0 | 0.164 | 6.6 | LOS A | 0.6 | 4.1 | 0.21 | 0.18 | 49.5 |
| 2 | T1 | 189 | 0.0 | 0.164 | 0.5 | LOS A | 0.6 | 4.1 | 0.21 | 0.18 | 56.0 |
| 3 | R2 | 56 | 0.0 | 0.164 | 6.8 | LOS A | 0.6 | 4.1 | 0.21 | 0.18 | 47.9 |
| Approach | | 274 | 0.0 | 0.164 | 2.4 | NA | 0.6 | 4.1 | 0.21 | 0.18 | 53.9 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 88 | 0.0 | 0.217 | 4.6 | LOS A | 0.9 | 6.4 | 0.05 | 0.52 | 40.1 |
| 5 | T1 | 49 | 0.0 | 0.217 | 7.9 | LOS A | 0.9 | 6.4 | 0.05 | 0.52 | 42.9 |
| 6 | R2 | 35 | 0.0 | 0.217 | 12.6 | LOS A | 0.9 | 6.4 | 0.05 | 0.52 | 44.3 |
| Approach | | 173 | 0.0 | 0.217 | 7.2 | LOS A | 0.9 | 6.4 | 0.05 | 0.52 | 42.1 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 45 | 0.0 | 0.141 | 5.7 | LOS A | 0.1 | 0.7 | 0.04 | 0.12 | 54.0 |
| 8 | T1 | 235 | 0.0 | 0.141 | 0.0 | LOS A | 0.1 | 0.7 | 0.04 | 0.11 | 56.0 |
| 9 | R2 | 9 | 0.0 | 0.141 | 6.2 | LOS A | 0.1 | 0.7 | 0.04 | 0.12 | 51.5 |
| Approach | | 289 | 0.0 | 0.141 | 1.1 | NA | 0.1 | 0.7 | 0.04 | 0.11 | 54.7 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 73 | 0.0 | 0.315 | 5.6 | LOS A | 1.5 | 10.8 | 0.51 | 0.72 | 46.1 |
| 11 | T1 | 106 | 0.0 | 0.315 | 8.7 | LOS A | 1.5 | 10.8 | 0.51 | 0.72 | 41.9 |
| 12 | R2 | 41 | 0.0 | 0.315 | 12.6 | LOS A | 1.5 | 10.8 | 0.51 | 0.72 | 43.3 |
| Approach | | 220 | 0.0 | 0.315 | 8.4 | LOS A | 1.5 | 10.8 | 0.51 | 0.72 | 43.8 |
| All Vehicles | | 956 | 0.0 | 0.315 | 4.3 | NA | 1.5 | 10.8 | 0.20 | 0.34 | 49.0 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [8. Houston Rd/ Borrodale Rd AM - Design - Priority - Sensivity Test 75%]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 46 | 0.0 | 0.313 | 6.7 | LOS A | 1.0 | 6.9 | 0.18 | 0.13 | 50.0 |
| 2 | T1 | 423 | 0.0 | 0.313 | 0.4 | LOS A | 1.0 | 6.9 | 0.18 | 0.13 | 56.9 |
| 3 | R2 | 77 | 0.0 | 0.313 | 7.1 | LOS A | 1.0 | 6.9 | 0.18 | 0.13 | 49.0 |
| Approach | | 546 | 0.0 | 0.313 | 1.9 | NA | 1.0 | 6.9 | 0.18 | 0.13 | 55.3 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 77 | 0.0 | 0.556 | 9.8 | LOS A | 3.6 | 24.9 | 0.10 | 0.56 | 29.2 |
| 5 | T1 | 88 | 0.0 | 0.556 | 18.9 | LOS B | 3.6 | 24.9 | 0.10 | 0.56 | 35.3 |
| 6 | R2 | 63 | 0.0 | 0.556 | 29.5 | LOS C | 3.6 | 24.9 | 0.10 | 0.56 | 34.6 |
| Approach | | 228 | 0.0 | 0.556 | 18.8 | LOS B | 3.6 | 24.9 | 0.10 | 0.56 | 33.5 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 54 | 0.0 | 0.152 | 6.3 | LOS A | 0.3 | 2.2 | 0.14 | 0.15 | 52.6 |
| 8 | T1 | 221 | 0.0 | 0.152 | 0.3 | LOS A | 0.3 | 2.2 | 0.13 | 0.14 | 54.8 |
| 9 | R2 | 22 | 0.0 | 0.152 | 7.5 | LOS A | 0.3 | 2.2 | 0.14 | 0.15 | 50.9 |
| Approach | | 297 | 0.0 | 0.152 | 1.9 | NA | 0.3 | 2.2 | 0.13 | 0.14 | 53.3 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 107 | 0.0 | 0.708 | 14.2 | LOS A | 5.7 | 40.2 | 0.80 | 1.26 | 39.2 |
| 11 | T1 | 160 | 0.0 | 0.708 | 22.3 | LOS B | 5.7 | 40.2 | 0.80 | 1.26 | 34.1 |
| 12 | R2 | 54 | 0.0 | 0.708 | 30.0 | LOS C | 5.7 | 40.2 | 0.80 | 1.26 | 36.1 |
| Approach | | 321 | 0.0 | 0.708 | 20.9 | LOS B | 5.7 | 40.2 | 0.80 | 1.26 | 36.4 |
| All Vehicles | | 1393 | 0.0 | 0.708 | 9.0 | NA | 5.7 | 40.2 | 0.30 | 0.46 | 44.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [8. Houston Rd/ Borrodale Rd PM - Design - Priority - Sensivity Test 75%]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 35 | 0.0 | 0.212 | 7.4 | LOS A | 0.9 | 6.1 | 0.28 | 0.18 | 49.2 |
| 2 | T1 | 235 | 0.0 | 0.212 | 0.9 | LOS A | 0.9 | 6.1 | 0.28 | 0.18 | 55.5 |
| 3 | R2 | 69 | 0.0 | 0.212 | 7.6 | LOS A | 0.9 | 6.1 | 0.28 | 0.18 | 47.3 |
| Approach | | 339 | 0.0 | 0.212 | 2.9 | NA | 0.9 | 6.1 | 0.28 | 0.18 | 53.5 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 115 | 0.0 | 0.355 | 5.4 | LOS A | 1.8 | 12.7 | 0.05 | 0.52 | 36.9 |
| 5 | T1 | 64 | 0.0 | 0.355 | 11.7 | LOS A | 1.8 | 12.7 | 0.05 | 0.52 | 40.8 |
| 6 | R2 | 45 | 0.0 | 0.355 | 18.8 | LOS B | 1.8 | 12.7 | 0.05 | 0.52 | 41.6 |
| Approach | | 224 | 0.0 | 0.355 | 9.9 | LOS A | 1.8 | 12.7 | 0.05 | 0.52 | 39.4 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 65 | 0.0 | 0.203 | 5.8 | LOS A | 0.2 | 1.1 | 0.05 | 0.12 | 53.9 |
| 8 | T1 | 329 | 0.0 | 0.203 | 0.1 | LOS A | 0.2 | 1.1 | 0.05 | 0.11 | 56.5 |
| 9 | R2 | 14 | 0.0 | 0.203 | 6.5 | LOS A | 0.2 | 1.1 | 0.05 | 0.12 | 51.5 |
| Approach | | 408 | 0.0 | 0.203 | 1.2 | NA | 0.2 | 1.1 | 0.05 | 0.11 | 55.3 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 86 | 0.0 | 0.472 | 7.7 | LOS A | 2.9 | 20.1 | 0.62 | 0.88 | 43.3 |
| 11 | T1 | 122 | 0.0 | 0.472 | 13.9 | LOS A | 2.9 | 20.1 | 0.62 | 0.88 | 38.8 |
| 12 | R2 | 47 | 0.0 | 0.472 | 19.6 | LOS B | 2.9 | 20.1 | 0.62 | 0.88 | 40.4 |
| Approach | | 256 | 0.0 | 0.472 | 12.9 | LOS A | 2.9 | 20.1 | 0.62 | 0.88 | 40.8 |
| All Vehicles | | 1227 | 0.0 | 0.472 | 5.7 | NA | 2.9 | 20.1 | 0.23 | 0.37 | 47.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# Appendix F

Arborist Report – treeiQ

# RANDWICK CYCLEWAY

## Route 1: Centennial Park to Kingsford

tree schedule June 2018

p. 0404 424 264 | f. 02 9012 0924
po box 146 summer hill 2130
info@treeiQ.com.au
abn 62 139 088 832

treeiQ.com.au

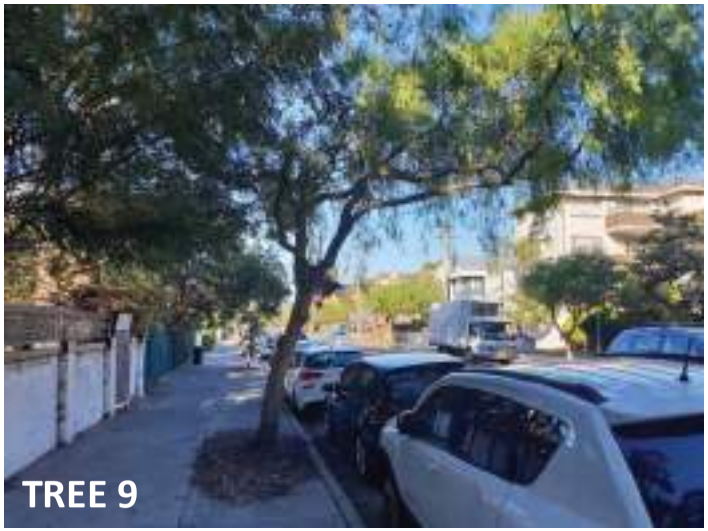



| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | *Lophostemon confertus* (Brush Box) | 375 | 6 | 4 | | | | | | | 5 | 2.2 |
| 2 | *Schinus molle* var. *areira* (Peppercorn Tree) | 225 | 5 | 4 | Fair | Fair | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Crown density 50-75%. Small (<25mmø) & medium (25-75mmø) epicormic growth in high volumes. Wound(s), no visible sign of decay. Structures within SRZ. | 5-15 | Low | Consider for Removal | 3 | 1.8 |
| 3 | *Schinus molle* var. *areira* (Peppercorn Tree) | 225 | 6 | 4 | Good | Good | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Small (<25mmø) & medium (25-75mmø) epicormic growth in moderate volumes. Pruned/lopped for powerline clearance. Wound(s), early signs of decay. Structures within SRZ. | 5-15 | Moderate | Consider for Retention | 3 | 1.8 |

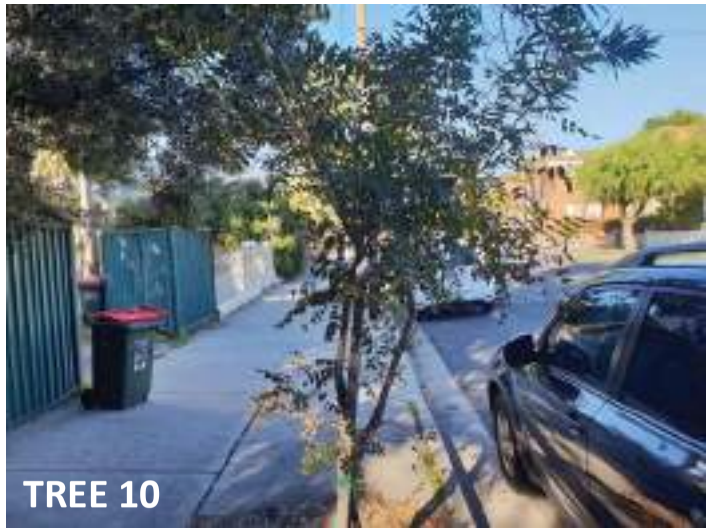



| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | *Schinus molle* var. *areira* (Peppercorn Tree) | 100 | 4 | 3 | Good | Good | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Crown density 75-95%. Wound(s), no visible sign of decay. Structures within SRZ. | 5-15 | Low | Consider for Removal | 2 | 1.5 |
| 5 | *Schinus molle* var. *areira* (Peppercorn Tree) | 225 | 5 | 4 | Good | Good | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Crown density 75-95%. Small (<25mmø) epicormic growth in moderate volumes. Pruned/lopped for powerline clearance. Structures within SRZ. | 5-15 | Moderate | Consider for Retention | 3 | 1.8 |
| 6 | *Schinus molle* var. *areira* (Peppercorn Tree) | 50 | 2 | 2 | Fair | Poor | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Lost central leader. Crown density 75-95%. Small (<25mmø) & medium (25-75mmø) epicormic growth in high volumes. Wound(s), early signs of decay. Structures within SRZ. | <5 | Low | Priority for Removal | 2 | 1.5 |






| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **7** | *Schinus molle* var. *areira* (Peppercorn Tree) | 475 | 7 | 6 | Good | Good | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Roots over paving. Small (<25mmø) & medium (25-75mmø) epicormic growth in high volumes. Pruned/lopped for powerline clearance. Wound(s), early signs of decay. | 15-40 | Moderate | Consider for Retention | 6 | 2.4 |
| **8** | *Pistacia chinensis* (Chinese Pistachio) | 50 | 2 | 1 | | | | | | | 2 | 1.5 |
| **9** | *Schinus molle* var. *areira* (Peppercorn Tree) | 250 | 7 | 6 | | | | | | | 3 | 1.8 |






| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **10** | *Pistacia chinensis* (Chinese Pistachio) | 50 | 2 | 2 | | | | | | | 2 | 1.5 |
| **11** | *Schinus molle* var. *areira* (Peppercorn Tree) | 250 | 5 | 3 | | | | | | | 3 | 1.8 |
| **12** | *Schinus molle* var. *areira* (Peppercorn Tree) | 225 | 5 | 3 | | | | | | | 3 | 1.8 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **13** | *Schinus molle* var. *areira* (Peppercorn Tree) | 400 | 7 | 5 | | | | | | | 5 | 2.3 |
| **14** | *Schinus molle* var. *areira* (Peppercorn Tree) | 246 | 6 | 6 | | | | | | | 5 | 2.3 |
| **15** | *Schinus molle* var. *areira* (Peppercorn Tree) | 400 | 7 | 5 | | | | | | | 5 | 2.3 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **16** | *Schinus molle* var. *areira* (Peppercorn Tree) | 150 | 6 | 3 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 2 | 1.5 |
| **17** | *Schinus molle* var. *areira* (Peppercorn Tree) | 450 | 7 | 6 | | | | | | | 5 | 2.4 |
| **18** | *Schinus molle* var. *areira* (Peppercorn Tree) | 375 | 7 | 5 | | | | | | | 5 | 2.2 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **19** | *Callistemon viminalis* (Weeping Bottlebrush) | 100 | 5 | 3 | | | | | | | 2 | 1.5 |
| **20** | *Schinus molle* var. *areira* (Peppercorn Tree) | 100 | 4 | 2 | | | | | | | 2 | 1.5 |
| **21** | Dead | | | | | | **DEAD** | | | | | |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **22** | *Metrosideros excelsa* (New Zealand Christmas Tree) | 214 | 6 | 4 | | | | | | | 3 | 1.7 |
| **23** | *Schinus molle* var. *areira* (Peppercorn Tree) | 318 | 7 | 6 | | | | | | | 4 | 2.0 |
| **24** | *Schinus molle* var. *areira* (Peppercorn Tree) | 250 | 6 | 5 | | | | | | | 3 | 1.8 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **25** | *Grevillea robusta* (Silky Oak) | 50 | 2 | 1 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 2 | 1.5 |
| **26** | *Schinus molle* var. *areira* (Peppercorn Tree) | 100 | 4 | 3 | | | | | | | 2 | 1.5 |
| **27** | *Schinus molle* var. *areira* (Peppercorn Tree) | 225 | 7 | 4 | | | | | | | 3 | 1.8 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **28** | *Schinus molle* var. *areira* (Peppercorn Tree) | 493 | 7 | 6 | | | | | | | 6 | 2.5 |
| **29** | *Schinus molle* var. *areira* (Peppercorn Tree) | 400 | 6 | 6 | | | | | | | 5 | 2.3 |
| **30** | *Schinus molle* var. *areira* (Peppercorn Tree) | 475 | 7 | 7 | | | | | | | 6 | 2.4 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **31** | *Schinus molle* var. *areira* (Peppercorn Tree) | 425 | 6 | 7 | | | | | | | 5 | 2.3 |
| **32** | *Schinus molle* var. *areira* (Peppercorn Tree) | 250 | 6 | 5 | | | | | | | 3 | 1.8 |
| **33** | *Schinus molle* var. *areira* (Peppercorn Tree) | 450 | 7 | 7 | Good | Good | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Crown density 75-95%. Small (<25mmø) & medium (25-75mmø) epicormic growth in moderate volumes. Pruned/lopped for powerline clearance. Wound(s), no visible sign of decay. Structures within SRZ. | 15-40 | Moderate | Consider for Retention | 5 | 2.4 |

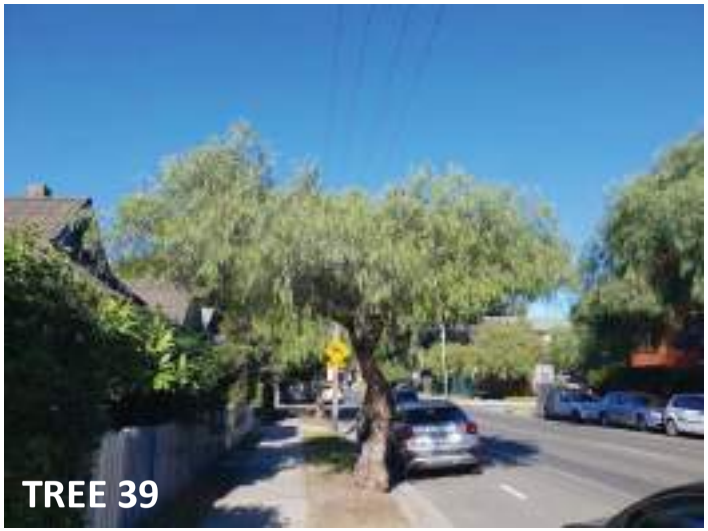
TREE 34


TREE 35

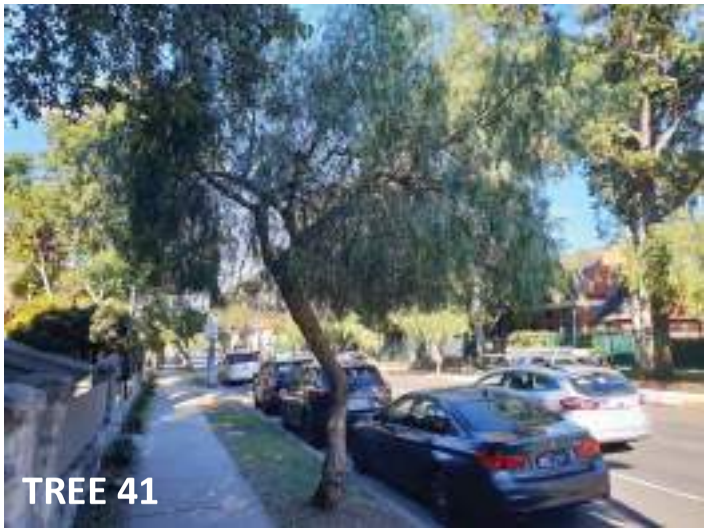

TREE 36

| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **34** | *Schinus molle* var. *areira* (Peppercorn Tree) | 100 | 6 | 3 | Fair | Fair | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Crown density 50-75%. Small (<25mmø) & medium (25-75mmø) epicormic growth in high volumes. Wound(s), no visible sign of decay. Structures within SRZ. Phototrophic lean, moderate. | 5-15 | Low | Consider for Removal | 2 | 1.5 |
| **35** | *Schinus molle* var. *areira* (Peppercorn Tree) | 375 | 6 | 6 | Fair | Fair | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Crown density 75-95%. Small (<25mmø) deadwood in moderate volumes. Small (<25mmø) epicormic growth in high volumes. Mechanical damage to exposed surface roots. Structures within SRZ. Adaptive growth. | 5-15 | Moderate | Consider for Retention | 5 | 2.2 |
| **36** | *Schinus molle* var. *areira* (Peppercorn Tree) | 250 | 6 | 5 | Good | Good | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Small (<25mmø), medium (25-75mmø) & large (>75mmø) epicormic growth in moderate volumes. Pruned/lopped for powerline clearance. Wound(s), early signs of decay. Structures within SRZ. | 5-15 | Moderate | Consider for Retention | 3 | 1.8 |






| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **37** | *Schinus molle* var. *areira* (Peppercorn Tree) | 400 | 6 | 6 | Good | Good | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Small (<25mmø) & medium (25-75mmø) epicormic growth in high volumes. Pruned/lopped for powerline clearance. Structures within SRZ. | 5-15 | Moderate | Consider for Retention | 5 | 2.3 |
| **38** | *Schinus molle* var. *areira* (Peppercorn Tree) | 100 | 5 | 3 | | | | | | | 2 | 1.5 |
| **39** | *Schinus molle* var. *areira* (Peppercorn Tree) | 450 | 6 | 6 | | | | | | | 5 | 2.4 |



| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | *Schinus molle* var. *areira* (Peppercorn Tree) | 450 | 7 | 7 | | | | | | | 5 | 2.4 |
| **41** | *Schinus molle* var. *areira* (Peppercorn Tree) | 250 | 6 | 4 | Fair | Fair | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Crown density 50-75%. Small (<25mmø) & medium (25-75mmø) epicormic growth in high volumes. Mechanical damage to exposed surface roots. Structures within SRZ. | 5-15 | Low | Consider for Removal | 3 | 1.8 |
| **42** | *Schinus molle* var. *areira* (Peppercorn Tree) | 400 | 6 | 6 | Fair | Fair | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Crown density 75-95%. Small (<25mmø) & medium (25-75mmø) epicormic growth in moderate volumes. Mechanical damage to exposed surface roots. Pruned/lopped for powerline clearance. Wound(s), advanced stages of decay. | 5-15 | Moderate | Consider for Retention | 5 | 2.3 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **43** | *Schinus molle* var. *areira* (Peppercorn Tree) | 100 | 4 | 3 | Fair | Poor | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Crown density 50-75%. Crown consists mainly of epicormic growth. Wound(s), early signs of decay. Structures within SRZ. | <5 | Low | Priority for Removal | 2 | 1.5 |
| **44** | *Schinus molle* var. *areira* (Peppercorn Tree) | 200 | 5 | 4 | Fair | Fair | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Crown density 50-75%. Small (<25mmø) & medium (25-75mmø) epicormic growth in high volumes. Partially suppressed. Lopped with resultant epicormics. Wound(s), early signs of decay. Structures within SRZ. | 5-15 | Low | Consider for Removal | 2 | 1.7 |
| **45** | *Schinus molle* var. *areira* (Peppercorn Tree) | 400 | 7 | 5 | | | | | | | 5 | 2.3 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **46** | *Schinus molle* var. *areira* (Peppercorn Tree) | 250 | 6 | 6 | | | | | | | 3 | 1.8 |
| **47** | *Schinus molle* var. *areira* (Peppercorn Tree) | 425 | 7 | 6 | | | | | | | 5 | 2.3 |
| **48** | *Elaeocarpus reticulatus* (Blueberry Ash) | 50 | 1 | 1 | | | | | | | 2 | 1.5 |

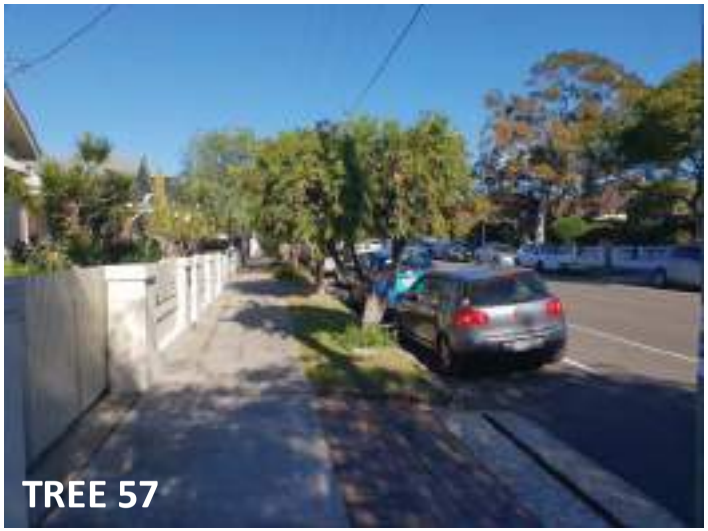



| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **49** | *Elaeocarpus reticulatus* (Blueberry Ash) | 50 | 1 | 1 | | | | | | | 2 | 1.5 |
| **50** | *Elaeocarpus reticulatus* (Blueberry Ash) | 50 | 1 | 1 | | | | | | | 2 | 1.5 |
| **51** | *Schinus molle* var. *areira* (Peppercorn Tree) | 50 | 2 | 2 | | | | | | | 2 | 1.5 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **52** | *Schinus molle* var. *areira* (Peppercorn Tree) | 50 | 2 | 2 | | | | | | | 2 | 1.5 |
| **53** | *Schinus molle* var. *areira* (Peppercorn Tree) | 50 | 2 | 2 | | | | | | | 2 | 1.5 |
| **54** | *Schinus molle* var. *areira* (Peppercorn Tree) | 50 | 2 | 2 | | | | | | | 2 | 1.5 |






| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **55** | *Callistemon viminalis* (Weeping Bottlebrush) | 189 | 5 | 4 | | | | | | | 2 | 1.6 |
| **56** | *Schinus molle* var. *areira* (Peppercorn Tree) | 450 | 7 | 6 | | | | | | | 5 | 2.4 |
| **57** | *Callistemon viminalis* (Weeping Bottlebrush) | 180 | 3 | 3 | | | | | | | 2 | 1.6 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **58** | *Callistemon viminalis* (Weeping Bottlebrush) | 180 | 3 | 3 | | | | | | | 2 | 1.6 |
| **59** | *Schinus molle* var. *areira* (Peppercorn Tree) | 354 | 5 | 6 | | | | | | | 4 | 2.1 |
| **60** | *Robinia pseudoacacia* 'Frisia' (Golden Robinia) | 375 | 5 | 7 | | | | | | | 5 | 2.2 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **61** | *Robinia pseudoacacia* 'Frisia' (Golden Robinia) | 350 | 5 | 7 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 4 | 2.1 |
| **62** | *Syzygium paniculatum* (Brush Cherry) | 106 | 5 | 3 | | | | | | | 2 | 1.5 |
| **63** | *Lagerstroemia indica* (Crepe Myrtle) | 375 | 4 | 4 | | | | | | | 5 | 2.2 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **64** | *Callistemon viminalis* (Weeping Bottlebrush) | 280 | 5 | 4 | | | | | | | 3 | 1.9 |
| **65** | *Eriobotrya japon*ica (Loquat) | 50 | 2 | 1 | | | | | | | 2 | 1.5 |
| **66** | *Callistemon viminalis* (Weeping Bottlebrush) | 146 | 3 | 2 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 2 | 1.5 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **67** | *Callistemon viminalis* (Weeping Bottlebrush) | 423 | 7 | 6 | | | | | | | 5 | 2.3 |
| **68** | *Callistemon viminalis* (Weeping Bottlebrush) | 348 | 7 | 6 | | | | | | | 4 | 2.1 |
| **69** | *Jacaranda mimosifolia* (Jacaranda) | 376 | 7 | 7 | | | | | | | 5 | 2.2 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **70** | *Jacaranda mimosifolia* (Jacaranda) | 370 | 7 | 7 | | | | | | | 4 | 2.2 |
| **71** | *Callistemon viminalis* (Weeping Bottlebrush) | 215 | 4 | 4 | | | | | | | 3 | 1.7 |
| **72** | *Olea europea* subsp. *cuspidata* (African Olive) | 459 | 7 | 6 | | | | | | | 6 | 2.4 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **73** | *Melaleuca decora* (Feather Honeymyrtle) | 596 | 7 | 5 | | | | | | | 7 | 2.7 |
| **74** | *Tristaniopsis laurina* (Water gum) | 450 | 6 | 5 | | | | | | | 5 | 2.4 |
| **75** | *Callistemon viminalis* (Weeping Bottlebrush) | 195 | 5 | 4 | | | | | | | 2 | 1.7 |



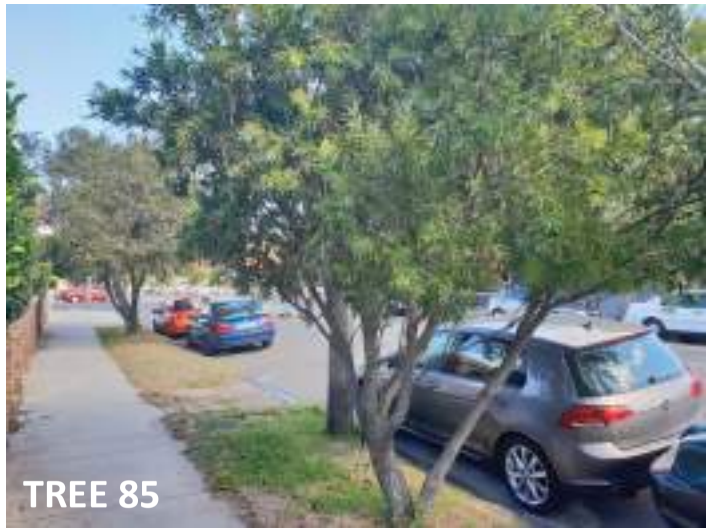

| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **76** | *Callistemon viminalis* (Weeping Bottlebrush) | 354 | 5 | 4 | | | | | | | 4 | 2.1 |
| **77** | *Callistemon viminalis* (Weeping Bottlebrush) | 241 | 5 | 4 | | | | | | | 3 | 1.8 |
| **78** | *Schinus molle* var. *areira* (Peppercorn Tree) | 496 | 7 | 6 | | | | | | | 6 | 2.5 |

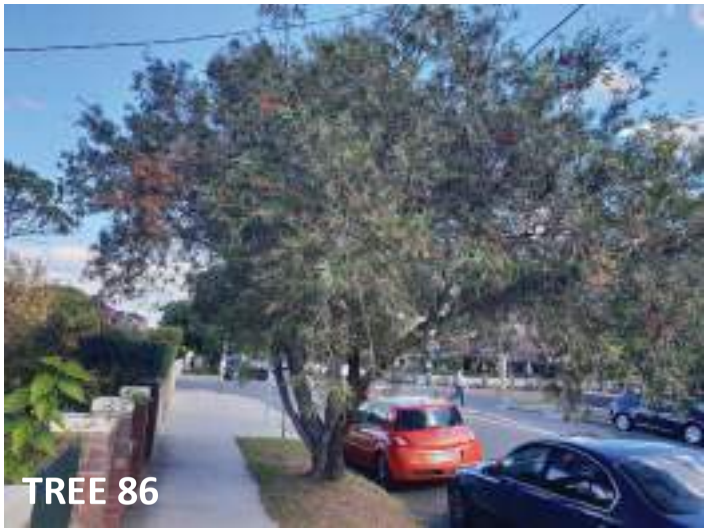



| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **79** | *Schinus molle* var. *areira* (Peppercorn Tree) | 275 | 6 | 6 | | | | | | | 3 | 1.9 |
| **80** | *Schinus molle* var. *areira* (Peppercorn Tree) | 506 | 7 | 6 | | | | | | | 6 | 2.5 |
| **81** | *Agonis flexuosa* (Willow Myrtle) | 600 | 5 | 7 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 7 | 2.7 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **82** | *Callistemon viminalis* (Weeping Bottlebrush) | 87 | 4 | 3 | | | | | | | 2 | 1.5 |
| **83** | *Callistemon viminalis* (Weeping Bottlebrush) | 100 | 4 | 3 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 2 | 1.5 |
| **84** | *Callistemon viminalis* (Weeping Bottlebrush) | 214 | 4 | 3 | | | | | | | 3 | 1.7 |



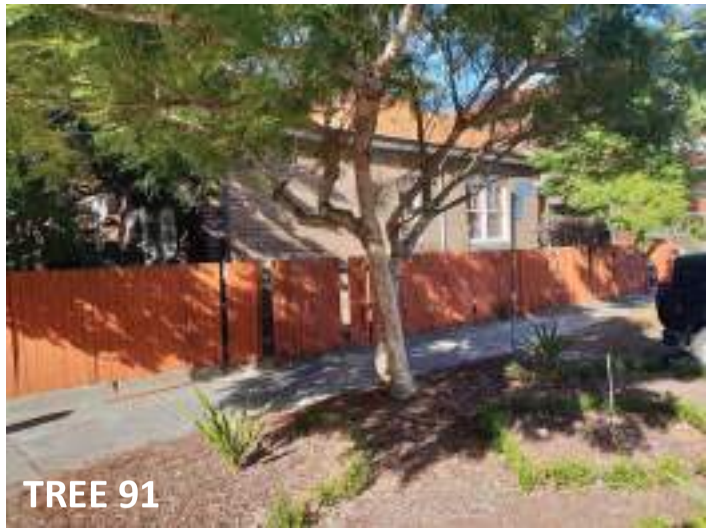





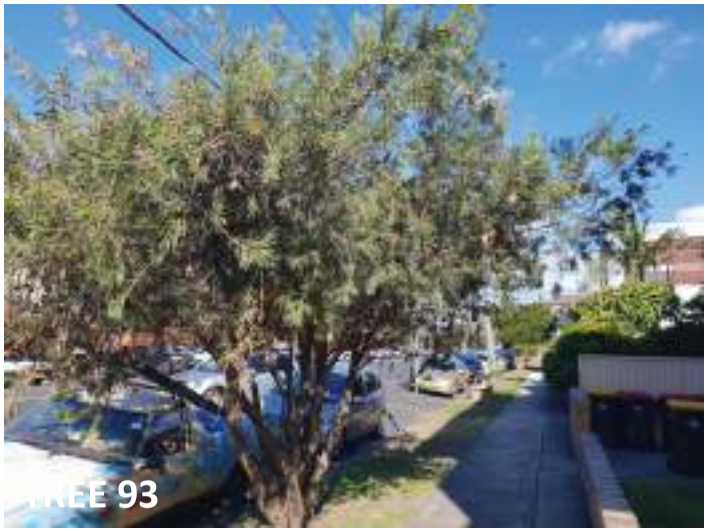
| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **85** | *Callistemon viminalis* (Weeping Bottlebrush) | 230 | 4 | 3 | | | | | | | 3 | 1.8 |
| **86** | *Callistemon viminalis* (Weeping Bottlebrush) | 432 | 6 | 8 | | | | | | | 5 | 2.3 |
| **87** | *Agonis flexuosa* (Willow Myrtle) | 600 | 6 | 5 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 7 | 2.7 |



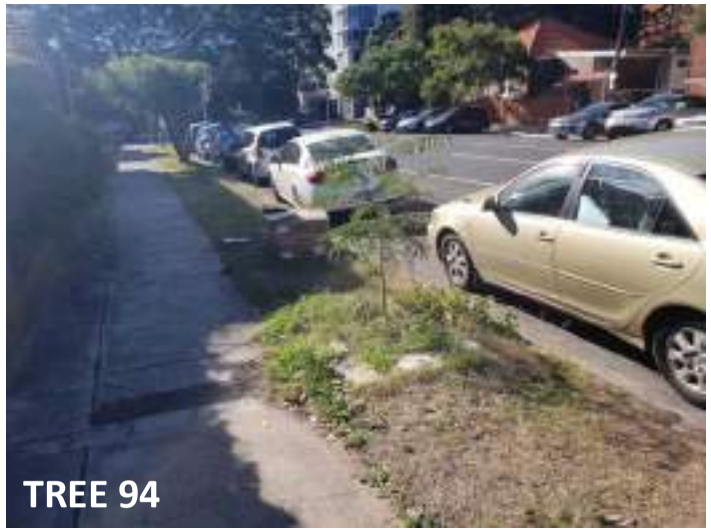

| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **88** | *Eucalyptus scoparia* (Willow Gum) | 600 | 8 | 6 | | | | | | | 7 | 2.7 |
| **89** | *Tristaniopsis laurina* (Water Gum) | 283 | 4 | 3 | | | | | | | 3 | 1.9 |
| **90** | *Eucalyptus scoparia* (Willow Gum) | 225 | 4 | 3 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 3 | 1.8 |








| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **91** | *Jacaranda mimosifolia* (Jacaranda) | 285 | 6 | 6 | | | | | | | 3 | 2.0 |
| **92** | *Jacaranda mimosifolia* (Jacaranda) | 180 | 6 | 4 | | | | | | | 2 | 1.6 |
| **93** | *Callistemon viminalis* (Weeping Bottlebrush) | 350 | 4 | 4 | | | | | | | 4 | 2.1 |






| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **94** | *Jacaranda mimosifolia* (Jacaranda) | 50 | 2 | 1 | | | | | | | 2 | 1.5 |
| **95** | *Tristaniopsis laurina* (Water Gum) | 203 | 5 | 4 | | | | | | | 2 | 1.7 |
| **96** | *Plumeria rubra* (Frangipani) | 100 | 3 | 3 | | | | | | | 2 | 1.5 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **97** | *Tristaniopsis laurina* (Water Gum) | 375 | 5 | 4 | | | | | | | 5 | 2.2 |
| **98** | *Callistemon viminalis* (Weeping Bottlebrush) | 237 | 5 | 3 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 3 | 1.8 |
| **99** | *Livistonia australis* (Cabbage Tree Palm) | 300 | 8 | 3 | | | | | | | 4 | |



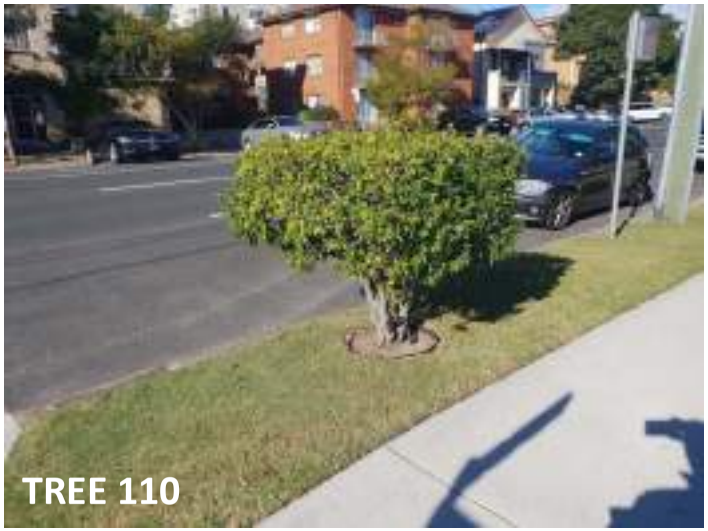

| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **100** | *Eucalyptus scoparia* (Willow Gum) | 275 | 6 | 4 | | | | | | | 3 | 1.9 |
| **101** | *Tristaniopsis laurina* (Water Gum) | 350 | 6 | 4 | | | | | | | 4 | 2.1 |
| **102** | *Tristaniopsis laurina* (Water Gum) | 226 | 6 | 4 | | | | | | | 3 | 1.8 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **103** | *Callistemon salignus* (White Bottlebrush) | 451 | 6 | 6 | | | | | | | 5 | 2.4 |
| **104** | *Tristaniopsis laurina* (Water gum) | 400 | 6 | 6 | | | | | | | 5 | 2.3 |
| **105** | *Callistemon viminalis* (Weeping Bottlebrush) | 330 | 4 | 5 | | | | | | | 4 | 2.1 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **106** | *Platanus xacerifolia* (London Plane) | 450 | 12 | 8 | | | | | | | 5 | 2.4 |
| **107** | *Callistemon viminalis* (Weeping Bottlebrush) | 50 | 2 | 1 | | | | | | | 2 | 1.5 |
| **108** | *Callistemon viminalis* (Weeping Bottlebrush) | 50 | 2 | 1 | | | | | | | 2 | 1.5 |



| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **109** | *Corymbia ficifolia* (Flower Eucalypt cvs) | 50 | 2 | 1 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 2 | 1.5 |
| **110** | *Michelia figo* (Port Wine Magnolia) | 71 | 2 | 2 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 2 | 1.5 |
| **111** | *Callistemon salignus* (White Bottlebrush)) | 400 | 7 | 4 | | | | | | | 5 | 2.3 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **112** | *Callistemon salignus* (White Bottlebrush) | 225 | 6 | 5 | | | | | | | 3 | 1.8 |
| **113** | *Melaleuca armillaris* (Braclet Honeymytle) | 400 | 4 | 4 | | | | | | | 5 | 2.3 |
| **114** | *Cupaniopsis anacardiodes* (Tuckeroo) | 425 | 7 | 6 | | | | | | | 5 | 2.3 |

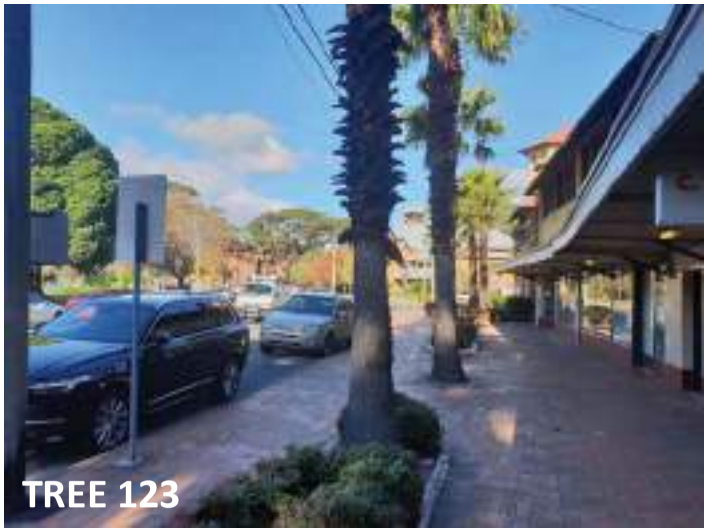



| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **115** | *Cupaniopsis anacardiodes* (Tuckeroo) | 50 | 2 | 1 | | | | | | | 2 | 1.5 |
| **116** | *Callistemon salignus* (Willow Bottlebrush) | 386 | 6 | 4 | | | | | | | 5 | 2.2 |
| **117** | *Agonis flexuosa* (Willow Myrtle) | 800 | 5 | 6 | | | **TREE RECOMMENDED FOR REMOVAL DUE TO ULE** | <5 | | | 10 | 3.0 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **118** | *Tristaniopsis laurina* (Water Gum) | 103 | 4 | 3 | | | | | | | 2 | 1.5 |
| **119** | *Livistonia australis* (Cabbage Tree Palm) | 450 | 11 | 3 | | | | | | | 5 | |
| **120** | *Livistonia australis* (Cabbage Tree Palm) | 450 | 11 | 3 | | | | | | | 5 | |






| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **121** | *Livistonia australis* (Cabbage Tree Palm) | 450 | 11 | 3 | | | | | | | 5 | |
| **122** | *Livistonia australis* (Cabbage Tree Palm) | 450 | 11 | 3 | | | | | | | 5 | |
| **123** | *Livistonia australis* (Cabbage Tree Palm) | 450 | 11 | 3 | | | | | | | 5 | |

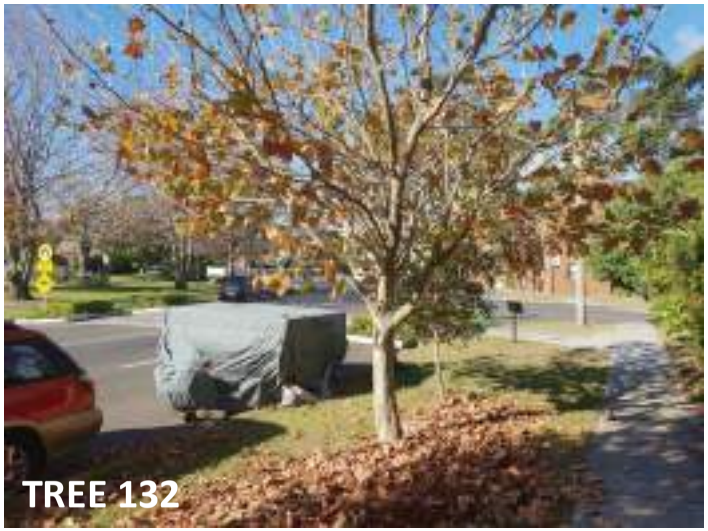



| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **124** | *Livistonia australis* (Cabbage Tree Palm) | 450 | 11 | 3 | | | | | | | 5 | |
| **125** | *Livistonia australis* (Cabbage Tree Palm) | 400 | 11 | 3 | | | | | | | 5 | |
| **126** | *Livistonia australis* (Cabbage Tree Palm) | 400 | 11 | 3 | | | | | | | 5 | |

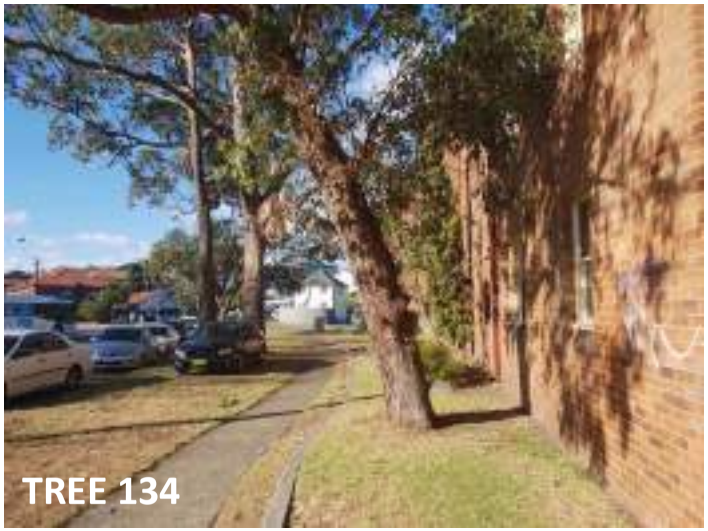



| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **127** | *Livistonia australis* (Cabbage Tree Palm) | 400 | 8 | 3 | | | | | | | 5 | |
| **128** | *Livistonia australis* (Cabbage Tree Palm) | 400 | 8 | 3 | | | | | | | 5 | |
| **129** | *Platanus xacerifolia* (London Plane) | 225 | 7 | 4 | | | | | | | 3 | 1.8 |






| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **130** | *Platanus xacerifolia* (London Plane) | 100 | 7 | 3 | | | | | | | 2 | 1.5 |
| **131** | *Liquidamber styraciflua* (Liquidambar) | 275 | 7 | 6 | | | | | | | 3 | 1.9 |
| **132** | *Platanus xacerifolia* (London Plane) | 250 | 7 | 5 | | | | | | | 3 | 1.8 |



| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **133** | *Hibiscus tiliaceus* (Native Rosella) | 325 | 7 | 8 | | | | | | | 4 | 2.1 |
| **134** | *Eucalyptus robusta* (Swamp Mahogany) | 650 | 14 | 8 | | | | | High | | 8 | 2.8 |
| **135** | *Eucalyptus robusta* (Swamp Mahogany) | 900 | 16 | 11 | | | | | High | | 11 | 3.2 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **136** | *Eucalyptus robusta* (Swamp Mahogany) | 900 | 16 | 12 | | | | | High | | 11 | 3.2 |
| **137** | *Eucalyptus robusta* (Swamp Mahogany) | 475 | 12 | 8 | | | | | | | 6 | 2.4 |
| **138** | *Gleditsia triacanthos* cvs (Honey Locust) | 75 | 7 | 4 | Dormant. No rating. | Good | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Wound(s), early signs of decay. | 5-15 | Low | Consider for Removal | 2 | 1.5 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **139** | *Gleditsia triacanthos* cvs (Honey Locust) | 122 | 7 | 7 | Dormant. No rating. | Fair | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Wound(s), early signs of decay. Borer. | 5-15 | Low | Consider for Removal | 2 | 1.5 |
| **140** | *Syzygium paniculatum* (Brush Cherry) | 350 | 6 | 6 | Good | Fair | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Crossing branches. Crown density 75-95%. Small (<25mmø) deadwood in moderate volumes. Small (<25mmø) & medium (25-75mmø) epicormic growth in moderate volumes. Wound(s), early signs of decay. Structures within SRZ. | 5-15 | Low | Consider for Removal | 4 | 2.1 |
| **141** | *Gleditsia triacanthos* cvs (Honey Locust) | 100 | 5 | 4 | Dormant. No rating. | Good | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Wound(s), no visible sign of decay. | 5-15 | Low | Consider for Removal | 2 | 1.5 |




| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **142** | *Syzygium paniculatum* (Brush Cherry) | 106 | 4 | 3 | Good | Poor | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Small (<25mmø) epicormic growth in high volumes. Co-dominant inclusions, major. | <5 | Low | | 2 | 1.5 |
| **143** | *Gleditsia triacanthos* cvs (Honey Locust) | 125 | 5 | 4 | Dormant. No rating. | Good | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Wound(s), no visible sign of decay. | 5-15 | Low | Consider for Removal | 2 | 1.5 |
| **144** | *Gleditsia triacanthos* cvs (Honey Locust) | 189 | 6 | 7 | Dormant. No rating. | Fair | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Wound(s), early signs of decay. | 5-15 | Low | Consider for Removal | 2 | 1.6 |


| Tree No. | Species | DBH (mm) | Height (m) | Radial Crown Spread (m) | Health Rating | Structural Rating | Comments | ULE (years) | L/Sign | Retention Value | TPZ (m) | SRZ (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **145** | *Gleditsia triacanthos* cvs (Honey Locust) | 75 | 3 | 3 | Dormant. No rating. | Fair | **TREE PROPOSED FOR REMOVAL TO ACCOMMODATE CYCLEWAY** Lost central leader. Wound(s), early signs of decay. | <5 | Low | Priority for Removal | 2 | 1.5 |

# Appendix G

Heritage Constraints and Opportunities Assessment – City Plan Heritage





# Constraints & Opportunities Assessment

## Randwick Cycleway

Doncaster Avenue, Day Avenue, Houston Road, General Bridges Crescent, Sturt Street, Avoca Street and Bundock Street.

Submitted to Group GSA

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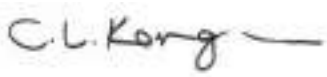
May 2018 | 17-206

## Report Revision History

| Revision | Date Issued | Prepared by | Reviewed by | Verified by |
|---|---|---|---|---|
| 01 | 20/04/18 | **Brittany Freelander**<br>*Senior Heritage Consultant* | **Carole-Lynne Kerrigan**<br>*Associate Director - Heritage* | **Carole-Lynne Kerrigan**<br>*Associate Director - Heritage*<br>  |
| 02 | 3/05/18 | **Brittany Freelander**<br>*Senior Heritage Consultant* | **Carole-Lynne Kerrigan**<br>*Associate Director - Heritage* | |

*This document is preliminary unless approved by a Director of City Plan Heritage.*

CERTIFICATION
This report has been authorised by City Plan Heritage, with input from a number of other expert consultants, on behalf of the Client. The accuracy of the information contained herein is to the best of our knowledge not false or misleading. The comments have been based upon information and facts that were correct at the time of writing this report.



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CITY PLAN HERITAGE P/L ABN 46 103 185 413

# 1. Introduction

It is understood that Randwick City Council is currently working on an integrated cycleway network that extends from the northern end of Doncaster Road, Kensington, through to the eastern end of Bundock Street, South Coogee, as depicted in Figure 1. The majority of the proposed cycleway is located within the Randwick City Council Local Government Area (LGA), however, a portion of the proposed Randwick Cycleway crosses over into Bayside Council, along General Bridges Crescent.

The proposed Randwick Cycleway is in response to the Kingsford Light Rail Terminus to South Coogee project, which has highlighted the need to provide cycle links from residential areas to the light rail.

Group GSA is in the process of preparing the design and specifications for the proposed Randwick Cycleway and, as such, this report has been prepared to advise on the heritage opportunities and constraints associated with the proposed route.


Figure 1: Proposed route of the Randwick Cycleway, indicated by the orange line. (Source: Randwick City Council)

## 1.1 Limitations

- An archaeological assessment including an assessment of historical archaeology and Aboriginal cultural heritage values does not form part of the scope of this advice report;
- This assessment does not form part of a Section 140 *Application for an Excavation Permit* or Section 144 *Application for an Excavation Variation Permit*;
- The pedestrian survey conducted by CPH only surveyed areas where the roadway would be affected by the proposed works. As such, internal investigation of individual heritage items was not undertaken. This is considered sufficient for the purposes of this advice report;
- The site inspection did not include a detailed survey of all sandstone kerbs and gutters. While these have been identified in part, a detailed survey should be undertaken and included in the submission package;
- This report does not include a landscape heritage assessment.

## 1.2 Author Identification

The following report has been prepared by Brittany Freelander (Senior Heritage Consultant). Carole-Lynne Kerrigan (Associate Director - Heritage) and Kerime Danis (Director - Heritage) have reviewed and endorsed its contents.

A site inspection was undertaken by Carole-Lynne Kerrigan and Keira De Rosa (Heritage Consultant) on 22 March 2018.

## 1.3 The Proposal

As the proposed works have not been finalised, a summary description of the proposal has been provided below.

Randwick City Council is proposing the construction of a 5km dedicated two-way cycleway (Randwick Cycleway) through the suburbs of Kensington, Kingsford, Randwick, Daceyville and Coogee. The cycleway is located within the road corridors of Doncaster Avenue, Day Avenue, Houston Road, General Bridges Crescent, Sturt Street, Avoca Street and Bundock Street and includes modifications to footpaths, driveways, kerbs, gutters and roundabouts. The proposed cycleway also crosses over Gardeners Road and Bunnerong Roads. This small section is located within the Bayside Council LGA while the rest of the works are located within the Randwick Council LGA.

There are some specific works proposed that are desired at this stage, these include the following:

- New pedestrian crossings;
- Clearer markings and separation at intersections;
- Pavement and pram ramp upgrades to improve access;
- New tree plantings;
- New medium build-outs with garden beds;
- New share zone markings;
- Streetscape improvements works.

The following drawings and documents prepared by Group GSA have been reviewed during production of this advice report:

- Route 1 Board - Cycleway - Centennial to Kingsford, Doncaster Avenue, Houston Road, General Bridges, Sturt Street, April 2018
- Route 2 Board - Cycleway - Kingsford to South Coogee, Sturt Street, Avoca Street, Bundock Street, April 2018;
- Randwick Cycleway Typologies, April 2018;
- RCC Cycleway - Typical Details, April 2018.

# 2. Study Area

## 2.1 Brief Description

The proposed Randwick Cycleway route encompasses 5km of roadway through the aforementioned suburbs. The route begins at the northern end of Doncaster Avenue, where it intersects with Alison Road, continues south towards Day Avenue and along Houston Road, before continuing east towards Bunnerong Street. The following is a list of the roadways included. For some the majority of the roadways will be encompassed within the proposed Randwick Cycleway while for other only a small portion is included:

- Doncaster Avenue;
- Day Avenue;
- Houston Road;
- Gardeners Road;
- General Bridges Crescent;
- Bunnerong Road;
- Sturt Street;
- Avoca Street;
- Bundock Street.

The following images provide an overview of the current appearance and configuration of the streets located within the proposed Randwick Cycleway route.


Figure 2: The intersection of Alison Road and Doncaster Avenue (towards the left) is the proposed northern end of the Randwick Cycleway.

Figure 3: Doncaster Avenue, showing the existing configuration of the roadway, pedestrian paths, kerbs, gutters and street parking.

Figure 4: A section of sandstone kerbs and gutters at 158 Doncaster Avenue, with a section of sandstone kerb patched with concrete circled in red (left) and a late nineteenth century sewerage vent located at 126 Doncaster Avenue (right).

Figure 5: Two forms of driveways, featuring concrete (left) and brick pavers with concrete lowered kerb (right). If the image on the left, the kerbs either side of the driveway are of concrete while the image of the right shows kerbs of sandstone.

Figure 6: Roundabout at intersection of Doncaster and Day Avenues, looking south along Doncaster Avenue


Figure 7: Looking east along Day Avenue from the intersection with Doncaster Avenue, with the separated cycleway on the left and an Inter-War apartment (circled in red) located in the background.

Figure 8: Looking south at 39-41 Houston Road. Concrete kerbs and gutters and two dual carriageway crossings for two apartment buildings breakup the grassed verges.

Figure 9: Sandstone kerbing and gutters at 37 Houston Road (left) and sandstone kerbing and gutters at 22 to 24 Houston Road.

Figure 10: Evidence of sandstone gutter underneath existing bitumen at 85A Houston Road, circled in red (left) and sandstone stormwater drain at 87 Houston Road (right).

Figure 11: Sandstone kerb with concrete patch repairs at 45 Houston Road.


Figure 12: Looking south along Houston Road at intersection with Barker Street.

Figure 13: Looking east along General Bridges Crescent from the corner of Gardeners Road with the heritage listed commercial buildings on the right-hand side of the image, circled in red.

Figure 14: Wide grassed verges with concrete footpaths and sporadic street tree planting along the southern side of Sturt Street between Bunnerong Road and Anzac Parade. The kerbs and gutters along this section of the street are constructed of concrete. The trees circled in red are proposed to be removed.

Figure 15: Sandstone kerb, gutters and damaged stormwater drain at 89 Sturt Street.

Figure 16: Looking east along Bundock Street across from 78 Bundock Street, with the Randwick Barracks on the right. The trees circled in red are proposed to be removed. All other plantings will be retained.

## 2.2 Heritage Listing

The following table summarises the Heritage Conservation Areas (HCA) and heritage items located along the proposed Randwick Cycleway route. Figure 17 to Figure 22 present maps of the proposed route with HCA's and heritage items identified.

| *NSW Heritage Act, 1977* |
|---|
| **Roads and Maritime Services (RMS) S170 Heritage and Conservation Register**<br>▪ Kerbs and Alignments, Bunnerong and Gardeners Road, Daceyville |

| **Environmental Planning and Assessment Act, 1979** |
|---|
| **Randwick Local Environmental Plan (LEP) 2012, Part 1 Heritage items**<br>▪ '2 storey terraced pair', 10-12 Doncaster Avenue, item no. I122<br>▪ '"Walworth", Victorian cottage', 25 Doncaster Avenue, item no. I123<br>▪ '"Creswell", Victorian terrace house', 58 Doncaster Avenue, item no. I124<br>▪ 'Detached cottage group', 68-82 Doncaster Avenue, item no, I125<br>▪ 'Kensington Public School buildings', 77-79E Doncaster Avenue, item no. I126<br>▪ 'Victorian mansion', 86-92 Doncaster Avenue, item no. I127<br>▪ 'Doncaster Hotel', 268-270 Anzac Parade, item no. I107<br>▪ 'Edwardian house', 127 Doncaster Avenue, item no. I128<br>▪ 'Corner bungalow', 167 Doncaster Avenue, item no. I129<br>▪ 'Bungalow', 202 Doncaster Avenue, item no. I130<br>**Randwick LEP 2012, Part 2 Heritage Conservation Areas**<br>▪ 'Racecourse', item no. C13 |
| **Botany Bay LEP 2013, Part 1 Heritage items**<br>▪ 'Dacey Garden Reserve and substation', Corner of Gardeners and Bunnerong Roads, item no. I76<br>▪ 'Commercial building group', 1-11 General Bridges Crescent, item no. I109<br>**Botany Bay LEP 2013, Part 2 Heritage Conservation Areas**<br>'Daceyville Garden Suburb Heritage Conservation Area', item no. C1 |

As a result of the heritage listings outlined above, the heritage provisions of the Randwick LEP 2012, Randwick Development Control Plan (DCP) 2012, Botany Bay LEP 2013 and Botany Bay DCP 2013 will apply.

This heritage advice report assesses the heritage significance of the Randwick Cycleway route and the likely impacts the proposed works may have on the established heritage significance of the 'Racecourse' HCA (item no. C13) and the 'Daceyville Garden Suburb Heritage Conservation Area' (item no. C1) as well as the heritage items located along the route.

The following maps provide an overview of the various heritage items located within the study area and located proximity.

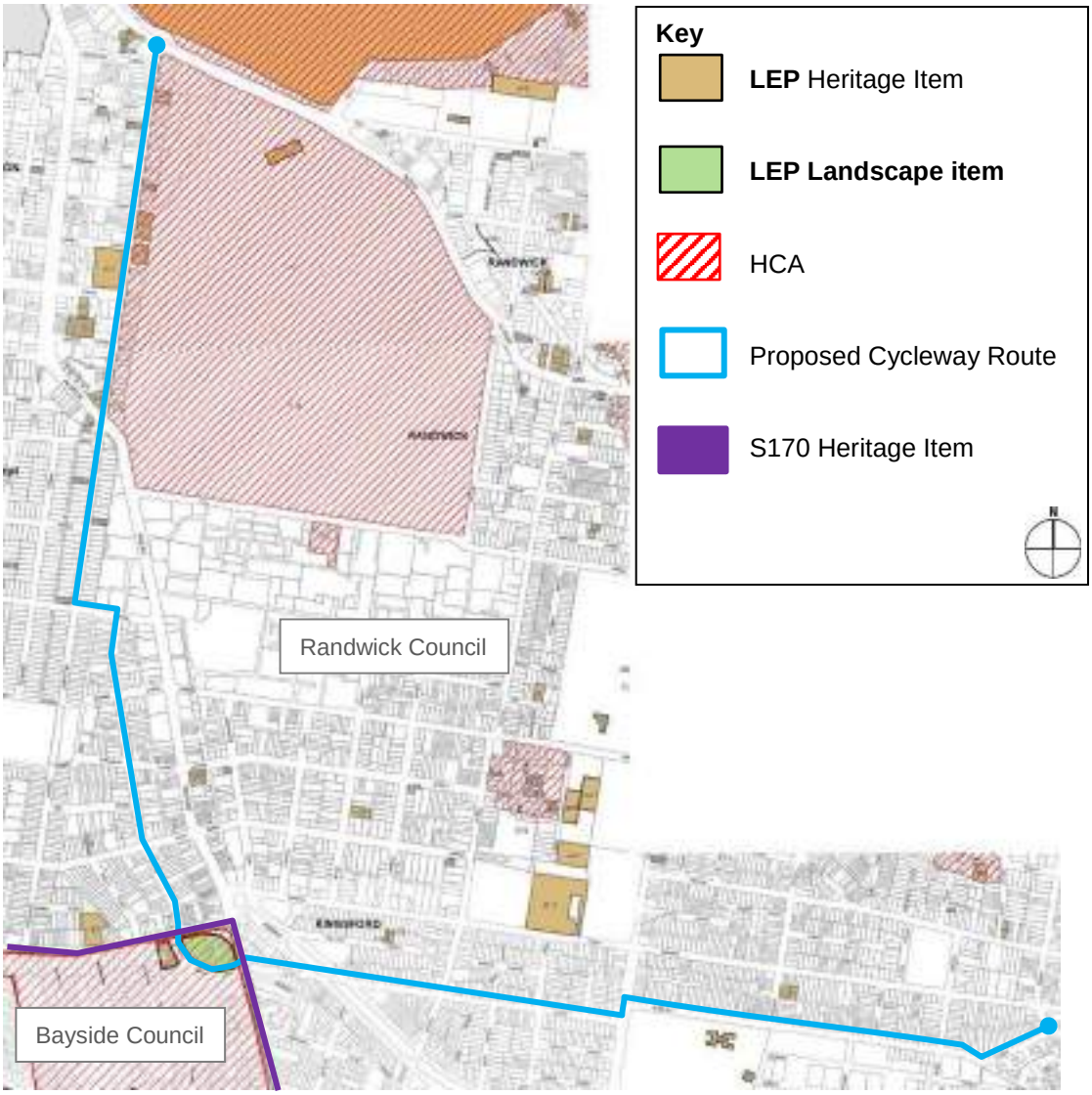


Figure 17: Route of the proposed Randwick Cycleway identified in blue, overlayed on the combined heritage maps from the Randwick LEP 2012 and Botany Bay LEP 2013 (Source: Randwick LEP 2012 Heritage Maps 001,002 and 007 and Botany Bay LEP 2013 Heritage Map 004)

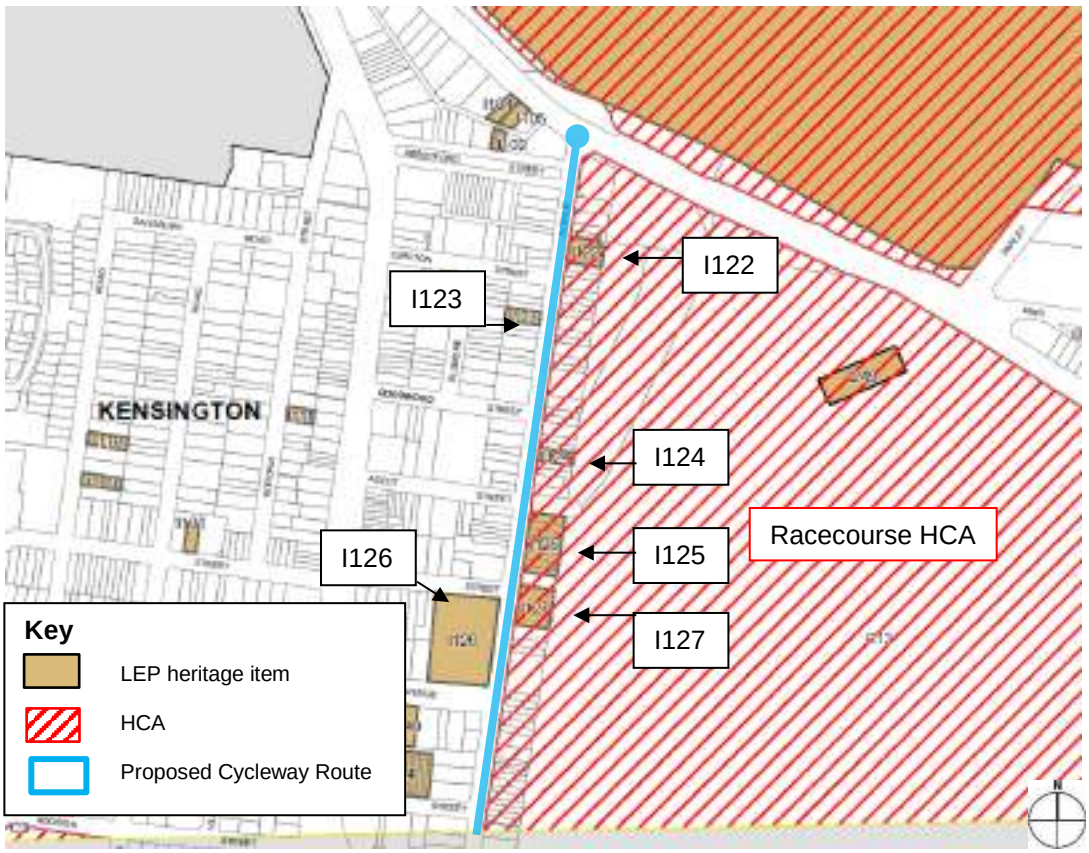


Figure 18: Randwick LEP 2012 heritage map showing a section of the Randwick Cycleway route with the 'Racecourse' HCA (item no .C13) and heritage items identified (Source: Randwick LEP 2012, heritage map 001)

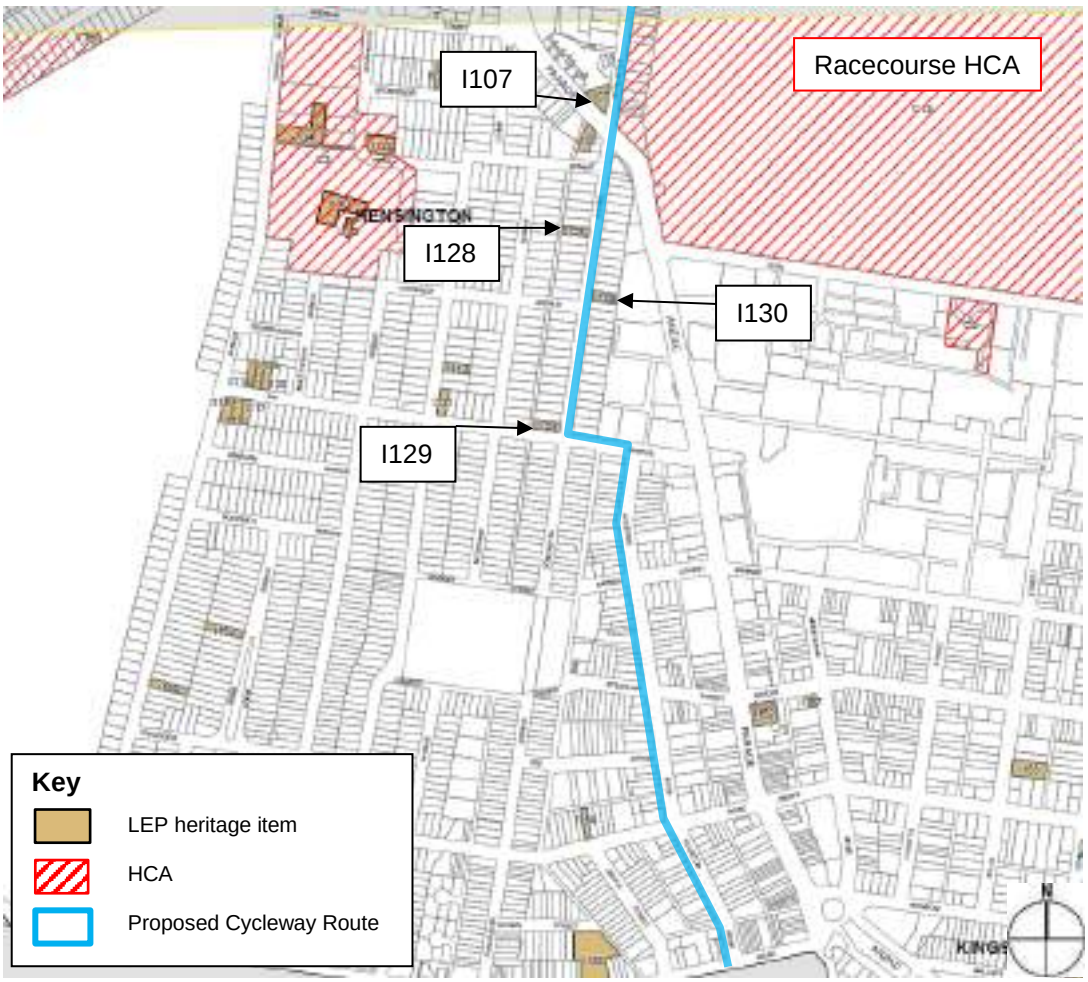


Figure 19: Randwick LEP 2012 heritage map showing a section of the Randwick Cycleway route with the 'Racecourse' HCA (item no. C13) and heritage items identified (Source: Randwick LEP 2012, heritage map 002)

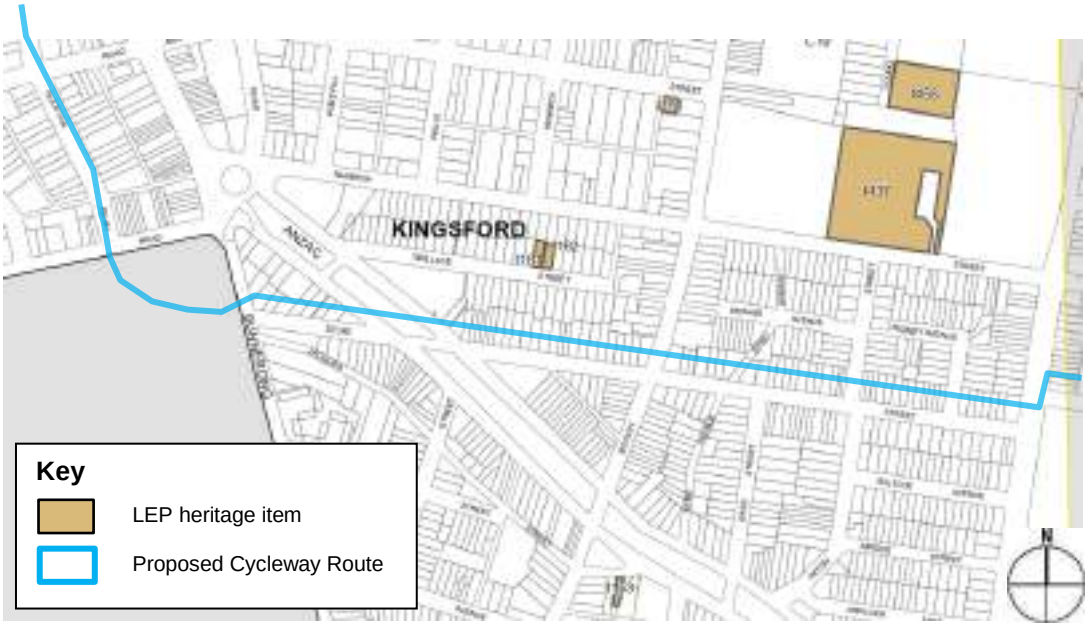


Figure 20: Randwick LEP 2012 heritage map showing a section of the Randwick Cycleway route. (Source: Randwick LEP 2012, heritage map 002)

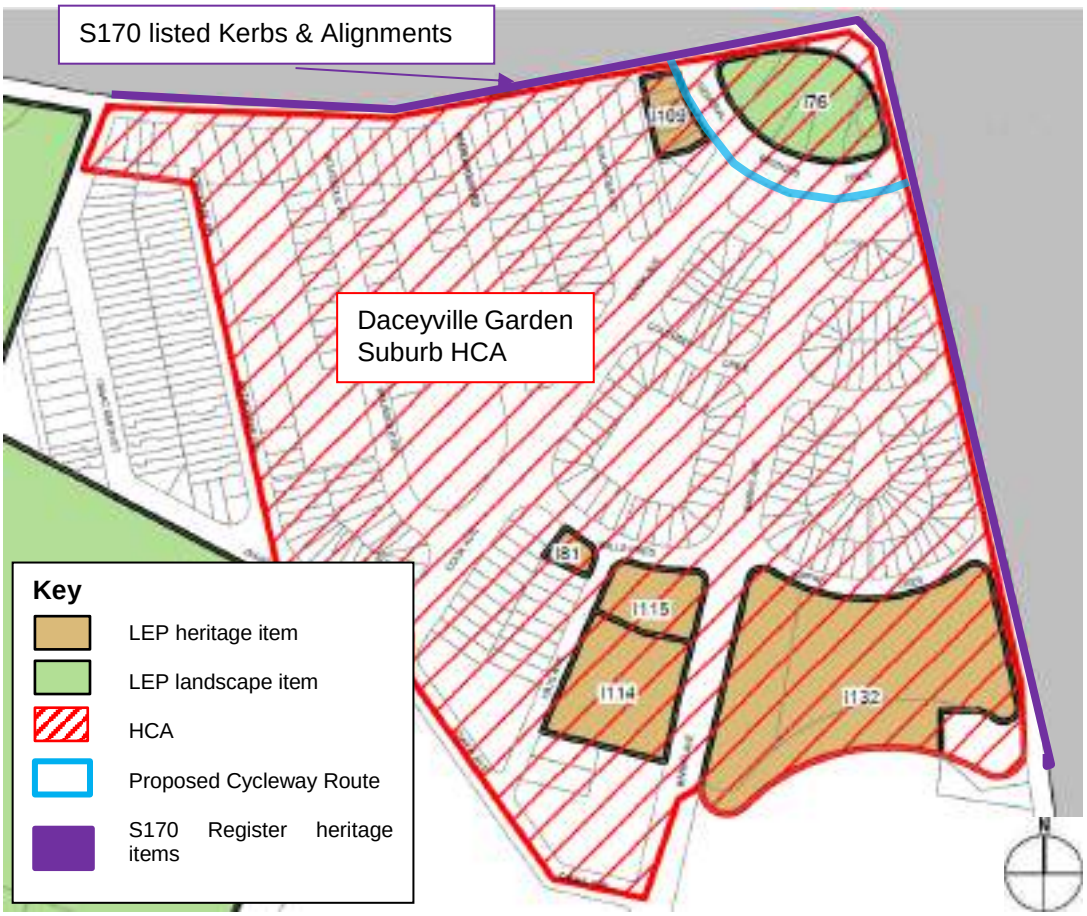


Figure 21: Botany Bay LEP 2013 heritage map showing a section of the Randwick Cycleway route with the 'Daceyville Garden Suburb Heritage Conservation Area'' HCA and heritage items identified. The S170 register item 'Kerbs and Alignments, Bunnerong and Gardeners Road, Daceyville' has also been indicated in purple. (Source: Botany Bay LEP 2013, heritage map 004, overlaid by CPH to include S170 heritage item)

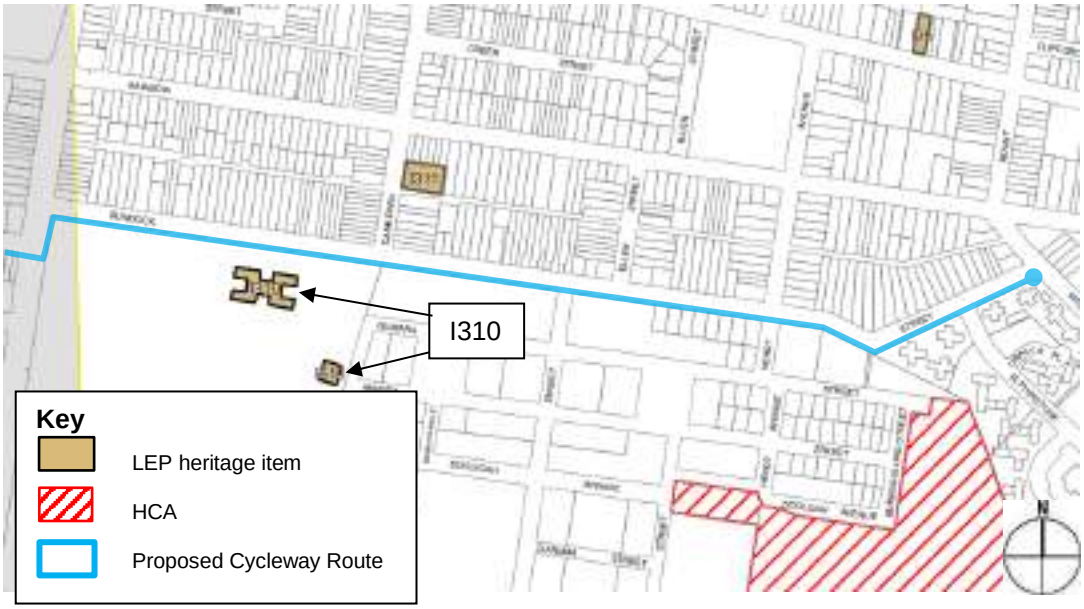


Figure 22: Randwick LEP 2012 heritage map showing a section of the Randwick Cycleway route with heritage items identified. (Source: Randwick LEP 2012, heritage map 007)

# 3. History

Preliminary historical research was undertaken to ascertain the significance of the roadways located within the proposed Randwick Cycleway route. The findings of this research have been included in the sections below.

## 3.1 Brief Suburb Histories

The proposed Randwick Cycleway route extends through several suburbs including Randwick, Kensington, Kingsford and South Coogee. The following sections provide a summary history of each of the suburbs and has been extracted in full from the Book of Sydney Suburbs.[1]

### 3.1.1 Randwick

*One of the earliest land grants was made in 1824 to Captain Francis March, who received 12 acres bounded by the present Botany and High Street, and Alison and Belmore Roads. In 1839 William Newcombe acquired the land north-west of the present town hall in Avoca Street.*

*Randwick takes its name from the town of Randwick in Gloucestershire, England. The name was suggested by Simeon Henry Pearce (1821-86) and his brother James. Simeon was born in the English Randwick and the brother were responsible for the early development of both Randwick and its neighbour Coogee.*

*The brothers bought and sold land profitably in this area and elsewhere. Simeon also campaigned for the construction of a road from the city to Coogee (achieved in 1853), petitioned Sir Thomas Mitchell to preserve the vegetation on the area's sandhills, warned of the danger of draining sewage into the harbour, and promoted the incorporating of the suburb. Once the municipality was gazetted, Simeon became the first mayor and was later twice re-elected to the same position.*

*Randwick was, nonetheless, slow to progress. The village was isolated from Sydney by swamps and sandhills, and although a horse-bus was operated by a man named Grice from the late 1850s, the journey was more a test of nerves than a pleasure jaunt. Wind blew sand across the track, and the bus sometimes became bogged, so that passengers had to get out and push it free.*

*From its early days, Randwick had a divided society. The wealthy lived elegantly in large houses built when Pearce promoted Randwick and Coogee as a fashionable area. But the market gardens, orchards and piggeries that continued alongside the large estates were the lot of the working class.*

*In 1858, when the New South Wales government passed the Municipalities Act, enabling the formation of municipal districts empowered to collect rates and borrow money to improve their suburb, Randwick was the first suburb to apply for the status of a municipality. It was approved in 1859, and its first council was elected in March 1859.*

*Randwick had been the venue for sporting events, as well as duels and illegal sports, from the early days in the colony's history. Its first racecourse, the Sandy Racecourse or Old Sand Track, had been a hazardous track over hills and gullies since 1860. When a move was made in 1863 by John Tait, later described as the Father of the Australian Turf, to establish Randwick Racecourse, Simeon Pearce was furious, especially when he heard that Tait also intended to move into Byron Lodge. Tait's venture prospered, however, and he became the first person in Australia to organise racing as a commercial sport. The racecourse made a big difference to the progress of Randwick. The horse-bus gave way to trams that linked the suburb with Sydney and civilisation. Randwick soon became a prosperous and lively place, and it still retains a busy residential, professional and commercial life.*

[1] Frances Pollon, Book of Sydney Suburbs, p.p. 217-9.

*Today, some of the houses have been replaced by home units. Many European migrants have made their homes in the area, along with students and workers at the nearby University of New South and the suburb's Prince of Wales Hospital. Traces of the suburb's history can still be seen, and the thrill of turf at Royal Randwick Racecourse has never been lost.*

### 3.1.2 Kensington

*The suburb of Kensington was named after the Royal Borough of Kensington, London, one of England's most interesting city areas. The name goes back to the 1880's when the idea of first planning a site for a suburb or town was new. Until then most new settlements "just growed", like storybook Topsy, or were subdivided by real estate agents who wanted to realise a profit from the area, and cared little about the attractive layout. Civic authorities in London designed the model suburb of Bedford park near English Kensington about ten years before a group of Sydney businessmen planned a new suburb on what was then the outskirts of Sydney. Because their inspiration came from London's Kensington, our Kensington received the same name.*

*The land was part of an estate formerly owned by Daniel Cooper (1785-1853), an ex-convict who acquired the land in 1825 with his partner Solomon Levey, whom he later bought out. Cooper's nephew Daniel (1821-1902) planned a subdivision and township here, but in 1865 all industry and development was forbidden; the land was crossed by the Lachlan Stream and was part of the catchment for the Lachlan Swamps in what is now Centennial park, which provided Sydney's domestic water supply. From 1888 Prospect Dam fulfilled that service, so the land now known as Kensington became available for occupation. A group of astute businessmen formed the Kensington Freehold Corporation which organised a competition with the prize of 250 pounds for the best design of the new settlement. This first town planning contest in Sydney's history aroused a great deal of interest and the winning designs chosen from the twenty entries where displayed at Sydney Town Hall in June 1889. The main feature in the winning design was a wide boulevard now the main traffic artery Anzac Parade, which set Kensington well ahead of other Sydney suburbs. It also provided for a railway which has so far not eventuated.*

*Kensington Racecourse in High street on the present site of the University of New South Wales opened in 1893 on 63 acres of government land leased by the Kensington Recreation Grounds Company. It did not compete with the adjacent Randwick Racecourse as it mostly held midweek meetings for pony racing and hosted related sports such as polo, as well as football, cricket and hockey. The course was used to house troops and horses in the Boer War and First World War. It did not survive the second World War and in 1950 the land was resumed for construction of Sydney's second university. The University of Technology was incorporated by an Act of Parliament in 1949, to meet the urgent demand in Australia for applied scientists and technologists. Its name was changed to the University of New South Wales in 1955, following the report of a body known as the Murray Committee, which inquired into the future development of all New South Wales Universities. Since then, the university has grown and increased the number of areas of study available although there is still an emphasis on scientific and commercial studies. Today the university has over 18,000 students. Kensington today is a quiet residential suburb. Like its neighbor Randwick, it was the site of many elegant homes during the years when the racing fraternity patronized the area. Many of those home today are nursing homes or have been replaced by flats and home units. But the sport of kings still flourishes, and neighboring Randwick is still Sydney's principal home of horse-racing.*


Figure 23: Undated map, c 1800s with the approximate location of Kensington circled in red. Part of Kensington lies directly in the land reserved for the supply of water for Sydney (Source: Land Registry Services, Historical Parish Maps, Cumberland Alexandria)

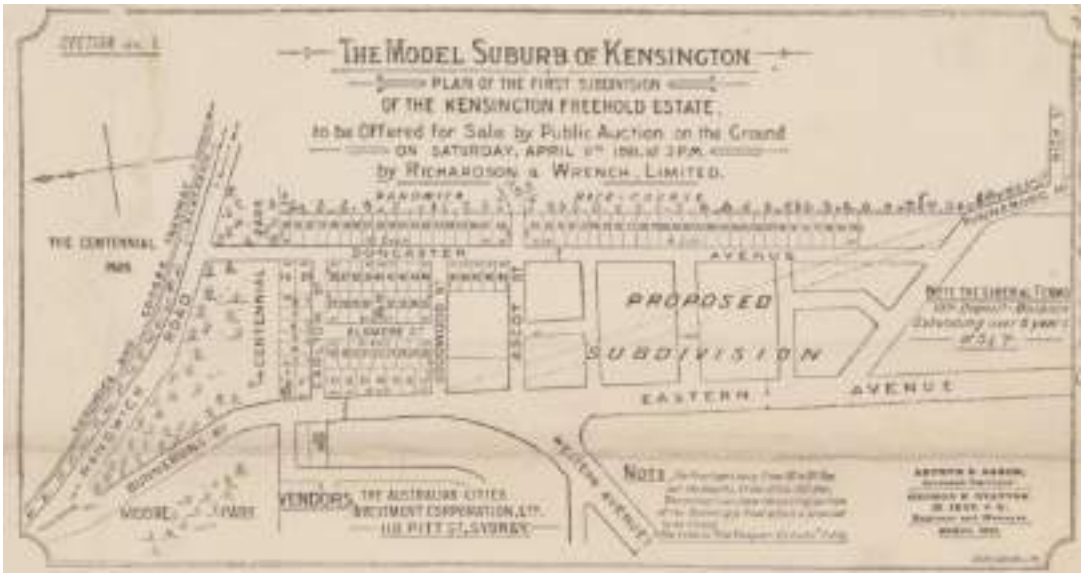


Figure 24: Proposed subdivision of Kensington, April 1891 (Source: National Library of Australia, MAP Folder 80, LFSP 1191 (Copy 1), https://nla.gov.au/nla.obj-230234594/view )


Figure 25: 1891-1899 Second subdivision of Kensington (Source: National Library of Australia, MAP Folder 80, LFSP 1195, https://nla.gov.au/nla.obj-230235641/view?searchTerm=kensington#search/kensington )

### 3.1.3 Kingsford

*Formerly known as South Kensington, the suburb was renamed in honour of Sir Charles Kingsford Smith (1897-1935), one of Australia's greatest pioneer aviators. In 1922 Kingsford Smith made a mail flight between Broome and Port Hedland in Western Australia in record time. From that day his ambition to be a first-class flyer never wavered. His first main aim to fly the Pacific, was eventually achieved with his colleague and co-pilot Charles Ulm. On 31 May 1928, their Fokker aircraft, the Southern Cross, left the United States to travel through fair and foul weather until, 83 hours later, it touched down in Brisbane. In 1933 Kingsford Smith made a record-breaking solo flight from England to Australia in 7 days and 4 hours and 43 minutes. He disappeared in 1935 while flying the Lady Southern Cross between Calcutta and Singapore. Kingsford remained undeveloped until the land boom of the 1920's. Previously it had been the site of stables because of its proximity to Kensington Racecourse, and poultry and pig farms. There were only scattered dwellings and a number of people living in shacks made of flattened kerosene tins. In the 1940's many Greeks settled in the areas, particularly migrants from the small island of Castellorizo, near the Turkish coast. Many opened businesses in the area and in 1973 they built the Castellorizan Club in Anzac Parade, as a local point for socializing and celebrations. Anzac Parade, named in honour of the Anzacs of the first World War, is the main thoroughfare through this suburb, which is a crossroads for bus services to Eastlakes, Matraville, La Perouse, Maroubra, Randwick, Bondi Junction, Rose Bay, Double Bay and the city. It was originally intended to be the terminus for the Eastern Suburbs Railway, built in 1979 the line was terminated at Bondi Junction. Today Kingsford is a residential suburb, with a shopping centre extending along Anzac Parade. It is home to many students attending the nearby University of New South Wales, but children attend schools in adjoining suburbs of Daceyville, Maroubra and Moore Park.*

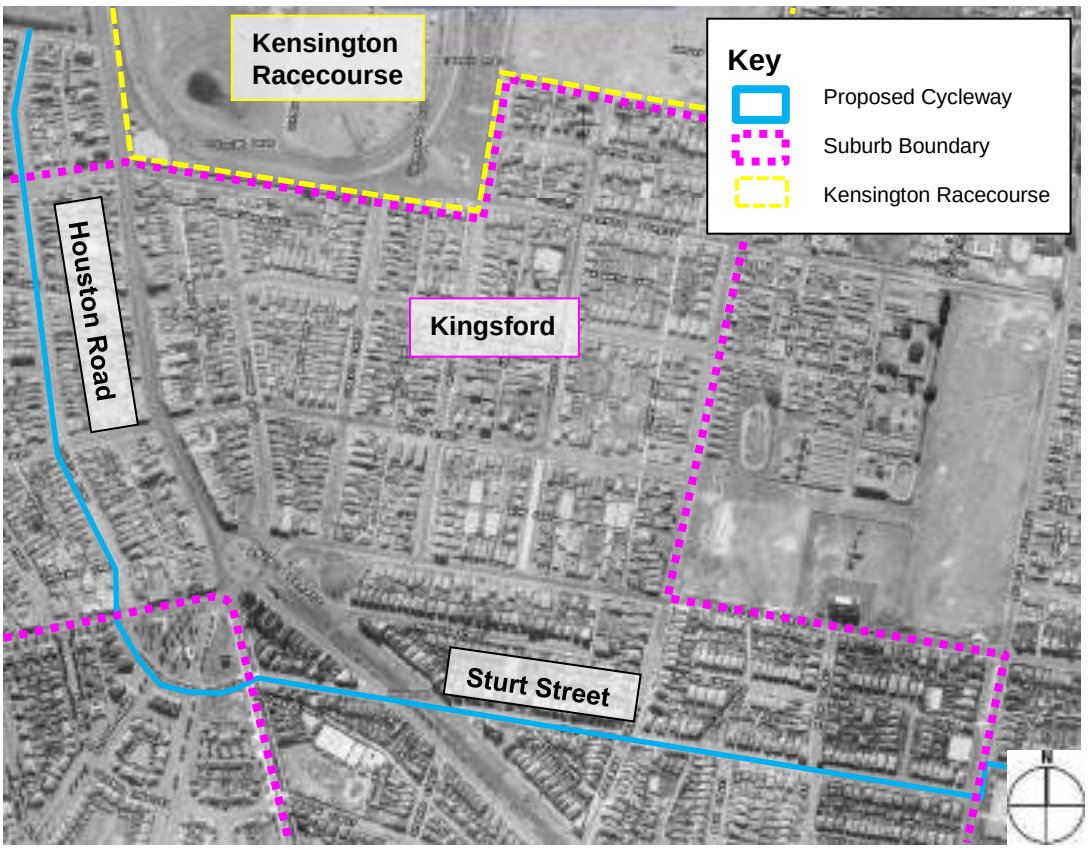


Figure 26: 1943 aerial of the Kingsford. Single storey detached houses lined Houston Road and Sturt Street on both sides. No street trees are present at this time. The suburb of Kingsford is bordered by the Kensington Racecourse to the north (Source: SIX Maps)

### 3.1.4 Coogee

*The original name for this seaside suburb south east of Sydney is hardly complimentary. It was derived from an Aboriginal word, "koojah", which means "a stinking place", probably because of the intolerable smell of rotting seaweed washed up on the beach. In 1835 William Charles Wentworth (1790-1872) bought 30 acres in the area bounded by the present Dolphin, Judge and Oswald streets and Carrington Road. No further land was sold in the area until 1840 although the village of Coogee was gazetted in 1838. One of the first settlers was George Dodery, a retired soldier and a veteran of the battle of Waterloo in 1815. He started a market garden, and the suburb gradually developed as an agricultural and horticultural area. By 1866 and Coogee had become popular for day trips and family picnics. The fine sandy beach, about half a kilometer long, was littered with shells, strangely shaped sponges and other interesting marine specimens, and "beach combing" became a favourite weekend pastime. The Coogee Aquarium, built in 1887, became a big tourist attraction, especially the seal tank. After about 1908 entertainments at the aquarium declined, but the building still stands on the corner of Beach and Dolphin streets, although it is in a poor state of repair. In the 1880's bathing machines appeared on Coogee Beach. In the days before surfing these miniature sheds on wheels served as dressing rooms. The machines were wheeled a few yards into the sea and the bather frolicked within the confines of the enclosure attached to each machine. The idea had come from the English seaside resorts, but it did not survive long at Coogee.*

*Coogee, like Manly was a popular and fashionable beach resort in the 1920's and 1930's. In 1928 an amusement pier became the main talking point in this suburb. It extended for 183 metres into the sea and had a number of structures built on it including an auditorium and a dance floor. The plan to give Australians the fun offered by the English piers in Blackpool and Brighton, on which the Coogee construction was modelled, fell apart when rough seas*

*pounded against the sections of the structure and rendered it unsafe for use. In 1933 the superstructure was demolished and by 1945 Randwick Council had completed demolition of the pier. Far more successful in the suburb was the shark net at Coogee Beach, inaugurated in 1929. Today Coogee is a residential suburb with mostly permanent residents. The suburb has a well laid out playing area, Coogee Oval; a busy post office in Brook Street; and a primary school in Coogee Bay Road, where a large enrolment of pupils dream of the ocean only a short run away. The first school was started by a Mrs. Birmingham in the 1850s. We may wonder what she would think of that happy, active, multicultural group learning in Coogee today.*

## 3.2 Study Area History

Historical research has been undertaken to ascertain the historical development of the main roadways located within the proposed Randwick Cycleway route. As such, the following explores each of the roadways separately. The Sands Directory has been used to provide an indication of the development of each of the roadways, however, it should be noted that while the roadways may not have been listed in the Sands Directory prior to the dates identified, they may have existed as dirt tracks or rudimentary roadways that had not yet been catalogue by the Sands Directory staff, due to the limited amount of development present.

### 3.2.1 Doncaster Avenue

Doncaster Avenue was one of the first streets created in the new suburb of Kensington during the 1890s. Doncaster Avenue was first recorded in in the Sands Directory in 1892. Its name was derived from the Doncaster Racecourse in England. Historical research to date has not indicated any connection between the Randwick/ Kensington Racecourses and the Doncaster Racecourse.

The section of Doncaster Avenue between Alison Road and Day Avenue that is located within the study area retains its original street alignment, as well as many early streetscape features including original sandstone kerbs and gutters and a late nineteenth century sewer vent at the front of 172 Doncaster Avenue. It is not known when the planting of trees along the footpaths occurred.  They are, however, not visible in the 1943 aerial photograph.

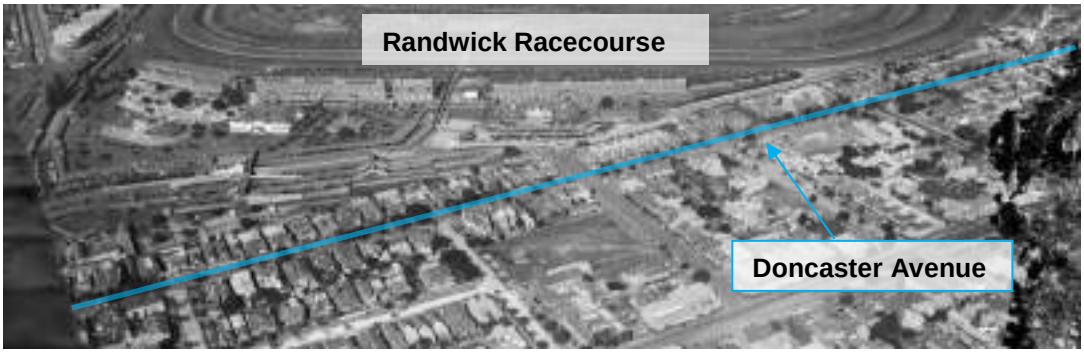


Figure 27: Aerial photograph of Doncaster Avenue c. 1920. Doncaster Avenue is indicated by the blue line, with Randwick Racecourse visible in the background. Where is northern and southern Kensington? They are mentioned in the text (Source: National Library of Australia, PIC/15611/14676 LOC Cold store PIC/15611, https://nla.gov.au/nla.obj-162897814/view )

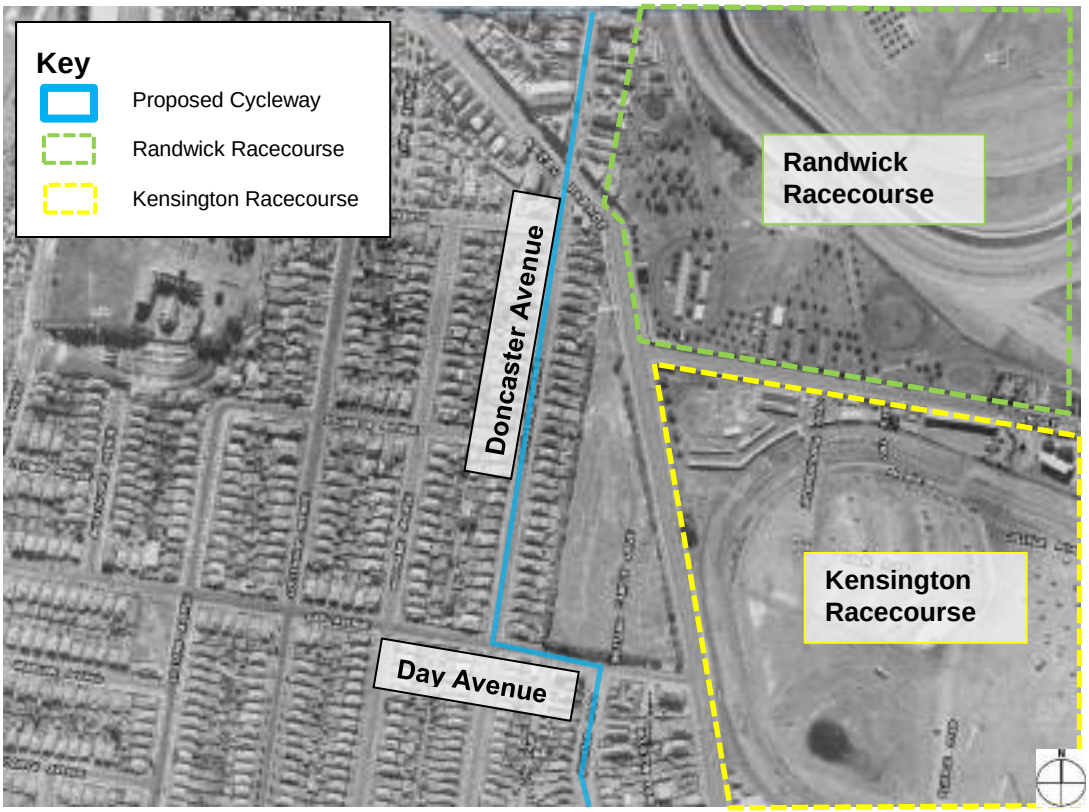


Figure 28: 1943 aerial of the southern portion of Kensington including the southern end of Doncaster Avenue and Day Avenue. Single storey detached houses line both Doncaster and Day Avenues. Randwick Racecourse, outlined in green and Kensington Racecourse, outlined in yellow, are also featured (Source: SIX Maps)

### 3.2.2 Day Avenue

Day Avenue was developed during the early twentieth century as the suburb of Kensington continued to grow and expand to the south. It was named after WR Day, who served as a Randwick Council alderman between 1890s and 1910.[2] Day Street was renamed Day Avenue in 1925 to avoid confusion with Tay Street, in Kensington. While Day Avenue retains is original alignment, the section between Doncaster Avenue and Houston Road does not retain early streetscape fabric, such as sandstone kerbs, gutters or driveways.

### 3.2.3 Houston Road

It is unclear when Houston Road was first developed, however, development along Houston Road began during the early twentieth century. This predates much of the development of the area, which predominately occurred during the land boom of the 1920s. Residential listings within Houston Road first appeared in the Sands Directory in 1907. The road was named after William Houston, a Randwick Council alderman from 1895-1908 and also Mayor of Randwick in 1898.[3] Both streets retain their early twentieth century alignments and their early streetscape fabric including original sandstone kerbs, gutters, stormwater drains. It would appear that the planting of trees along the footpaths of Houston Road and Sturt Street occurred after the 1943 aerial photograph was taken.

[2] Randwick City Council, Street Names A-F, accessed via http://www.randwick.nsw.gov.au/about-council/history/historic-places/historic-street-and-place-names/street-names-a-f on 27 March 2018
[3] Randwick City Council, Street Names G-L, accessed via http://www.randwick.nsw.gov.au/about-council/history/historic-places/historic-street-and-place-names/street-names-g-l on 27 March 2018

### 3.2.4 Gardeners Road

The establishment of Gardeners Road is intrinsically linked to the development of the Daceyville garden suburb. As such, the following paragraphs provide a brief history of the Daceyville garden suburb in order to provide context to the historic establishment of Gardeners Road.

The idea of a low-cost housing estate for working class people in Sydney was conceived of by John Rowland Dacey, who served as a state parliamentarian for the area from 1895 to 1912. Dacey's ideas borrowed from Letchworth, one of the world's first garden towns constructed in Hertfordshire, England. Unfortunately, Dacey never lived to see his idea come to fruition due to his untimely death in 1912. Following Dacey's death, 336 acres were resumed for the project to the east of Mascot. Daceyville was to become Australia's first garden city experiment with Sir John Sulman given the responsibility of designing the housing estate on the scrubby crown land that was previously reserved as a water conservation site (Figure 29).[4]

In 1912, the new garden suburb, yet to be built was described as follows:

(a) *The main avenue of the suburb bisects the angle formed by the junction of Gardener's Road and Bunnerong Road, and runs straight through the estate to meet Maroubra Bay Road. It is 6085 feet long and 100 feet wide. It follows the contours of the estate and will be relieved by flanking gardens about a quarter mile from the portal. It debouches into an oval space near the Maroubra Bay Road, and this space will contain some important public buildings. This part of the avenue will eventually become the centre of the business zone of the village.*

(b) *Two other avenues are Gardener's Road widened to 100ft, and radial avenue between that road and the main avenue. This is also 100ft wide, passing out of the estate in the direction of Botany. The fourth avenue will be Bunnerong Road, which is not widened. The secondary roads are, so far as can be done without impairing the natural contours, placed in the most convenient way to lead to the business centre, trams, open spaces, and main avenues.*[5]

The plan developed by Sulman featured four main roads meeting in the suburbs north-eastern tip, being Gardeners Road, Anzac Parade, Rainbow Street and Bunnerong Road. Sulman's original plan provided for almost 15,000 cottages including school churches and public open spaces.[6]

[4] Frances Pollon, Book of Sydney Suburbs, 'Daceyville' (1988) p. 176-77.
[5] The Sydney Morning Herald, 31 August 1912, p. 21, accessed via http://nla.gov.au/nla.news-page1291088
[6] Frances Pollon, Book of Sydney Suburbs, 'Daceyville' (1988) p. 176-77.

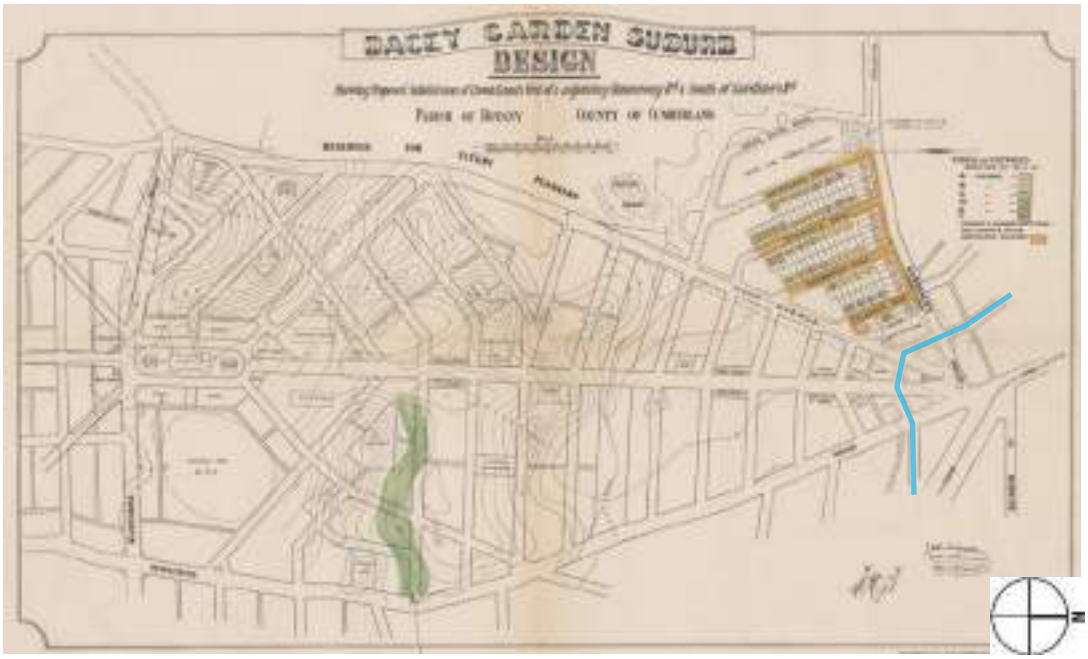


Figure 29: c.1912 proposed subdivision of Dacey Garden Suburb, as designed by Sir John Sulman. The location of the proposed cycleway is indicated in blue (Source: State Archives & Records, NRS 12060 [9/4693 letter 14/6358, p.3, https://nswanzaccentenary.records.nsw.gov.au/on-the-homefront/daceyville-the-garden-suburb/ )

Work on the new garden suburb began on 6 June 1912, requiring the levelling of many sand dunes and the reconfiguration of the landscape particularly for the development of the large stormwater channel needed to prevent flooding. Progress on the construction of houses was slow due to rising labour costs and lack of funds. Mid way through construction the street layout of the suburb was redesigned to make shorter streets as the earlier plans by Sulman were thought to be extravagant and costly.[7]

With the outbreak of World War I, coupled with the change in the social and political scenes, the focus of Daceyville was readjusted. The intention for the suburb was, rather than to provide Government-owned houses which would be leased to working class people, to provide financial assistance to people wanting to buy an existing home or purchase land to build one. This change in focus resulted in the sale and subdivision of the empty land at the southern end of the suburb *(*Figure 30*).* This suburb would later be renamed as Pagewood in 1930. By June 1920, only 315 of the intended houses had been built in Daceyville. Of the public amenities proposed, only six shops, a baby health clinic, a large community hall, a police station and one public school were built*.*[8]

The exact date of the establishment date of Gardeners Road is unknown, however, it is understood that the existing road most likely created during the early development period of the Daceyville suburb. The following historical information has been extracted from the SHI form for Gardeners Road and Bunnerong Road and provides some insight into the history of the kerbs:[9]

> (c) *Historic photographs held in the Mitchell Library show that the southern edge of Gardeners Road was kerbed before 1928 and probably when the area was initially developed between 1912 and 1917. The sandstone kerbing extant between Astrolabe and Solander Roads on this side of the road probably dates*

[7] Samantha Sinnayah, *Audaciousville; the story of Dacey Garden Suburb, Australia's first public housing estate* (2012) p. 11.
[8] Ibid, p. 18.
[9] State Heritage Inventory form for 'Kerbs and Kerb Alignment', accessed 18 April 2018 via http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=4306007

*from this time. The alignment of a bay on this side of Gardeners Road between Isaac Smith St and Astrolabe Road visible in a 1928 photograph can still be seen in the current road structure. The exact purposed of this bay is not known, although it may be related to the tram tracks visible in the road at this time. The west side of Bunnerong Road, by contrast, had not been kerbed by 1934, at least in part, and no sandstone kerbing, only concrete, is extant there today.*

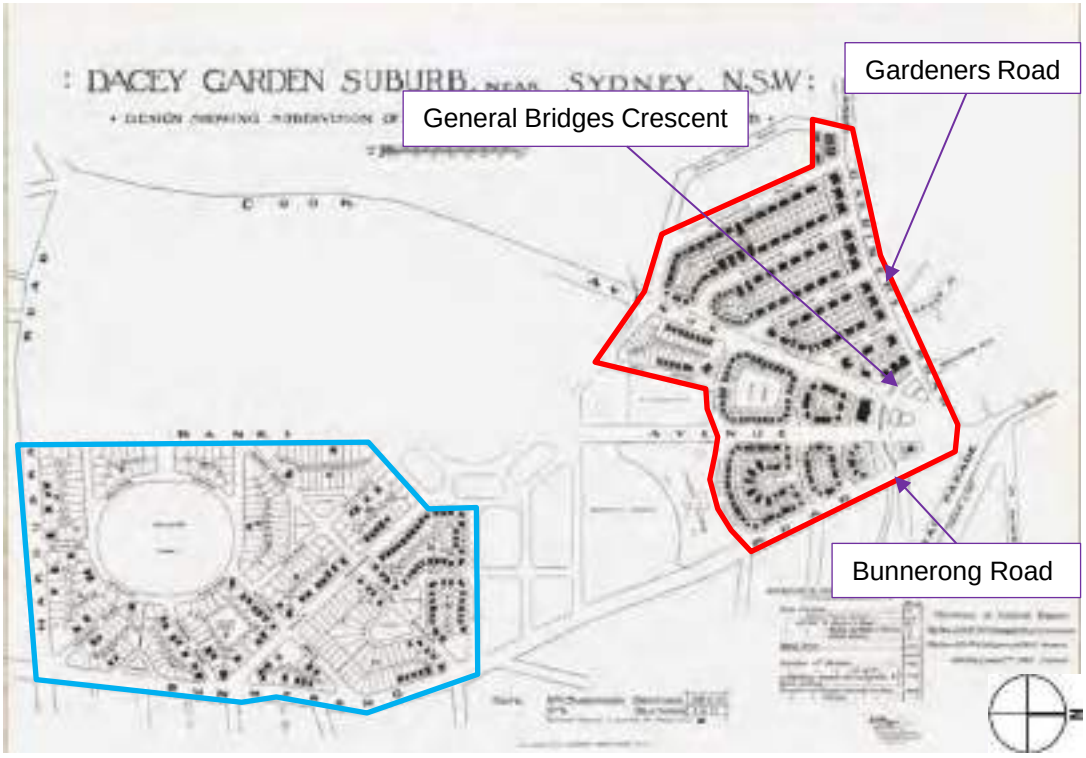


Figure 30: Map showing planned housing in Daceyville (outlined in red) and Pagewood (outlined in blue) in 1921. Gardeners Road, General Bridges Crescent and Bunnerong Road are indicated by the purple arrows. (Source: State Library of New South Wales, Mitchell Library, MDQ 328.9106/5)

Figure 31: July 1917, shops located along General Bridges Crescent (left) and looking south-west towards Daceyville, with the theatre on the left and the shops on the right, dated 6 September 1917 (Source: State Archives & Records, NSW ANZAC Centenary, https://nswanzaccentenary.records.nsw.gov.au/on-the-homefront/daceyville-the-garden-suburb/ )

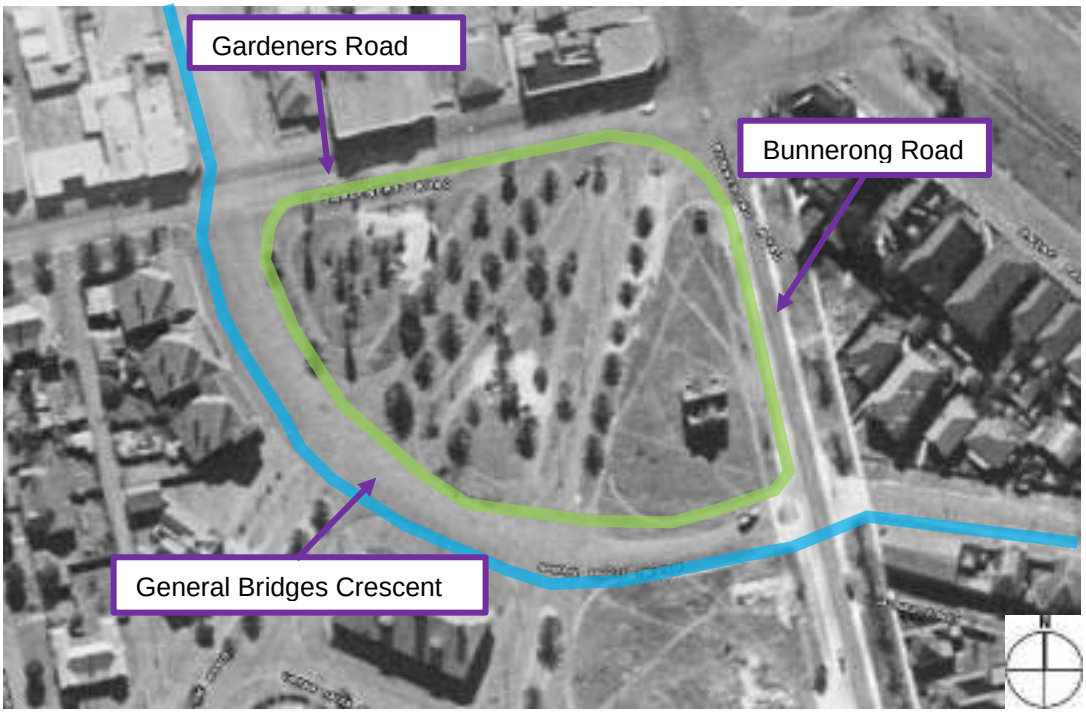


Figure 32: 1943 Aerial showing Garderners Road, General Bridges Crescent and Bunnerong Road. The proposed route of the cycleway is indicated in blue. The three landscaped parcels of land, circled in green, were amalgamated into one park, named the Dacey Garden Reserve in 1960. The alignment of the southern side of General Bridges Crescent remains the same as the present day. (Source: SIX Maps)

### 3.2.5 General Bridges Crescent

As with Gardeners Road, General Bridges Crescent was created as part of the Daceyville garden suburb developed in the early 20th century.

By 1917, General Bridges Crescent had been constructed along with the commercial shops and a theatre which lined the street's southern border *(*Figure 31*).*[10] The crescent was named after Major General Bridges who a Gallipoli war hero. [11] The original kerbs and gutters, like the rest of the Daceyville, were constructed of sandstone.

By 1960, the three landscaped parcels of land which laid between the four main avenues leading to Daceyville, Cooks and Banks Avenue, were amalgamated, closing off Cooks and Banks Avenue's link to Gardeners and Bunnerong Roads (Figure 31) . The amalgamation of these parcels of land created one large park, named the Dacey Garden Reserve, providing a large formal garden entry to the Daceyville.[12] The northern side of General Bridges Crescent was thus reconfigured with new kerbs and gutters, made of concrete, closing off the northern ends of two of the avenues.

During the redevelopment of Daceyville in the 1980s, some original sandstone kerbs and gutters were replaced with concrete. It is not known why this occurred. Despite these changes, the original alignment of General Bridges Crescent appears to have remained the same.

[10] General Bridges Crescent is first listed in the Sands Directory in 1917. The Sands Directory is a city directory that provides information on lists of householders, businesses, public institutions and officials from 1858 to 1933.
[11] State Archives & Records, NSW ANZAC Centenary, https://nswanzaccentenary.records.nsw.gov.au/on-the-homefront/daceyville-the-garden-suburb/ )
[12] Dacey Garden Reserve and Substation, SHI form

### 3.2.6 Bunnerong Road

The name Bunnerong Road derives from the original 1923 land grant of 100 acres near Botany Bay. One of the original landowners, John Brown, in his writings noted that the Aboriginal Natives called the land Bunnerong, (small creek in the native language) and he wished it to keep the same name. Bunnerong Road was in the 19th century known as Botany Bay Old Road which was an important parish road which acted as the original boundary between the boroughs of Botany and Randwick. The road also provided important access to facilities such as the Little Bay Hospital and the forts at Bear Island and Henry's Head. Parts of Bunnerong Road were renamed to Anzac Parade in 1917 to commemorate when the first Australian Imperial Force camped at Kensington Racecourse and paraded down that road upon their embarkation for overseas service.

### 3.2.7 Sturt Street

Sturt Street, named after the explorer Charles Sturt, can be seen in the Sands Directory from 1909 with its first registered occupant Robert Brooks. The initial development of the street can be observed to have started on the northern side as occupancy grew to 8 people in 1914, 7 resided in the north and 1 in the south. This imbalance was quickly moderated as in the following year the number of residents was split 9 in the north and 7 in the south, as development of the street strengthened from there. Initial housing of the street consisted of weatherboard structures. [13]

### 3.2.8 Avoca Street

Avoca Street was originally part of Frenchmans Road; however, its name was changed to Avoca Street in 1859. Frenchmans Road was one of the oldest European roads in Australia, dating to 1788, named after the French explorer, Jean-Francois de Galaup, Comte de La Perouse, and his crew.[14] Avoca Street was named after Thomas Callaghan's (1815-1863) home Avoca, which in turn was named after the town Avoca in County Wicklow, Ireland.[15] Callaghan was a district judge who originally purchased a land grant in 1853 in Randwick. This grant was situated at the intersection of High and Avoca Street in Randwick. Development along Avoca Street began in 1891 with the development of the Randwick Barracks on its eastern side. Development of the western side of the street commenced in the early twentieth century. No early streetscape features such as sandstone kerbs, gutters, planting or sewer vents exist along this section of Avoca Street.

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[13] Source: Trove, https://trove.nla.gov.au/newspaper/article/15936949?searchTerm=Sturt%20Street%20Randwick&searchLimits=

[14] Ibid.

[15] Thomas Callaghan was a District Judge during the mid nineteenth century. Callaghan died from an accident in 1863 according to The Golden Age, 3 December 1863, p. 2 accessed via https://trove.nla.gov.au/newspaper/article/30634277 on 10 April 2018.

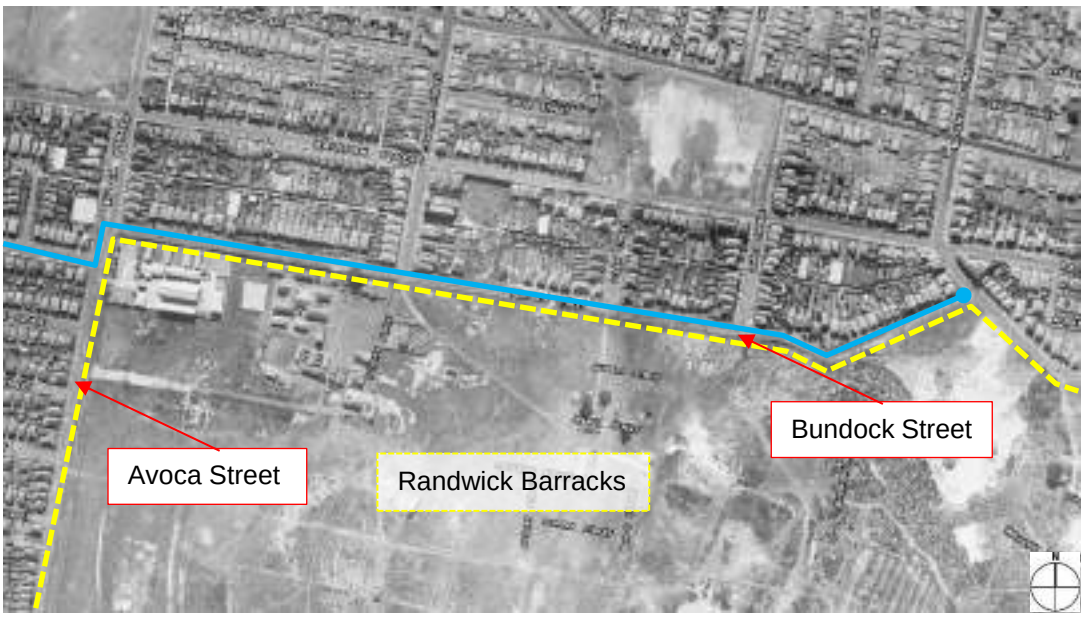


Figure 33: 1943 aerial of Bundock Street, with the Randwick Barracks visible in the southern portion of the image (outlined in yellow). Some lots in the middle Bundock Street are undeveloped. The route of the cycleway in outlined blue (Source: SIX Maps)

### 3.2.9 Bundock Street

Bundock Street in Randwick is named after James B. Bundock a former Randwick Council alderman and treasurer of the Randwick Coogee Sailing Club c.1897. Bundock Street was first entered in the Sands Directory in 1912 with one resident Alfred Smith “Grafton”. Initial growth of the street was slow with 6 residents noted in 1920, but by 1933 the street had 54 known residents. The development of the street was concentrated to the north side, as the south side from 1921 housed the Randwick Rifle Club and Small Arms School. The southern side also currently includes the Randwick Barracks, Environment Park and Randwick Community Centre.

## 3.3 Historic Maps

The following maps provide a chronological overview of the development of Doncaster Avenue, Day Avenue, Houston Road, Gardeners Road, General Bridges Crescent, Bunnerong Road, Sturt Street, Avoca Street and Bundock Street from the late 19th century through to the 1980s.

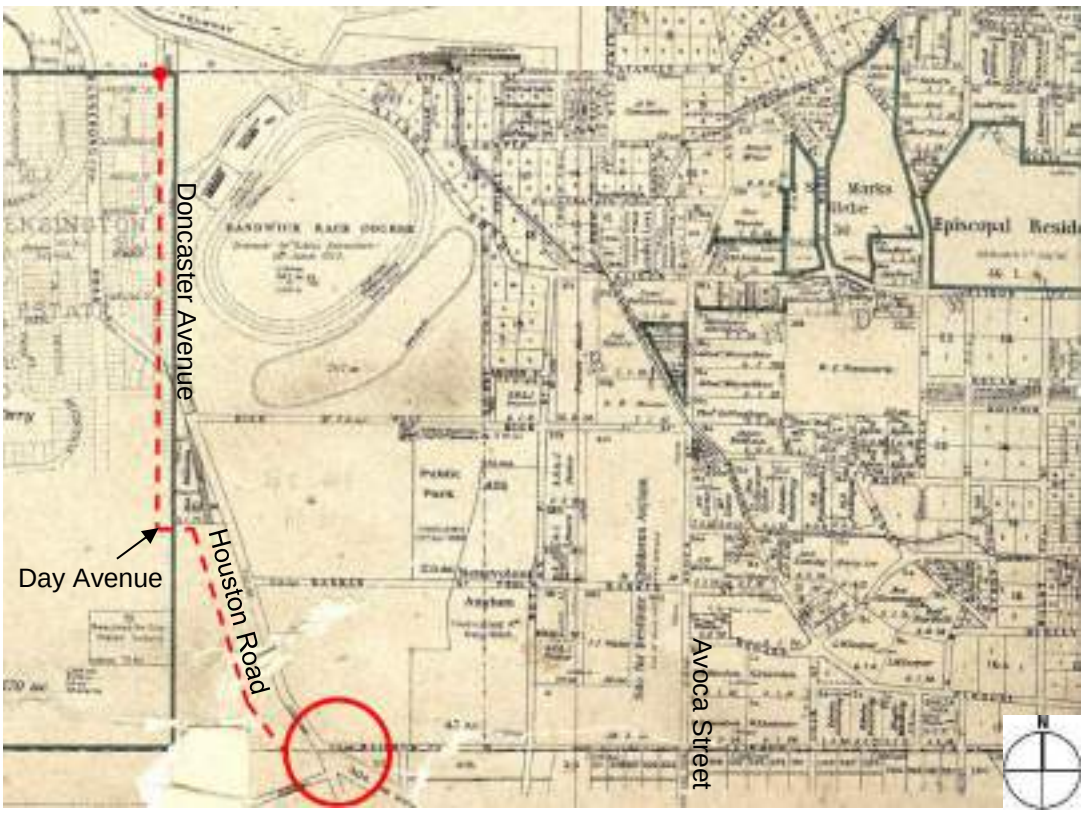


Figure 34: 1900: Map indicating roadways (proposed or built) associated with the Randwick Cycleway that has been indicated with a red dotted line . (Source: Land Registry Services, Historical Parish Maps, Cumberland Alexandria, Sheet 1)

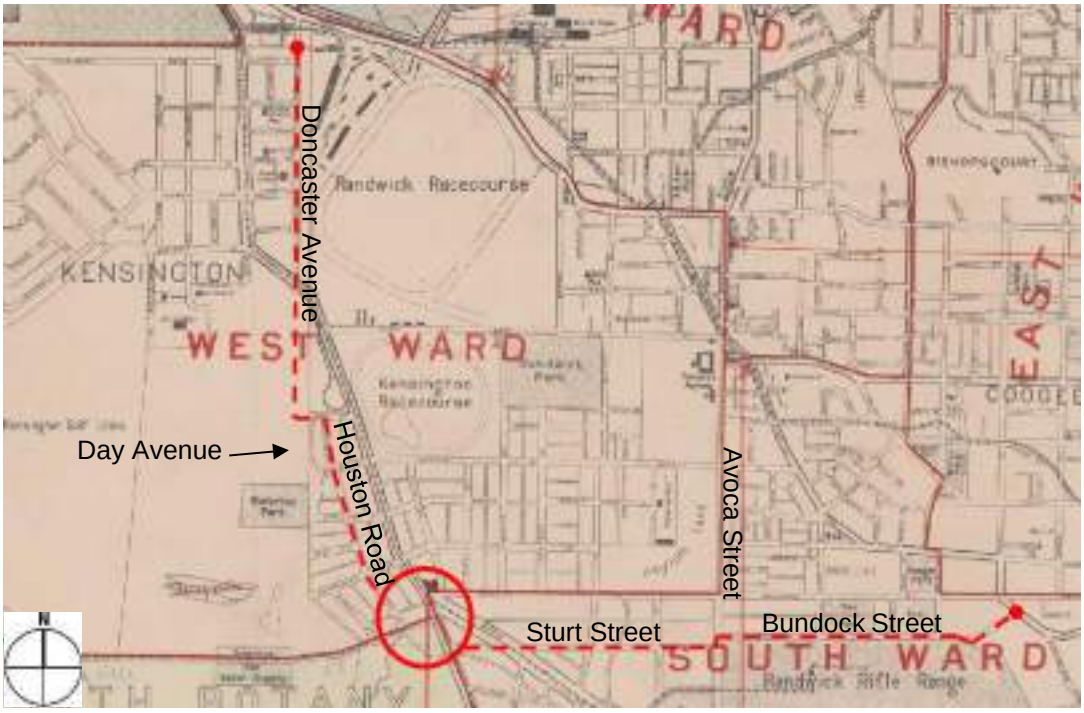


Figure 35: 1911: Map indicating roadways (proposed or built) associated with the Randwick Cycleway that has been indicated with a red dotted line (Source: State Archives & Records, Digital ID: 9590_62796)


Figure 36: 1969: This map shows the street alignment and residential allotments that had developed either side of Doncaster Avenue, Day Avenue and Houston Road. The proposed Randwick Cycleway has been indicated with a red dotted line (Source: Land Registry Services, Regional Charting Map, Cumberland, Alexandria 8a and 12a)

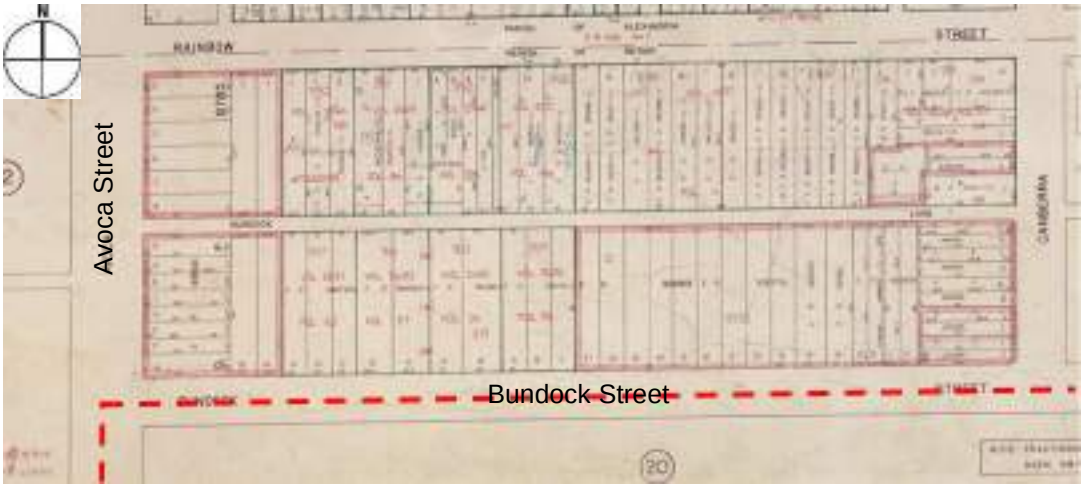


Figure 37: 1973: Bundock Street between Avoca Street and Canberra Street. The proposed Randwick Cycleway has been indicated with a red dotted line (Source: Land Registry Services, LTO Charting Maps, VG Sheet, Randwick, Sheet 43)


Figure 38: 1973: Bundock Street (between Canberra Street and Hendy Avenue) showing the presence of residential allotments on the northern side of the street. The proposed Randwick Cycleway has been indicated with a red dotted line (Source: Land Registry Services, LTO Charting Maps, VG Sheet, Randwick, Sheet 42)


Figure 39: 1973: Eastern extent of Bundock Street between Henry Avenue and Malabar Road. The proposed Randwick Cycleway has been indicated with a red dotted line (Source: Land Registry Services, Regional Charting Map, Cumberland, Alexandria 12a)

Figure 40: 1989: Sturt and Avoca Streets. The proposed Randwick Cycleway has been indicated with a red dotted line (Source: Land Registry Services, LTO Charting Maps, VG Sheet, Randwick, Sheet 12)

# 4. Assessment of Significance

## 4.1 Assessment of Criteria

The following assessment of significance has been prepared in accordance with the 'Assessing Heritage Significance, 2001' guidelines from the Heritage Division of the NSW Office of Environment & Heritage. While an overview history of the streets located within the study area has been provided in Section 3.2, the following significance assessments focus on the specific sections of roadways.

**a) an item is important in the course, or pattern, of the local area's cultural or natural history**

*Doncaster Avenue - Alison Road to Day Avenue*

- The northern section of Doncaster Avenue (Alison Road to ANZAC Parade) initially developed around the 1890s, during a key period of subdivision and growth for the suburb of Kensington. In contrast, the southern portion of Doncaster Avenue (ANZAC Parade to Day Avenue) developed at the beginning of the 20th century as a result of the Daceyville 'garden suburb' development. The roadway, along with the residences located on either side of the street, reflect the continuing residential development of the roadway and the suburb of Kensington.

- *Day Avenue – Doncaster Avenue to Houston Road*
  - Having retained its original street alignment, Day Avenue (between Doncaster Avenue and Houston Road) reflects the growing residential development of the suburb of Kensington during the early 20th century,. The residential developments located within this section of Day Avenue predominately date from the early 20th century and therefore reflect the early 20th century development of the street.
- *Houston Road – Day Avenue to Gardeners Road*
  - Houston Road was established at the beginning of the 20th century in association with a number of other roads in the suburb of Kingsford. It therefore can be seen to reflect the growing residential development of Kingsford during the early 20th century. More contemporary developments are also present, showing the growing requirements of the suburb and its inhabitants.
- *General Bridges Crescent – Gardeners Road to Bunnerong Road*
  - General Bridges Crescent was first constructed in 1917 along with the commercial shops and theatre for the garden suburb of Daceyville. In tandem with the decline of Daceyville during the 1960s, the northern side of General Bridges Crescent was altered due to the amalgamation of the three parcels of land located between Gardeners Road, Cooks Avenue, Banks Avenue and Bunnerong Road for the creation of the Dacey Garden Reserve. Development of the former theatre site for pensioner flats during the 1980s further altered the original setting of General Bridge Crescent. The combination of changes along the street thus reflect the different stages of development of the suburb of Daceyville.
- *Sturt Street – Bunnerong Road to Avoca Street*
  - Sturt Street first appeared in the Sands Directory in 1909 and was one of a collection of roads to be established in Kingsford during the early twentieth century. Sturt Street is predominantly lined by residences dating to the early twentieth century, however later development is also present, reflecting the continuing development of the street and suburb of Kingsford. There is also a strong Greek influence present within the street. Sturt Street retains its original alignment.
- *Avoca Street – Sturt Street to Bundock Street*
  - Avoca Street was originally part of Frenchmans Road, one of the oldest European roads in Australia. Despite this early beginning, the short section of Avoca Street between Sturt and Bundock Streets developed during the late nineteenth and early

twentieth centuries with the Randwick Barracks on its eastern side and mid to late twentieth century dwellings on its eastern side.

- *Bundock Street – Avoca Street to Malabar Road*
  - Bundock Street first appeared in the Sands directory in 1916. It formed the northern boundary of the Randwick Barracks established in 1891. Bundock Street was slow to develop and is predominantly lined with residences dating from the early to mid-twentieth century, with late-twentieth century development at its eastern end. The southern side features contemporary residential developments dating from c.2007, showing the growing need for residential allotments in the area and the subsequent subdivision and development of the northern side of the Randwick Barracks site. The street thus represents various period of development within the suburb of Randwick. Bundock Street retains its original alignment.

**b) an item has strong or special associations with the life or works of a person, or group of persons, of importance in the local area's cultural or natural history**

- *Doncaster Avenue – Avoca Street to Day Avenue*
  - The northern section of Doncaster Avenue was developed as part of the subdivision plan of the Kensington Freehold Corporation in the late 19th century. While it is believed that Doncaster Avenue was named after Doncaster Ave in England, historic research has not indicated there is a direct association other than the location on the western boundary of Randwick Racecourse and proximity to the former Kensington Racecourse.
- *Day Avenue – Doncaster Avenue to Houston Road*
  - Day Avenue is named after WR Day a Randwick Council alderman from the 1890s to 1910. While the street is named after Day, historic research has not indicated he had direct association with the street, however he was an important figure in Randwick during the late nineteenth and early twentieth century. Therefore, the street is considered to have a special association with WR Day.
- *Houston Road – Day Avenue to Gardeners Road*
  - Houston Road is named after William Houston a Randwick Council alderman from 1895-1908 who also served as Mayor of Randwick in 1898. While the street is named after Houston, historic research has not indicated that he had direct association with the street, however, he was an important figure in Randwick during the late nineteenth and early twentieth centuries. Therefore, the street is considered to have a special association with William Houston.
- *General Bridges Crescent – Gardeners Road to Bunnerong Road*
  - General Bridges Crescent is named after Major General Bridges a Gallipoli war hero. Historic research has not indicated that Major General Bridges had a direct association with the street, however many of Daceyville's streets were named in honour of war heroes from World War I. Therefore, although the street is not directly associated with Major General Bridges the naming of the streets within Daceyville after World War I war heroes does have significance for its association with a group of persons.
- *Sturt Street – Bunnerong Road to Avoca Street*
  - Sturt Street is named after Charles Sturt (1795-1869), an explorer. While the street is named after Sturt, historic research has not indicated that he had a direct association with the street or the development of Randwick. Therefore, the street is considered to have some significance for its association with Charles Sturt.
- *Avoca Street – Sturt Street to Bundock Street*
  - Avoca Street is named after a house constructed by Thomas Callaghan (1815-1863) on his Randwick land grant which was purchased in 1853. Callaghan was a

prominent District Judge who operated in the mid-nineteenth century. Therefore, the street does have a special association with the life of Thomas Callaghan.

- *Bundock Street – Avoca Street to Malabar Road*
  - Bundock Street is named after James B. Bundock who was a Randwick Council alderman in c.1897. While the street is named after Bundock, historic research has not indicated he had direct association with the street, however, he was an important figure in Randwick during the late nineteenth and early twentieth century. Therefore, the street does have special association with James B Bundock.

**c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the local area**

- *Doncaster Avenue – Avoca Street to Day Avenue*
  - The late 19th and early 20th century residential developments presented on both the eastern and western side of Doncaster Avenue are considered of aesthetic significance, contributing to the streetscape presentation and an understanding of the historic development of the street. Of particular note are the many heritage items (item no.'s I122, I123, I124, I126, I125, I127, I130, I107, I128, and I129) and contributory items, which are relatively intact examples with prominent decorative facades, fences and roof forms that are highly visible from within the street.

    The northern half of the street is of particular note, with numerous semi-detached and terraced residences present. This is in contrast to the southern section of the street, where asymmetrical free standing Federation and Inter-War dwellings with prominent gable ends are visible. These historic residences are in contrast to the many residential flat buildings present, particularly on the western side, which date from the 1970s onwards. These residential flat buildings interrupt the historic streetscape rhythm and are considered to detract.
  - While historical research has indicated the street landscaping present along Doncaster Avenue were planted after 1943, the plantings are considered to enhance the streetscape character of Doncaster Avenue.
- *Day Avenue – Doncaster Avenue to Houston Road*
  - This section of Day Avenue features a few residential developments that date from the turn of the 19th century, although have been modified and stripped of their original detailing. Of particular note is an Inter-War residential flat building, located centrally within this section of Day Avenue. The residential flat building is prominently visible within the streetscape and features decorative parapets to Day Avenue and Houston Road and polychromatic brickwork.
  - The roadway itself has been significantly modified, with no early sandstone kerbing or gutters present. Some mature trees on the northern side of the roadway dating from at least 1943 remain adding to the aesthetics of the streetscape.
- *Houston Road – Day Avenue to Gardeners Road*
  - Houston Road features a mix of developments, dating from the early twentieth century through the present day. Of particular note are a few Inter-War residential flat buildings with projecting parapets and the few single storey residences, dating from the late 19th and early 20th centuries. These residences typically are of facebrick with asymmetrical facades, prominent gable ends and terracotta tiled roofs.
  - The roadway is however dominated by residential flat buildings dating from the 1970s onwards and large contemporary residential developments which dwarf earlier developments.
  - . The roadway itself retains early street fabric including sandstone kerbs, gutters and stormwater drains. While the existing street trees were planted after 1943, their presence enhances the streetscape character.

- *General Bridges Crescent – Gardeners Road to Bunnerong Road*
  - The northern side of General Bridges Crescent is considered of aesthetic significance due to the presence of the medium sized pocket park known as 'Daceyville Garden Reserve'. The park reflects the aesthetic intent of the Daceyville 'garden suburb' and has been manicured to reflect the original subdivision pattern of the north eastern apex of the Daceyville development.
  - A number of residential flat buildings dating from the 1950s onwards are located on the southern side of General Bridges Crescent and are not considered of aesthetic significance.
  - Even though General Bridges Crescent has been modified over the years, the alignments and trees plantings in the southern side of the street still remain. These are considered to contribute to the aesthetics of the streetscape.
- *Sturt Street – Bunnerong Road to Avoca Street*
  - Sturt Street contains a mixture of development types ranging from residences dating from the early 20th century to residences, ecclesiastical developments and commercial developments dating from the mid to late 20th century. While some historic residences are present within the western end of Sturt Street, the eastern extent (from ANZAC Parade onwards) features a higher density of historic residences and is therefore considered to be of some aesthetic significance. Of particular note are the detached early 20th century residences located on the northern side of the street, which feature prominent gable ends, asymmetrical forms and front verandahs with decorative timber fretwork.
  - The mid to late 20th century residential and commercial developments within Sturt Street are not considered of aesthetic significance and detract from the historic character of the street.
  - The street itself retains early street fabric including sandstone kerbs, gutters and stormwater drains. While the existing street trees were planted after 1943, their presence enhances the streetscape character.
- *Avoca Street – Sturt Street to Bundock Street*
  - This section of Avoca Street has been heavily modified and does not contain any aesthetic fabric of note.
- *Bundock Street – Avoca Street to Malabar Road*
  - Bundock Street features a number of residences dating from the early twentieth century along the northern side of the street. These residences show consistency in form, shape and style, featuring asymmetrical forms, prominent gable ends, terracotta or slate tiles, front verandahs, eyelid shades to windows, and in some instances bargeboard detailing. They are often set back from the street with low brick walls demarcating the boundary of the site. These features are of some aesthetic significance and contribute to the overall streetscape character of Bundock street;
  - The southern side of the street is not considered of particular aesthetic significance, although some glimpses to the historic Randwick Barracks site are possible. This, however, does not have a major impact on the aesthetic presentation of the street.
  - The modern residential developments on the southern side of the street are not considered of aesthetic significance.
  - The street itself has been significantly modified, with no early sandstone kerbing or gutters present. While the existing street trees were planted after 1943, their presence enhances the streetscape character.

**d) an item has strong or special association with a particular community or cultural group in the local area for social, cultural or spiritual reasons**

- *Doncaster Avenue – Alison Road to Day Avenue*
  - There has been a continued community and residential focus in the Kensington area since the late nineteenth century and proximity to the Randwick Racecourse.
- *Day Avenue – Doncaster Avenue to Houston Road*
  - There has been a continued community and residential focus in the Kensington area since the early twentieth century.
- *Houston Road – Day Avenue to Gardeners Road*
  - There has been a continued community and residential focus in the Kingsford area since the early twentieth century.
- *General Bridges Crescent – Gardeners Road to Bunnerong Road*
  - There has been a continued community and residential focus in the Daceyville area since the early twentieth century.
- *Sturt Street – Bunnerong Road to Avoca Street*
  - There has been a continued community and residential focus in the Kingsford area since the early twentieth century.
- *Avoca Street – Sturt Street to Bundock Street*
  - There has been a continued community and residential focus in the Randwick area since the late nineteenth century.
- *Bundock Street – Avoca Street to Malabar Road*
  - There has been a continued community and residential focus in the Randwick area since the early twentieth century.

**e) an item has potential to yield information that will contribute to an understanding of the local area's cultural or natural history**

- As there are a number of sandstone kerbs and gutters, the study area is considered to have the potential to yield information that will contribute to an understanding of the local area's cultural or natural history.

**f) an item possesses uncommon, rare or endangered aspects of the local area's cultural or natural history**

- *Doncaster Avenue – Avoca Street to Day Avenue*
  - This section of Doncaster Avenue does not feature any known uncommon, rare or endangered aspects of the area's cultural or natural history.
- *Day Avenue – Doncaster Avenue to Houston Road*
  - This section of Day Avenue does not feature any known uncommon, rare or endangered aspects of the area's cultural or natural history.
- *Houston Road – Day Avenue to Gardeners Road*
  - Houston Road does not feature any known uncommon, rare or endangered aspects of the area's cultural or natural history.
- *General Bridges Crescent – Gardeners Road to Bunnerong Road*
  - General Bridges Crescent is an uncommon feature within the garden suburb of Daceyville, due to its curved alignment and prominent siting.
- *Sturt Street – Bunnerong Road to Avoca Street*
  - Sturt Street does not feature any known uncommon, rare or endangered aspects of the area's cultural or natural history.
- *Avoca Street – Sturt Street to Bundock Street*

- This section of Avoca Street does not feature any known uncommon, rare or endangered aspects of the area's cultural or natural history

- *Bundock Street – Avoca Street to Malabar Road*
  - Bundock Street does not feature any known uncommon, rare or endangered aspects of the area's cultural or natural history.

**g) an item is important in demonstrating the principal characteristics of a class of the local area's cultural or natural places; or cultural or natural environments**

- *Doncaster Avenue – Avoca Street to Day Avenue*
  - This section of Doncaster Avenue is one of a representative group of streets dating to the early development and subdivision of Kensington during the late nineteenth to early twentieth centuries.
  - Due to the presence of sandstone kerbs and gutters there is archaeological potential.
- *Day Avenue – Doncaster Avenue to Houston Road*
  - This section of Day Avenue is one of a representative group of streets dating to the early development and subdivision of Kensington during the early twentieth century.
- *Houston Road – Day Avenue to Gardeners Road*
  - Houston Road is one of a representative group of streets dating to the early development and subdivision of Kingsford during the early twentieth century.
  - Due to the presence of sandstone kerbs, gutters and stormwater drains there is archaeological potential.
- *General Bridges Crescent – Gardeners Road to Bunnerong Road*
  - General Bridges Crescent is one of a representative group of streets developed for the garden suburb of Daceyville during the early twentieth century.
- *Sturt Street – Bunnerong Road to Avoca Street*
  - Sturt Street is one of a representative group of streets dating to the early development and subdivision of Kingsford during the early twentieth century.
  - Due to the presence of sandstone kerbs, gutters and stormwater drains there is archaeological potential.
- *Avoca Street – Sturt Street to Bundock Street*
  - This section of Avoca Street is representative of the wider characteristics of the prominent thoroughfare.
- *Bundock Street – Avoca Street to Malabar Road*
  - Bundock Street is one of a representative group of streets dating to the early development and subdivision of Randwick during the early twentieth century.

## 4.2 Statements of Significance - Randwick Cycleway Route

### 4.2.1 Doncaster Avenue – Alison Road to Day Avenue

Doncaster Avenue was established over two key periods with the northern portion (Alison Road to ANZAC Parade) reflecting the early subdivision and growth of Kensington during the 1890s, and the southern section (ANZAC Parade to Day Avenue) reflecting the later development of the Daceyville suburb at the beginning of the twentiethth century. This early development of the street can be seen in the alignment of the street and the sandstone kerbs, gutters and late nineteenth century sewerage vent, which are considered to contribute to the historic aesthetics of the street.

The residential developments that line either side of the street are therefore also considered to reflect these two key periods of development, however, some sections of the roadway (predominately the western side) have been aesthetically impacted by the proliferation of residential flat buildings from the 1970s onwards. These are considered detracting and impact on the historic streetscape rhythm.

Due to the presence of sandstone kerbs and gutters, there is the potential for early street fabric under the existing bitumen surface. Early Street fabric is considered to contribute to an understanding of the early development of the area and therefore to the heritage items and HCA in proximity.

Doncaster Avenue is not considered of sufficient significance to warrant individual listing on any statutory instruments.

### 4.2.2 Day Avenue – Doncaster Avenue to Houston Road

Day Avenue (between Doncaster Avenue and Houston Road) reflects the growing residential development of the suburb of Kensington during the early twentieth century, having retained its original street alignment. The name of the street has special association with the commemoration of the life of WR Day, a Randwick Council alderman from the 1890s, further adding to the streets sense of place for the local community. This section of the street itself has been significantly modified, with no early sandstone kerbing or gutters present. The single storey residences within the street have also been significantly modified, although the Inter-War residential flat building is considered of note for it use of polychromatic brickwork and its two decorative parapets. Some mature trees on the northern side of the street dating from at least 1943 remain adding to the aesthetics of the streetscape.

Day Avenue is not considered of sufficient significance to warrant individual listing on any statutory instruments. Early Street fabric is considered to contribute to an understanding of the early development of the area and therefore to the heritage items and HCA in proximity.

### 4.2.3 Houston Road – Day Avenue to Gardeners Road

Houston Road was established at the beginning of the 20th century in association with a number of other roadways in the suburb of Kingsford. It therefore can be seen to reflect the growing residential development of Kingsford during the early 20th century onwards.

Houston Road features a mix of developments, dating from the early twentieth century through the present day. Of particular note are a few Inter-War residential flat buildings with projecting parapets and the few single storey residences present, dating from the late 19th and early 20th centuries. These residences typically are of facebrick with asymmetrical facades, prominent gable ends and terracotta tiles to the roof.

The street is however dominated by residential flat buildings dating from the 1970s onwards and large contemporary residential developments which dwarf earlier developments and have significantly impacted on the aesthetics of the streetscape.

The name of the street has a special association with the commemoration of the life of William Houston a Randwick Council alderman from 1895-1908 and Mayor of Randwick in 1898. While Houston Road has been modified over the years, early street fabric is present and includes sandstone kerbs, gutters and storm water drains. There is also the potential for further early street fabric to be present under the existing bitumen. Early Street fabric is considered to contribute to an understanding of the early development of the area and therefore to the heritage items and HCA in proximity.

Houston Road is not considered of sufficient significance to warrant individual listing on any statutory instruments.

### 4.2.4 General Bridges Crescent – Gardeners Road to Bunnerong Road

General Bridges Crescent is an uncommon street within the garden suburb of Daceyville due to its prominent location and public amenities which line the northern and southern sides of the street. Constructed in 1917 and modified during the 1960s and 1980s, the streets history

of development reflects the different stages of development of the suburb of Daceyville. While the name of the street does not have a direct association with Major General Bridges, the naming of streets within Daceyville after World War I heroes does have significance within the wider context of the suburb. Even though General Bridges Crescent has been modified over the years, the kerb alignments and tree plantings in the southern side of the street still remain. Although modifications to the northern side of the street were made for the creation of the Dacey Garden Reserve, sufficient interpretation of the original street layout is present. The Dacey Garden Reserve is considered of aesthetic significance as a medium sized pocket park in an otherwise predominately commercial and residential context. Early Street fabric is considered to contribute to an understanding of the early development of the area and therefore to the heritage items and HCA in proximity.

General Bridges Crescent is not considered of sufficient significance to warrant individual listing on any statutory instruments.

### 4.2.5 Sturt Street – Bunnerong Road to Avoca Street

Sturt Street is representative of the early residential development of Kingsford since the early twentieth century.

Sturt Street contains a mixture of development types ranging from residences dating from the early twentieth century to residences, ecclesiastical developments and commercial developments dating from the mid to late twentieth century. While some historic residences are present within the western end of Sturt Street, the eastern extent (from ANZAC Parade onwards) features a higher density of historic residences and is therefore considered to be of some aesthetic significance. Of particular note are the detached early twentieth century residences located on the northern side of the street, which feature prominent gable ends, asymmetrical forms and front verandahs with decorative timber fretwork.

The mid to late twentieth century residential and commercial developments within Sturt Street are not considered of aesthetic significance and detract from the historic character of the street.

While Sturt Street has been modified over the years, early street fabric including sandstone kerbs, gutters and storm water drains remain. There is also the potential for further early street fabric to be present under the existing bitumen. Avoca Street – Sturt Street to Bundock Street. Early Street fabric is considered to contribute to an understanding of the early development of the area and therefore to the heritage items and HCA in proximity.

The section of Avoca Street between Sturt Street and Bundock Street was originally part of Frenchmans Road, one of the oldest European roads in Australia. This section of Avoca Street has been significantly modified and does not contain any aesthetic fabric of note.

Sturt Street is not considered of sufficient significance to warrant individual listing on any statutory instruments.

### 4.2.6 Bundock Street – Avoca Street to Malabar Road

Bundock Street reflects the early residential development of Randwick and the development of Randwick Barracks, established in 1891. Bundock Street features a number of residences dating from the early twentieth century and located on the northern side of the street. These residences show consistency in form, shape and style, featuring asymmetrical forms, prominent gable ends, terracotta or slate tiles, front verandahs, eyelid shades to windows, and in some instances bargeboard detailing. They are often set back from the street with low brick walls demarcating the boundary of the site. These features are of some aesthetic significance and contribute to the overall streetscape character of Bundock street;

The southern side of the street is not considered of particular aesthetic significance, although some glimpses to the historic Randwick Barracks site are possible. This, however, does not have a major impact on the aesthetic presentation of the street.

The modern residential developments on the southern side of the street are not considered of aesthetic significance.

The street itself has been significantly modified, with no early sandstone kerbing or gutters present. While the existing street trees were planted after 1943, their presence enhances the streetscape character.

Bundock Street is not considered of sufficient significance to warrant individual listing on any statutory instruments.

# 5. Assessment of Constraints and Opportunities

In order to advise on the appropriateness of the proposed works from a heritage perspective, the following sections explore various aspects of the design and heritage constraints associated with the study area.

## 5.1 Specific Heritage Item/ HCA Requirements

### 5.1.1 RMS S170 Heritage Conservation Register

As detailed in Section 2.2, located within Bunnerong and Gardeners Road is the heritage item 'Kerbs and Kerb Alignments'. The State Heritage Inventory (SHI) form for the heritage item does not provide details regarding the extent of the heritage item or associated curtilage. CPH has enquired with the Heritage Division of the Office of Environment and Heritage (OEH), however, no further information was held by the agency.

CPH has also undertaken consultation with RMS to obtain further information about the heritage item, however, it is understood that a detailed survey with information showing the extent of the heritage item has not been produced to date. As such we recommend the following course of action:

- Undertake a detailed inspection of the study area and create a survey map that provides an indication of the extent of visible sandstone kerbs and gutters. While the survey undertaken by Group GSA and CPH did not identify any sandstone kerbs or gutters, further survey is required to confirm this;
- The survey should also include a portion of Gardeners Road and Bunnerong Road either side of the proposed route, in order to provide an indication of any sandstone kerbs or gutters in the vicinity of the proposed Randwick Cycleway;
- Create a clear indicative map showing the extent of sandstone kerbs and gutters specifically within the section of Gardeners Road and Bunnerong Road, where the proposed Randwick Cycleway route will pass through;
- Following the undertaking of these works, it is also advised that an archaeology specialist be engaged to ascertain the extent of remnant sandstone kerbs and gutters underneath the bitumen in these areas. Pamela Kottaras (of EMM) was involved in the 2005 assessment of the heritage item and may be of assistance in this matter. The archaeology consultant engaged could potentially also assist in the preparation of the aforementioned plans.

An archaeological assessment will be required to accompany the Heritage Impact Statement (HIS) to be prepared by CPH.

The findings of the archaeological assessment will determine whether any applications are required under the *NSW Heritage Act, 1977* for the proposed works within Gardeners Road and Bunnerong Road. At this stage, it is possible that a Section 60 application may be required. The requirement for archaeological application and permits will be determined by the archaeological assessment.

### 5.1.2 Randwick LEP 2012 and Botany Bay LEP 2013 - Heritage Items

There are a number of locally listed heritage items located within close proximity to the proposed Randwick Cycleway route, along the roads noted above. As the works primarily involve modifications to the roadway and pedestrian paths, consideration is required of the following aspects:

- Should a new path or landscaping works be proposed directly outside a heritage item, consideration is required of how close the works are to original boundary fences and how they may impact on the preservation and conservation of the heritage item;
- The works should not obscure the heritage items from view from within the streetscape. In particular, should any trees be proposed for removal, replacement or

installation, these should be carefully located to ensure views to the heritage item from within the street are maintained;

- A landscape heritage specialist should be engaged to consult regarding any future proposed plantings to ensure they will not have an impact on heritage fabric;
- Large plantings (or plantings that can grow to be large) in proximity to sandstone kerbs and gutters and heritage items requires consideration and is not advised as their root structure or foliage could impact on heritage. Consultation should be undertaken with the landscape heritage specialist to ensure this will not occur.

These investigative landscape heritage works should be undertaken prior to finalisation of the design.

### 5.1.3 Randwick LEP 2012 and Botany Bay LEP 2013 - HCAs

Heritage considerations regarding HCAs are similar to those noted above for heritage items, however, the following will also need to be considered.

The Daceyville Suburb HCA is considered of significance for the following reasons:[16]

- *Daceyville is the first example of a Garden Suburb developed in New South Wales;*
- *Daceyville is an important part in the evolution of the development of the Garden Suburb in Australia;*
- *Daceyville is able to demonstrate "modern" design philosophy in response to the physical and social conditions of the 19th Century inner cities in Australia;*
- *Daceyville is an important step in the development of Garden Suburb Principles and their application in the development of Australian cities and suburbs;*
- *Daceyville is a relatively homogenous federation period of social housing development;*
- *Daceyville contains the first cul-de-sac layout designed by a public authority in Australia;*
- *Daceyville provides important evidence on the development of the City of Botany Bay; and*
- *Daceyville was designed as a serviced suburb, having community facilities located within distance of residential amenities*.

Any works within the Daceyville Suburb HCA need to ensure the significance of the HCA, as stated above, is not adversely impacted. Of particular note is the 'garden suburb' aspects of the HCA, which need to be considered in the establishment of any new public domain works. As such, it is recommended that Group GSA refer to the information included in Section 3.2 to ensure the general planning and design aspects of the Daceyville HCA are preserved and implemented in the design of the proposed Randwick Cycleway landscape works. The current proposal in principle is considered acceptable from a heritage perspective, however, a full survey of sandstone kerbs and gutters is required to gain a better understanding of the potential heritage impacts and to ensure the detail of the proposal is refined to protect heritage values. It is understood Group GSA will prepare this survey. In addition, it is recommended that an Archaeological Assessment be undertaken following the sandstone kerbs and gutters survey, to identify if any archaeological fabric is present under the existing bitumen.

Bayside Council do not have any contributory ranking maps for their HCAs. It is therefore recommended that the heritage officer at Council (Louise Thom) be consulted to ensure the proposed works will not have an adverse impact on the heritage significance of the Daceyville Suburb HCA.

[16] Botany Bay Development Control Plan, Part 3B Heritage, p.41

For the Racecourse HCA, the following are the key significant features that require consideration:[17]

- *The residential properties on the eastern side of Doncaster Avenue form a straight street frontage almost a kilometre in length, with a predominantly Victorian and Federation period character. This housing is representative of the larger Kensington precinct, on either side of Anzac Parade.*
- *The most common building types are one storey Federation period detached and semidetached houses. These mostly stand on narrow lots and have consistent setbacks and verandah and roof designs. There are also a large number of Victorian period one and two storey houses, and two storey terraces. The unity of the streetscape is disturbed to some degree by Post-War period three storey flat buildings, but to a lesser degree than the remainder of the historical Kensington precinct.*
- *Doncaster Avenue shares a close physical and visual link with the racecourse. It is a major route for pedestrian access to the racecourse. Doncaster Avenue is also appreciated* by the community as part of an important local period landscape and streetscape.

As with the Daceyville Suburb HCA, consideration is required to the landscape and streetscape values of the HCA. Any landscape works should be devised in consultation with a landscape heritage specialist.

Contributory ranking maps for the Racecourse HCA have been produced by Randwick City Council.They include? the location of contributory items in proximity to the study area.

[17] Racecourse Precinct inventory for, Randwick City Council, accessed 19 April 2018

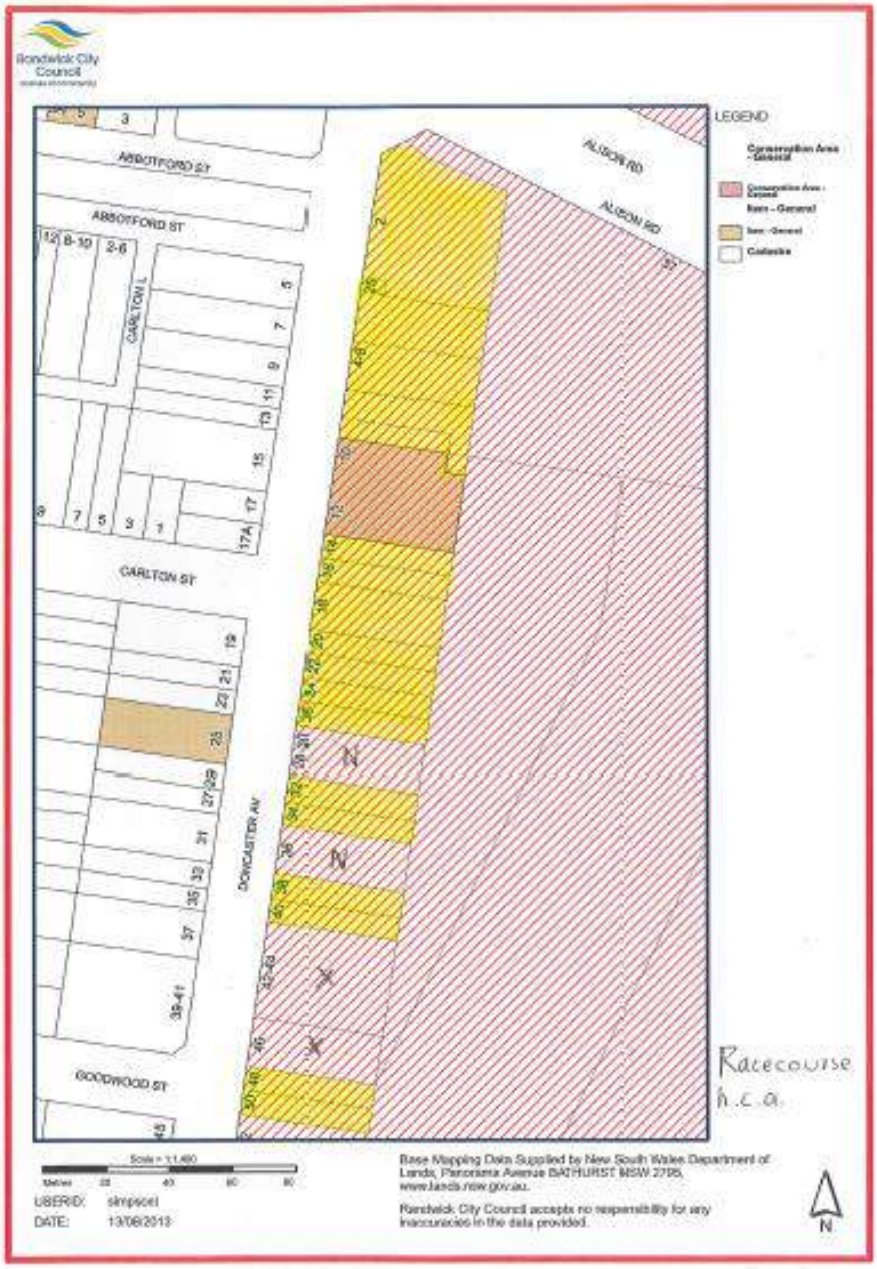


Figure 41: Contributory ranking map for the northern end of Doncaster Avenue. (Source: courtesy of Randwick City Council)

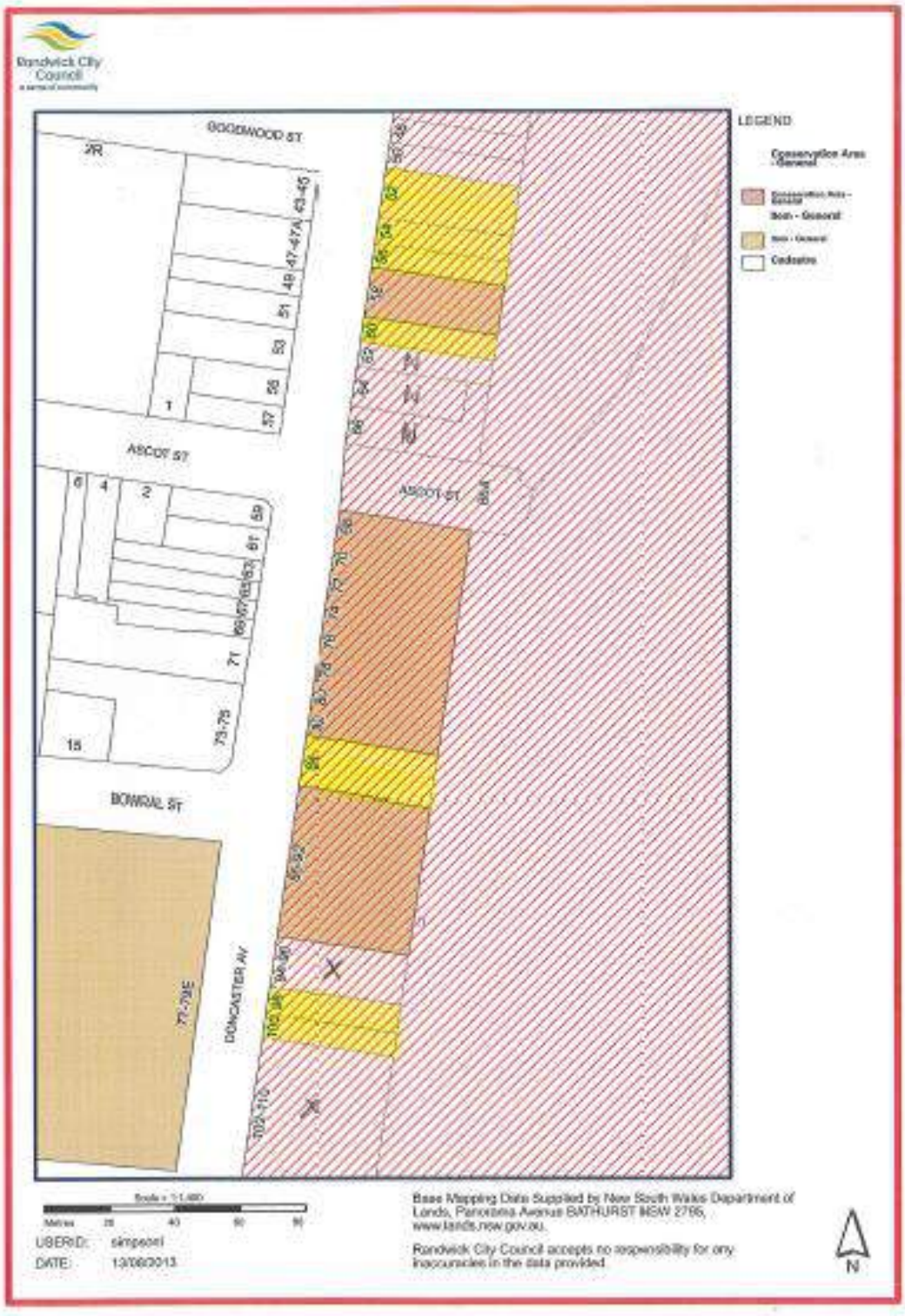


Figure 42: Contributory ranking map for a central section of Doncaster Avenue. (Source: courtesy of Randwick City Council)

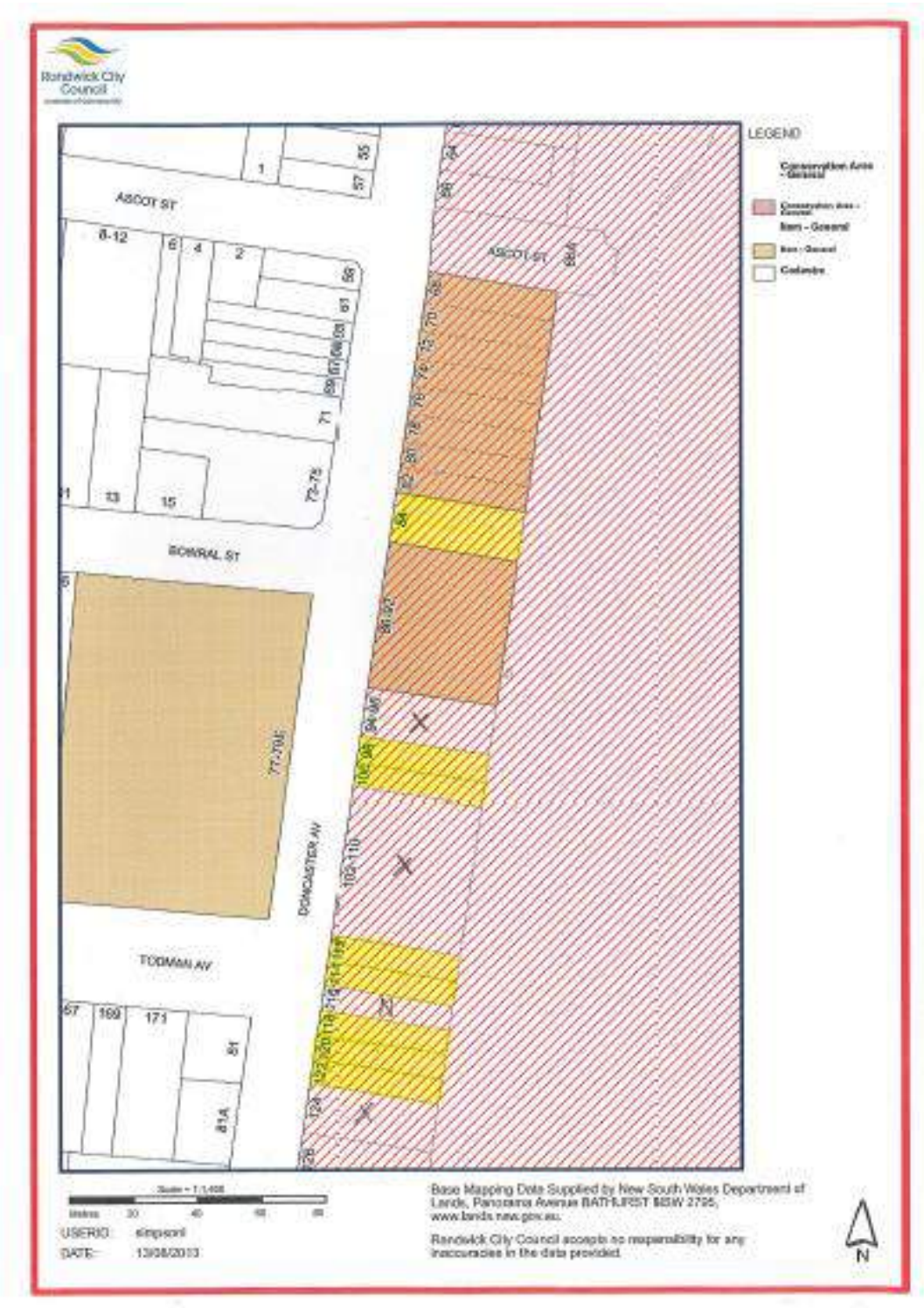


Figure 43: Contributory ranking map for a central section of Doncaster Avenue. (Source: courtesy of Randwick City Council)

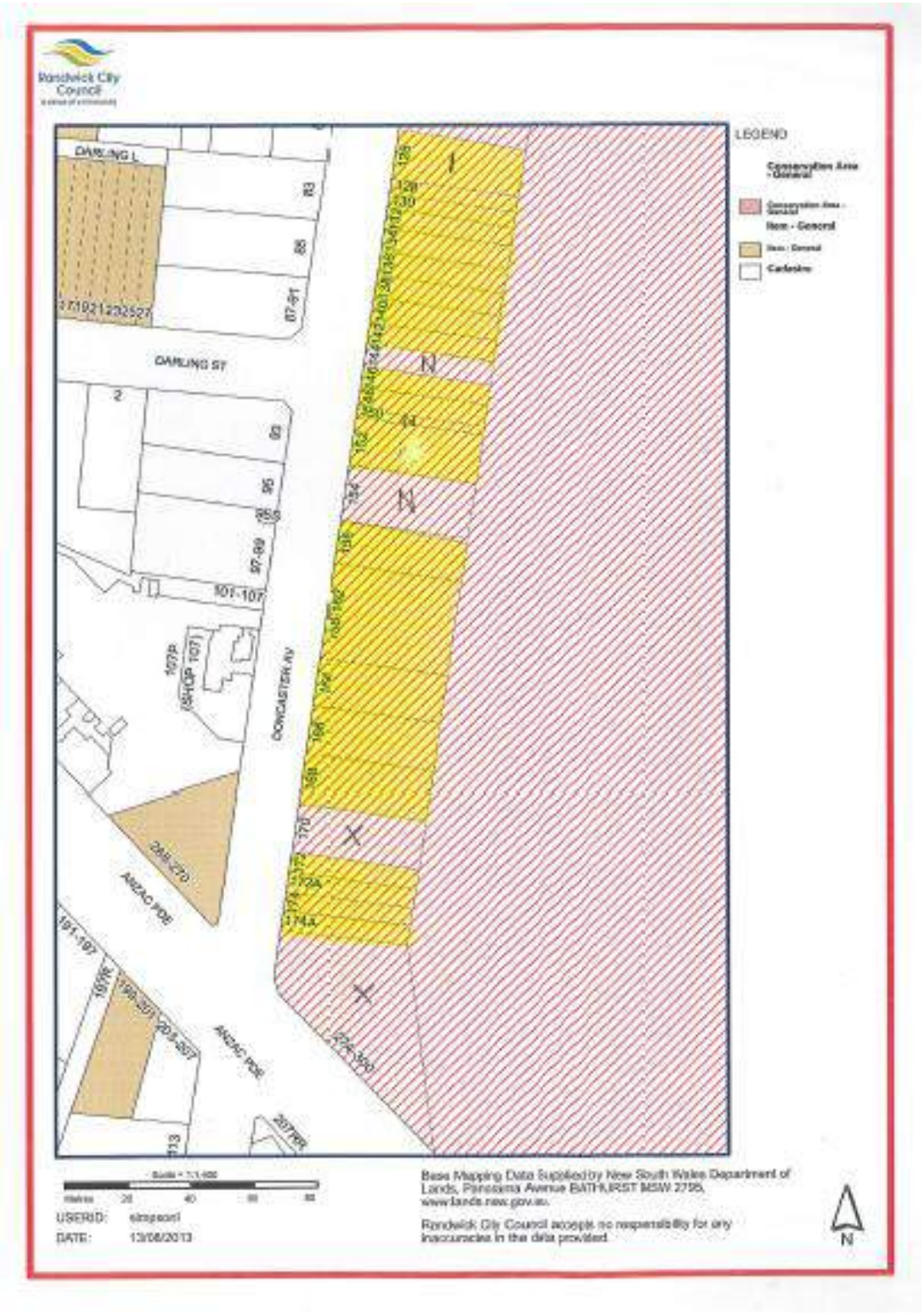


Figure 44: Contributory ranking map for the southern end of Doncaster Avenue, towards the intersection with ANZAC Parade. (Source: courtesy of Randwick City Council)

#### 5.1.4 An assessment of contributory items located within the HCAs was not undertaken by CPH, however, consideration of the same potential heritage issues as detailed in Section 5.1.2 should also be explored for Contributory Items. As noted in the Statements of Significance above, the sandstone kerbs and gutters are considered to have heritage value as they reflect the early development of the area. Other heritage factors

While the majority of the roadways located within the study area are not incorporated in any heritage listings (except for General Bridge Crescent, Gardeners Road and Bunnerong Road), they are located in direct proximity to listed heritage items and HCAs. As such, the works within the roadway will need to ensure there is no impact on the heritage items or HCAs. The following is a list of considerations required when designing the workings directly within the roadway:

- Where sandstone kerbs and gutters are present, these contribute to the streetscape and the setting of heritage items and HCAs. Therefore, it is preferable to keep these in situ or salvage and reinstate. It is understood that in some circumstances this may not be possible, however, once the detailed sandstone kerbs and gutters study has been undertaken CPH will advise Group GSA on the most appropriate solutions in the various areas where sandstone kerbs and gutters are present. Sandstone should be retained where possible and, following an options analysis, may be replaced with concrete if necessary;
- During the site inspection undertaken by CPH it was evident that the existing bitumen on several roadways has been laid over historic sandstone kerbs and gutters. While there are extensive sandstone kerbs and gutters visible, more may be present under the bitumen;
- An archaeology specialist therefore should be employed to investigate this potential and to further advise on the best course of action;
- In addition, there are a few mature street trees throughout the study area that contribute to the streetscape and setting of heritage items and HCAs. As the proposed works involve the removal and replacement of some street trees, it is recommended that a landscape heritage specialist be engaged to undertake an assessment to ensure significant trees are retained and preserved and to advise on the most appropriate tree replacements.

## 5.2 Assessment of Typologies

A number of typologies for the proposed Randwick Cycleway were provided by Group GSA to provide an indication of the various ways in which the kerbs, gutters, paving and roadways may be modified to include the Randwick Cycleway. The potential heritage implications of each typology are explored below.

### 5.2.1 Double Stepped Cycleway

Comprises:

- Approximately 100mm high kerb separating the cycleway and parking lanes; and
- A second 100mm high kerb (75mm minimum) at the existing kerb alignment separating the cyclists and footpath.

Heritage implications:

- This form of cycleway is considered acceptable in areas where there are no sandstone kerbs, gutters, or other early material. Complete replacement of sandstone kerbs, gutters and other early material is not considered preferable from a heritage perspective. This should only occur following an options study and the retention or salvaging and reinstating the existing sandstone kerb and gutter or early material is not feasible for the identified sections of cycleway.

- Where new and early material abut, provide an isolating strip to eliminate contact; and
- Archaeological potential also needs to be identified.

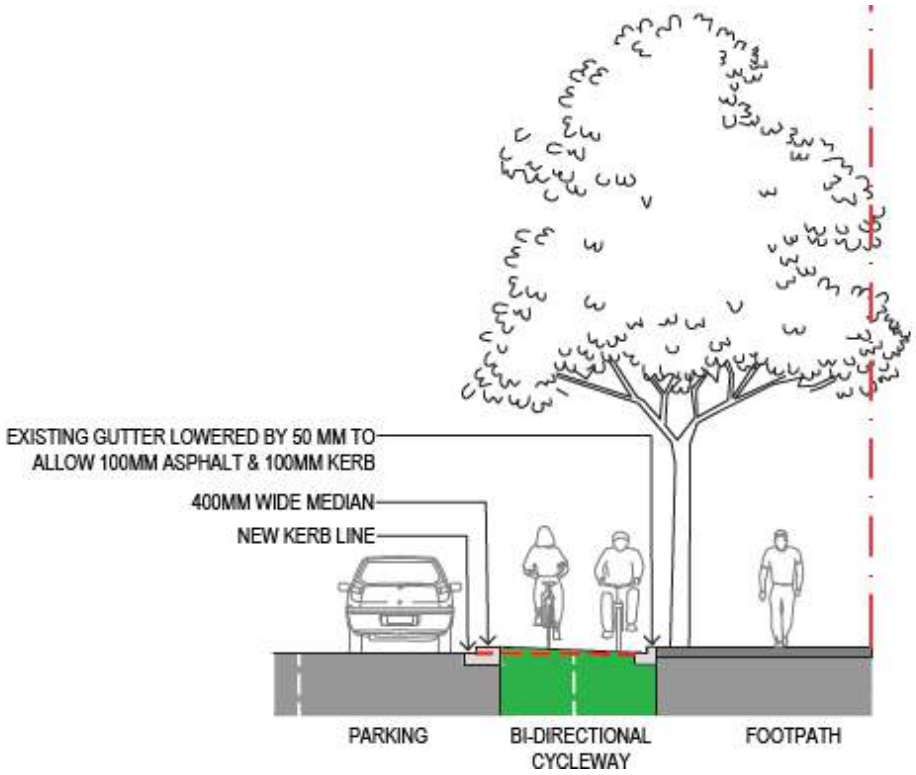


Figure 45: Cross section representation of proposed double stepped cycleway. Existing gutters would need to be lowered by 50mm to allow for 100mm of asphalt and 100mm of kerb.

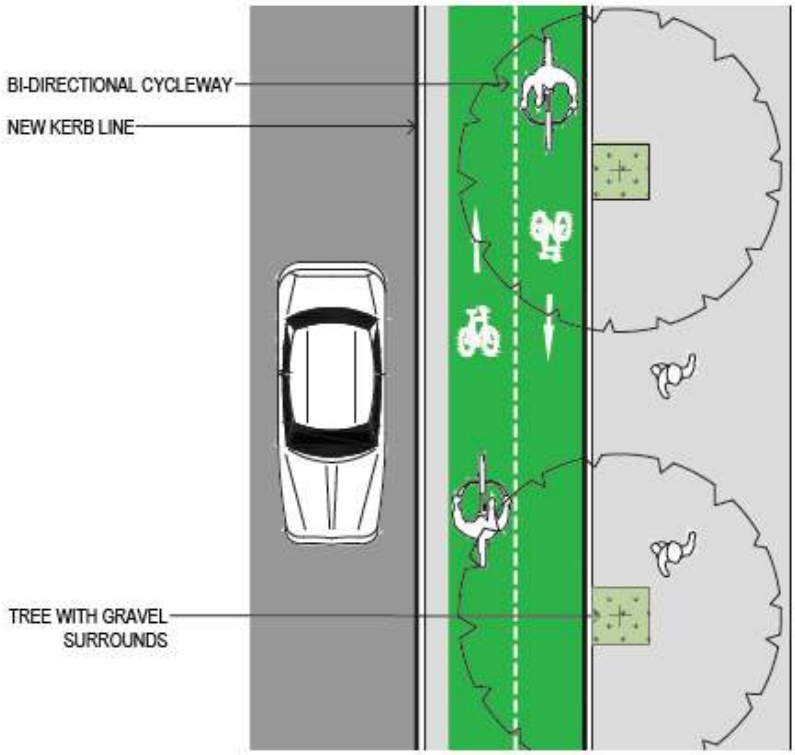


Figure 46: Aerial mock up images showing how the double stepped cycleway will appear.

### 5.2.2 Flush to Footpath Cycleway

Comprises:

- A single approximately 100mm kerb at parking lane;
- A 0.8m-1m wide planted nature strip;
- Logos indicating cycleway; and
- Contrasting pavement threshold crossings.

Heritage implications:

- As with the example above, this form of cycleway is considered acceptable in areas where there are no sandstone kerbs, gutters, or other early material. Complete replacement of sandstone kerbs, gutters and other early material is not considered preferable from a heritage perspective. This should only occur following an options study and the retention or salvaging and reinstating the existing sandstone kerb and gutter or early material is not feasible for the identified sections of cycleway.
- Should this example be employed where sandstone kerbs, gutters and early material occur it will result in the covering up of these. This is not an acceptable heritage outcome;
- Where new and early material abut, provide an isolating strip to eliminate contact; and
- The archaeological assessment will also identify if this typology will have any potential impact or archaeological remains (if any identified as being present).

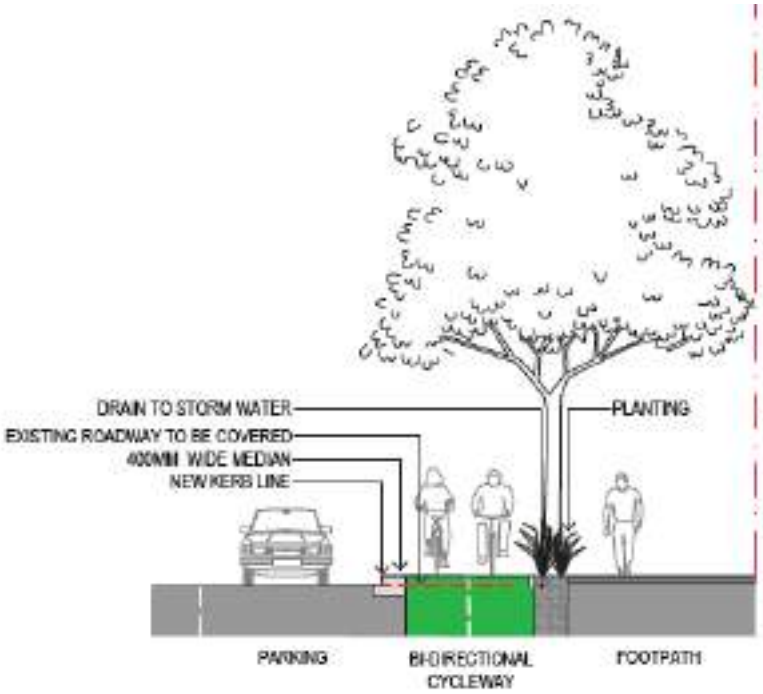


Figure 47: Cross section representation of the flush to footpath example.

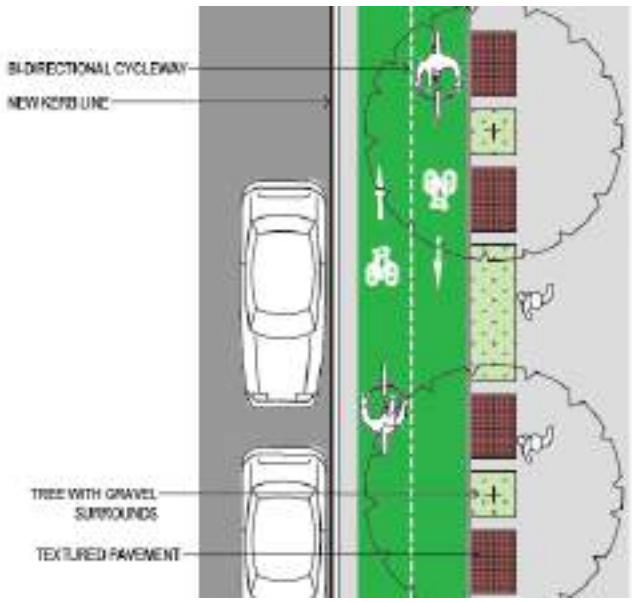


Figure 48: Aerial view of the flush to footpath typology.

### 5.2.3 Median Separated Cycleway

Comprises:

- 400mm x 100mm high concrete separator to provide a physical barrier between the cycleway and traffic lane.

Heritage implications:

- This typology is one of the most appropriate solution in areas where sandstone kerbs, gutters and early material is present. It is, however, not suitable for the sandstone gutters to be covered by the surface used for the proposed Randwick Cycleway. Retaining in situ or salvaging and reinstating is preferable;
- This option has the potential to retain sandstone kerbs and gutters;
- Consideration should be given to uncovering the sandstone gutters;
- Where new and early material abut, provide an isolating strip to eliminate contact; and
- The archaeological assessment should also be undertaken in areas where this typology is proposed.

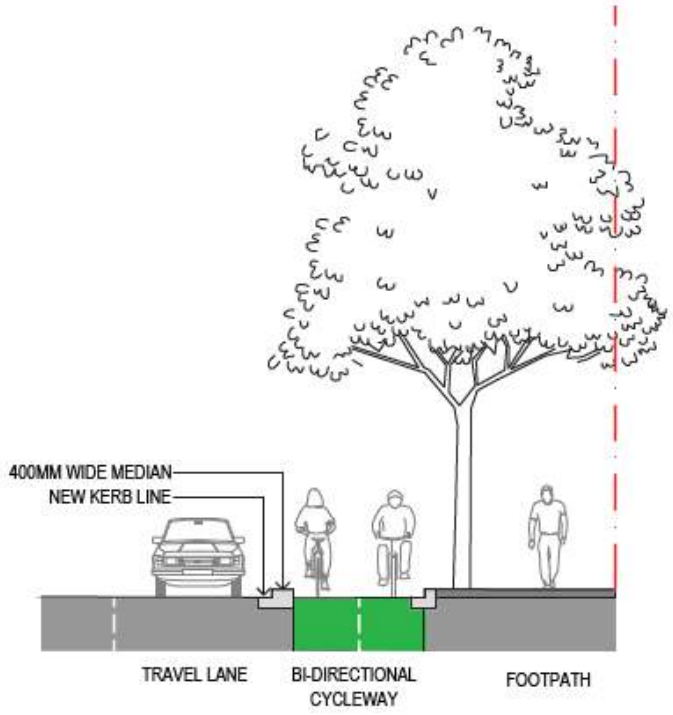


Figure 49: Cross section showing the proposed median separated cycleway.

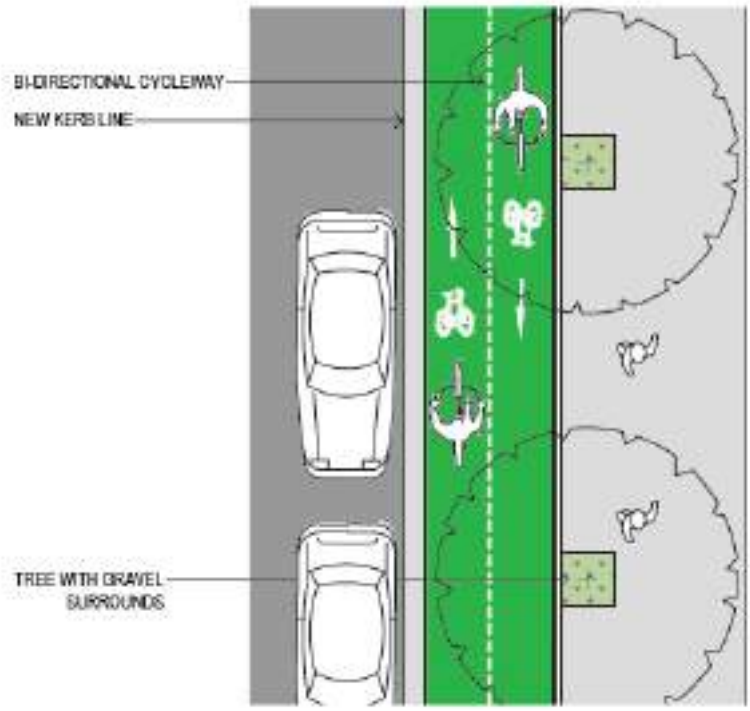


Figure 50: Aerial view showing the configuration of the proposed median separated cycleway.

### 5.2.4 Interrupted Median

Comprises:

- Parking lane, 6m long marked bays;

- 150mm high median separator;
- Contrast paving between kerb sections;
- 80mm edge line on both sides of median/ buffer zone;
- Contrast colour along edge of kerb (top and vertical).

Heritage implications:

- It is understood from Group GSA that removal of sandstone gutters would be required for this typology. However, this typology is considered to have the potential for the least amount of intervention. and will assist in ensuring retention of sandstone kerbs and gutters; and
- These works should also be advised by the archaeological assessment.

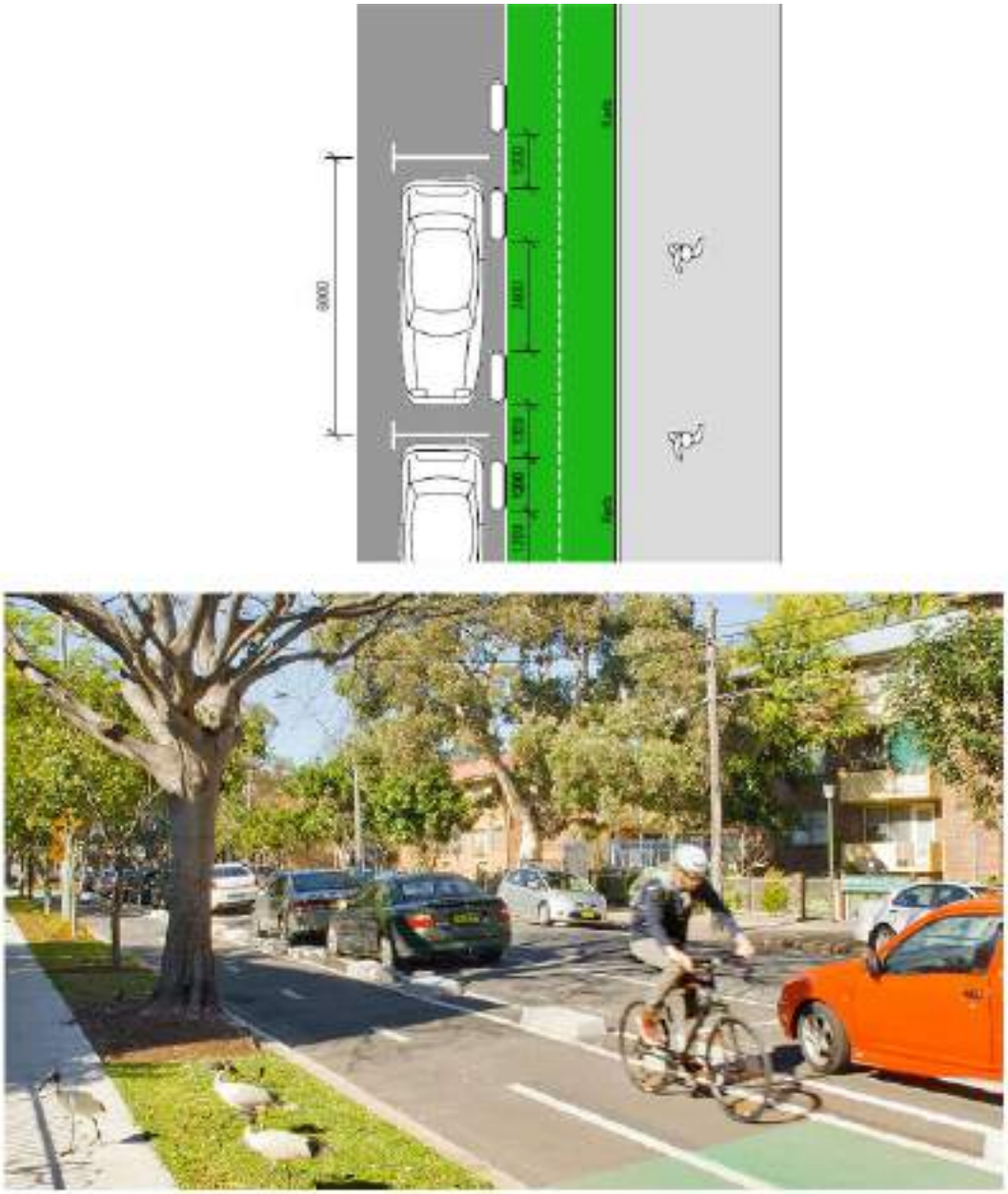

Figure 51: Aerial view and example image of the interrupted median typology.

### 5.2.5 Conclusion

The latter two typologies explored above are considered to have the potential to be the most appropriate from a heritage perspective as they could involve the least amount of intervention into the sandstone kerbs and gutters.

To create a better understanding of the impacts the typologies will have on sandstone kerbs, gutters and early material, the survey detailing the specific location of sandstone kerbs and gutters needs to be undertaken and overlaid. An archaeological potential map should also be overlaid with the proposed drawings.

In terms of the aesthetics of the typologies proposed, they are generally considered to have an acceptable impact on the streetscape and therefore are not considered at this stage to impact on the streetscape presentation of heritage items or the HCAs.

# 6. Conclusions and Recommendations

Overall, the proposed Randwick Cycleway will involve much needed roadway and public domain works that will improve the usability of the streets involved in the area for pedestrians, drivers and cyclists. In principle, the works are considered acceptable from a heritage perspective, however, the following additional studies and design considerations should be undertaken:

- Archaeological assessment - an archaeologist should be engaged to undertake an assessment of the proposed route and advise on the potential for archaeology. The report should also include a survey showing the location of all sandstone kerbs, gutters, other early material and potential archaeological sites. This can be done at the DA stage;
- A landscape heritage specialist should be engaged to advise on the appropriateness of the landscape works proposed. In addition, the landscape heritage specialist will also advise if there are any significant trees along the route that require retention and what species of new trees will have a limited impact on heritage fabric located in proximity;
- Retention of sandstone kerbs, gutters and other early material in situ is the desired heritage outcome, however, it may be possible to salvage and reinstate these in some areas. Further investigation is required following completion of the aforementioned survey;
- In order to retain the sandstone kerbs, gutters and early material, it is recommended that typology 'median separated cycleway' and 'interrupted typologies' be used where possible;
- Consultation with Council's heritage planner is also advised once the above additional studies are completed.

In addition to the recommendations above, the following standard Conditions of Consent issued by Randwick City Council require consideration:

- Any sandstone identified for removal shall be under the supervision of a built heritage specialist. Salvaged sandstone should be stored in Council's care;
- An archival recording of the property shall be submitted to and approved by Council's Director City Planning, in accordance with Section 80A (2) of the *Environmental Planning and Assessment Act 1979* prior to a construction certificate being issued for the development. This recording shall be in accordance with the NSW Heritage Office 2006 Guidelines for Photographic Recording of Heritage Items using Film or Digital Capture. Two copies of the endorsed archival recording shall be presented to Council, one of which shall be placed in the Local History Collection of Randwick City Library.
- The SHI forms for the S170 RMS register 'Kerbs and Kerb Alignments also recommend the following, which also requires consideration:
  - Prepare and undertake a maintenance strategy for the kerbs and drains on Gardeners Road that includes strategies for arresting the further deterioration of the sandstone.
  - Replace only those kerbs that are necessary under current RTA safety regulations.

# Appendix H

Traffic Impact Assessment (including Pedestrian Crossing Report) – GTA Consultants

GTAconsultants

# Randwick Cycleways
# Centennial Park to Kingsford
# Transport Impact Assessment

**Client //** GroupGSA Pty Ltd
**Office //** NSW
**Reference //** N138320
**Date //** 12/07/18

# Randwick Cycleways

# Centennial Park to Kingsford

# Transport Impact Assessment

Issue: A 12/07/18

Client: GroupGSA Pty Ltd
Reference: N138320
GTA Consultants Office: NSW

**Quality Record**

| Issue | Date | Description | Prepared By | Checked By | Approved By | Signed |
|---|---|---|---|---|---|---|
| A-Dr | 16/05/18 | Draft | O Maw | V Buhl | | |
| A-Dr2 | 31/05/18 | Draft | O Maw | V Buhl/ N Vukic | N Vukic | |
| A | 12/07/18 | Final | O Maw | V Buhl/ N Vukic | N Vukic | N.Vukic |





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# 1. Introduction

## 1.1 Background

Randwick City Council (RCC) was successful in gaining funding through the NSW Government's *Active Transport Program* to design a new cycleway link between Centennial Park and the Light Rail Terminus at Kingsford and streetscape improvements. The cycleway link begins at the intersection of Doncaster Avenue and Alison Road and heads south via Doncaster Avenue, Houston Road, Day Avenue, General Bridges Crescent and Sturt Street before finishing at the intersection of Sturt Street and Anzac Parade.

Group GSA Architects, on behalf of RCC, engaged GTA Consultants (GTA) to prepare a transport impact assessment of the cycleway link.

## 1.2 Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed cycleway, including consideration of the following:

i Existing traffic and parking conditions surrounding the site
ii Suitability of the proposed changes to parking in terms of supply (quantum) and layout
iii Pedestrian and bicycle requirements
iv The transport impact of the implementation of the proposed cycleway on the surrounding road network.

## 1.3 References

In preparing this report, reference has been made to the following:

- An inspection of the site and its surrounds
- Australian Standards, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- Traffic and car parking surveys undertaken by Data Audit Systems as referenced in the context of this report
- Plans for the proposed development prepared by Group GSA Architects as referenced in the context of this report
- Other documents and data as referenced in this report.

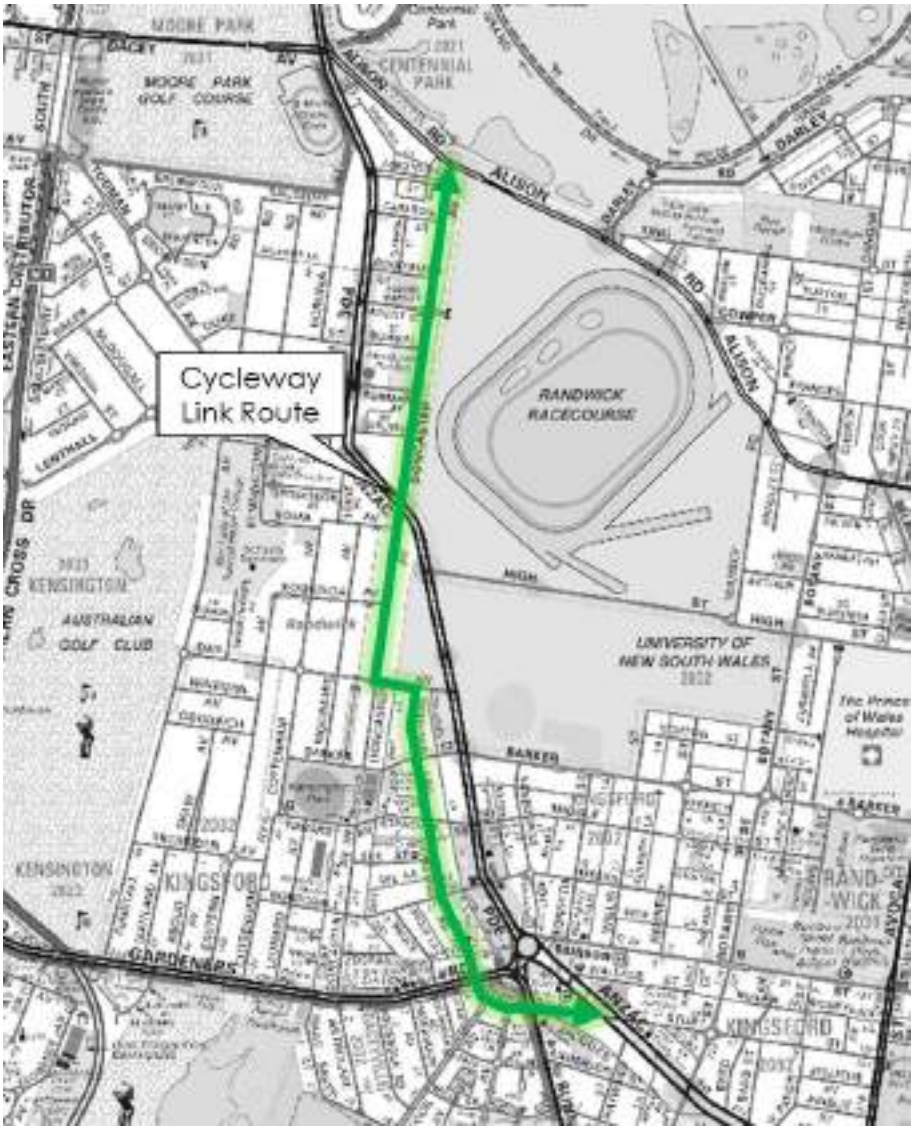
# 2. Existing Conditions



The subject site, which includes the proposed cycleway route and streetscape upgrades are located within the suburbs of Randwick and Kingsford. The properties along the route include a mixture of medium density residential apartments, semi-detached housing, single dwellings retail and commercial uses.

The cycleway link route is shown in Figure 2.1.

**Figure 2.1: Cycleway link route**

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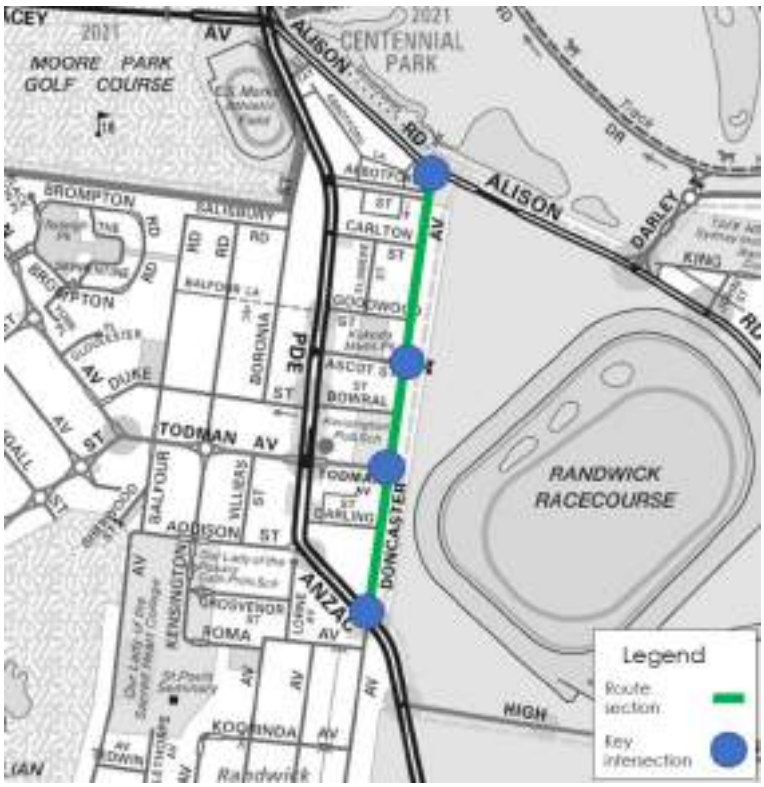
For the purpose of reporting, the cycleway link has been split into the following sections:

- Section 1 – Alison Road to Anzac Parade via Doncaster Avenue
- Section 2 – Anzac Parade to Day Avenue via Doncaster Avenue
- Section 3 – Doncaster Avenue to Gardeners Road via Day Avenue and Houston Road
- Section 4 – Gardeners Road to Anzac Parade via General Bridge Crescent and Sturt Street.

## 2.1 Section 1 - Alison Road to Anzac Parade

Section 1 begins at the intersection of Alison Road/ Doncaster Avenue and heads south, along Doncaster Avenue to Anzac Parade. Section 1 and the key intersections along the route are illustrated in Figure 2.2.

**Figure 2.2: Section 1 – Alison Road to Anzac Parade**




Basemap source: Sydways

### Road Network

Doncaster Road is a two-way Regional Road, aligned in a north-south direction. The road width is approximately 12.8 metres and generally consists of one traffic lane, one parking lane and one bicycle shoulder lane in each direction.

Alison Road is a two-way State Road, aligned in a north-west to south-east direction. Alison Road is approximately 20 metres wide and consists of three traffic lanes in each direction with localised widening at some intersections.

Ascot Street is a two-way local road and is approximately 12.8 metres in width. There are no marked lanes and parking is permitted on both sides. Ascot Street is aligned in an east-west direction.

Todman Avenue is a two-way Regional Road, aligned in an east-west direction. The road width is approximately 21 metres and generally consists of two traffic lanes and 90-degree rear-to-kerb parking on both sides of the road.

Anzac Parade is a classified State Road, generally aligned in a north-west to south-east near the cycleway link. Anzac Parade is two-way and has three travel lanes in each direction and a road width of approximately 25 metres.

The following key intersections are located along Section 1 of the route:

- Doncaster Avenue/ Alison Road (signalised)
- Doncaster Avenue/ Ascot Street (roundabout)
- Doncaster Avenue/ Todman Avenue (signalised)
- Doncaster Avenue/ Anzac Parade (signalised).

In addition, some minor intersections are located along Doncaster Avenue, which are priority controlled.

### Intersection operation

Turning movement surveys at key intersection along the cycleway link route were undertaken in March 2016 and March 2018. Based on these survey results, the existing conditions for the intersections were assessed using SIDRA Intersection[1], a computer based modelling package, which calculates intersection operation. The commonly used measure of intersection operation, as defined by Roads and Maritime Services, is vehicle delay. SIDRA Intersection determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.1 shoes the criteria that SIDRA Intersection adopts in assessing the level of service. A level of service of D or better is generally considered acceptable.

**Table 2.1: SIDRA Intersection level of service criteria**

| Level of service | Average delay per vehicle (secs/veh) | Traffic signals, roundabouts | Give way and stop sign |
|---|---|---|---|
| A | Less than 14 | Good operation | Good operation |
| B | 15 to 28 | Good with acceptable delays and spare capacity | Acceptable delays and spare capacity |
| C | 29 to 42 | Satisfactory | Satisfactory, but accident study required |
| D | 43 to 56 | Near capacity | Near capacity, accident study required |
| E | 57 to 70 | At capacity, at signals incidents will cause excessive delays | At capacity, requires other control mode |
| F | Greater than 70 | Extra capacity required | Extreme delay, major treatment required |

Table 2.2 presents a summary of the existing operations of the intersections within Section 1, with full results and layouts for each respective intersection presented in Appendix A of this report.

**Table 2.2: Section 1 existing intersection operating conditions**

| Intersection | Peak | Degree of saturation | Average delay (seconds) [1] | 95th percentile queue (metres) | Level of service[1] |
|---|---|---|---|---|---|
| Doncaster Avenue/ Alison Road (signalised) | AM | 0.80 | 22 | 244 | B |
| | PM | 0.83 | 28 | 226 | B |
| Doncaster Avenue/ Ascot Street (roundabout) | AM | 0.55 | 10 | 40 | A |
| | PM | 0.61 | 13 | 50 | A |
| Doncaster Avenue/ Todman Avenue (signalised) | AM | 0.83 | 25 | 166 | B |
| | PM | 0.55 | 19 | 110 | B |
| Doncaster Avenue/ Anzac Parade (signalised) | AM | 0.84 | 29 | 225 | C |
| | PM | 0.83 | 27 | 212 | B |

[1] Delay and level of service for unsignalized intersections is based on the worst approach

[1] Program used under license from Akcelik & Associates Pty Ltd.

The results indicate that the key intersections along Section 1 currently operate at acceptable levels of service of C or better. Full SIDRA Intersection movement summary results for the existing operation of key intersections along the route are presented in Appendix A.

## Public Transport Infrastructure

Public transport currently exists within the vicinity of Section 1 by way of numerous bus routes travelling along Alison Road and Anzac Parade. The closest bus stops are located at the intersections of Doncaster Avenue/ Alison Road and Doncaster Avenue/ Anzac Parade. The bus network map for the area is shown in Figure 2.3.

**Figure 2.3: Section 1 bus network map**


Source: https://transportnsw.info/document/1699/region-guide-sydney-sydney-east.pdf (accessed 03/05/18)

The CBD and South-East Light Rail (CSELR) is currently under construction within the area near the proposed cycleway link route. The CSELR forms part of the Sydney Light Rail network, which includes the Inner West Light Rail. The alignment for the CSELR will travel from Circular Quay, through George Street within Sydney CBD, Surry Hills, Moore Park and along Anzac Parade through to Kingsford. The route for CSELR is shown in Figure 2.4. CSELR is currently under construction with an expected operation date within 2019.

**Figure 2.4: CSELR route**

Source: NSW Government

Near the site, CSELR will run along Alison Road and Anzac Parade with stops planned at Carlton Street and Todman Avenue along Anzac Parade. CSELR will run at headways of approximately four minutes during peak periods. With the opening of CSELR, a number of bus routes in the area are expected to be altered or removed as CSELR will provide much of the same amenity. The proposed changes to bus routes in the area as reproduced from the CSELR Environmental Impact Statement are shown in Appendix B.

## Active Transport Infrastructure

Footpaths are located along both sides of Doncaster Avenue. Existing cyclist infrastructure includes on-road bicycle lanes in both directions along Doncaster Avenue between Carlton Street and Anzac Parade. North of Carlton Street, a shared path runs on the western side of Doncaster Avenue. There is also a shared path on the northern side of Alison Road, which connects to Centennial Park and Moore Park.

## 2.2 Section 2 – Anzac Parade to Day Avenue

Section 2 begins at the intersection of Anzac Parade and Doncaster and runs along Doncaster Avenue to Day Avenue. Section 2 and key intersections along the route are illustrated in Figure 2.2.

**Figure 2.5: Section 2 – Anzac Parade to Day Avenue**


Basemap source: Sydways

### Road Network

Doncaster Road is a two-way Regional Road, aligned in a north-south direction. The road width is approximately 12.8 metres and consists of one traffic lane, one parking lane and one bicycle shoulder lane in each direction.

Anzac Parade is a classified State Road, generally aligned in a north-west to south-east near the cycleway link. Anzac Parade is a two-way road, has three travel lanes in each direction and a road width of approximately 25 metres.

Day Avenue is a local road, aligned in an east-west direction. West of Doncaster Avenue, Day Avenue is approximately 12.8 metres-wide (16.5m between Day Lane and Houston Road) and generally consists of one traffic lane, one parking lane and one bicycle shoulder lane in each direction. East of Doncaster Avenue, Day Avenue consists of one traffic lane per direction, parking is permitted on the south side east of Doncaster Avenue and on both sides east of Day Lane. A separated bi-directional cycleway is located on the north side of Day Avenue.

### Intersection Operation

The intersection of Day Avenue and Doncaster Avenue was assessed for the existing conditions in SIDRA Intersection. The Doncaster Avenue/ Anzac Avenue intersection has been previously assessed in Section 2.1. Table 2.3 represents a summary of the existing operations of the Doncaster Avenue/ Day Avenue intersection. Full results are presented in Appendix A of this report.

**Table 2.3: Section 2 existing intersection operating conditions**

| Intersection | Peak | Degree of saturation | Average delay (seconds) [1] | 95th percentile queue (metres) | Level of Service[1] |
|---|---|---|---|---|---|
| Doncaster Avenue/ Day Avenue (roundabout) | AM | 0.62 | 10 | 42 | A |
| | PM | 0.49 | 9 | 24 | A |

[1] Delay and level of service for unsignalized intersections is based on the worst approach

The results above show that the key intersections along Section 2 currently operate at acceptable levels of service. Full SIDRA Intersection movement summary results for the above intersections are presented in Appendix A.

## Public Transport Infrastructure

Public transport infrastructure near Section 2 currently exists as bus services, which run along Day Avenue and Anzac Parade, most notably routes 302 and 303. Several bus stops are located along Day Avenue which are serviced by routes 302 and 303. These bus stops are located east and west of the proposed cycleway link route. The bus network for the Section 2 area is shown in Figure 2.6.

**Figure 2.6: Section 2 bus network map**


Source: https://transportnsw.info/document/1699/region-guide-sydney-sydney-east.pdf (accessed 03/05/18)

The future opening of CSELR would also provide additional public transport amenity for the area with a light rail stop planned along Anzac Parade near UNSW.

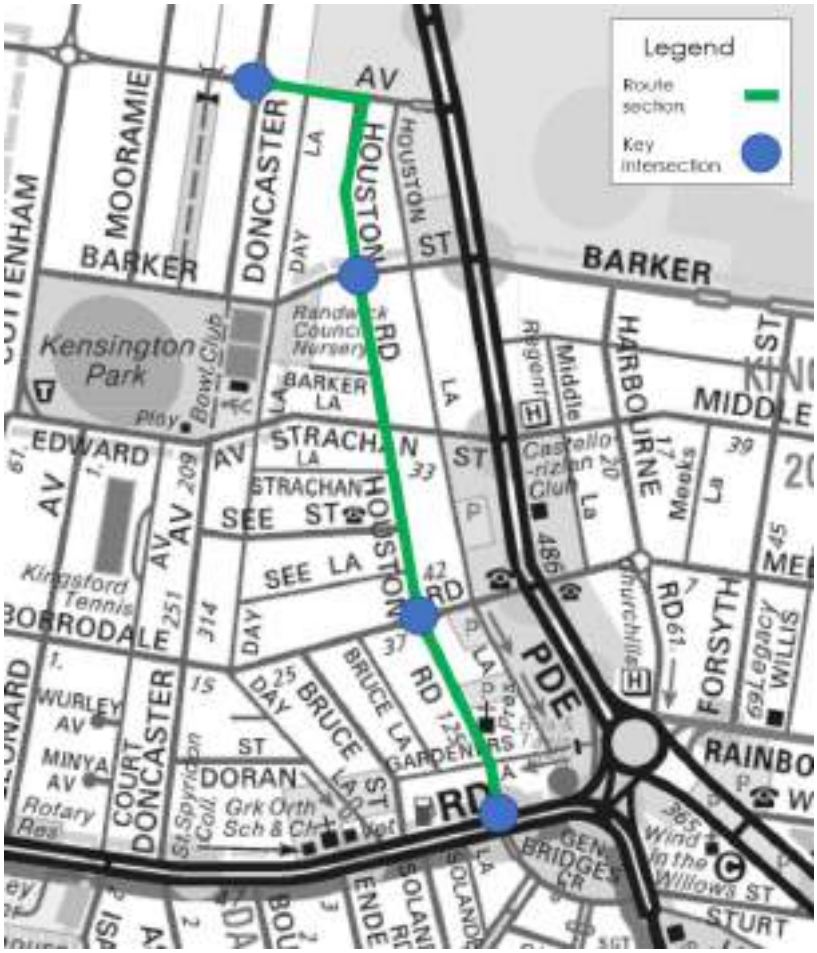
## Active Transport Infrastructure

Footpaths currently exist along both sides of Doncaster Avenue which services pedestrians. Cycle infrastructure currently existing includes on-road bicycle lanes in both directions along Doncaster Avenue.

## 2.3 Section 3 – Doncaster Avenue to Gardeners Road

Section 3 begins at Doncaster Avenue travelling along Day Avenue and along Houston Road before finishing at Gardeners Road. Section 3 is shown in Figure 2.7.

**Figure 2.7: Section 3 – Doncaster Avenue to Gardeners Road**




Basemap source: Sydways

### Road Network

Day Avenue is a local street and is aligned in an east-west direction. West of Doncaster Avenue, Day Avenue is approximately 12.8 metres-wide and generally consists of one traffic lane, one parking lane and one bicycle shoulder lane in each direction of travel. East of Doncaster Avenue, Day Avenue consists of one traffic lane per direction, parking is permitted on the south side east of Doncaster Avenue and on both sides east of Day Lane. A separated bi-directional cycleway is located on the north side of Day Avenue.

Houston Road is a local street and is aligned in a north-south direction. Houston Road consists of a parking lane, bicycle shoulder lane and traffic lane on the northbound side. On the southbound side Houston Road consists of a travel lane, bicycle lane and 90-degree rear-to-kerb parking. Houston Road is approximately 16.5 metres-wide.

Gardeners Road is a classified State main road and is aligned in an east-west direction. Gardeners Road consists of three traffic lanes in each direction and has a road width of approximately 19.0 metres.

General Bridges Crescent is a local road aligned in a north-west to south-east direction. It is approximately 14.0 metres-wide and provides a traffic lane, parking and bicycle shoulder lane in each direction of travel.

The following key intersections are present along Section 3:

- Houston Road/ Barker Street (roundabout)
- Houston Road/ Borrodale Road (roundabout)
- Houston Road/ Gardeners Road/ General Bridges Crescent (signalised).

## Intersection Operation

The key intersections along Section 3 were assessed for the existing conditions using SIDRA Intersection. Intersection operation results for the Doncaster Avenue/ Day Avenue intersection are shown as part of Section 2. Table 2.4 summarises the existing intersection operation for Section 3.

**Table 2.4: Section 3 existing intersection operating conditions**

| Intersection | Peak | Degree of saturation | Average delay (seconds) [1] | 95th percentile queue (metres) | Level of Service[1] |
|---|---|---|---|---|---|
| Houston Road/ Barker Street (roundabout) | AM | 0.83 | 12 | 86 | A |
| | PM | 0.50 | 8 | 22 | A |
| Houston Road/ Borrodale Road (roundabout) | AM | 0.59 | 15 | 41 | B |
| | PM | 0.46 | 8 | 26 | A |
| Houston Road/ Gardeners Road/ General Bridges Crescent (signalised) | AM | 0.59 | 26 | 18 | B |
| | PM | 0.78 | 28 | 185 | B |

[1] Delay and level of service for unsignalized intersections is based on the worst approach

Overall, key intersections along Section 3 can be seen to operate at acceptable levels of delay. Full SIDRA Intersection movement summary results for the above intersections are presented in Appendix A.

## Public Transport

Public infrastructure near Section 3 includes several bus routes currently running along Day Avenue (routes 302 and 303), Anzac Parade and Gardeners Road. Additionally, a number of bus stops exist along Day Avenue and Gardeners Road as well as a cluster at the Kingsford Nine-ways. The bus network map for the area is shown in Figure 2.8.

**Figure 2.8: Section 3 bus network map**


Source: https://transportnsw.info/document/1699/region-guide-sydney-sydney-east.pdf (accessed 03/05/18)

The Kingsford Terminus for CSELR is expected to displace several bus stops in the area. Additionally, a number of bus routes that run through the Nine-ways are expected to be altered as routes travelling towards Sydney CBD would effectively be duplicated by CSELR. These routes are listed in Appendix B.

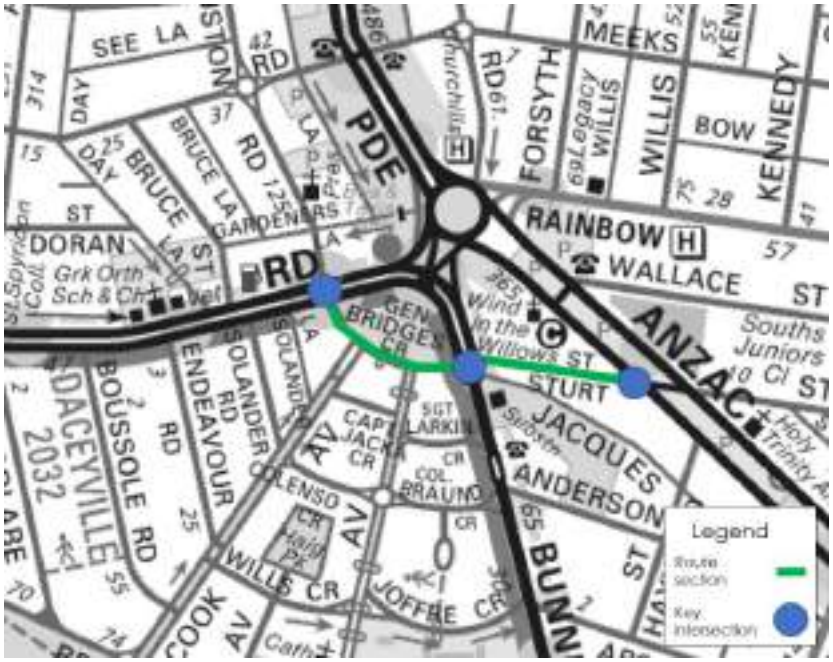
### Active Transport

Active transport along Section 3 consists of a bi-directional cycleway along the northern side of Day Avenue between Doncaster Avenue and Houston Road, and bicycle lanes for each direction of travel along Houston Road. Additionally, footpaths are provided for both sides of Day Avenue and Houston Road.

## 2.4 Section 4 – Gardeners Road to Anzac Avenue

Section 4 begins at Gardeners Road and proceeds along General Bridges Crescent crossing Bunnerong Road and transitioning to Sturt Street before finishing at Anzac Parade. Section 4 is shown in Figure 2.9.

**Figure 2.9: Section 4 – Gardeners Road to Anzac Parade**




Basemap source: Sydways

## Road Network

Gardeners Road is a classified State main road and is generally aligned in an east-west direction. Gardeners Road is three lanes in each direction with a road width of approximately 19.0 metres.

General Bridges Crescent is a local road aligned in a north-west to south-east direction. It is approximately 14.0 metres-wide and provides a traffic lane, parking and bicycle shoulder lane in each direction of travel.

Bunnerong Road is a classified State main road and is aligned in a north-south direction. Bunnerong Road has two traffic lanes in each direction of travel, set within an approximately 14.0 metre-wide road. In the immediate vicinity of Section 4, Bunnerong Road has three traffic lanes in each direction as a result of localised widening to accommodate turning lanes as part of the Gardeners Road/ Bunnerong Road intersection. A central median runs along Bunnerong Road to prevent cars moving between General Bridges Crescent and Sturt Street.

Sturt Street is a local road aligned in an east-west direction with a road width of approximately 9.0 metres. There are no marked lanes on Sturt Street and parking is permitted on both sides of travel.

The following key intersections currently exist along Section 4:

- Houston Road/ Gardeners Road/ General Bridges Crescent (signalised)
- General Bridges Crescent/ Bunnerong Road (left-in/ left-out)
- Bunnerong Road/ Sturt Street (left-in/ left-out)
- Sturt Street/ Anzac Parade (stop-sign controlled).

## Intersection Operation

The key intersections along Section 4 were assessed for the existing conditions using SIDRA Intersection. Intersection operation results for the Houston Road/ Gardeners Road/ General Bridges Crescent intersection are shown as part of Section 3. Table 2.5 summarises the existing intersection operation for Section 4.

**Table 2.5: Section 4 existing intersection operating conditions**

| Intersection | Peak | Degree of saturation | Average delay (seconds) [1] | 95th percentile queue (metres) | Level of service[1] |
|---|---|---|---|---|---|
| General Bridges/ Bunnerong Road (left-in/ left-out) | AM | 0.26 | 5 | 1 | A |
| | PM | 0.17 | 5 | 1 | A |
| Bunnerong Road/ Sturt Street (left-in/ left-out) | AM | 0.17 | 7 | 0 | A |
| | PM | 0.28 | 8 | 1 | A |

[1] Delay and level of service for unsignalized intersections is based on the worst approach for intersection

The results as shown above indicate that the key intersections along Section 4 operate with minimal delays as evidenced by levels of service A for both intersections. Full SIDRA Intersection movement summary results for the above intersections are presented in Appendix A.

## Public Transport

Public transport in and around Section 4 will be similar to that seen in Section 3, mainly consisting of buses running along Gardeners Road, Bunnerong Road (routes 391, 391 and 302) and Anzac Parade. The bus network map for the area is shown in Figure 2.10.

**Figure 2.10: Section 4 bus network map**


Source: https://transportnsw.info/document/1699/region-guide-sydney-sydney-east.pdf (accessed 03/05/18)

The Kingsford Terminus for CSELR is expected to replace several bus stops in the area. Additionally, a number of bus routes that run through the Nine-Ways intersection are expected to be altered as routes travelling towards Sydney CBD would effectively be duplicated by CSELR. These routes are listed in Appendix B.

## Active Transport

General Bridges Crescent consists of shared bicycle and parking lanes in both directions and a footpath on the southern side. There is a pedestrian crossing on the west approach of the General Bridges Crescent/ Bank Avenue to allow pedestrian access to the Kingsford Nine-Ways intersection. Sturt Street contains footpaths on both sides.

# 3. Project Proposal

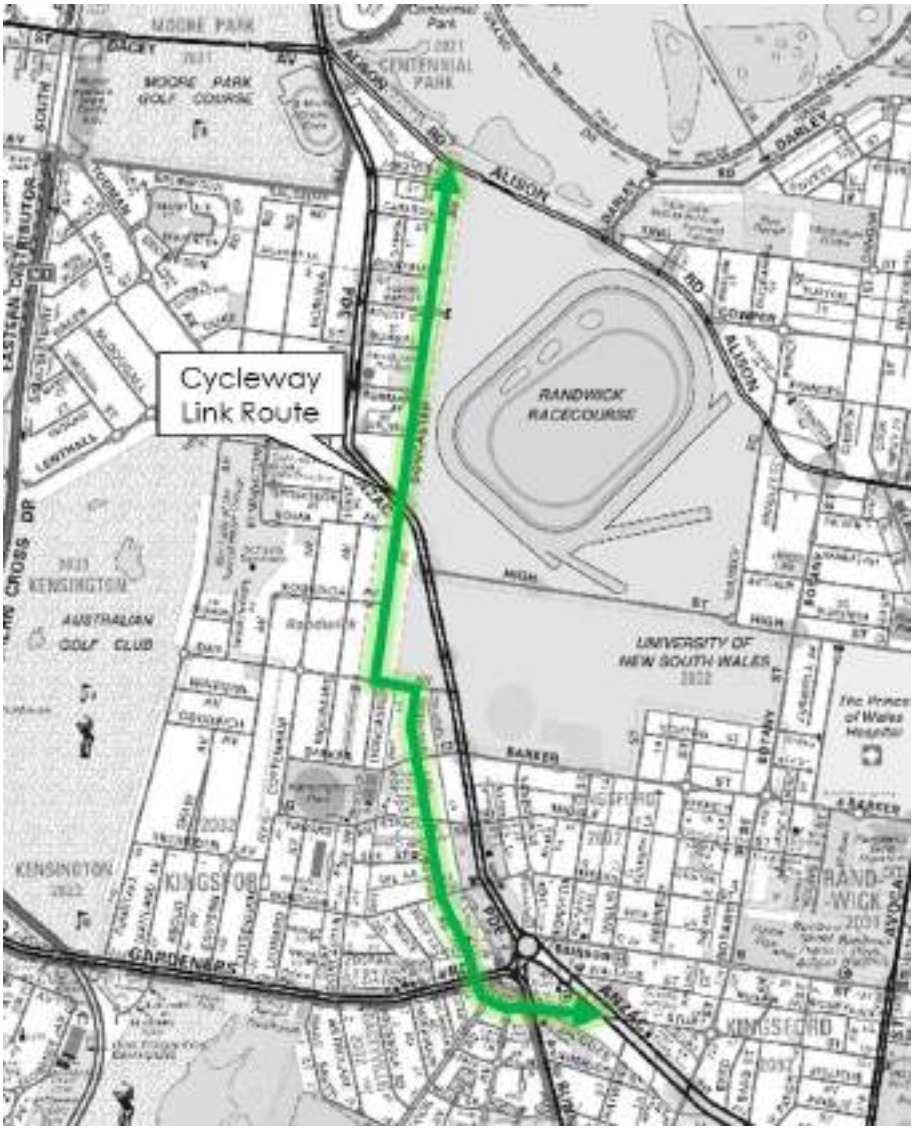


## 3.1 Proposal

The proposal is for the implementation of a bi-directional cycleway link from Centennial Park at the intersection of Alison Road and Doncaster Avenue through Kensington to the intersection of Sturt Street and Anzac Parade in Kingsford. The proposed cycleway would connect key locations such as the Randwick Racecourse, UNSW and Kingsford Light Rail Terminus. This in turn would connect to locations such as Moore Park, Centennial Park and Surry Hills which provide additional cycleways to Sydney CBD and beyond.

The cycleway link route is shown in Figure 3.1.

**Figure 3.1: Subject Site and Its Environs**




(Reproduced with permission from Sydway Publishing Pty Ltd)

As aforementioned, the proposed cycleway link has been split into four sections which are as follows:

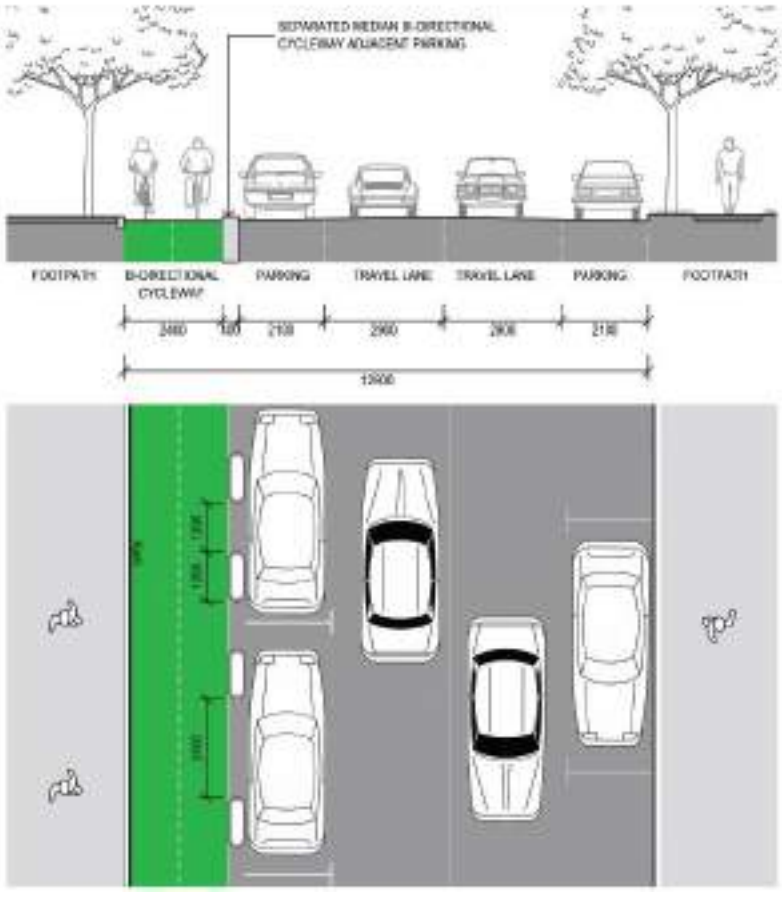
- Section 1 – Alison Road to Anzac Parade via Doncaster Avenue
- Section 2 – Anzac Parade to Day Avenue via Doncaster Avenue
- Section 3 – Doncaster Avenue to Gardeners Road via Day Avenue and Houston Road
- Section 4 – Gardeners Road to Anzac Parade via General Bridge Crescent and Sturt Street.

## 3.2 Section 1 – Alison Road to Anzac Parade

The cycleway is proposed to start on the south-east corner of the Alison Road/ Doncaster Avenue intersection and continue south towards Anzac Parade on the eastern side of Doncaster Avenue. This includes provision of a shared path from Abbotsford Street to Alison Road on Doncaster Avenue with a cyclists' crossing point to facilitate cyclist crossing from the shared path on Alison Road.

The cycleway for Section 1 is proposed to include a shared crossing from the shared path along the northern side of Alison Road to the cycleway on the eastern side of Doncaster Avenue. The cycleway is proposed to be 2.4 metres-wide with a 0.4-metre-wide raised concrete median separating the parking lane from the cycleway. A typical cross-section for Doncaster Avenue is shown in Figure 3.2.

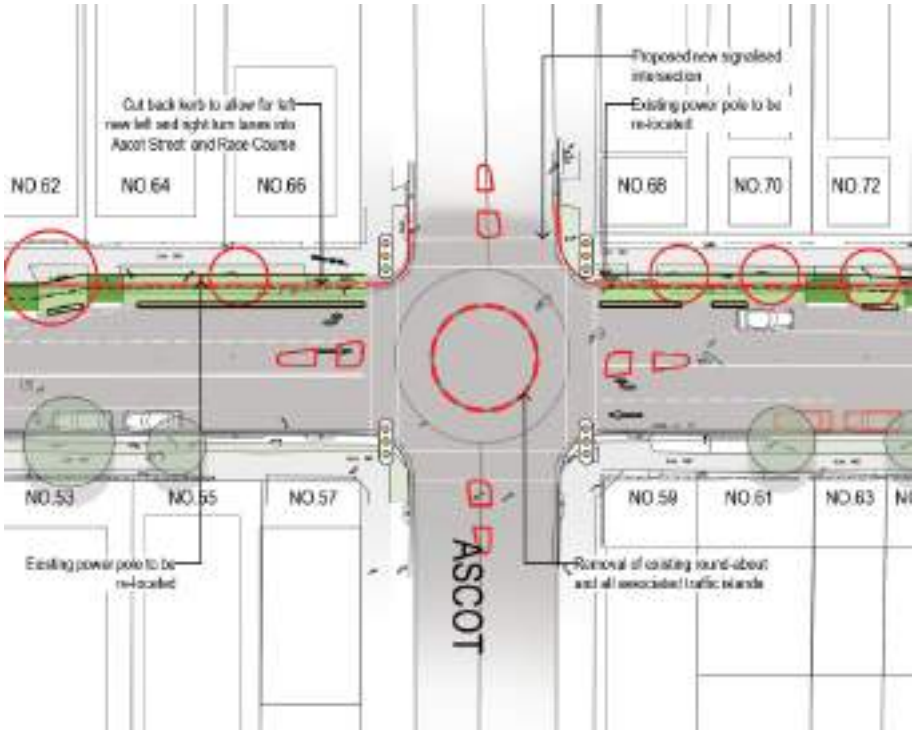
**Figure 3.2: Typical road cross-section for Doncaster Avenue**




Source: GroupGSA Drawing No. L-C1-1002 Rev. E

The implementation of the cycleway along Section 1 include the conversion of the Doncaster Avenue/ Ascot Street roundabout to a signalised intersection. The existing roundabout and associated traffic islands would be removed and a through lane and right-turn lane implemented on the north and south approaches (along Doncaster Avenue). The conversion to a signalised intersection would provide additional safety for bicycle riders to navigate the intersection. Signalised pedestrian crossings would also be available for each of the approaches. The proposed conversion to a signalised intersection for the Doncaster Avenue/ Ascot Street intersection is shown in Figure 3.3.

**Figure 3.3: Doncaster Avenue/ Ascot Street Signalised Intersection Conversion**




Source: GroupGSA Drawing No. L-C1-1003 Rev. E

In addition to the cycleway related changes, associated garden bed build-outs are proposed along Doncaster Avenue south of Carlton Street and south of Darling Street. The proposed pedestrian crossings are shown in Figure 3.4 and Figure 3.5.

**Figure 3.4: Pedestrian crossing south of Carlton Street**

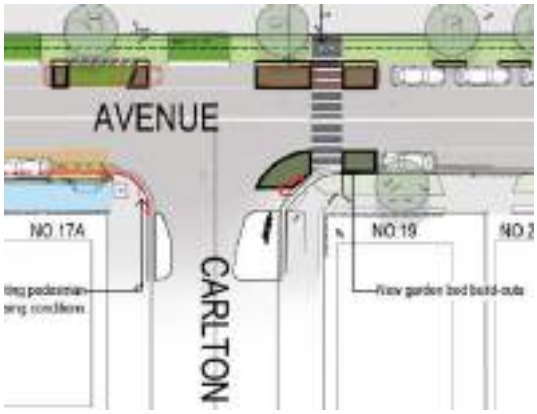
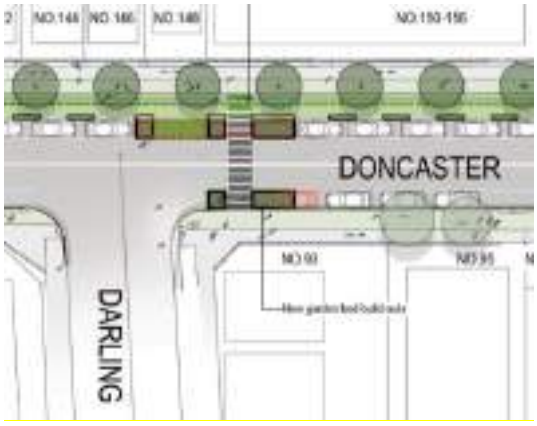


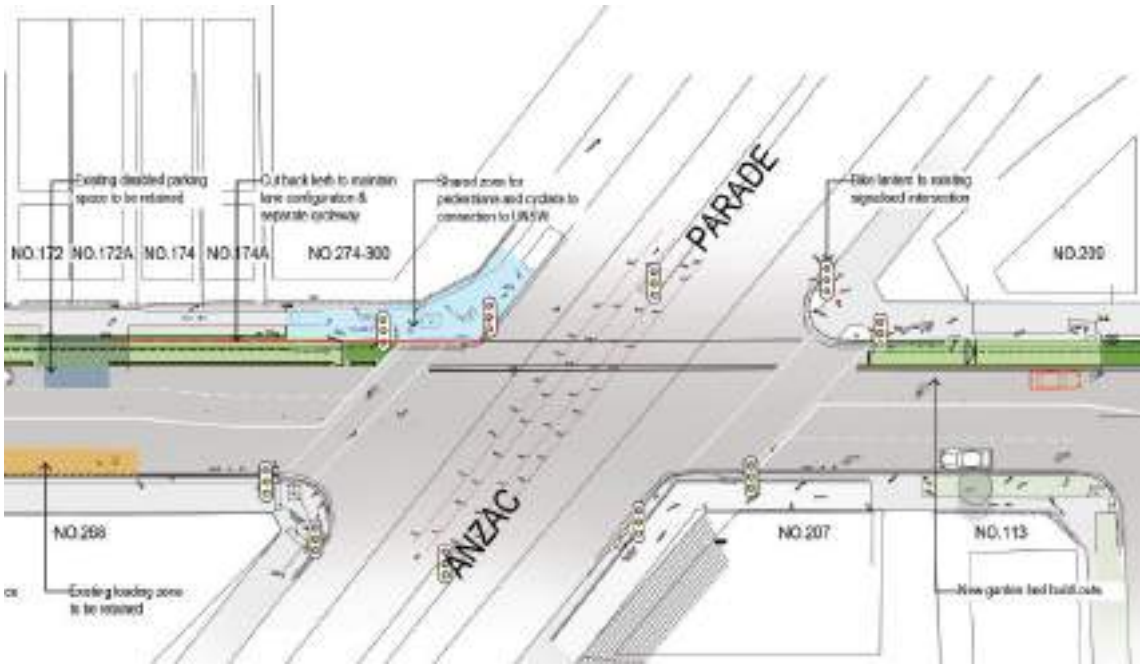

**Figure 3.5: Pedestrian crossing south of Darling Street**




Source: GroupGSA Drawing No. L-C1-1001 and L-C1-1003 Rev. E

The Doncaster Avenue/ Anzac Parade intersection is proposed to be modified to include a cycleway crossing as well as a shared crossing for connection to UNSW. The Doncaster Avenue/ Anzac Parade intersection is shown in Figure 3.6.

**Figure 3.6: Doncaster Avenue/ Anzac Parade intersection modifications**




Source: GroupGSA Drawing No. L-C1-1003 Rev. E

## 3.3 Section 2 – Anzac Parade to Day Avenue

The cycleway would continue along the eastern side of Doncaster Avenue towards Day Avenue. The intersection of Day Avenue and Doncaster Avenue is proposed to be converted from an existing roundabout to a priority-controlled intersection with stop-lines on the north and south approach. Additionally, a pedestrian crossing is proposed across the north approach (Doncaster Avenue) at this intersection. The proposed changes to the Doncaster Avenue/ Day Avenue intersection is shown in Figure 3.7.

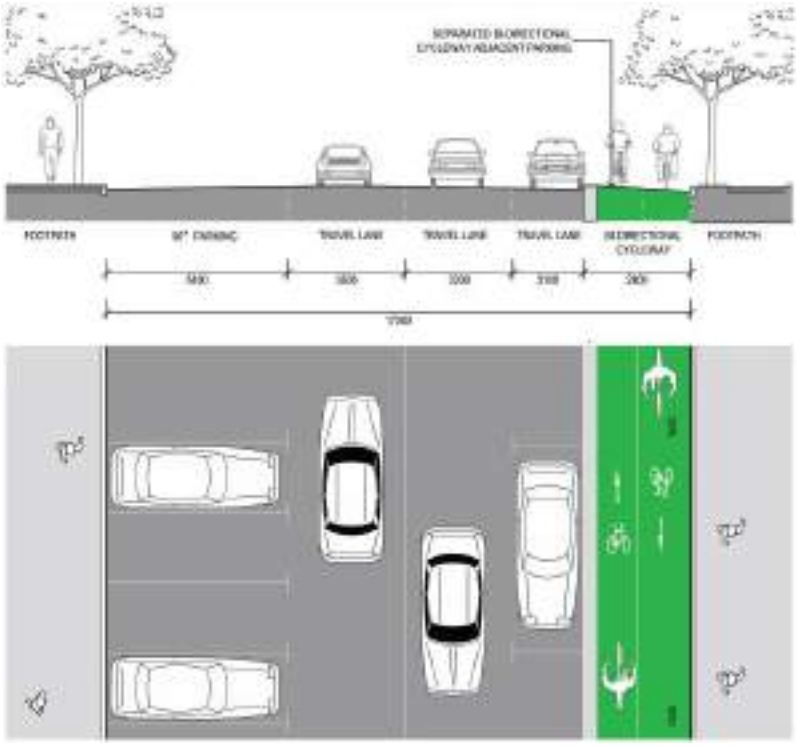
**Figure 3.7: Doncaster Avenue/ Day Avenue priority-controlled intersection conversion**


Source: GroupGSA Drawing No. L-C1-1004 Rev. E

## 3.4 Section 3 – Doncaster Avenue to Gardeners Road

Section 3 of the cycleway would utilise the existing Day Avenue bi-directional cycleway with minor modifications to allow cyclists to transition to/from Houston Road. Along Houston Road, the cycleway would be located on the western side between the footpath and the parking lane. The cycleway is proposed to be 2.8 metres-wide including kerb. A typical cross-section for Houston Road is shown in Figure 3.8.

**Figure 3.8: Typical road cross-section for Houston Road**



Source: GroupGSA Drawing No. L-C1-1005 Rev. E

As part of the cycleway along Houston Road, a number of changes are proposed along the cycleway route which are as follows:

- Houston Road/ Barker Street intersection: conversion from roundabout to priority-controlled intersection including bend-out treatment for the west approach.
- Houston Road/ Borrodale Street intersection: conversion from roundabout to priority-controlled intersection including bend-out treatment for the west approach.
- Houston Road/ Barker Lane, Houston Road/ Strachan Lane, Houston Road/ Gardeners Lane and Houston Road/ See Lane intersections: shared intersection treatments.
- Houston Road/ Strachan Street and Houston Road/ See Street intersections: bend out treatments for the west approaches.

The introduction of bend-out treatments at key intersections provides additional reaction time for cyclists and drivers to avoid a collision thus improving safety. Additionally, cyclists and pedestrians are separated from each other as pedestrian crossings are proposed with each of the bend-out treatments.

The proposed changes for different intersections along Houston Road as discussed above are shown in Figure 3.9 to Figure 3.12.

**Figure 3.9: Houston Road/ Barker Street intersection conversion**

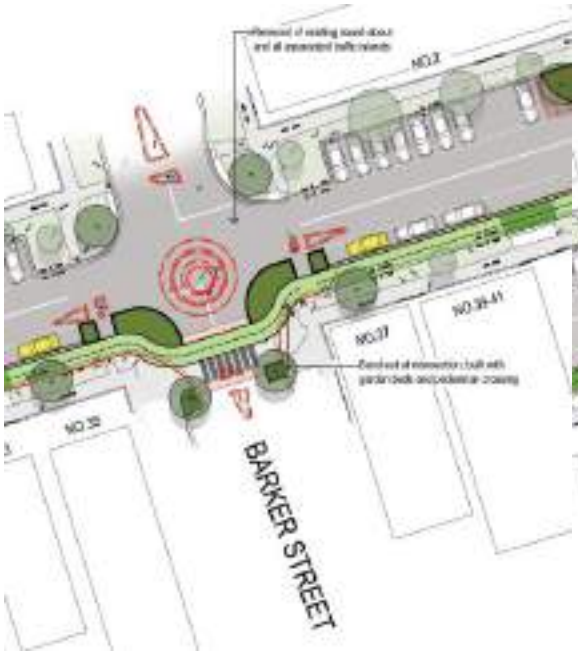



**Figure 3.10: Houston Road/ Borrodale Street intersection conversion**


Source: GroupGSA Drawing No. L-C1-1005 and L-C1-1006 Rev. E

**Figure 3.11: Example of shared intersection treatment along Houston Road**

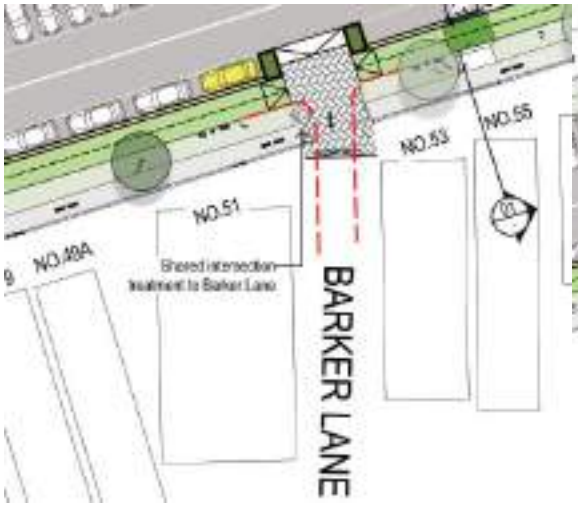
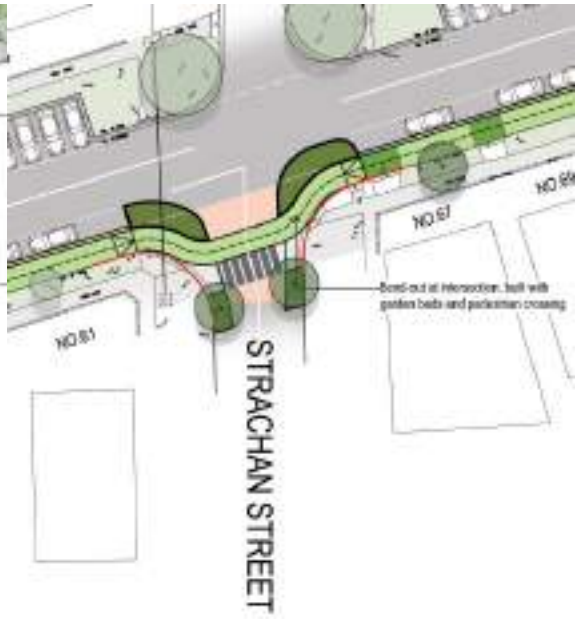



**Figure 3.12: Example of bend-out treatment along Houston Road**




Source: GroupGSA Drawing No. L-C1-1005 Rev. E

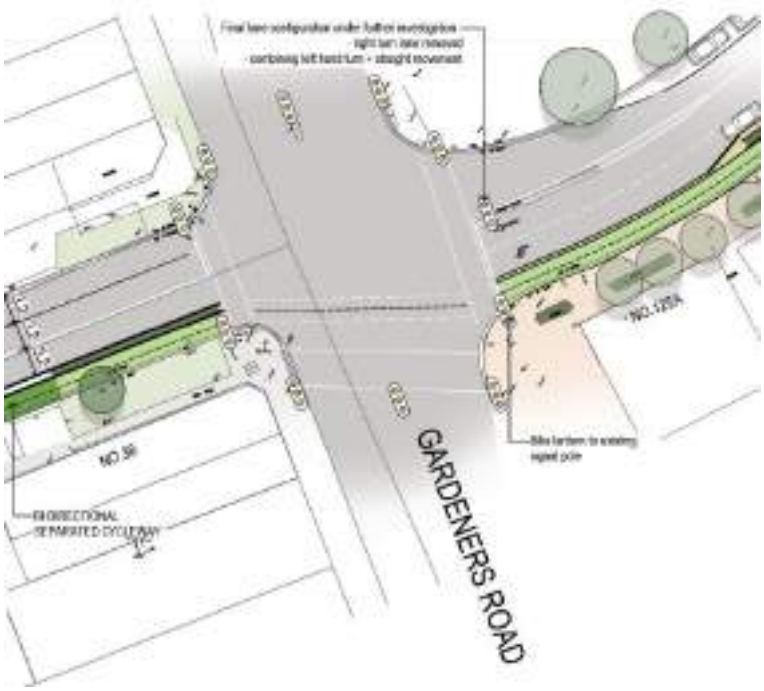
In addition to the above cycleway facilities, a number of pedestrian crossings and associated kerb-build outs incorporating garden beds are also proposed along Houston Road at the following locations:

- Opposite No. 2 Barker Street and No. 37 Houston Road
- Opposite No. 6 Strachan Street and No. 61 Houston Road
- Opposite No. 68 and No. 95 Houston Road.

## 3.5 Section 4 – Gardeners Road to Anzac Parade

Section 4 continues from Section 3, with the cycleway proposed on the western side of General Bridges Crescent. The transition from Houston Road to General Bridges Crescent would be facilitated by modification of the Houston Road/ Gardeners Road/ General Bridges Crescent intersection with a dedicated crossing for the cycleway across Gardeners Road. The intersection is shown in Figure 3.13.

**Figure 3.13: Houston Road/ Gardeners Road/ General Bridges Crescent intersection**

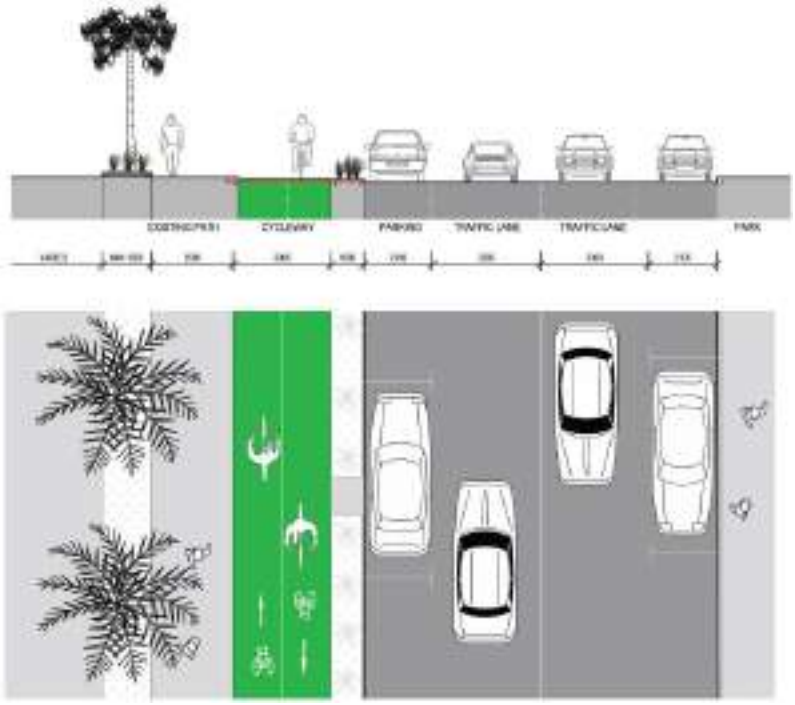



Source: GroupGSA Drawing No. L-C1-1006 Rev. E

The cycleway along General Bridges Crescent is proposed to be 2.4 metres-wide with a one-metre-wide median to separate the cycleway from general traffic. A typical road cross section along General Bridges Crescent is shown in Figure 3.14.

To provide space for the cycleway, General Bridges Crescent (northbound) has been narrowed to two traffic lanes. The right turn movement has been banned, allowing for a designated left turn lane and a through lane. Vehicles that want to turn eastbound into Gardeners Road and then northbound onto Anzac Parade will have to make this trip via General Bridges Crescent and Bunnerong Road.

**Figure 3.14: Typical road cross-section for General Bridges Crescent**



Source: GroupGSA Drawing No. L-C1-1007 Rev. E

As part of the implementation of the cycleway along General Bridges Crescent, the intersections of General Bridges Crescent/ Cook Avenue and General Bridges Crescent/ Banks Avenue are proposed to be modified to include a bend-out treatment and pedestrian crossing. Additionally, the existing pedestrian crossing is proposed to be reconfigured to accommodate the cycleway. This is shown in Figure 3.15.

**Figure 3.15: Bend-out treatments along General Bridges Crescent**


Source: GroupGSA Drawing No. L-C1-1007 Rev. E

As part of Section 4 of the cycleway link, the intersections of General Bridges Crescent/ Bunnerong Road and Bunnerong Road/ Sturt would be combined into a signalised intersection to facilitate bicycle and pedestrian crossing on the east, west and south approaches. The existing left-in/ left-out operations to/from Bunnerong Road into General Bridges Crescent and Sturt Street would be maintained. The intersection is shown in Figure 3.16.

**Figure 3.16: Signalisation of General Bridges Crescent/ Bunnerong Road/ Sturt Street**


Source: GroupGSA Drawing No. L-C1-1007 Rev. E

The cycleway is proposed to continue along the southern side of Sturt Street before ending at Anzac Parade. The cycleway along Sturt Street is proposed to be 2.4 metres-wide with a 0.4 metre-wide median to separate the cycleway from general traffic. The cycleway would transition into a shared path near the intersection of Sturt Street and Anzac Parade.

## 3.6 Pedestrian Facilities

The existing pedestrian facilities would be maintained. The cycleway link and streetscape upgrades propose additional pedestrian amenity by way of marked pedestrian crossings and signalised pedestrian crossings at intersections. The locations and types for proposed pedestrian facilities as part of the proposed development are as follows:

- Signalised pedestrian crossings on all approaches as part of Doncaster Avenue/ Ascot Street signalisation.
- South approach of Doncaster Avenue/ Darling Street (marked pedestrian crossing).
- North approach of Doncaster Avenue/ Day Avenue (marked pedestrian crossing).
- On the west approaches of Houston Road/ Barker Street and Houston Road/ Strachan Street as part of the bend-out treatments.
- Opposite No. 22, No. 52-54, No. 76 Houston Road (marked pedestrian crossing).
- On the west approaches of General Bridges Crescent/ Cook Avenue and General Bridges Crescent/ Banks Avenue as part of the bend-out treatments.
- Signalised shared crossing on the south, east and west approaches as part of General Bridges Crescent/ Bunnerong Road/Sturt Street signalisation.

The provision of additional pedestrian crossings has two benefits; additional amenity for pedestrians, and increased driver awareness and vigilance.

# 4. Car Parking



The proposed cycleway link and streetscape upgrades includes a number of kerb extension and pedestrian crossings which will inevitably impact on-street parking. As such, an assessment of existing and expected changes to on-street parking have been conducted as below.

## 4.1 Existing On-street Car Parking

The existing on-street parking along the cycleway link takes the form of parallel parking or rear-to-kerb parking and was surveyed during the design. The existing on-street parking and quantum have been organised into each relevant route section of the cycleway as discussed above. The existing parking supply is summarised in Table 4.1.

**Table 4.1: Existing on-street parking supply**

| Route Section | Section Start and End | Existing Parking |
|---|---|---|
| 1 | Alison Road to Anzac Parade | 141 (+4*) |
| 2 | Anzac Parade to Day Avenue | 78 |
| 3 | Doncaster Avenue to Gardeners Road | 242 |
| 4 | Gardeners Road to Anzac Parade | 59 |
| | **Total** | 520 (+4*) |

* denotes disability space

The above shows that the existing supply of on-street parking along the proposed cycleway link route is approximately 524 car spaces which includes four spaces for persons with disability.

## 4.2 Changes to Car Parking

As discussed above, the proposed cycleway link and streetscape would incur changes to the existing on-street parking as a result of proposed kerb changes and pedestrian crossings. The expected change to the different sections of the proposed cycleway link and new parking supply are summarised in Table 4.2.

**Table 4.2: Summary of changes to parking supply across cycleway sections**

| Route Section | Existing supply | Loss in parking | Gain in parking | Proposed parking supply |
|---|---|---|---|---|
| 1 | 141 (+4*) | 12 | 1 | 130 (+4*) |
| 2 | 78 | 3 | 0 | 75 |
| 3 | 242 | 13 | 9 | 238 |
| 4 | 59 | 3 | 1 | 57 |
| **Total** | 520 (+4*) | 31 | 11 | 500 (+4*) |

* denotes disability space

Overall, the proposed cycleway results in an expected net loss of 20 on-street car parking spaces along the cycleway link. This includes losses as a result of the introduction of pedestrian crossings and gains from converting existing roundabout intersections to priority controlled or signalised. Disability spaces, as noted by surveys used in the concept design, are not affected by the proposed cycleway and streetscape upgrades. A disabled parking spot on Doncaster Avenue north of Anzac Parade has been moved approximately 12m north and a new pram ramp will be installed.

# 5. Traffic Impact Assessment



## 5.1 Traffic Generation

The proposed cycleway link and streetscape upgrades are not expected to generate any additional traffic from the existing conditions. Therefore, this traffic impact assessment assumes the same vehicle volumes at each respective as that in Section 2 with changes to the intersection layouts to the accommodate the proposed cycleway and streetscape upgrades.

## 5.2 Traffic Impact

### 5.2.1 Section 1 – Alison Road to Anzac Parade

The three signalised intersections within Section 1 are proposed to undergo minor changes to accommodate the cycleway. This includes small intersection geometry changes and phasing changes. A comparison between the previous layouts for the intersections of Doncaster Avenue/ Alison Road, Doncaster Avenue/ Todman Avenue, Doncaster Avenue/ Anzac Parade are shown in Figure 5.1 to Figure 5.6.

**Figure 5.1: Existing Doncaster Avenue/ Alison Road layout**

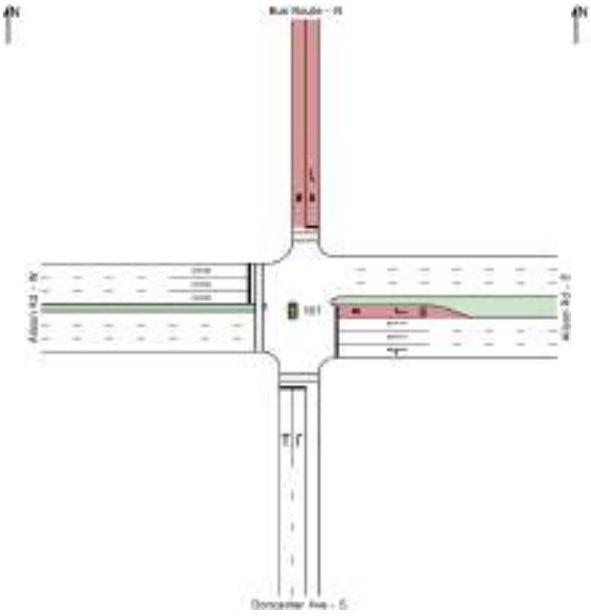


**Figure 5.2: Proposed Doncaster Avenue/ Alison Road layout**

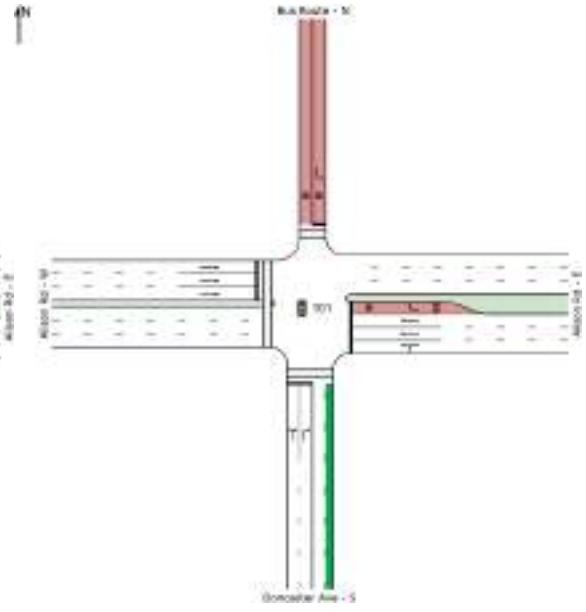


**Figure 5.3: Existing Doncaster Avenue/ Todman Avenue layout**

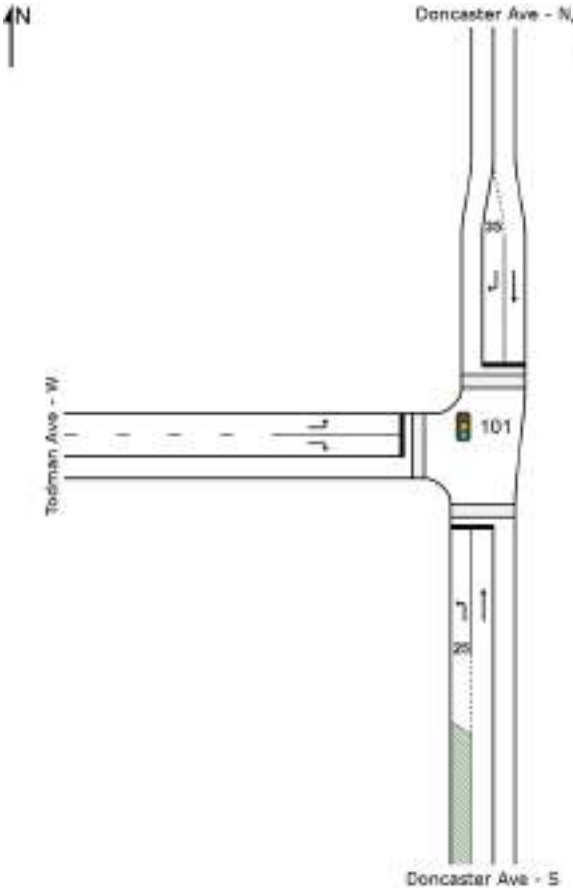



**Figure 5.4: Proposed Doncaster Avenue/ Todman Avenue layout**

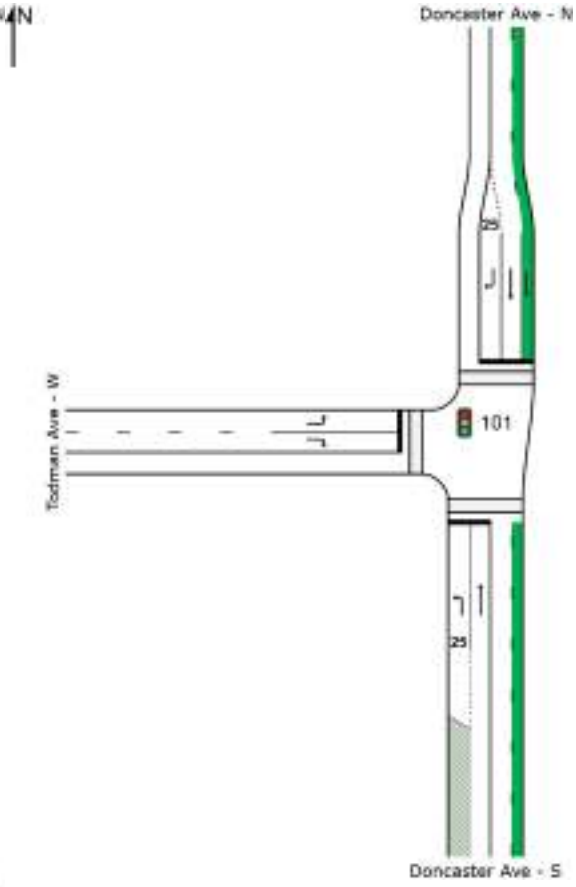



**Figure 5.5: Existing Doncaster Avenue/ Anzac Parade layout**

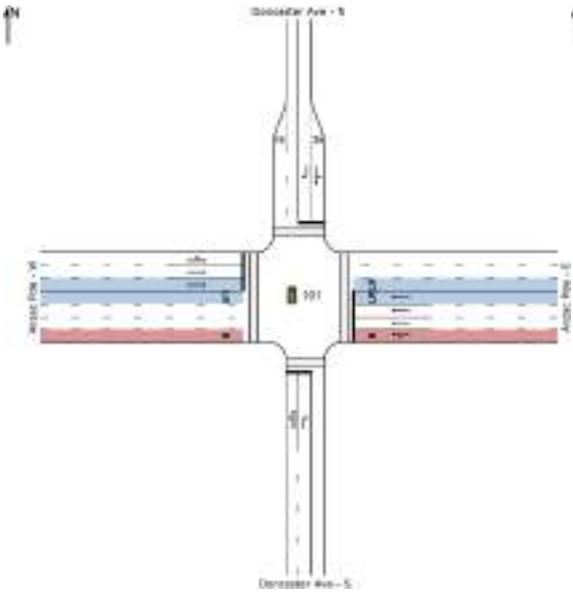
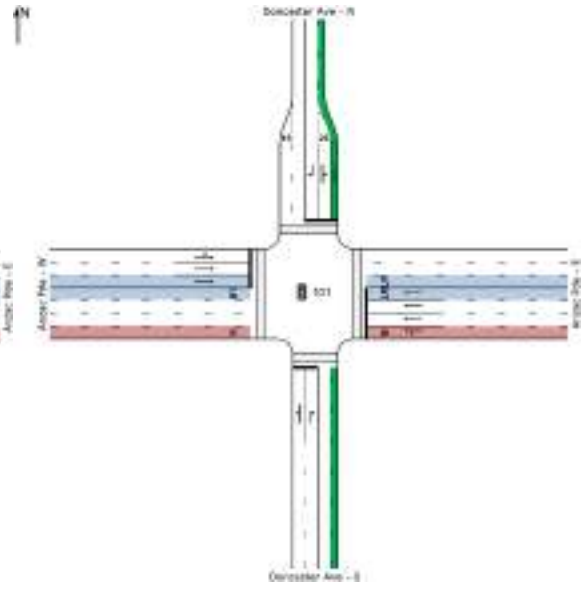


**Figure 5.6: Proposed Doncaster Avenue/ Anzac Parade layout**



As discussed previously, the intersection of Doncaster Avenue/ Ascot Street will be modified from a roundabout control to a signalised intersection. This includes provision for the cycleway and pedestrian crossings on all approaches. A comparison between the existing layout and proposed layout for Doncaster Avenue/ Ascot Street can be seen in Figure 5.7 and Figure 5.8, respectively.

**Figure 5.7: Existing Doncaster Avenue/ Ascot Street layout**

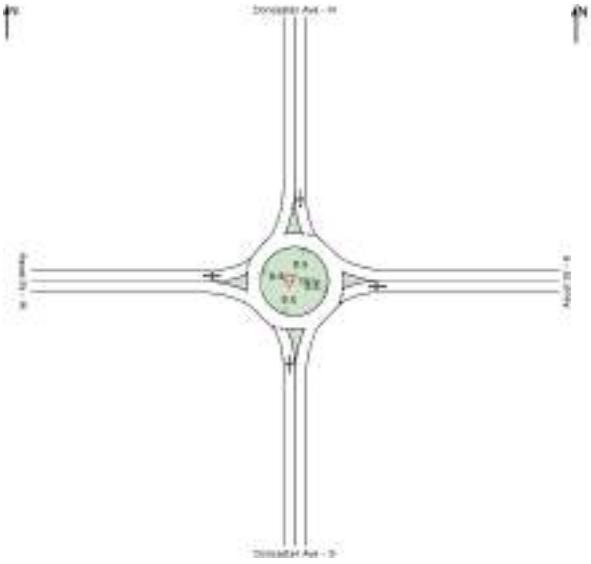
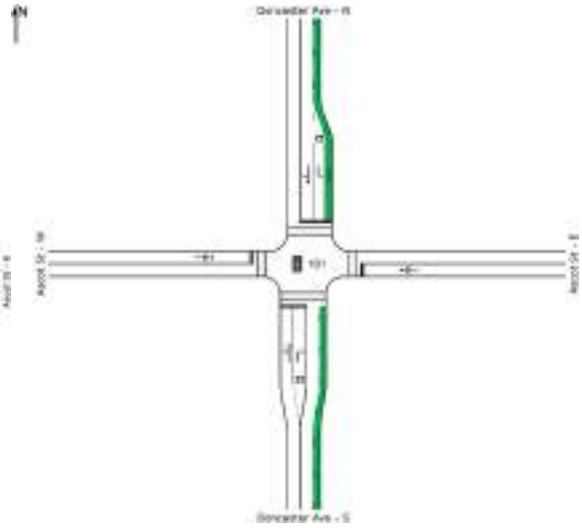


**Figure 5.8: Proposed Doncaster Avenue/ Ascot Street layout**



The expected intersection operation after implementation of the cycleways and streetscape upgrades are summarised in Table 5.1

**Table 5.1: Section 1 future intersection operating conditions**

| Intersection | Peak | Degree of saturation | Average delay (seconds) | 95th percentile queue (metres) | Level of Service |
|---|---|---|---|---|---|
| Doncaster Avenue/ Alison Road (signalised) | AM | 0.81 | 23 | 248 | B |
| | PM | 0.85 | 29 | 226 | C |
| Doncaster Avenue/ Ascot Street (signalised) | AM | 0.58 | 9 | 87 | A |
| | PM | 0.61 | 8 | 117 | A |
| Doncaster Avenue/ Todman Avenue (signalised) | AM | 0.85 | 25 | 166 | B |
| | PM | 0.61 | 19 | 109 | B |
| Doncaster Avenue/ Anzac Parade (signalised) | AM | 1.02 | 63 | 428 | E |
| | PM | 0.95 | 57 | 423 | E |

As seen above, intersections along Section 1 of the cycleway link are proposed to operate at acceptable levels of delay. Whilst, some increased delay can be expected in a post-implementation case for the cycleway, the overall intersection delay and level of service is still considered acceptable (level of service D or better). Full SIDRA Intersection movement summary results are presented in Appendix C.

### 5.2.2 Section 2 – Anzac Parade to Day Avenue

The intersection of Doncaster Avenue/ Day Avenue will be converted from a roundabout to a priority-controlled intersection. A comparison between the existing roundabout layout and the proposed priority-control layout is show in Figure 5.9 and Figure 5.10, respectively.

**Figure 5.9: Existing Doncaster Avenue/ Day Avenue layout**

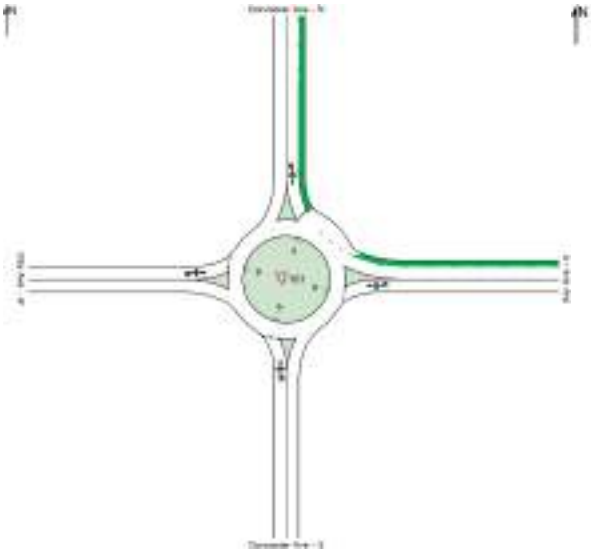
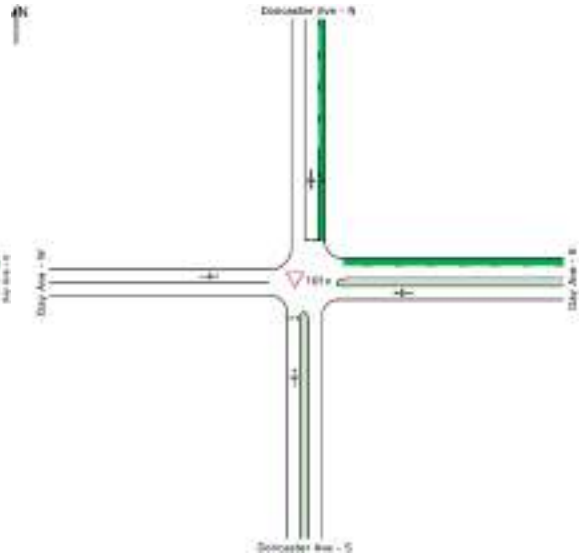


**Figure 5.10: Proposed Doncaster Avenue/ Day Avenue layout**



The expected intersection operation of Doncaster Avenue/ Day Avenue after implementation of the cycleways and streetscape upgrades is summarised in Table 5.2.

**Table 5.2: Section 2 future intersection operating conditions**

| Intersection | Peak | Degree of saturation | Average delay (seconds) [1] | 95th percentile queue (metres) | Level of Service[1] |
|---|---|---|---|---|---|
| Doncaster Avenue/ Day Avenue (priority) | AM | 0.46 | 13 | 24 | A |
| | PM | 0.45 | 11 | 16 | A |

[1] Delay and level of service for unsignalized intersections is based on the worst approach

The above SIDRA Intersection analysis indicate that the intersection of Doncaster Avenue/ Day Avenue is expected to operate with minimal delays and below capacity for both the AM and PM peak as a priority-controlled intersection. Full SIDRA Intersection movement summary results are presented in Appendix C.

### 5.2.3 Section 3 – Doncaster Avenue to Gardeners Road

Along Section 3, the intersections of Houston Road/ Barker Street and Houston Road/ Borrodale Road are proposed to be converted from roundabout control to priority-controlled. Additionally, the intersection of Houston Road/ Gardeners Road/ General Bridges Crescent will be modified slightly to accommodate the cycleway and shared crossing. The layout comparisons between the existing intersection layouts and proposed intersection layouts for Section 3 are shown in

Figure 5.11: Existing Houston Road/ Barker Street layout

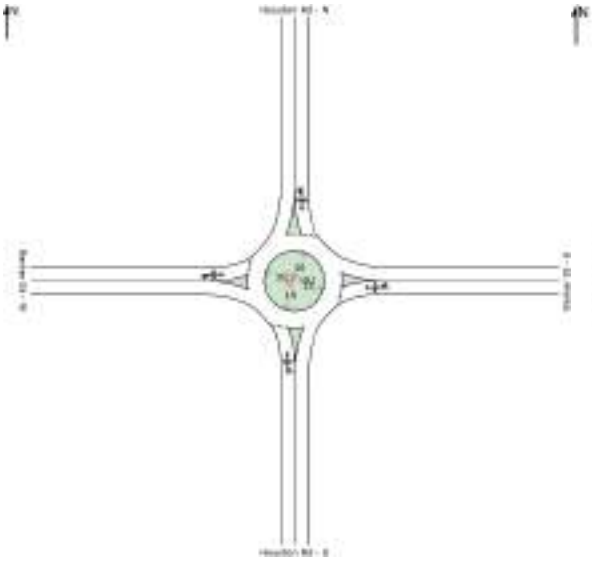


Figure 5.12: Proposed Houston Road/ Barker Street layout

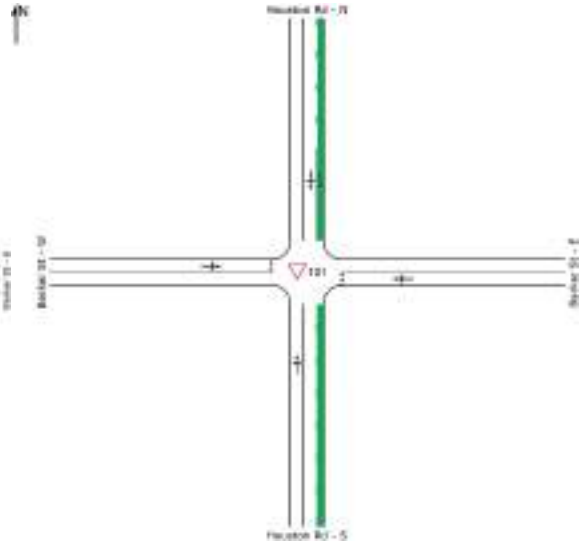


Figure 5.13: Existing Houston Road/ Borrodale Road layout

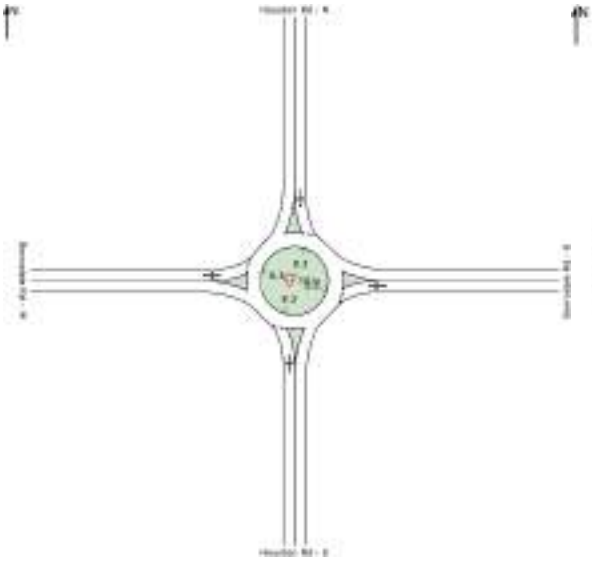


Figure 5.14: Proposed Houston Road/ Borrodale Road layout

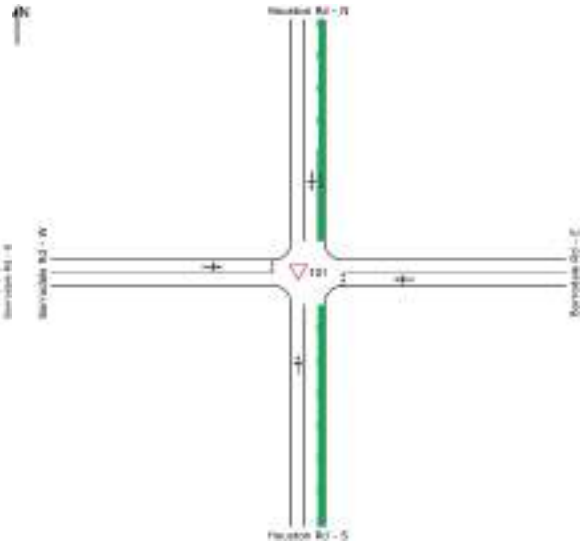


**Figure 5.15: Existing Houston Road/ Gardeners Road/ General Bridges Crescent layout**

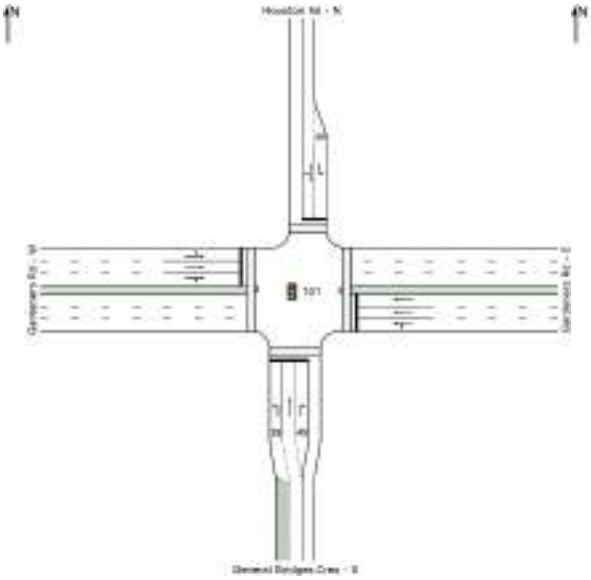
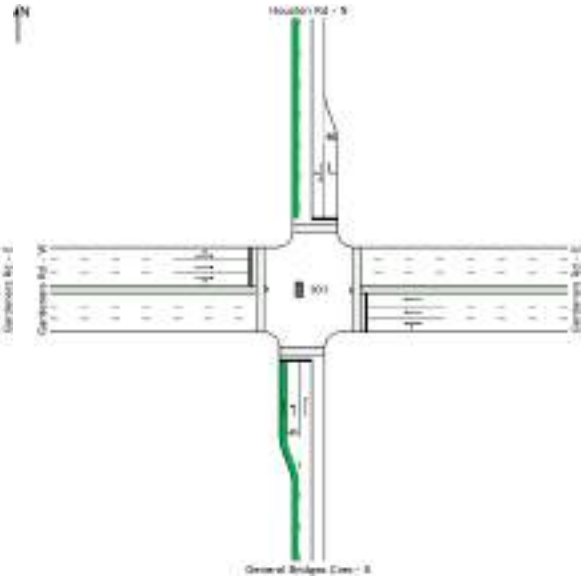


**Figure 5.16: Proposed Houston Road/ Gardeners Road/ General Bridges Crescent Parade layout**



The expected intersection operation after implementation of the cycleways and streetscape upgrades for Section 3 are summarised in Table 5.3.

**Table 5.3: Section 3 future intersection operating conditions**

| Intersection | Peak | Degree of saturation | Average delay (seconds) [1] | 95th percentile queue (metres) | Level of Service[1] |
|---|---|---|---|---|---|
| Houston Road/ Barker Street (give-way) | AM | 1.10 | 146 | 259 | F |
| | PM | 0.64 | 17 | 30 | B |
| Houston Road/ Borrodale Road (give-way) | AM | 1.08 | 139 | 213 | F |
| | PM | 0.52 | 15 | 26 | C |
| Houston Road/ Gardeners Road/ General Bridges Crescent (signalised) | AM | 0.64 | 27 | 124 | B |
| | PM | 0.78 | 28 | 185 | B |

[1] Delay and level of service for unsignalized intersections is based on the worst approach

The SIDRA analysis for survey traffic volumes shows that the intersections of Houston Road/ Barker Street and Houston Road/ Borrodale Road will operate at unsatisfactory levels of delay (level of service F) in the AM peak. It is noted that only the minor approaches for the Houston Road/ Barker Street and Houston Road/ Borrodale Road intersections will be subject to high delays.

Whilst, the survey traffic volumes represent existing traffic conditions, modelling for the area was undertaken in AIMSUN to understand the traffic impact after the opening of CSELR. This model indicated that a significant portion of traffic would no longer use Houston Road as a result of CSELR. Using the AIMSUN model provided, GTA Consultants extracted the intersection layouts, volumes and intersection phasing for further analysis using SIDRA Intersection. GTA noted the volumes extracted from the AIMSUN model were significantly lower than the intersection survey counts completed in 2016 for the same intersections, however, the AIMSUN model is the generally accepted forecast for future traffic conditions. The intersections of Houston Road/ Barker Street

and Houston Road/ Borrodale Road were modelled using AIMSUN volumes in SIDRA Intersection. The results are summarised in Table 5.4.

**Table 5.4: AIMSUN model volume intersection operating conditions**

| Intersection | Peak | Degree of saturation | Average delay (seconds) [1] | 95th percentile queue (metres) | Level of Service[1] |
|---|---|---|---|---|---|
| Houston Road/ Barker Street (give-way) | AM | 0.60 | 11 | 40 | A |
| | PM | 0.24 | 7 | 6 | A |
| Houston Road/ Borrodale Road (give-way) | AM | 0.35 | 6 | 12 | A |
| | PM | 0.27 | 5 | 9 | A |

Using the AIMSUN model volumes, the SIDRA Intersection analysis for the two priority-controlled intersections are expected to operate at acceptable levels of service. To understand the extent of the impact caused by the traffic volume differences between the AIMSUN model and surveyed traffic volumes, two sensitivity tests were conducted for the AM peak on both intersections. The tests are as follows:

- Scenario 1: traffic volumes at 50% in between the volumes from the AIMSUN model and survey counts
- Scenario 2: traffic volumes at 75% in between the volumes from the AIMSUN model and survey counts (i.e. closer to the survey volumes).

The results of the SIDRA Intersection analysis are summarised in Table 5.5.

**Table 5.5: Sensitivity Analysis - intersection operating conditions with proposed cycleway using volumes based on the AIMSUN and survey volumes**

| Intersection | Sensitivity Volume | Intersection Type | Peak | Degree of Saturation (DOS) | Average Delay (sec)[1] | 95th Percentile Queue (m) | Level of Service (LOS) |
|---|---|---|---|---|---|---|---|
| Houston Road/ Barker Street | 50% | Priority – Give Way | AM | 0.76 | 23 | 49 | B |
| | | | PM | 0.34 | 10 | 13 | A |
| | 75% | | AM | 1.14 | 163 | 290 | F |
| | | | PM | 0.57 | 15 | 23 | A |
| Houston Road/ Borrodale Road | 50% | Priority – Give Way | AM | 0.58 | 13 | 30 | A |
| | | | PM | 0.32 | 8 | 11 | A |
| | 75% | | AM | 0.71 | 21 | 40 | B |
| | | | PM | 0.47 | 13 | 20 | A |

[1] delay and level of service reported for worst movement for unsignalized intersections

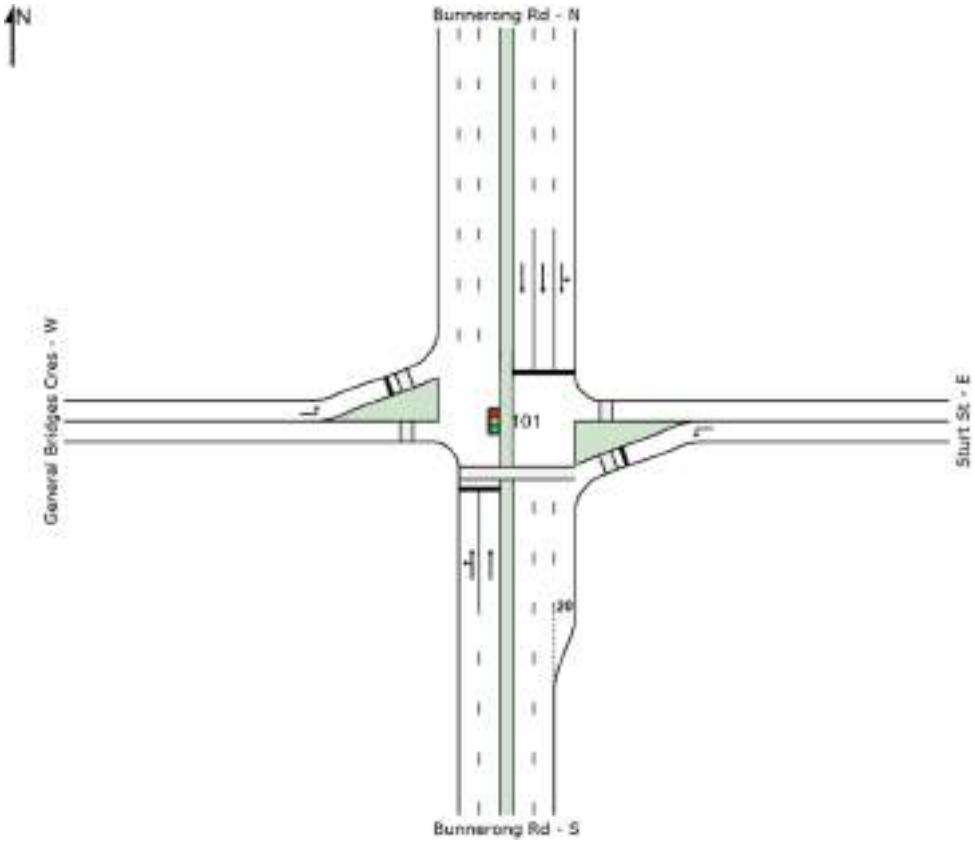
Under 50% sensitivity analysis, both the studied intersections operate on a satisfactory Level of Service A or B. However, under 75% sensitivity analysis, the Houston Road/ Barker Street intersection fails to operate at a satisfactory level of service due to the volume of traffic on Barker Street. Understanding that the AIMSUN model is the generally accepted forecast for traffic conditions in the area, especially along Houston Road, the intersections of Houston Road/ Barker Street and Houston Road/ Borrodale Road are expected to operate at acceptable levels of delay as priority controlled.

The intersection of Houston Road/ Gardeners Road/ General Bridges Crescent is expected to operate at acceptable levels of delay and within capacity (degree of saturation less than one) for both survey volumes and AIMSUN model volumes. Full SIDRA Intersection movement summary results are presented in Appendix C for the surveyed traffic volumes and Appendix D for AIMSUN model volumes and sensitivity tests.

### 5.2.4 Section 4 – Gardeners Road to Anzac Avenue

Along Section 4, the key intersection operation change will be the conversion of General Bridges Crescent/ Bunnerong Road and Bunnerong Road/ Sturt Street into a single signalised intersection. The existing operations for a left-in/ left-out to and from General Bridges Crescent and Sturt Street will be maintained. The signalised intersection has been proposed to add crossing amenity for pedestrians and cyclists. The proposed General Bridges Crescent/ Bunnerong Road/ Sturt Street intersection is shown in Figure 5.17.

**Figure 5.17: Proposed General Bridges Crescent/ Bunnerong Road/ Sturt Street layout**




The post-implementation intersection operation of General Bridges Crescent/ Bunnerong Road/ Sturt Street is summarised in Table 5.6.

**Table 5.6: Section 4 future intersection operating conditions**

| Intersection | Peak | Degree of saturation | Average delay (seconds) [1] | 95th percentile queue (metres) | Level of Service[1] |
|---|---|---|---|---|---|
| General Bridges Crescent/ Bunnerong Road/ Sturt Street | AM | 0.44 | 13 | 90 | A |
| | PM | 0.47 | 13 | 99 | A |

The above results show that the proposed General Bridges Crescent/ Bunnerong Road/ Sturt Street signalised intersection will operate with minimal delay as demonstrated by a level of service A. Full SIDRA Intersection movement summary results are presented in Appendix C.

## 5.3 Construction Traffic Impact

A construction traffic management plan should be prepared prior to works commencing on-site.

# 6. Conclusion



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

i A cycleway link and streetscape upgrades between Centennial Park and Kingsford has been proposed.

ii The cycleway link travels along a series of lower order streets such as Doncaster Avenue, Day Avenue, Houston Road, General Bridges Crescent and Sturt Street.

iii The proposed cycleway link will provide a safer cycle link between key locations such as the future Kingsford Light Rail Terminus, UNSW, Randwick Racecourse and Moore Park as well as providing key north-south link from Sydney CBD through Randwick.

iv The proposed streetscape upgrades will improve pedestrian amenity by providing more pedestrian crossing locations.

v A series of modifications and conversions of intersections along the route are proposed to improve cyclist safety, especially at roundabouts.

vi There are approximately 524 on-street car parking spaces along the cycleway link route.

vii The proposed cycleway link and streetscape upgrades are expected to result in a net loss of 43 on-street parking spaces, which accounts for less than 10 per cent of the overall supply.

viii All intersections along the route currently operate at acceptable levels of delay and service.

ix The proposed cycleway link and streetscape upgrades will induce additional delay as a result of changes to the intersection, however, all intersections are expected to operate within acceptable realms.

x A construction management plan should be prepared for the development prior to commencement of work.

# Appendix A

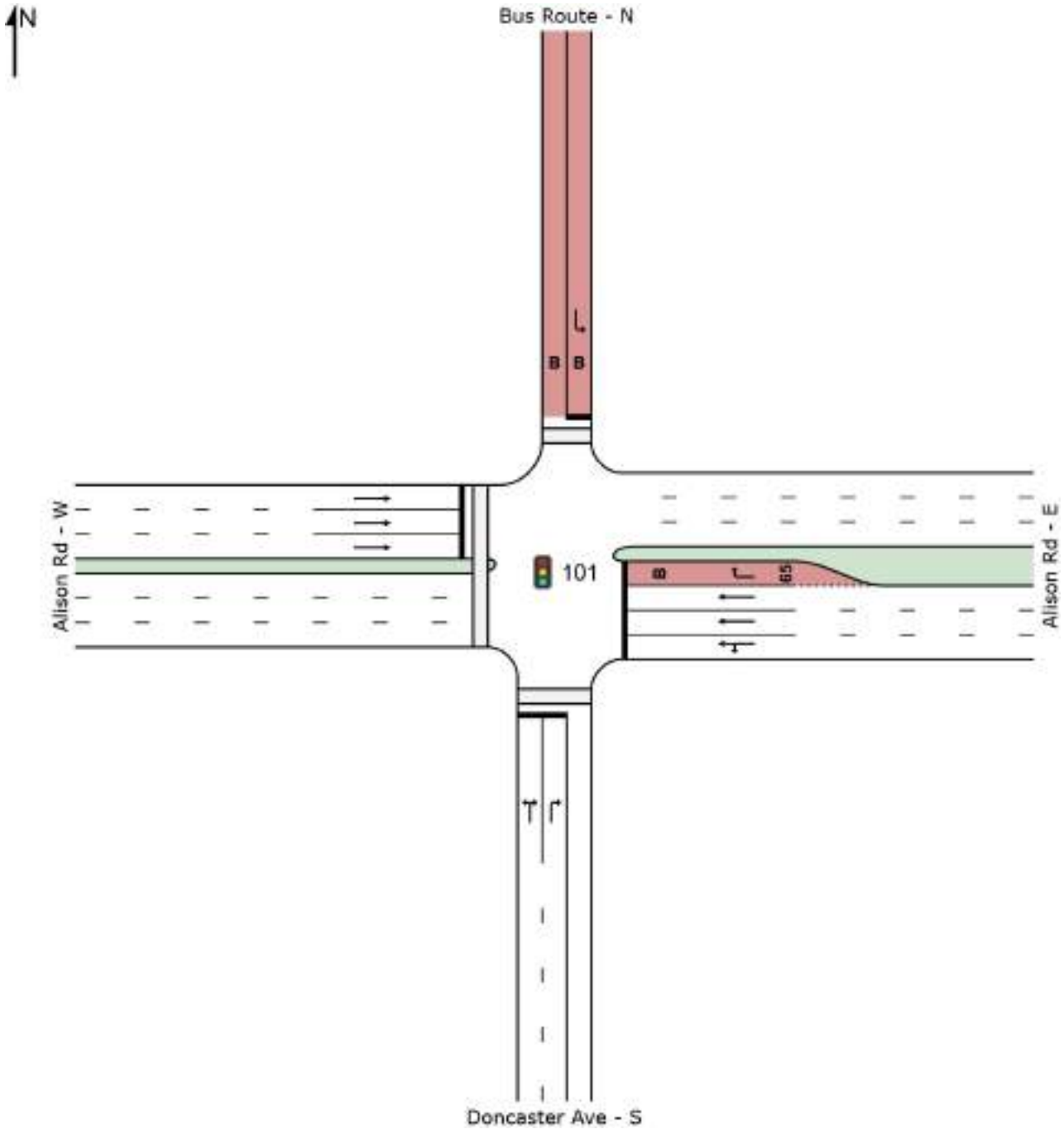
## Existing Conditions SIDRA Intersection Movement Summary

# SITE LAYOUT

## Site: 101 [1. Alison Rd/ Doncaster Ave AM]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated

Existing layout



# PHASING SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave AM]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

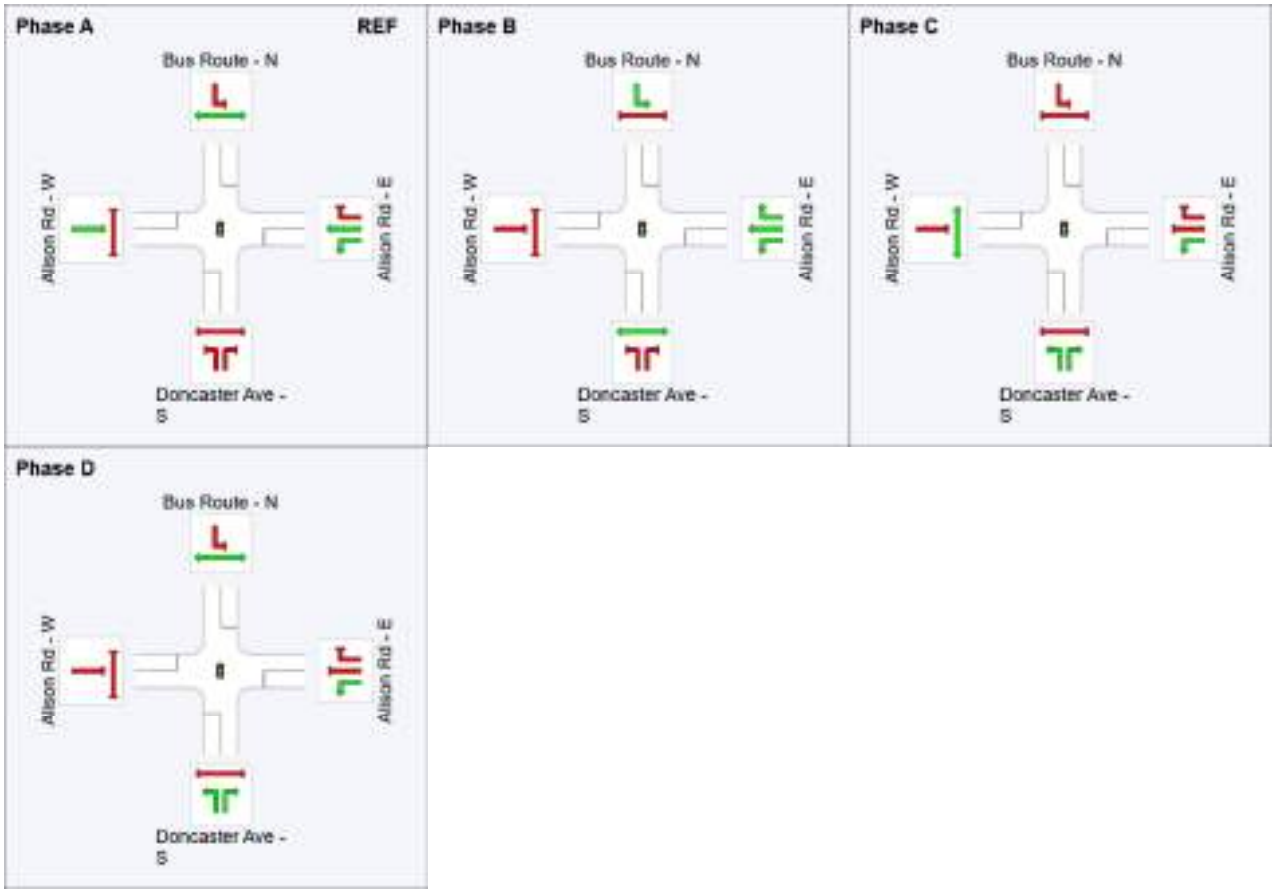
**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 0 | 57 | 72 | 104 |
| Green Time (sec) | 51 | 9 | 26 | *** |
| Phase Time (sec) | 57 | 15 | 31 | 2 |
| Phase Split | 54% | 14% | 30% | 2% |

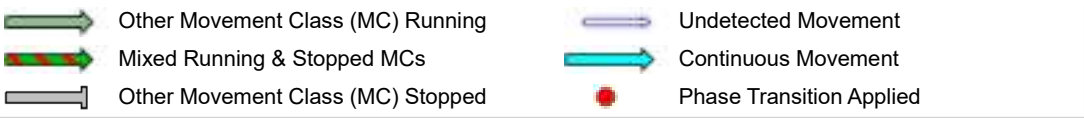
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |



# PHASING SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave PM]

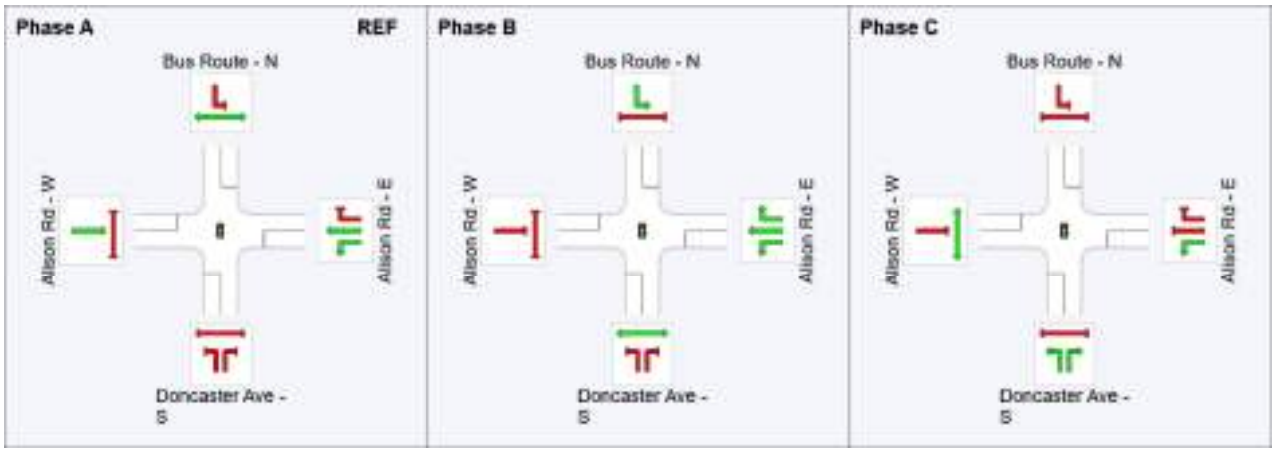
Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing (phase reduction applied)**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 0 | 53 | 68 |
| Green Time (sec) | 47 | 9 | 26 |
| Phase Time (sec) | 53 | 15 | 32 |
| Phase Split | 53% | 15% | 32% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

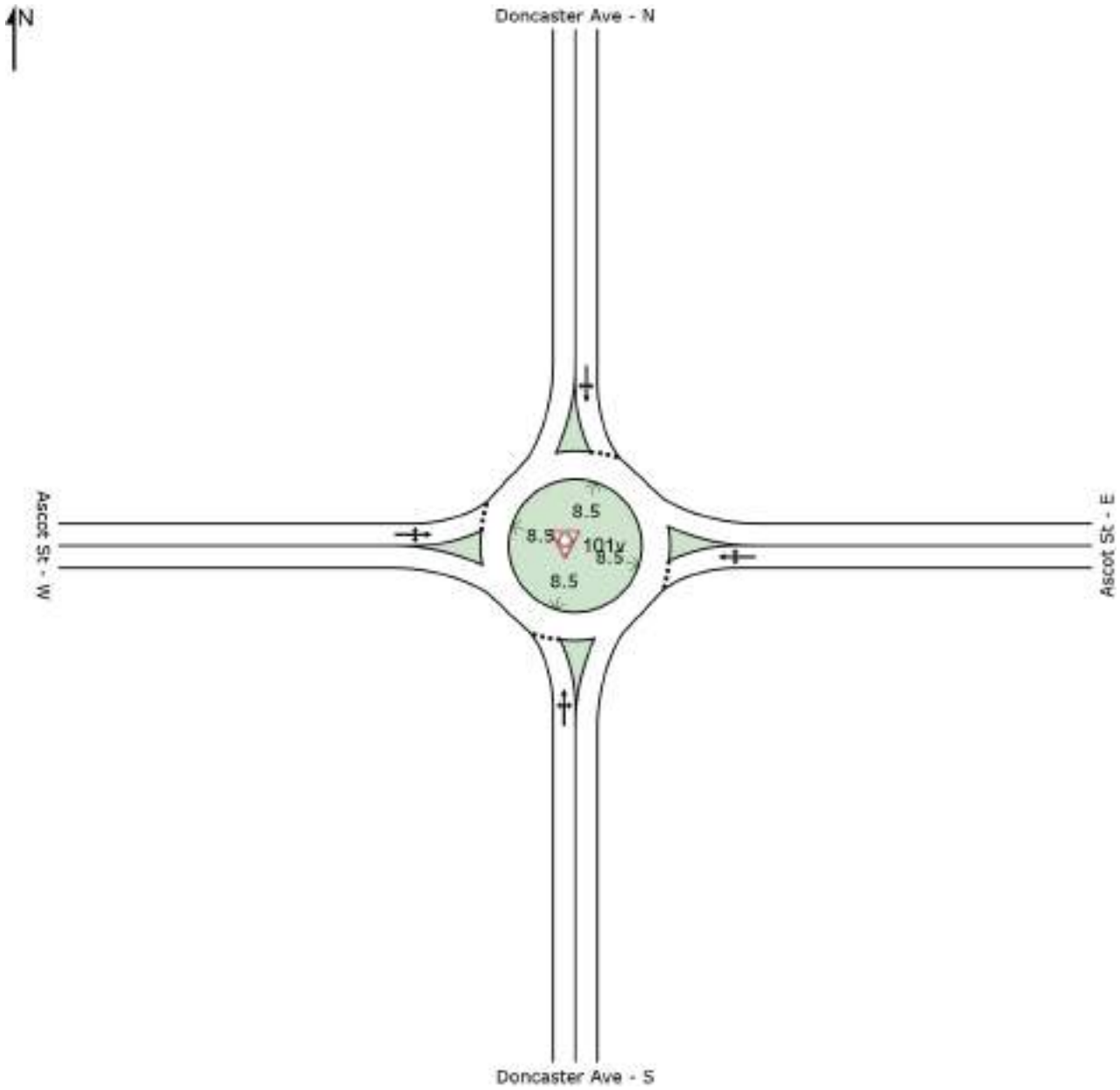
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101v [7. Doncaster Ave/ Ascot St AM]

Doncaster Avenue/ Ascot Street, Kensington
Roundabout

Existing layout

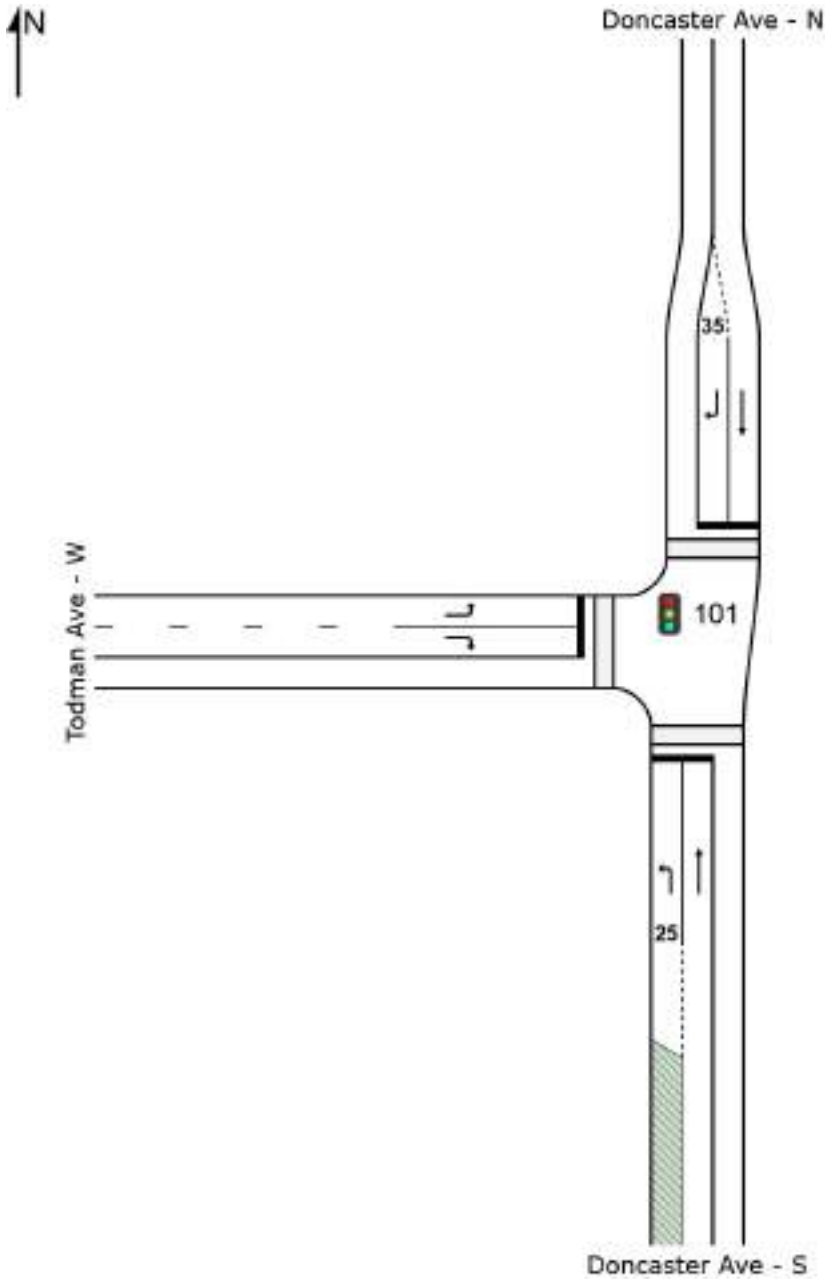


## SITE LAYOUT

### Site: 101 [2. Doncaster Ave/ Todman Ave AM]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated

Existing layout



# PHASING SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave AM]

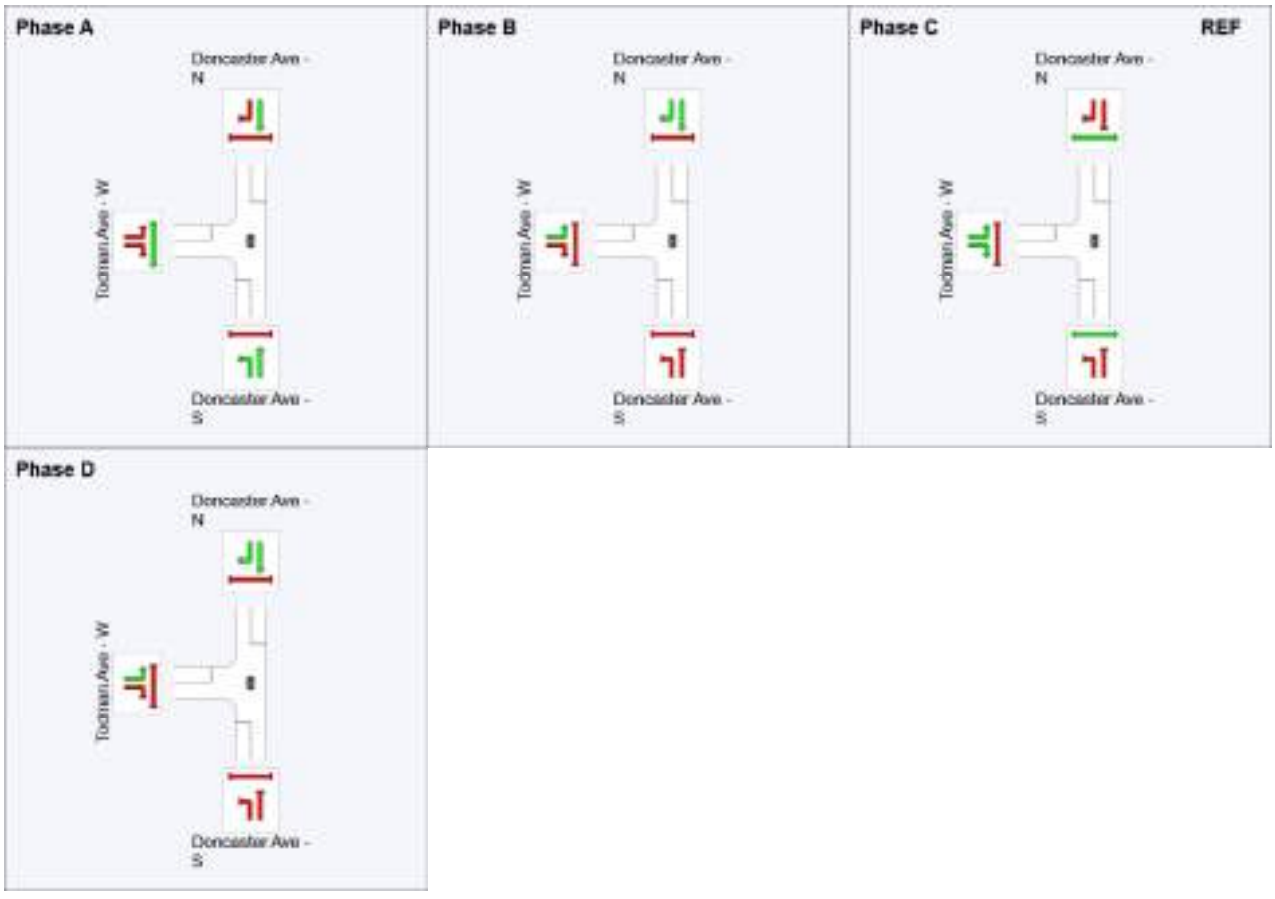
Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated  Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 33 | 69 | 0 | 15 |
| Green Time (sec) | 30 | 25 | 9 | 12 |
| Phase Time (sec) | 36 | 31 | 15 | 18 |
| Phase Split | 36% | 31% | 15% | 18% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave PM]

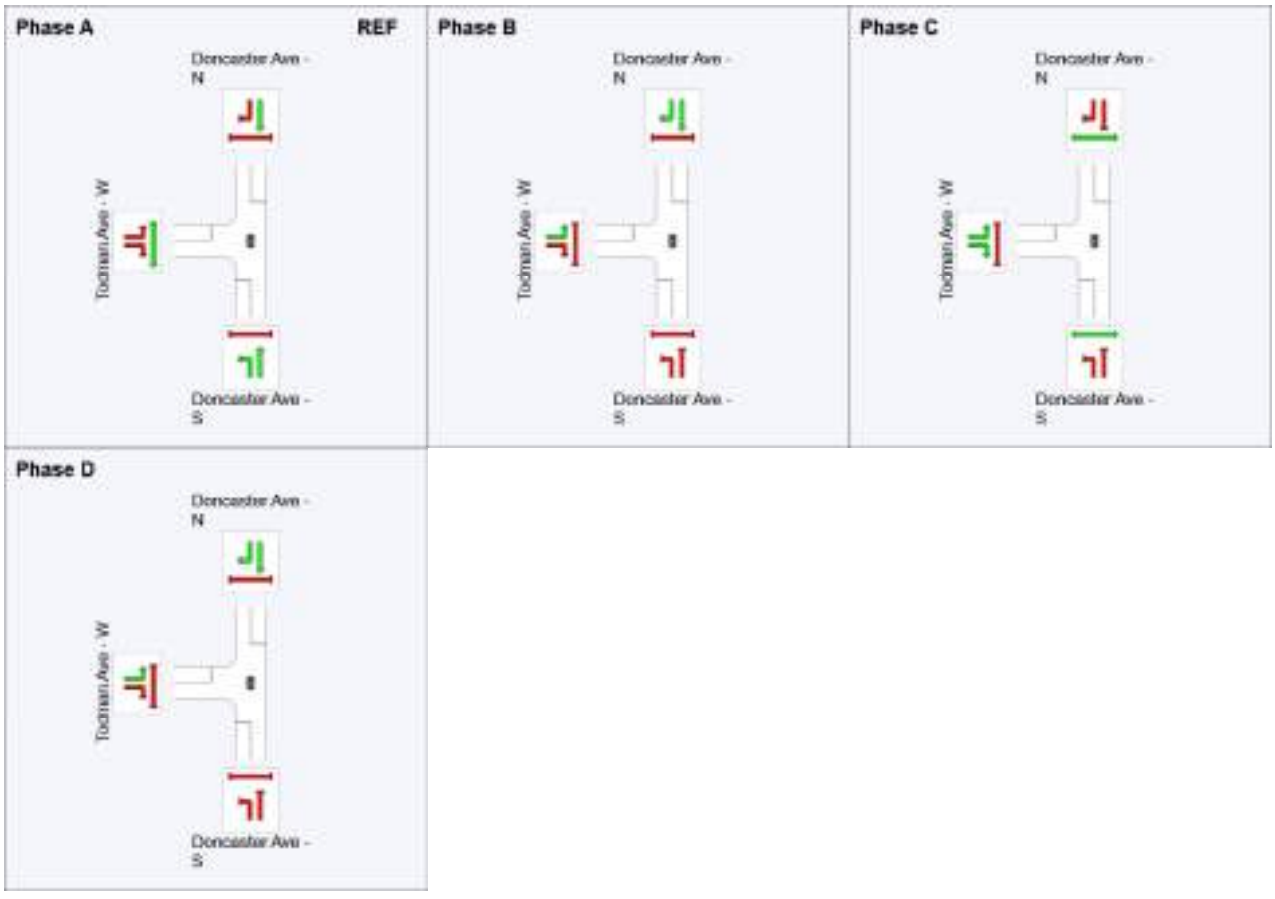
Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated  Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 0 | 28 | 58 | 72 |
| Green Time (sec) | 22 | 24 | 8 | 12 |
| Phase Time (sec) | 28 | 30 | 14 | 18 |
| Phase Split | 31% | 33% | 16% | 20% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

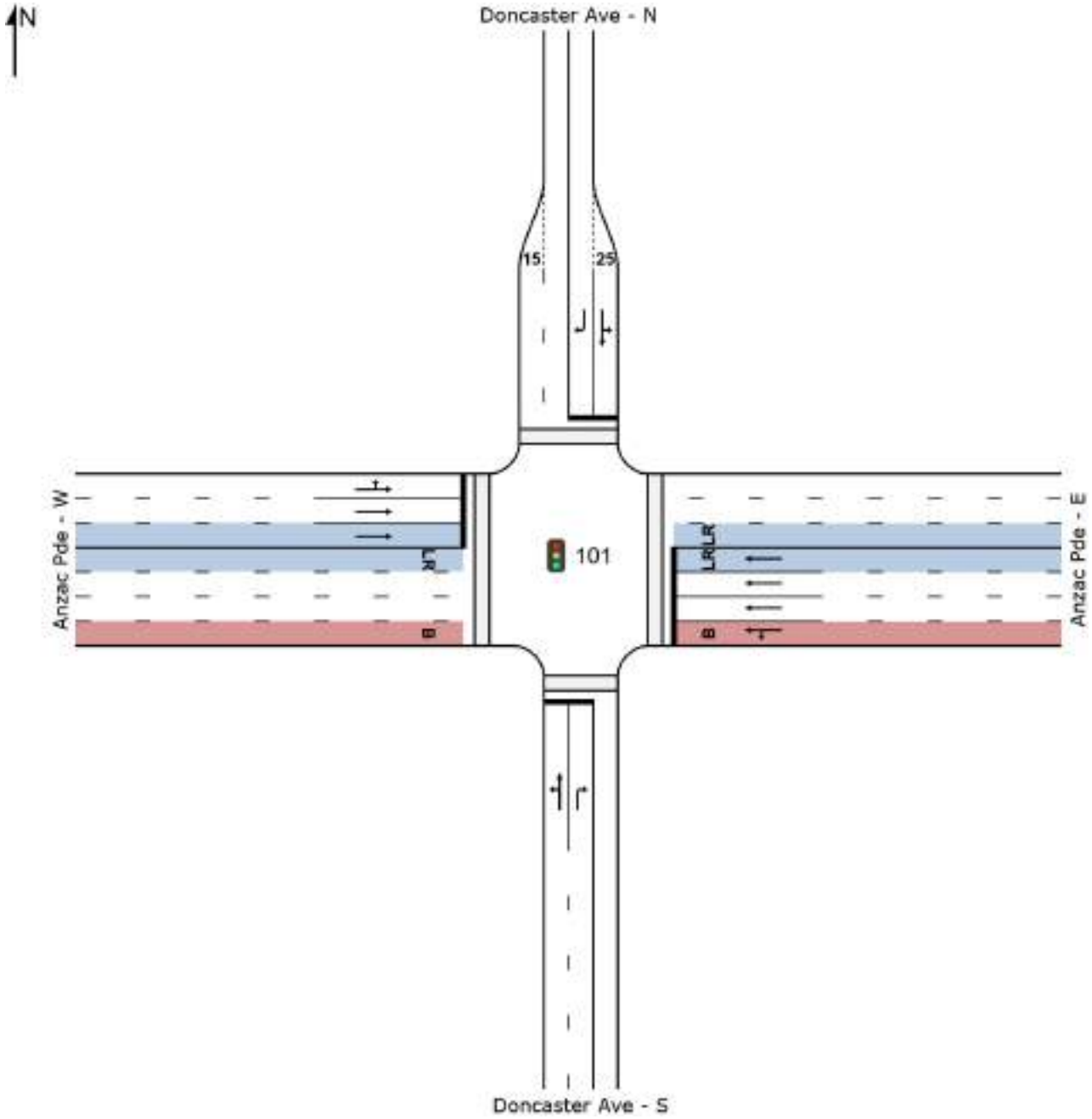
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated

Existing layout



# PHASING SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM]

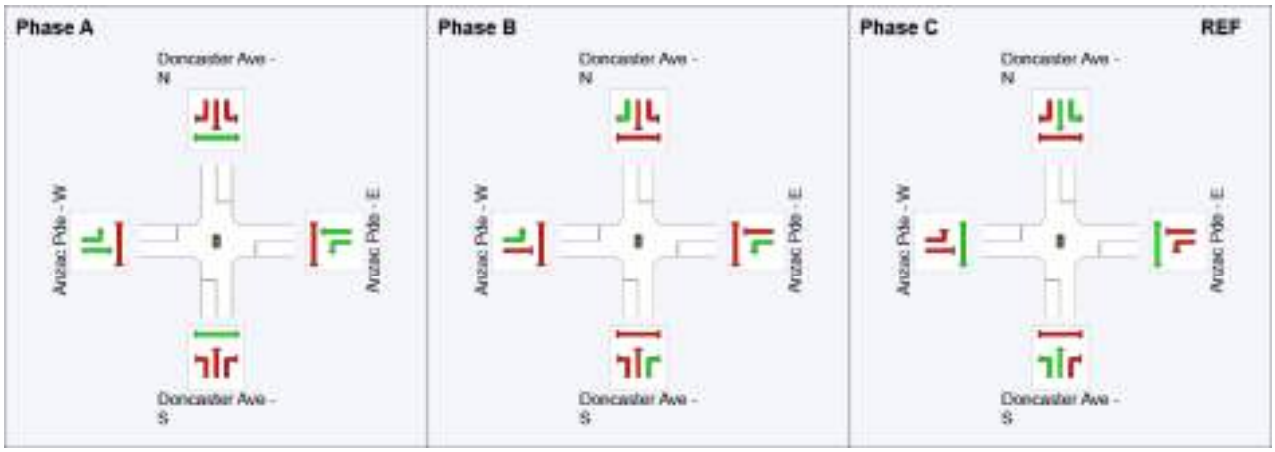
Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated  Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 23 | 73 | 0 |
| Green Time (sec) | 44 | 11 | 17 |
| Phase Time (sec) | 50 | 17 | 23 |
| Phase Split | 56% | 19% | 26% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade PM]

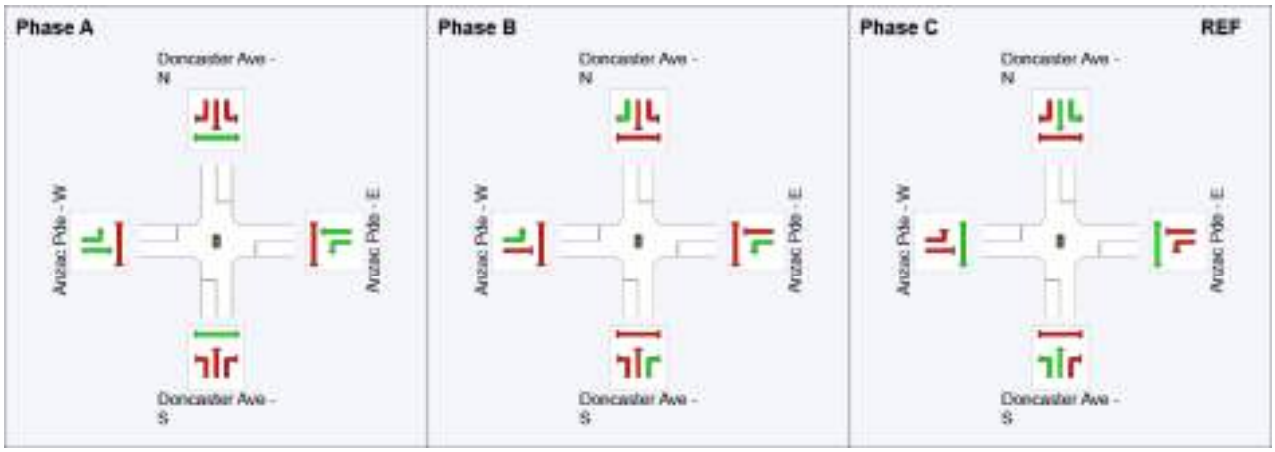
Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated  Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 22 | 83 | 0 |
| Green Time (sec) | 55 | 6 | 16 |
| Phase Time (sec) | 61 | 12 | 22 |
| Phase Split | 64% | 13% | 23% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

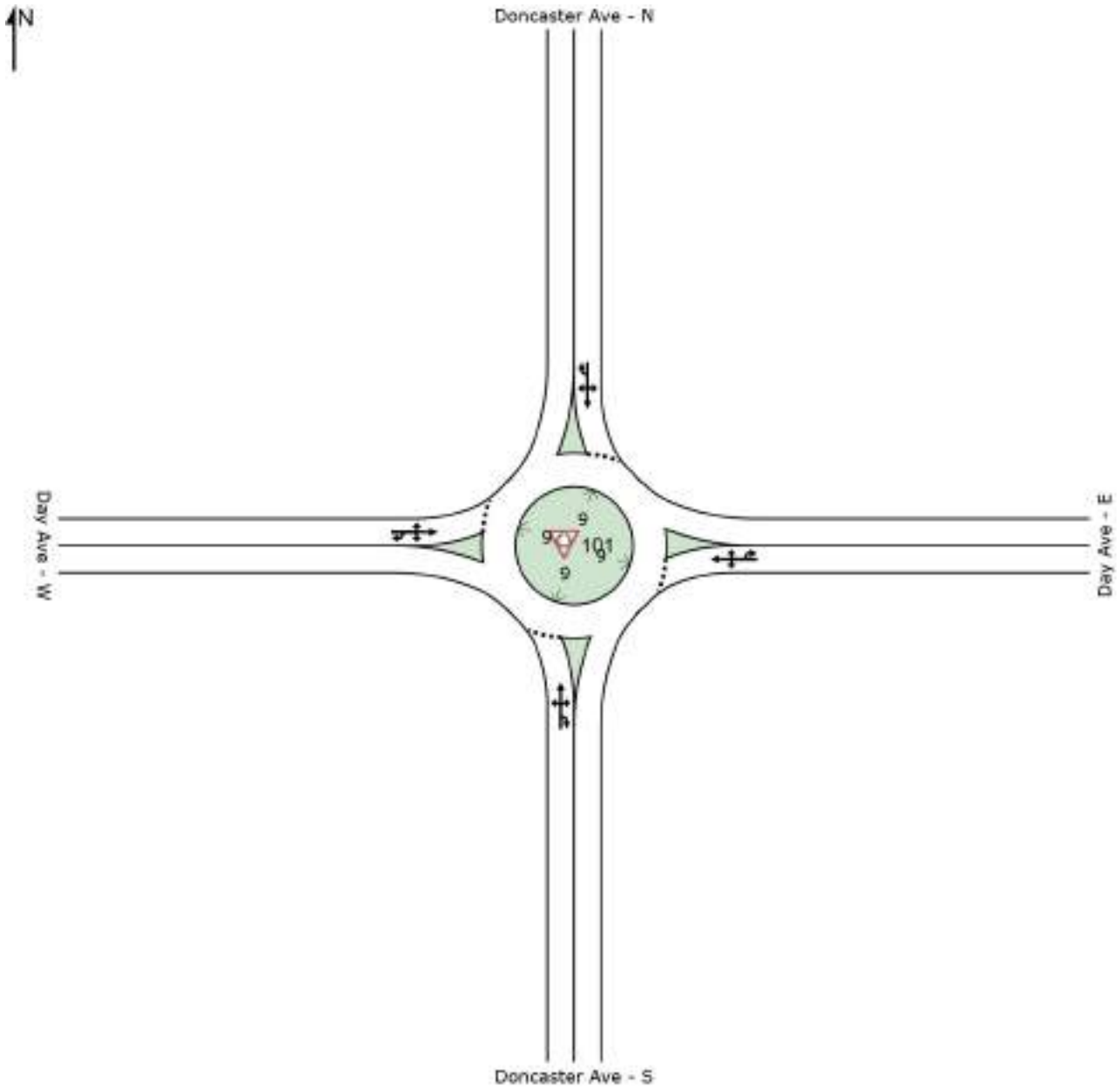
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101 [9. Doncaster Ave/ Day Ave AM]

Doncaster Avenue/ Day Avenue, Kensington
Roundabout

Existing layout



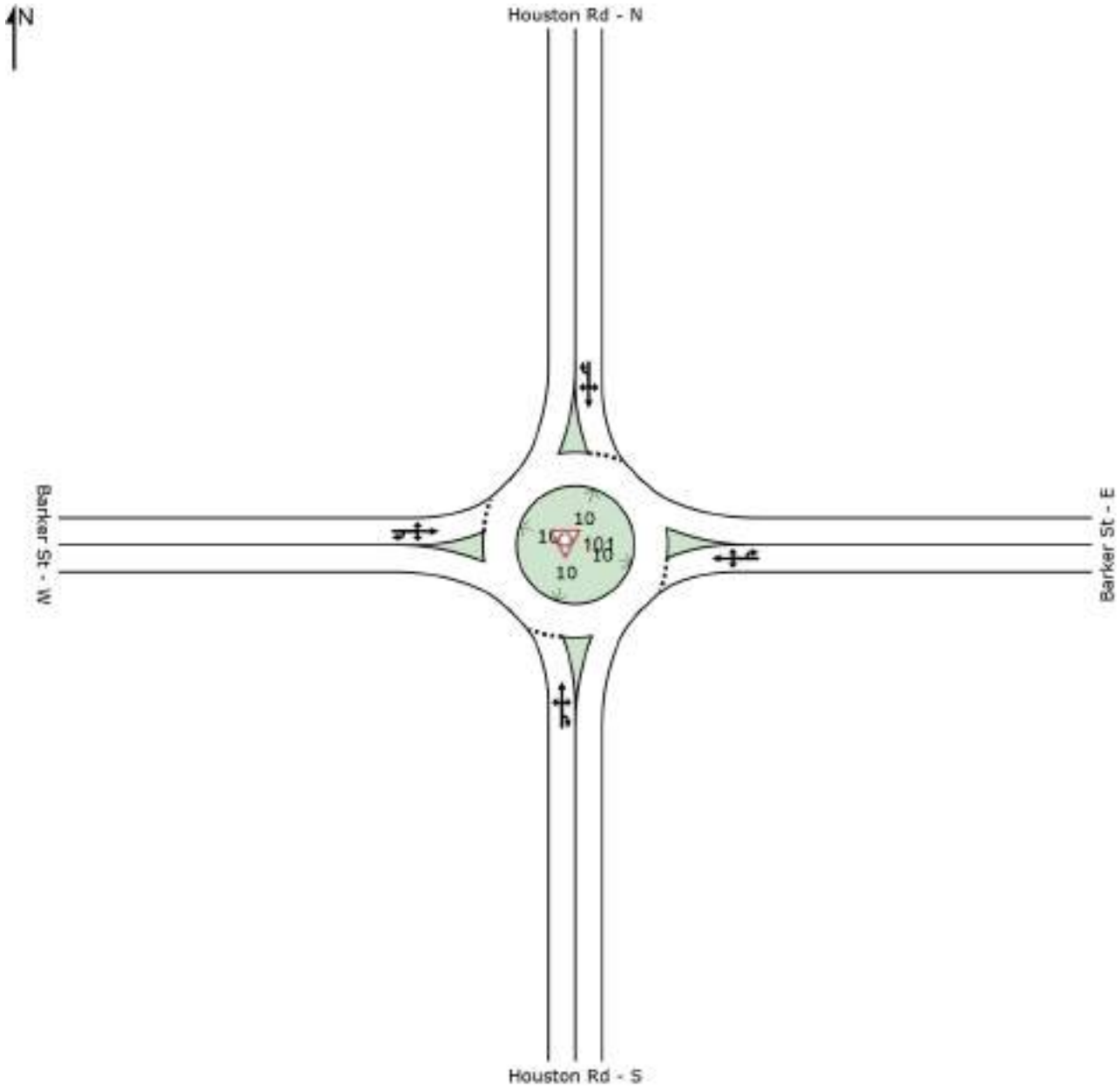
# SITE LAYOUT

## Site: 101 [4. Houston Rd/ Barker St AM]

Houston Rd/ Barker St, Kensington

Roundabout

Existing layout

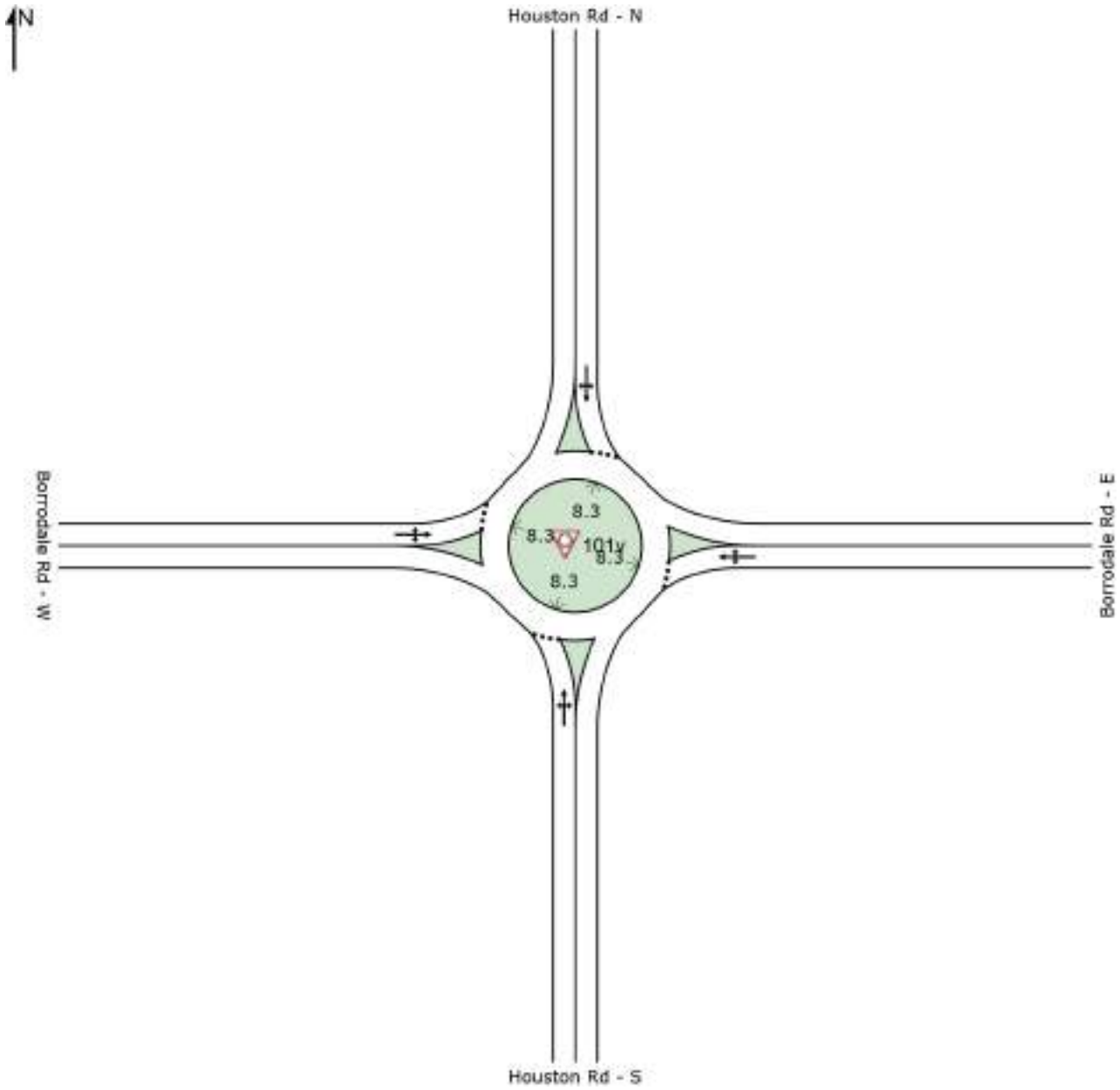


# SITE LAYOUT

## Site: 101v [8. Houston Rd/ Borrodale Rd AM]

Houston Road/ Borrodale Road, Kingsford
Roundabout

Existing layout

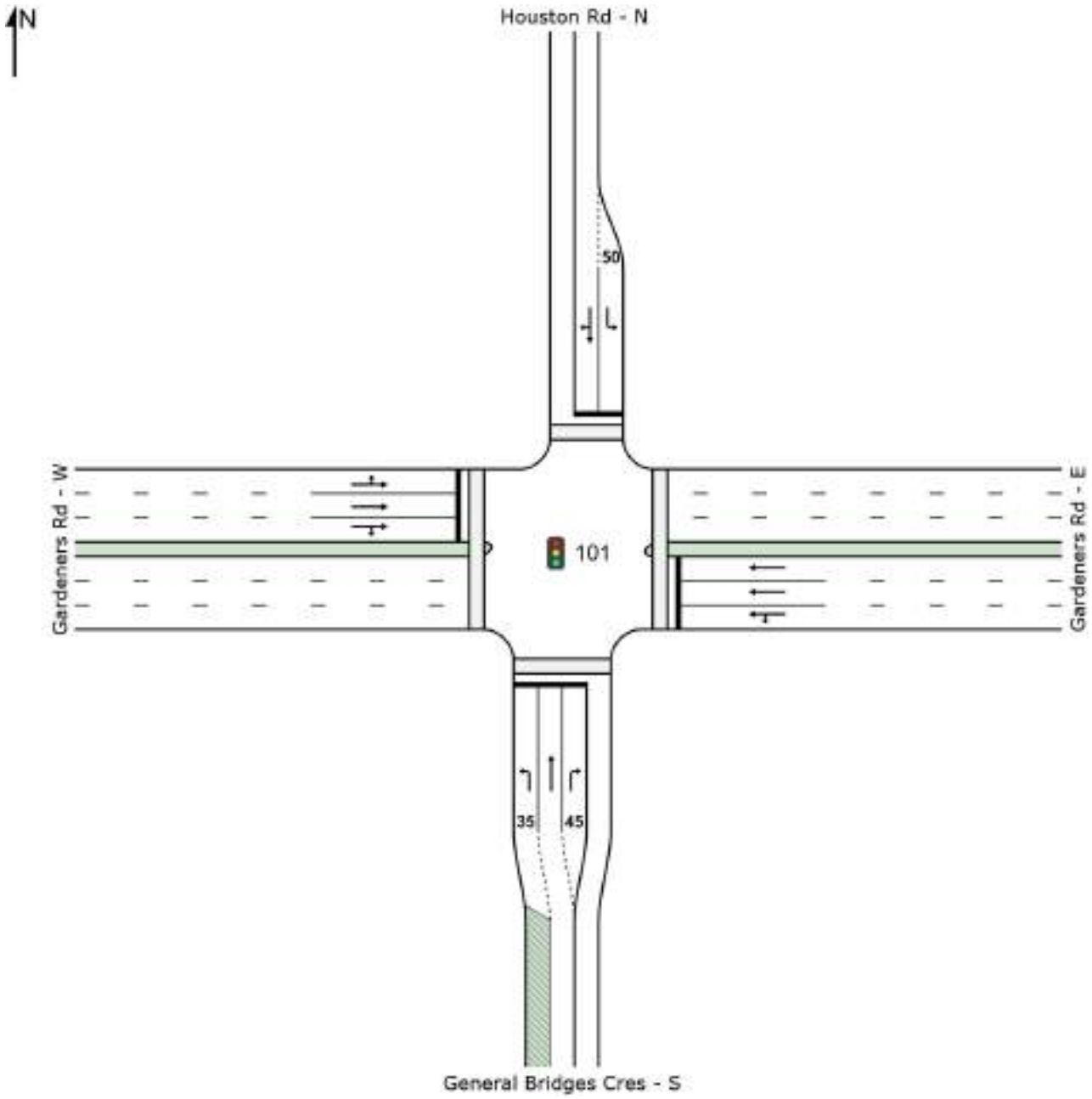


# SITE LAYOUT

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated

Existing layout



# PHASING SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM]

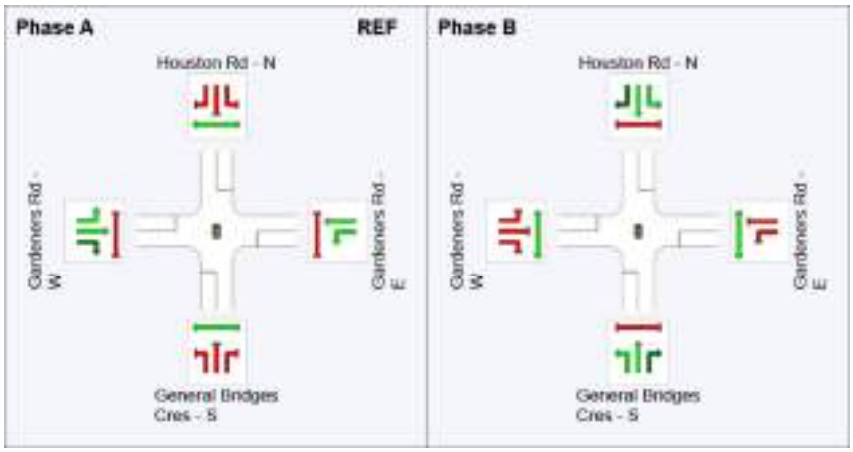
Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated  Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B**
**Output Phase Sequence: A, B**

**Phase Timing Results**

| Phase | A | B |
|---|---|---|
| Phase Change Time (sec) | 0 | 62 |
| Green Time (sec) | 56 | 32 |
| Phase Time (sec) | 62 | 38 |
| Phase Split | 62% | 38% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres PM]

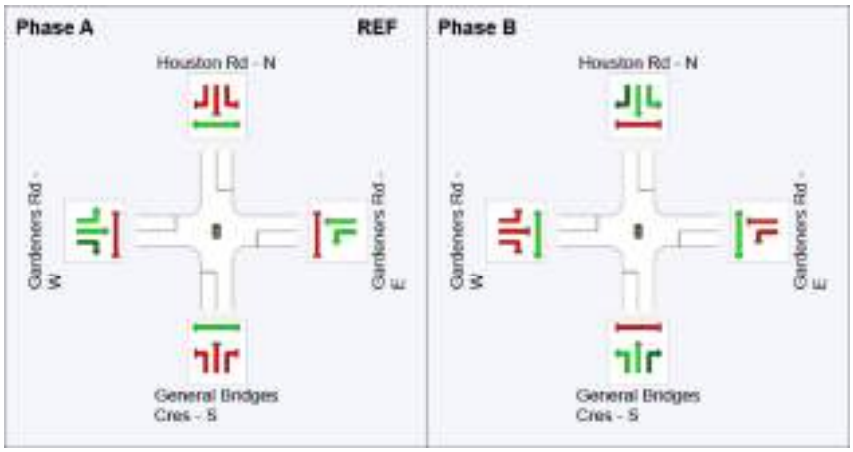
Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated  Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B**
**Output Phase Sequence: A, B**

**Phase Timing Results**

| Phase | A | B |
|---|---|---|
| Phase Change Time (sec) | 0 | 76 |
| Green Time (sec) | 70 | 18 |
| Phase Time (sec) | 76 | 24 |
| Phase Split | 76% | 24% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

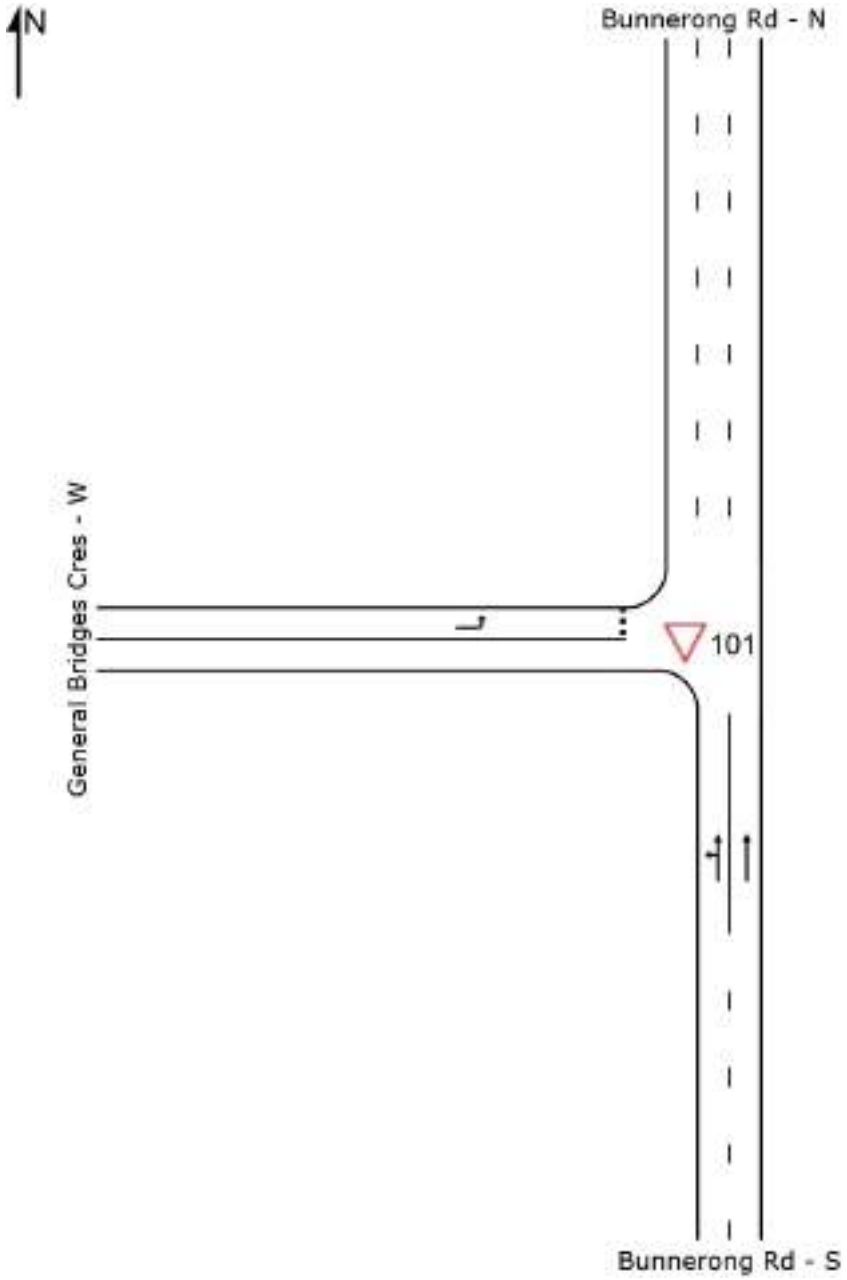
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

## SITE LAYOUT

### Site: 101 [6a. Bunnerong Rd/ General Bridges Cres AM ]

Bunnerong Rd/ General Bridges Cres, Kingsford
Giveway / Yield (Two-Way)

Existing layout

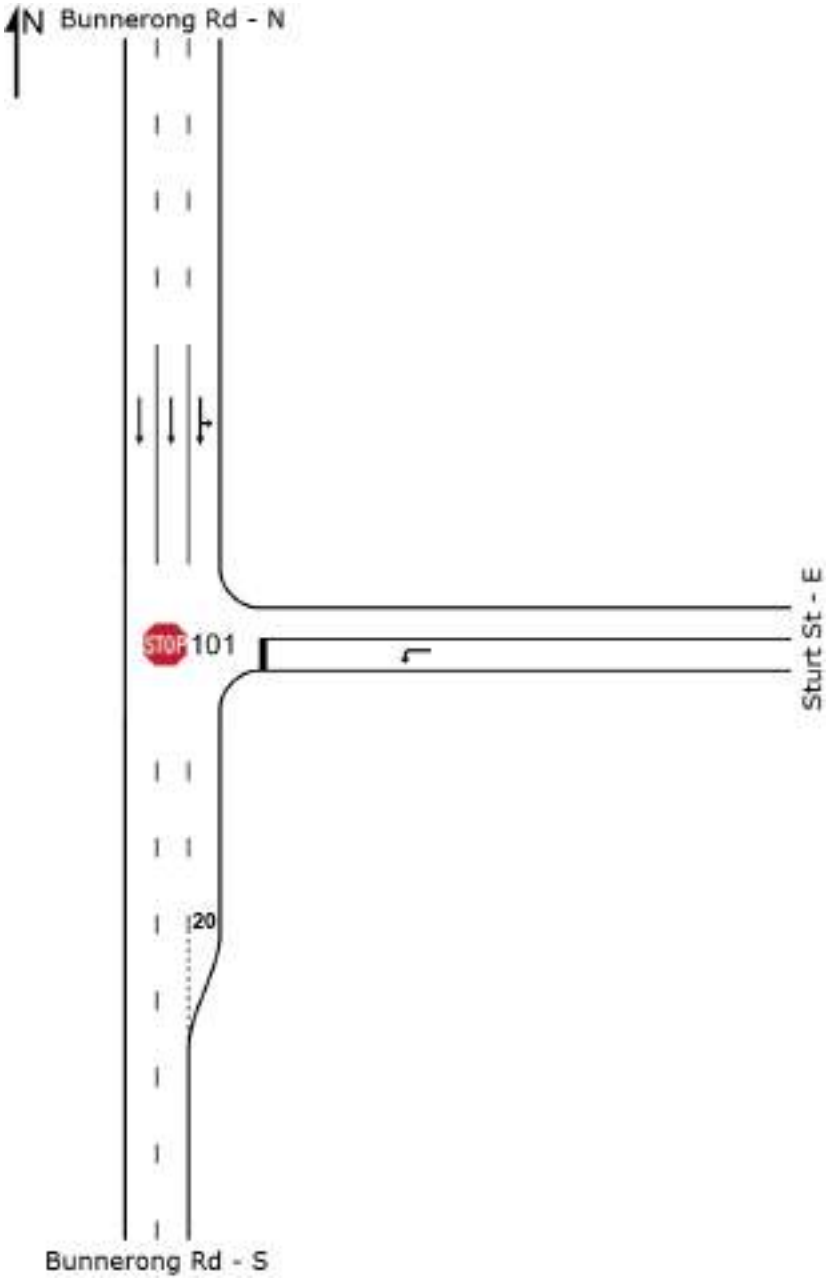


# SITE LAYOUT

## Site: 101 [6b. Bunnerong Rd/ Sturt St AM]

Bunnerong Rd/ Sturt St, Kingsford
Stop (Two-Way)

Existing layout



# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave AM]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 71 | 0.0 | 0.558 | 41.4 | LOS C | 12.0 | 83.7 | 0.92 | 0.82 | 32.2 |
| 3 | R2 | 462 | 0.0 | 0.558 | 41.3 | LOS C | 12.0 | 83.7 | 0.92 | 0.82 | 32.9 |
| Approach | | 533 | 0.0 | 0.558 | 41.3 | LOS C | 12.0 | 83.7 | 0.92 | 0.82 | 32.8 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 585 | 0.0 | 0.565 | 13.4 | LOS A | 15.8 | 110.5 | 0.56 | 0.73 | 47.7 |
| 5 | T1 | 1500 | 0.0 | 0.565 | 11.5 | LOS A | 20.1 | 141.0 | 0.62 | 0.58 | 56.2 |
| 6 | R2 | 1 | 100.0 | 0.011 | 56.3 | LOS D | 0.1 | 0.7 | 0.93 | 0.61 | 30.4 |
| Approach | | 2086 | 0.1 | 0.565 | 12.1 | LOS A | 20.1 | 141.0 | 0.60 | 0.62 | 53.6 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.011 | 54.2 | LOS D | 0.1 | 0.7 | 0.93 | 0.60 | 30.1 |
| Approach | | 1 | 100.0 | 0.011 | 54.2 | LOS D | 0.1 | 0.7 | 0.93 | 0.60 | 30.1 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1014 | 0.0 | 0.357 | 17.9 | LOS B | 10.6 | 74.5 | 0.66 | 0.58 | 51.2 |
| Approach | | 1014 | 0.0 | 0.357 | 17.9 | LOS B | 10.6 | 74.5 | 0.66 | 0.58 | 51.2 |
| All Vehicles | | 3634 | 0.1 | 0.565 | 18.0 | LOS B | 20.1 | 141.0 | 0.67 | 0.64 | 48.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 46.8 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 15.5 | LOS B | 0.1 | 0.1 | 0.54 | 0.54 |
| P4 | West Full Crossing | 53 | 44.0 | LOS E | 0.1 | 0.1 | 0.92 | 0.92 |
| All Pedestrians | | 158 | 35.4 | LOS D | | | 0.80 | 0.80 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave PM]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 160 | 0.0 | 0.535 | 39.2 | LOS C | 11.0 | 76.8 | 0.91 | 0.81 | 32.9 |
| 3 | R2 | 357 | 0.0 | 0.535 | 39.2 | LOS C | 11.0 | 76.8 | 0.91 | 0.81 | 33.6 |
| Approach | | 517 | 0.0 | 0.535 | 39.2 | LOS C | 11.0 | 76.8 | 0.91 | 0.81 | 33.4 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 493 | 0.0 | 0.457 | 12.2 | LOS A | 10.9 | 76.0 | 0.50 | 0.70 | 48.5 |
| 5 | T1 | 1187 | 0.0 | 0.457 | 10.4 | LOS A | 14.1 | 98.8 | 0.57 | 0.52 | 57.3 |
| 6 | R2 | 1 | 100.0 | 0.011 | 53.5 | LOS D | 0.0 | 0.6 | 0.93 | 0.61 | 31.1 |
| Approach | | 1681 | 0.1 | 0.457 | 10.9 | LOS A | 14.1 | 98.8 | 0.55 | 0.58 | 54.5 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.011 | 51.4 | LOS D | 0.0 | 0.6 | 0.93 | 0.60 | 30.8 |
| Approach | | 1 | 100.0 | 0.011 | 51.4 | LOS D | 0.0 | 0.6 | 0.93 | 0.60 | 30.8 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1461 | 0.0 | 0.531 | 20.0 | LOS B | 16.7 | 116.7 | 0.76 | 0.67 | 49.6 |
| Approach | | 1461 | 0.0 | 0.531 | 20.0 | LOS B | 16.7 | 116.7 | 0.76 | 0.67 | 49.6 |
| All Vehicles | | 3660 | 0.1 | 0.535 | 18.6 | LOS B | 16.7 | 116.7 | 0.68 | 0.65 | 48.4 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 16.9 | LOS B | 0.1 | 0.1 | 0.58 | 0.58 |
| P4 | West Full Crossing | 53 | 41.5 | LOS E | 0.1 | 0.1 | 0.91 | 0.91 |
| All Pedestrians | | 158 | 34.2 | LOS D | | | 0.81 | 0.81 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101v [7. Doncaster Ave/ Ascot St AM]

Doncaster Avenue/ Ascot Street, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 1 | 0.0 | 0.472 | 3.9 | LOS A | 4.1 | 28.5 | 0.46 | 0.45 | 35.3 |
| 2 | T1 | 551 | 0.0 | 0.472 | 3.5 | LOS A | 4.1 | 28.5 | 0.46 | 0.45 | 37.5 |
| 3 | R2 | 26 | 0.0 | 0.472 | 6.5 | LOS A | 4.1 | 28.5 | 0.46 | 0.45 | 31.9 |
| Approach | | 578 | 0.0 | 0.472 | 3.7 | LOS A | 4.1 | 28.5 | 0.46 | 0.45 | 37.4 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 7 | 0.0 | 0.034 | 7.4 | LOS A | 0.2 | 1.4 | 0.70 | 0.67 | 29.5 |
| 5 | T1 | 5 | 0.0 | 0.034 | 7.1 | LOS A | 0.2 | 1.4 | 0.70 | 0.67 | 29.4 |
| 6 | R2 | 9 | 0.0 | 0.034 | 10.0 | LOS A | 0.2 | 1.4 | 0.70 | 0.67 | 33.7 |
| Approach | | 22 | 0.0 | 0.034 | 8.4 | LOS A | 0.2 | 1.4 | 0.70 | 0.67 | 31.8 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.465 | 3.4 | LOS A | 4.3 | 30.0 | 0.32 | 0.41 | 27.0 |
| 8 | T1 | 538 | 0.0 | 0.465 | 3.0 | LOS A | 4.3 | 30.0 | 0.32 | 0.41 | 37.7 |
| 9 | R2 | 98 | 0.0 | 0.465 | 5.9 | LOS A | 4.3 | 30.0 | 0.32 | 0.41 | 37.5 |
| Approach | | 638 | 0.0 | 0.465 | 3.4 | LOS A | 4.3 | 30.0 | 0.32 | 0.41 | 37.7 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 23 | 0.0 | 0.080 | 7.2 | LOS A | 0.5 | 3.3 | 0.70 | 0.69 | 34.8 |
| 11 | T1 | 17 | 0.0 | 0.080 | 6.8 | LOS A | 0.5 | 3.3 | 0.70 | 0.69 | 19.6 |
| 12 | R2 | 14 | 0.0 | 0.080 | 9.8 | LOS A | 0.5 | 3.3 | 0.70 | 0.69 | 33.5 |
| Approach | | 54 | 0.0 | 0.080 | 7.8 | LOS A | 0.5 | 3.3 | 0.70 | 0.69 | 30.6 |
| All Vehicles | | 1292 | 0.0 | 0.472 | 3.8 | LOS A | 4.3 | 30.0 | 0.41 | 0.44 | 37.2 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [7. Doncaster Ave/ Ascot St PM]

Doncaster Avenue/ Ascot Street, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 1 | 0.0 | 0.354 | 4.1 | LOS A | 2.7 | 18.7 | 0.19 | 0.42 | 41.8 |
| 2 | T1 | 508 | 0.0 | 0.354 | 3.9 | LOS A | 2.7 | 18.7 | 0.19 | 0.42 | 45.3 |
| 3 | R2 | 4 | 0.0 | 0.354 | 6.9 | LOS A | 2.7 | 18.7 | 0.19 | 0.42 | 37.1 |
| Approach | | 514 | 0.0 | 0.354 | 3.9 | LOS A | 2.7 | 18.7 | 0.19 | 0.42 | 45.3 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 14 | 0.0 | 0.026 | 6.2 | LOS A | 0.1 | 1.0 | 0.60 | 0.62 | 35.3 |
| 5 | T1 | 1 | 0.0 | 0.026 | 6.1 | LOS A | 0.1 | 1.0 | 0.60 | 0.62 | 35.2 |
| 6 | R2 | 5 | 0.0 | 0.026 | 8.8 | LOS A | 0.1 | 1.0 | 0.60 | 0.62 | 40.8 |
| Approach | | 20 | 0.0 | 0.026 | 6.9 | LOS A | 0.1 | 1.0 | 0.60 | 0.62 | 37.2 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.321 | 4.0 | LOS A | 2.6 | 18.3 | 0.14 | 0.43 | 33.6 |
| 8 | T1 | 460 | 0.0 | 0.321 | 3.8 | LOS A | 2.6 | 18.3 | 0.14 | 0.43 | 45.4 |
| 9 | R2 | 25 | 0.0 | 0.321 | 6.8 | LOS A | 2.6 | 18.3 | 0.14 | 0.43 | 44.8 |
| Approach | | 487 | 0.0 | 0.321 | 4.0 | LOS A | 2.6 | 18.3 | 0.14 | 0.43 | 45.3 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 32 | 0.0 | 0.060 | 7.6 | LOS A | 0.3 | 2.3 | 0.63 | 0.67 | 41.0 |
| 11 | T1 | 3 | 0.0 | 0.060 | 7.4 | LOS A | 0.3 | 2.3 | 0.63 | 0.67 | 23.7 |
| 12 | R2 | 11 | 0.0 | 0.060 | 10.4 | LOS B | 0.3 | 2.3 | 0.63 | 0.67 | 38.4 |
| Approach | | 45 | 0.0 | 0.060 | 8.2 | LOS A | 0.3 | 2.3 | 0.63 | 0.67 | 39.6 |
| All Vehicles | | 1066 | 0.0 | 0.354 | 4.2 | LOS A | 2.7 | 18.7 | 0.19 | 0.44 | 45.0 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave AM]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 111 | 0.0 | 0.198 | 32.6 | LOS C | 4.0 | 28.1 | 0.78 | 0.74 | 25.4 |
| 2 | T1 | 208 | 0.0 | 0.401 | 29.6 | LOS C | 8.0 | 55.9 | 0.83 | 0.69 | 27.5 |
| Approach | | 319 | 0.0 | 0.401 | 30.6 | LOS C | 8.0 | 55.9 | 0.81 | 0.71 | 26.8 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 193 | 0.0 | 0.125 | 2.6 | LOS A | 2.1 | 14.9 | 0.25 | 0.21 | 46.7 |
| 9 | R2 | 284 | 0.0 | 0.414 | 18.9 | LOS B | 7.0 | 48.9 | 0.79 | 0.78 | 29.3 |
| Approach | | 477 | 0.0 | 0.414 | 12.3 | LOS A | 7.0 | 48.9 | 0.57 | 0.55 | 35.6 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 355 | 0.0 | 0.329 | 17.1 | LOS B | 8.9 | 62.1 | 0.56 | 0.74 | 31.6 |
| 12 | R2 | 44 | 0.0 | 0.265 | 53.3 | LOS D | 2.1 | 14.7 | 0.97 | 0.74 | 19.5 |
| Approach | | 399 | 0.0 | 0.329 | 21.1 | LOS B | 8.9 | 62.1 | 0.60 | 0.74 | 29.2 |
| All Vehicles | | 1195 | 0.0 | 0.414 | 20.1 | LOS B | 8.9 | 62.1 | 0.65 | 0.66 | 30.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 29.7 | LOS C | 0.1 | 0.1 | 0.77 | 0.77 |
| All Pedestrians | | 158 | 39.4 | LOS D | | | 0.89 | 0.89 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave PM]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 89 | 0.0 | 0.197 | 33.9 | LOS C | 3.2 | 22.1 | 0.83 | 0.74 | 24.6 |
| 2 | T1 | 148 | 0.0 | 0.311 | 30.3 | LOS C | 5.4 | 37.8 | 0.86 | 0.70 | 28.5 |
| Approach | | 238 | 0.0 | 0.311 | 31.7 | LOS C | 5.4 | 37.8 | 0.85 | 0.72 | 27.0 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 212 | 0.0 | 0.140 | 2.6 | LOS A | 2.3 | 15.8 | 0.27 | 0.22 | 46.6 |
| 9 | R2 | 171 | 0.0 | 0.230 | 15.0 | LOS B | 3.2 | 22.1 | 0.70 | 0.73 | 32.0 |
| Approach | | 382 | 0.0 | 0.230 | 8.2 | LOS A | 3.2 | 22.1 | 0.46 | 0.45 | 39.8 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 362 | 0.0 | 0.313 | 14.0 | LOS A | 7.4 | 51.6 | 0.50 | 0.73 | 34.1 |
| 12 | R2 | 43 | 0.0 | 0.261 | 48.9 | LOS D | 1.9 | 13.1 | 0.97 | 0.73 | 20.5 |
| Approach | | 405 | 0.0 | 0.313 | 17.7 | LOS B | 7.4 | 51.6 | 0.55 | 0.73 | 31.4 |
| All Vehicles | | 1025 | 0.0 | 0.313 | 17.4 | LOS B | 7.4 | 51.6 | 0.59 | 0.62 | 32.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 31.3 | LOS D | 0.1 | 0.1 | 0.84 | 0.84 |
| All Pedestrians | | 158 | 36.6 | LOS D | | | 0.90 | 0.90 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 22 | 0.0 | 0.666 | 42.5 | LOS D | 10.3 | 72.4 | 0.98 | 0.84 | 31.3 |
| 2 | T1 | 222 | 0.0 | 0.666 | 38.0 | LOS C | 10.3 | 72.4 | 0.98 | 0.84 | 29.6 |
| 3 | R2 | 152 | 0.0 | 0.668 | 48.0 | LOS D | 6.8 | 47.5 | 1.00 | 0.84 | 24.9 |
| Approach | | 396 | 0.0 | 0.668 | 42.1 | LOS C | 10.3 | 72.4 | 0.99 | 0.84 | 27.9 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 8 | 12.5 | 0.380 | 20.5 | LOS B | 9.4 | 65.8 | 0.66 | 0.58 | 38.7 |
| 5 | T1 | 1071 | 0.6 | 0.380 | 15.2 | LOS B | 9.9 | 69.5 | 0.67 | 0.58 | 40.7 |
| Approach | | 1079 | 0.7 | 0.380 | 15.3 | LOS B | 9.9 | 69.5 | 0.67 | 0.58 | 40.7 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 42 | 2.5 | 0.382 | 39.8 | LOS C | 5.4 | 38.2 | 0.92 | 0.75 | 24.5 |
| 8 | T1 | 96 | 0.0 | 0.382 | 35.2 | LOS C | 5.4 | 38.2 | 0.92 | 0.75 | 30.2 |
| 9 | R2 | 52 | 0.0 | 0.227 | 44.4 | LOS D | 2.1 | 14.9 | 0.94 | 0.74 | 26.6 |
| Approach | | 189 | 0.6 | 0.382 | 38.7 | LOS C | 5.4 | 38.2 | 0.92 | 0.75 | 28.2 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 108 | 1.0 | 0.665 | 23.7 | LOS B | 20.0 | 140.1 | 0.81 | 0.74 | 37.7 |
| 11 | T1 | 1140 | 0.6 | 0.665 | 18.4 | LOS B | 21.0 | 147.1 | 0.81 | 0.73 | 37.9 |
| Approach | | 1248 | 0.6 | 0.665 | 18.9 | LOS B | 21.0 | 147.1 | 0.81 | 0.74 | 37.8 |
| All Vehicles | | 2913 | 0.5 | 0.668 | 22.0 | LOS B | 21.0 | 147.1 | 0.79 | 0.69 | 35.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 15.6 | LOS B | 0.1 | 0.1 | 0.59 | 0.59 |
| P2 | East Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 17.5 | LOS B | 0.1 | 0.1 | 0.62 | 0.62 |
| P4 | West Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 27.9 | LOS C | | | 0.77 | 0.77 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade PM]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 6 | 0.0 | 0.517 | 44.4 | LOS D | 7.4 | 51.5 | 0.96 | 0.78 | 27.2 |
| 2 | T1 | 163 | 0.0 | 0.517 | 39.8 | LOS C | 7.4 | 51.5 | 0.96 | 0.78 | 29.1 |
| 3 | R2 | 51 | 0.0 | 0.431 | 54.2 | LOS D | 2.4 | 17.0 | 1.00 | 0.74 | 23.4 |
| Approach | | 220 | 0.0 | 0.517 | 43.2 | LOS D | 7.4 | 51.5 | 0.97 | 0.77 | 27.7 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 25 | 0.0 | 0.399 | 16.7 | LOS B | 10.6 | 74.4 | 0.58 | 0.52 | 41.2 |
| 5 | T1 | 1314 | 0.5 | 0.399 | 11.5 | LOS A | 11.3 | 79.0 | 0.58 | 0.52 | 38.9 |
| Approach | | 1339 | 0.5 | 0.399 | 11.6 | LOS A | 11.3 | 79.0 | 0.58 | 0.52 | 39.0 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 86 | 1.2 | 0.544 | 44.6 | LOS D | 7.5 | 52.7 | 0.96 | 0.79 | 22.6 |
| 8 | T1 | 85 | 0.0 | 0.544 | 40.0 | LOS C | 7.5 | 52.7 | 0.96 | 0.79 | 28.4 |
| 9 | R2 | 6 | 0.0 | 0.054 | 51.8 | LOS D | 0.3 | 2.0 | 0.96 | 0.65 | 20.1 |
| Approach | | 178 | 0.6 | 0.544 | 42.7 | LOS D | 7.5 | 52.7 | 0.96 | 0.79 | 25.6 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 65 | 0.0 | 0.586 | 18.6 | LOS B | 18.3 | 128.1 | 0.68 | 0.63 | 37.0 |
| 11 | T1 | 1238 | 0.5 | 0.586 | 13.3 | LOS A | 19.4 | 135.6 | 0.68 | 0.62 | 36.7 |
| Approach | | 1303 | 0.5 | 0.586 | 13.6 | LOS A | 19.4 | 135.6 | 0.68 | 0.62 | 36.7 |
| All Vehicles | | 3040 | 0.5 | 0.586 | 16.5 | LOS B | 19.4 | 135.6 | 0.68 | 0.60 | 34.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 11.7 | LOS B | 0.1 | 0.1 | 0.50 | 0.50 |
| P2 | East Full Crossing | 53 | 41.8 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 13.2 | LOS B | 0.1 | 0.1 | 0.53 | 0.53 |
| P4 | West Full Crossing | 53 | 41.8 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 27.1 | LOS C | | | 0.73 | 0.73 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [9. Doncaster Ave/ Day Ave AM]

Doncaster Avenue/ Day Avenue, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 25 | 0.0 | 0.102 | 6.4 | LOS A | 0.5 | 3.7 | 0.54 | 0.62 | 40.4 |
| 2 | T1 | 57 | 0.0 | 0.102 | 6.1 | LOS A | 0.5 | 3.7 | 0.54 | 0.62 | 44.3 |
| 3 | R2 | 6 | 0.0 | 0.102 | 9.1 | LOS A | 0.5 | 3.7 | 0.54 | 0.62 | 41.2 |
| 3u | U | 1 | 0.0 | 0.102 | 10.5 | LOS A | 0.5 | 3.7 | 0.54 | 0.62 | 42.5 |
| Approach | | 89 | 0.0 | 0.102 | 6.4 | LOS A | 0.5 | 3.7 | 0.54 | 0.62 | 43.3 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 12 | 0.0 | 0.288 | 4.2 | LOS A | 1.8 | 12.4 | 0.21 | 0.50 | 41.6 |
| 5 | T1 | 255 | 0.0 | 0.288 | 3.9 | LOS A | 1.8 | 12.4 | 0.21 | 0.50 | 42.2 |
| 6 | R2 | 125 | 0.0 | 0.288 | 7.0 | LOS A | 1.8 | 12.4 | 0.21 | 0.50 | 44.6 |
| 6u | U | 1 | 0.0 | 0.288 | 8.4 | LOS A | 1.8 | 12.4 | 0.21 | 0.50 | 42.8 |
| Approach | | 393 | 0.0 | 0.288 | 4.9 | LOS A | 1.8 | 12.4 | 0.21 | 0.50 | 43.2 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 27 | 0.0 | 0.062 | 4.2 | LOS A | 0.3 | 2.2 | 0.19 | 0.54 | 43.7 |
| 8 | T1 | 11 | 0.0 | 0.062 | 3.9 | LOS A | 0.3 | 2.2 | 0.19 | 0.54 | 44.7 |
| 9 | R2 | 37 | 0.0 | 0.062 | 7.0 | LOS A | 0.3 | 2.2 | 0.19 | 0.54 | 44.2 |
| 9u | U | 1 | 0.0 | 0.062 | 8.4 | LOS A | 0.3 | 2.2 | 0.19 | 0.54 | 46.2 |
| Approach | | 76 | 0.0 | 0.062 | 5.6 | LOS A | 0.3 | 2.2 | 0.19 | 0.54 | 44.1 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 16 | 0.0 | 0.058 | 4.9 | LOS A | 0.3 | 2.0 | 0.36 | 0.50 | 44.0 |
| 11 | T1 | 42 | 0.0 | 0.058 | 4.7 | LOS A | 0.3 | 2.0 | 0.36 | 0.50 | 42.2 |
| 12 | R2 | 2 | 0.0 | 0.058 | 7.7 | LOS A | 0.3 | 2.0 | 0.36 | 0.50 | 42.3 |
| 12u | U | 1 | 0.0 | 0.058 | 9.1 | LOS A | 0.3 | 2.0 | 0.36 | 0.50 | 42.6 |
| Approach | | 61 | 0.0 | 0.058 | 4.9 | LOS A | 0.3 | 2.0 | 0.36 | 0.50 | 42.8 |
| All Vehicles | | 619 | 0.0 | 0.288 | 5.2 | LOS A | 1.8 | 12.4 | 0.27 | 0.52 | 43.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [9. Doncaster Ave/ Day Ave PM]

Doncaster Avenue/ Day Avenue, Kensington
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 4 | 0.0 | 0.017 | 4.9 | LOS A | 0.1 | 0.5 | 0.34 | 0.49 | 41.3 |
| 2 | T1 | 12 | 0.0 | 0.017 | 4.6 | LOS A | 0.1 | 0.5 | 0.34 | 0.49 | 45.0 |
| 3 | R2 | 1 | 0.0 | 0.017 | 7.6 | LOS A | 0.1 | 0.5 | 0.34 | 0.49 | 42.2 |
| 3u | U | 1 | 0.0 | 0.017 | 9.1 | LOS A | 0.1 | 0.5 | 0.34 | 0.49 | 43.4 |
| Approach | | 18 | 0.0 | 0.017 | 5.1 | LOS A | 0.1 | 0.5 | 0.34 | 0.49 | 44.1 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 8 | 0.0 | 0.133 | 4.1 | LOS A | 0.7 | 4.8 | 0.14 | 0.50 | 41.8 |
| 5 | T1 | 109 | 0.0 | 0.133 | 3.8 | LOS A | 0.7 | 4.8 | 0.14 | 0.50 | 42.5 |
| 6 | R2 | 62 | 0.0 | 0.133 | 6.8 | LOS A | 0.7 | 4.8 | 0.14 | 0.50 | 44.8 |
| 6u | U | 1 | 0.0 | 0.133 | 8.3 | LOS A | 0.7 | 4.8 | 0.14 | 0.50 | 43.1 |
| Approach | | 181 | 0.0 | 0.133 | 4.9 | LOS A | 0.7 | 4.8 | 0.14 | 0.50 | 43.5 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 20 | 0.0 | 0.039 | 4.2 | LOS A | 0.2 | 1.3 | 0.18 | 0.53 | 43.9 |
| 8 | T1 | 8 | 0.0 | 0.039 | 3.9 | LOS A | 0.2 | 1.3 | 0.18 | 0.53 | 45.0 |
| 9 | R2 | 18 | 0.0 | 0.039 | 6.9 | LOS A | 0.2 | 1.3 | 0.18 | 0.53 | 44.5 |
| 9u | U | 1 | 0.0 | 0.039 | 8.4 | LOS A | 0.2 | 1.3 | 0.18 | 0.53 | 46.4 |
| Approach | | 47 | 0.0 | 0.039 | 5.3 | LOS A | 0.2 | 1.3 | 0.18 | 0.53 | 44.4 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 16 | 0.0 | 0.055 | 4.3 | LOS A | 0.3 | 1.8 | 0.22 | 0.46 | 44.5 |
| 11 | T1 | 45 | 0.0 | 0.055 | 4.0 | LOS A | 0.3 | 1.8 | 0.22 | 0.46 | 43.0 |
| 12 | R2 | 2 | 0.0 | 0.055 | 7.1 | LOS A | 0.3 | 1.8 | 0.22 | 0.46 | 43.0 |
| 12u | U | 1 | 0.0 | 0.055 | 8.5 | LOS A | 0.3 | 1.8 | 0.22 | 0.46 | 43.4 |
| Approach | | 64 | 0.0 | 0.055 | 4.3 | LOS A | 0.3 | 1.8 | 0.22 | 0.46 | 43.5 |
| All Vehicles | | 311 | 0.0 | 0.133 | 4.8 | LOS A | 0.7 | 4.8 | 0.17 | 0.50 | 43.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St AM]

Houston Rd/ Barker St, Kensington

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 14 | 0.0 | 0.292 | 4.5 | LOS A | 2.1 | 14.5 | 0.34 | 0.52 | 44.3 |
| 2 | T1 | 222 | 0.0 | 0.292 | 4.4 | LOS A | 2.1 | 14.5 | 0.34 | 0.52 | 44.0 |
| 3 | R2 | 116 | 0.0 | 0.292 | 7.6 | LOS A | 2.1 | 14.5 | 0.34 | 0.52 | 42.9 |
| 3u | U | 8 | 0.0 | 0.292 | 9.1 | LOS A | 2.1 | 14.5 | 0.34 | 0.52 | 48.3 |
| Approach | | 361 | 0.0 | 0.292 | 5.5 | LOS A | 2.1 | 14.5 | 0.34 | 0.52 | 43.8 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 38 | 0.0 | 0.135 | 4.5 | LOS A | 0.6 | 4.3 | 0.25 | 0.55 | 42.1 |
| 5 | T1 | 52 | 0.0 | 0.135 | 4.4 | LOS A | 0.6 | 4.3 | 0.25 | 0.55 | 43.0 |
| 6 | R2 | 60 | 0.0 | 0.135 | 7.6 | LOS A | 0.6 | 4.3 | 0.25 | 0.55 | 39.7 |
| 6u | U | 3 | 0.0 | 0.135 | 9.1 | LOS A | 0.6 | 4.3 | 0.25 | 0.55 | 18.4 |
| Approach | | 152 | 0.0 | 0.135 | 5.8 | LOS A | 0.6 | 4.3 | 0.25 | 0.55 | 41.1 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 24 | 0.0 | 0.117 | 6.9 | LOS A | 0.7 | 4.7 | 0.65 | 0.68 | 36.9 |
| 8 | T1 | 62 | 0.0 | 0.117 | 6.8 | LOS A | 0.7 | 4.7 | 0.65 | 0.68 | 43.1 |
| 9 | R2 | 4 | 0.0 | 0.117 | 10.1 | LOS A | 0.7 | 4.7 | 0.65 | 0.68 | 42.5 |
| 9u | U | 1 | 0.0 | 0.117 | 11.5 | LOS A | 0.7 | 4.7 | 0.65 | 0.68 | 42.1 |
| Approach | | 90 | 0.0 | 0.117 | 7.0 | LOS A | 0.7 | 4.7 | 0.65 | 0.68 | 41.9 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 23 | 0.0 | 0.487 | 7.2 | LOS A | 3.6 | 25.0 | 0.71 | 0.74 | 41.2 |
| 11 | T1 | 351 | 0.0 | 0.487 | 7.1 | LOS A | 3.6 | 25.0 | 0.71 | 0.74 | 41.3 |
| 12 | R2 | 63 | 0.0 | 0.487 | 10.3 | LOS A | 3.6 | 25.0 | 0.71 | 0.74 | 43.9 |
| 12u | U | 1 | 0.0 | 0.487 | 11.8 | LOS A | 3.6 | 25.0 | 0.71 | 0.74 | 46.6 |
| Approach | | 438 | 0.0 | 0.487 | 7.6 | LOS A | 3.6 | 25.0 | 0.71 | 0.74 | 41.8 |
| All Vehicles | | 1041 | 0.0 | 0.487 | 6.6 | LOS A | 3.6 | 25.0 | 0.51 | 0.63 | 42.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St PM]

Houston Rd/ Barker St, Kensington

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 4 | 0.0 | 0.107 | 4.5 | LOS A | 0.6 | 4.4 | 0.33 | 0.50 | 44.4 |
| 2 | T1 | 84 | 0.0 | 0.107 | 4.4 | LOS A | 0.6 | 4.4 | 0.33 | 0.50 | 44.2 |
| 3 | R2 | 31 | 0.0 | 0.107 | 7.6 | LOS A | 0.6 | 4.4 | 0.33 | 0.50 | 43.2 |
| 3u | U | 2 | 0.0 | 0.107 | 9.1 | LOS A | 0.6 | 4.4 | 0.33 | 0.50 | 48.5 |
| Approach | | 121 | 0.0 | 0.107 | 5.3 | LOS A | 0.6 | 4.4 | 0.33 | 0.50 | 44.1 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 76 | 0.0 | 0.196 | 4.8 | LOS A | 0.9 | 6.4 | 0.29 | 0.56 | 42.1 |
| 5 | T1 | 67 | 0.0 | 0.196 | 4.7 | LOS A | 0.9 | 6.4 | 0.29 | 0.56 | 43.0 |
| 6 | R2 | 59 | 0.0 | 0.196 | 7.9 | LOS A | 0.9 | 6.4 | 0.29 | 0.56 | 39.7 |
| 6u | U | 12 | 0.0 | 0.196 | 9.4 | LOS A | 0.9 | 6.4 | 0.29 | 0.56 | 18.4 |
| Approach | | 214 | 0.0 | 0.196 | 5.9 | LOS A | 0.9 | 6.4 | 0.29 | 0.56 | 40.3 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 26 | 0.0 | 0.121 | 5.3 | LOS A | 0.6 | 4.5 | 0.47 | 0.55 | 38.4 |
| 8 | T1 | 91 | 0.0 | 0.121 | 5.2 | LOS A | 0.6 | 4.5 | 0.47 | 0.55 | 44.1 |
| 9 | R2 | 1 | 0.0 | 0.121 | 8.4 | LOS A | 0.6 | 4.5 | 0.47 | 0.55 | 43.6 |
| 9u | U | 2 | 0.0 | 0.121 | 9.9 | LOS A | 0.6 | 4.5 | 0.47 | 0.55 | 43.6 |
| Approach | | 120 | 0.0 | 0.121 | 5.3 | LOS A | 0.6 | 4.5 | 0.47 | 0.55 | 43.3 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 24 | 0.0 | 0.241 | 4.9 | LOS A | 1.4 | 10.1 | 0.41 | 0.56 | 42.4 |
| 11 | T1 | 158 | 0.0 | 0.241 | 4.8 | LOS A | 1.4 | 10.1 | 0.41 | 0.56 | 42.7 |
| 12 | R2 | 74 | 0.0 | 0.241 | 8.0 | LOS A | 1.4 | 10.1 | 0.41 | 0.56 | 44.8 |
| 12u | U | 9 | 0.0 | 0.241 | 9.5 | LOS A | 1.4 | 10.1 | 0.41 | 0.56 | 47.7 |
| Approach | | 265 | 0.0 | 0.241 | 5.9 | LOS A | 1.4 | 10.1 | 0.41 | 0.56 | 43.6 |
| All Vehicles | | 720 | 0.0 | 0.241 | 5.7 | LOS A | 1.4 | 10.1 | 0.37 | 0.55 | 42.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [8. Houston Rd/ Borrodale Rd AM]

Houston Road/ Borrodale Road, Kingsford
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 20 | 0.0 | 0.190 | 4.0 | LOS A | 1.0 | 7.2 | 0.29 | 0.44 | 48.3 |
| 2 | T1 | 181 | 0.0 | 0.190 | 4.1 | LOS A | 1.0 | 7.2 | 0.29 | 0.44 | 54.4 |
| 3 | R2 | 33 | 0.0 | 0.190 | 9.8 | LOS A | 1.0 | 7.2 | 0.29 | 0.44 | 44.5 |
| Approach | | 234 | 0.0 | 0.190 | 4.9 | LOS A | 1.0 | 7.2 | 0.29 | 0.44 | 52.7 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 60 | 0.0 | 0.133 | 2.6 | LOS A | 0.7 | 4.9 | 0.24 | 0.40 | 46.4 |
| 5 | T1 | 63 | 0.0 | 0.133 | 2.4 | LOS A | 0.7 | 4.9 | 0.24 | 0.40 | 48.4 |
| 6 | R2 | 44 | 0.0 | 0.133 | 7.8 | LOS A | 0.7 | 4.9 | 0.24 | 0.40 | 53.1 |
| Approach | | 167 | 0.0 | 0.133 | 3.9 | LOS A | 0.7 | 4.9 | 0.24 | 0.40 | 49.0 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 5 | 0.0 | 0.030 | 4.5 | LOS A | 0.2 | 1.1 | 0.41 | 0.47 | 49.3 |
| 8 | T1 | 23 | 0.0 | 0.030 | 4.7 | LOS A | 0.2 | 1.1 | 0.41 | 0.47 | 53.8 |
| 9 | R2 | 3 | 0.0 | 0.030 | 10.4 | LOS B | 0.2 | 1.1 | 0.41 | 0.47 | 52.1 |
| Approach | | 32 | 0.0 | 0.030 | 5.2 | LOS A | 0.2 | 1.1 | 0.41 | 0.47 | 52.9 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 108 | 0.0 | 0.312 | 3.9 | LOS A | 1.9 | 13.0 | 0.49 | 0.50 | 49.2 |
| 11 | T1 | 164 | 0.0 | 0.312 | 3.6 | LOS A | 1.9 | 13.0 | 0.49 | 0.50 | 47.5 |
| 12 | R2 | 55 | 0.0 | 0.312 | 9.1 | LOS A | 1.9 | 13.0 | 0.49 | 0.50 | 49.5 |
| Approach | | 327 | 0.0 | 0.312 | 4.6 | LOS A | 1.9 | 13.0 | 0.49 | 0.50 | 48.5 |
| All Vehicles | | 760 | 0.0 | 0.312 | 4.6 | LOS A | 1.9 | 13.0 | 0.37 | 0.46 | 49.9 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [8. Houston Rd/ Borrodale Rd PM]

Houston Road/ Borrodale Road, Kingsford
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 15 | 0.0 | 0.104 | 3.5 | LOS A | 0.5 | 3.7 | 0.14 | 0.42 | 48.8 |
| 2 | T1 | 99 | 0.0 | 0.104 | 3.7 | LOS A | 0.5 | 3.7 | 0.14 | 0.42 | 55.2 |
| 3 | R2 | 28 | 0.0 | 0.104 | 9.3 | LOS A | 0.5 | 3.7 | 0.14 | 0.42 | 45.4 |
| Approach | | 142 | 0.0 | 0.104 | 4.8 | LOS A | 0.5 | 3.7 | 0.14 | 0.42 | 52.8 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 35 | 0.0 | 0.057 | 2.6 | LOS A | 0.3 | 1.9 | 0.23 | 0.39 | 46.9 |
| 5 | T1 | 20 | 0.0 | 0.057 | 2.4 | LOS A | 0.3 | 1.9 | 0.23 | 0.39 | 48.7 |
| 6 | R2 | 14 | 0.0 | 0.057 | 7.9 | LOS A | 0.3 | 1.9 | 0.23 | 0.39 | 53.8 |
| Approach | | 68 | 0.0 | 0.057 | 3.6 | LOS A | 0.3 | 1.9 | 0.23 | 0.39 | 49.0 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 5 | 0.0 | 0.023 | 4.4 | LOS A | 0.1 | 0.9 | 0.38 | 0.42 | 49.7 |
| 8 | T1 | 44 | 0.0 | 0.023 | 2.8 | LOS A | 0.1 | 0.9 | 0.38 | 0.32 | 45.7 |
| 9 | R2 | 1 | 0.0 | 0.023 | 10.1 | LOS B | 0.1 | 0.9 | 0.38 | 0.42 | 52.5 |
| Approach | | 51 | 0.0 | 0.023 | 3.1 | LOS A | 0.1 | 0.9 | 0.38 | 0.33 | 44.5 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 100 | 0.0 | 0.242 | 3.0 | LOS A | 1.3 | 9.4 | 0.34 | 0.42 | 49.7 |
| 11 | T1 | 137 | 0.0 | 0.242 | 2.8 | LOS A | 1.3 | 9.4 | 0.34 | 0.42 | 48.2 |
| 12 | R2 | 54 | 0.0 | 0.242 | 8.2 | LOS A | 1.3 | 9.4 | 0.34 | 0.42 | 50.2 |
| Approach | | 291 | 0.0 | 0.242 | 3.9 | LOS A | 1.3 | 9.4 | 0.34 | 0.42 | 49.2 |
| All Vehicles | | 552 | 0.0 | 0.242 | 4.0 | LOS A | 1.3 | 9.4 | 0.28 | 0.41 | 49.5 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 34 | 0.0 | 0.057 | 29.7 | LOS C | 1.1 | 7.9 | 0.72 | 0.69 | 24.5 |
| 2 | T1 | 212 | 0.0 | 0.339 | 27.9 | LOS B | 7.9 | 55.2 | 0.81 | 0.67 | 28.4 |
| 3 | R2 | 139 | 0.8 | 0.383 | 38.8 | LOS C | 5.7 | 40.5 | 0.88 | 0.78 | 17.7 |
| Approach | | 384 | 0.3 | 0.383 | 32.0 | LOS C | 7.9 | 55.2 | 0.82 | 0.71 | 23.9 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 16 | 0.0 | 0.392 | 18.5 | LOS B | 11.2 | 78.3 | 0.60 | 0.54 | 31.6 |
| 5 | T1 | 1252 | 0.0 | 0.392 | 13.2 | LOS A | 11.6 | 81.3 | 0.60 | 0.53 | 33.1 |
| Approach | | 1267 | 0.0 | 0.392 | 13.2 | LOS A | 11.6 | 81.3 | 0.60 | 0.53 | 33.1 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 11 | 10.0 | 0.019 | 30.3 | LOS C | 0.3 | 2.6 | 0.71 | 0.66 | 21.9 |
| 8 | T1 | 20 | 0.0 | 0.213 | 33.8 | LOS C | 2.9 | 20.0 | 0.83 | 0.74 | 24.0 |
| 9 | R2 | 53 | 0.0 | 0.213 | 38.1 | LOS C | 2.9 | 20.0 | 0.83 | 0.74 | 23.1 |
| Approach | | 83 | 1.3 | 0.213 | 36.1 | LOS C | 2.9 | 20.0 | 0.82 | 0.73 | 23.2 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 26 | 0.0 | 0.211 | 17.2 | LOS B | 5.5 | 38.4 | 0.53 | 0.48 | 38.0 |
| 11 | T1 | 656 | 0.0 | 0.211 | 11.6 | LOS A | 5.5 | 38.6 | 0.53 | 0.46 | 34.8 |
| 12 | R2 | 1 | 100.0 | 0.211 | 17.7 | LOS B | 5.4 | 37.7 | 0.53 | 0.45 | 37.1 |
| Approach | | 683 | 0.2 | 0.211 | 11.9 | LOS A | 5.5 | 38.6 | 0.53 | 0.46 | 34.9 |
| All Vehicles | | 2418 | 0.1 | 0.392 | 16.6 | LOS B | 11.6 | 81.3 | 0.63 | 0.55 | 30.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 14.6 | LOS B | 0.1 | 0.1 | 0.54 | 0.54 |
| P2 | East Full Crossing | 53 | 36.2 | LOS D | 0.1 | 0.1 | 0.85 | 0.85 |
| P3 | North Full Crossing | 53 | 13.0 | LOS B | 0.1 | 0.1 | 0.51 | 0.51 |
| P4 | West Full Crossing | 53 | 36.2 | LOS D | 0.1 | 0.1 | 0.85 | 0.85 |
| All Pedestrians | | 211 | 25.0 | LOS C | | | 0.69 | 0.69 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres PM]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 21 | 0.0 | 0.065 | 41.5 | LOS C | 0.9 | 6.0 | 0.86 | 0.69 | 20.3 |
| 2 | T1 | 87 | 0.0 | 0.249 | 38.5 | LOS C | 3.7 | 26.0 | 0.90 | 0.70 | 23.9 |
| 3 | R2 | 21 | 0.0 | 0.087 | 43.9 | LOS D | 0.9 | 6.3 | 0.88 | 0.70 | 16.3 |
| Approach | | 129 | 0.0 | 0.249 | 39.9 | LOS C | 3.7 | 26.0 | 0.89 | 0.70 | 22.1 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 46 | 0.0 | 0.065 | 10.3 | LOS A | 1.3 | 9.1 | 0.33 | 0.48 | 37.6 |
| 5 | T1 | 921 | 0.0 | 0.323 | 6.1 | LOS A | 8.2 | 57.2 | 0.41 | 0.37 | 43.4 |
| Approach | | 967 | 0.0 | 0.323 | 6.3 | LOS A | 8.2 | 57.2 | 0.41 | 0.38 | 43.1 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 7 | 14.3 | 0.024 | 42.2 | LOS C | 0.3 | 2.3 | 0.85 | 0.66 | 17.8 |
| 8 | T1 | 38 | 0.0 | 0.311 | 41.7 | LOS C | 3.5 | 24.7 | 0.92 | 0.75 | 21.7 |
| 9 | R2 | 42 | 0.0 | 0.311 | 46.0 | LOS D | 3.5 | 24.7 | 0.92 | 0.75 | 20.9 |
| Approach | | 87 | 1.2 | 0.311 | 43.8 | LOS D | 3.5 | 24.7 | 0.91 | 0.75 | 21.0 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 47 | 0.0 | 0.236 | 11.2 | LOS A | 5.5 | 38.5 | 0.38 | 0.39 | 44.8 |
| 11 | T1 | 911 | 0.0 | 0.236 | 5.7 | LOS A | 5.5 | 38.7 | 0.38 | 0.35 | 44.0 |
| 12 | R2 | 1 | 100.0 | 0.236 | 11.7 | LOS A | 5.4 | 38.2 | 0.38 | 0.34 | 44.0 |
| Approach | | 959 | 0.1 | 0.236 | 6.0 | LOS A | 5.5 | 38.7 | 0.38 | 0.35 | 44.0 |
| All Vehicles | | 2143 | 0.1 | 0.323 | 9.7 | LOS A | 8.2 | 57.2 | 0.45 | 0.40 | 38.0 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Movement Performance - Pedestrians | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1 | South Full Crossing | 53 | 8.0 | LOS A | 0.1 | 0.1 | 0.40 | 0.40 |
| P2 | East Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 6.9 | LOS A | 0.1 | 0.1 | 0.37 | 0.37 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 25.9 | LOS C | | | 0.66 | 0.66 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [6a. Bunnerong Rd/ General Bridges Cres AM ]

Bunnerong Rd/ General Bridges Cres, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Bunnerong Rd - S | | | | | | | | | | | |
| 1 | L2 | 75 | 0.0 | 0.136 | 5.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.17 | 35.0 |
| 2 | T1 | 454 | 0.0 | 0.136 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.07 | 57.6 |
| Approach | | 528 | 0.0 | 0.136 | 0.8 | NA | 0.0 | 0.0 | 0.00 | 0.08 | 53.4 |
| West: General Bridges Cres - W | | | | | | | | | | | |
| 10 | L2 | 285 | 0.0 | 0.205 | 4.8 | LOS A | 0.9 | 6.5 | 0.31 | 0.54 | 32.0 |
| Approach | | 285 | 0.0 | 0.205 | 4.8 | LOS A | 0.9 | 6.5 | 0.31 | 0.54 | 32.0 |
| All Vehicles | | 814 | 0.0 | 0.205 | 2.2 | NA | 0.9 | 6.5 | 0.11 | 0.25 | 45.6 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [6a. Bunnerong Rd/ General Bridges Cres PM]

Bunnerong Rd/ General Bridges Cres, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Bunnerong Rd - S | | | | | | | | | | | |
| 1 | L2 | 75 | 0.0 | 0.136 | 5.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.17 | 35.0 |
| 2 | T1 | 454 | 0.0 | 0.136 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.07 | 57.6 |
| Approach | | 528 | 0.0 | 0.136 | 0.8 | NA | 0.0 | 0.0 | 0.00 | 0.08 | 53.4 |
| West: General Bridges Cres - W | | | | | | | | | | | |
| 10 | L2 | 285 | 0.0 | 0.205 | 4.8 | LOS A | 0.9 | 6.5 | 0.31 | 0.54 | 32.0 |
| Approach | | 285 | 0.0 | 0.205 | 4.8 | LOS A | 0.9 | 6.5 | 0.31 | 0.54 | 32.0 |
| All Vehicles | | 814 | 0.0 | 0.205 | 2.2 | NA | 0.9 | 6.5 | 0.11 | 0.25 | 45.6 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [6b. Bunnerong Rd/ Sturt St AM]

Bunnerong Rd/ Sturt St, Kingsford
Stop (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| East: Sturt St - E | | | | | | | | | | | |
| 4 | L2 | 21 | 0.0 | 0.015 | 7.5 | LOS A | 0.1 | 0.4 | 0.07 | 0.94 | 44.7 |
| Approach | | 21 | 0.0 | 0.015 | 7.5 | LOS A | 0.1 | 0.4 | 0.07 | 0.94 | 44.7 |
| North: Bunnerong Rd - N | | | | | | | | | | | |
| 7 | L2 | 21 | 0.0 | 0.021 | 5.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.31 | 47.0 |
| 8 | T1 | 428 | 0.0 | 0.105 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 59.7 |
| Approach | | 449 | 0.0 | 0.105 | 0.3 | NA | 0.0 | 0.0 | 0.00 | 0.03 | 59.3 |
| All Vehicles | | 471 | 0.0 | 0.105 | 0.6 | NA | 0.1 | 0.4 | 0.00 | 0.07 | 58.3 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [6b. Bunnerong Rd/ Sturt St PM]

Bunnerong Rd/ Sturt St, Kingsford
Stop (Two-Way)

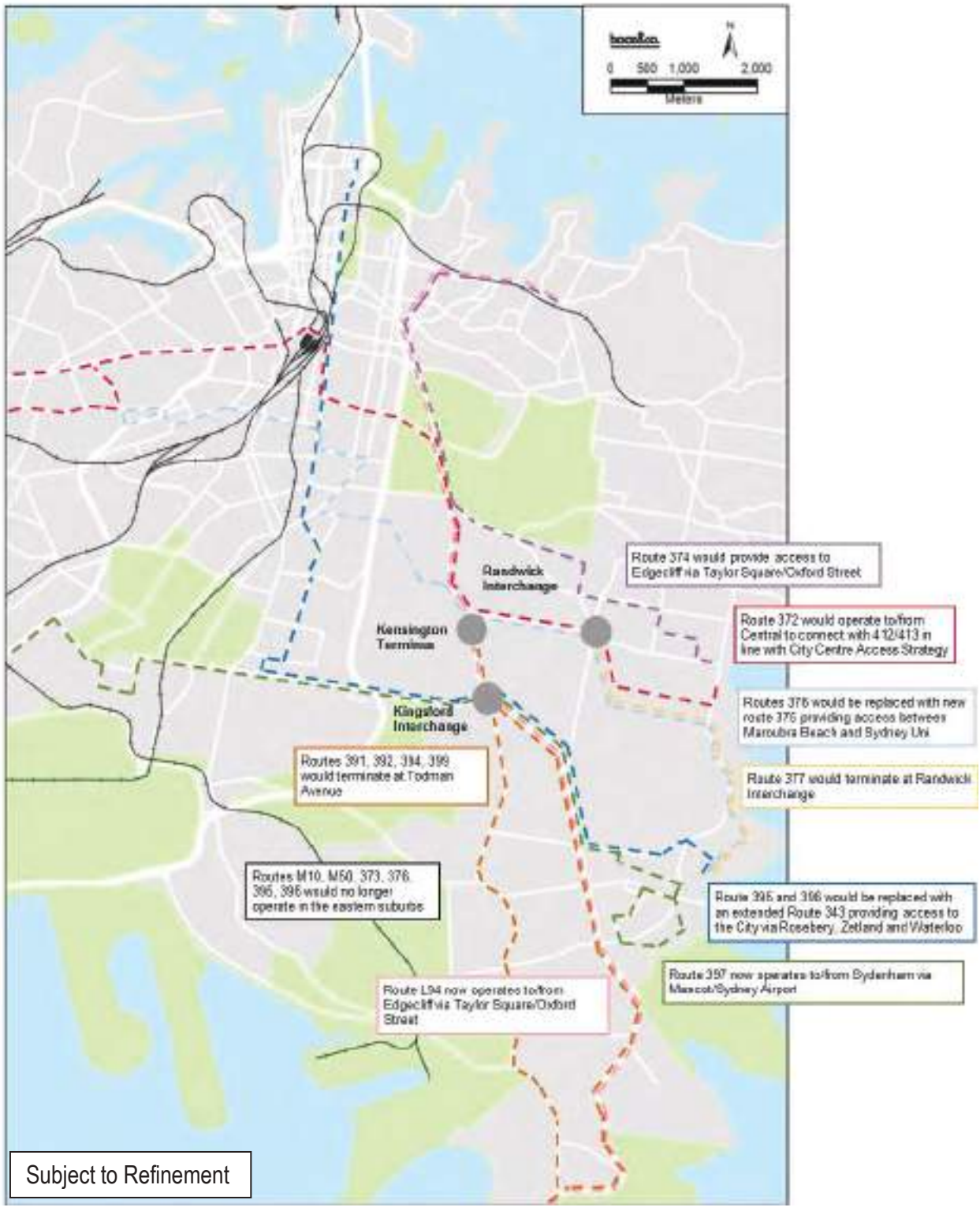
| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| East: Sturt St - E | | | | | | | | | | | |
| 4 | L2 | 21 | 0.0 | 0.015 | 7.6 | LOS A | 0.1 | 0.4 | 0.12 | 0.91 | 44.7 |
| Approach | | 21 | 0.0 | 0.015 | 7.6 | LOS A | 0.1 | 0.4 | 0.12 | 0.91 | 44.7 |
| North: Bunnerong Rd - N | | | | | | | | | | | |
| 7 | L2 | 21 | 0.0 | 0.032 | 5.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.20 | 49.4 |
| 8 | T1 | 675 | 0.0 | 0.162 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 59.7 |
| Approach | | 696 | 0.0 | 0.162 | 0.2 | NA | 0.0 | 0.0 | 0.00 | 0.02 | 59.5 |
| All Vehicles | | 717 | 0.0 | 0.162 | 0.4 | NA | 0.1 | 0.4 | 0.00 | 0.04 | 58.8 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# Appendix B

## Bus Route Alteration Details from CSELR EIS

**Figure 4-2: Proposed Key South East Bus Network Changes (AM Peak inbound)[99]**




[99] *Note: Only illustrates bus routes changed. Those bus routes not mentioned should be assumed to continue operating on their existing routes.*

**Table 4-1: South East Bus Network Scenario Route Changes (AM Peak)**

| Route Number | Old Route | New Route |
|---|---|---|
| **372** | Coogee-Railway Square via Cleveland Street | Coogee-Railway Square via Cleveland Street, through-routed with 412/413 to align with the city centre bus network redesign |
| **373** | Coogee-Circular Quay via Oxford Street | Route cancelled |
| **374** | Coogee-Circular Quay via Foveaux Street | Operates existing route to Anzac Parade, then travels to Edgecliff via Darlinghurst Road and William Street (subject to detailed implementation planning on routing) |
| **375** | N/A | New service operating Maroubra Beach-Sydney University via Randwick Junction, High Street and Todman Avenue |
| **376** | Maroubra Beach-Circular Quay via Marine Parade, Alison Road and Foveaux Street | Route cancelled, replaced with 375 |
| **377** | Maroubra Beach-Circular Quay via Marine Parade, Alison Road and Oxford Street | Operates existing route to Alison Road via Belmore Road and terminates |
| **395/396** | Maroubra Beach-City via Maroubra Junction and Anzac Parade | Routes cancelled, to be replaced with extended Route 343 |
| **343** | Kingsford-City via Gardeners Road and Elizabeth Street | Route extended to operate to/from Maroubra Beach along old 395/396 alignment |
| **397** | South Maroubra-City via Anzac Parade | Operates existing route to Kingsford interchange, then Gardeners Road to Sydenham via Mascot/Sydney Airport |
| **M10** | Metrobus route between Maroubra Junction and Leichhardt | No longer operates in the eastern suburbs to align with the city centre bus network redesign |
| **M50** | Metrobus route between Drummoyne and Coogee | No longer operates in the eastern suburbs to align with the city centre bus network redesign |
| **391** | La Perouse-City via Bunnerong Road and Anzac Parade | Operates existing route to Todman Avenue, Kensington and terminates |
| **392** | Little Bay-City via Anzac Parade | Operates existing route to Todman Avenue, Kensington and terminates |
| **393** | La Perouse-City via Bunnerong Road and Anzac Parade | Operates existing route to Todman Avenue, Kensington and terminates |
| **394** | La Perouse-City via Bunnerong Road and Anzac Parade | Operates existing route to Todman Avenue, Kensington and terminates |
| **399** | Little Bay-City via Anzac Parade | Operates existing route to Todman Avenue, Kensington and terminates |
| **L94** | La Perouse-City via Bunnerong Road and Anzac Parade | Operates existing route to Anzac Parade, then travels to Edgecliff via Darlinghurst Road and William Street (subject to detailed implementation planning on routing) |

# Appendix C

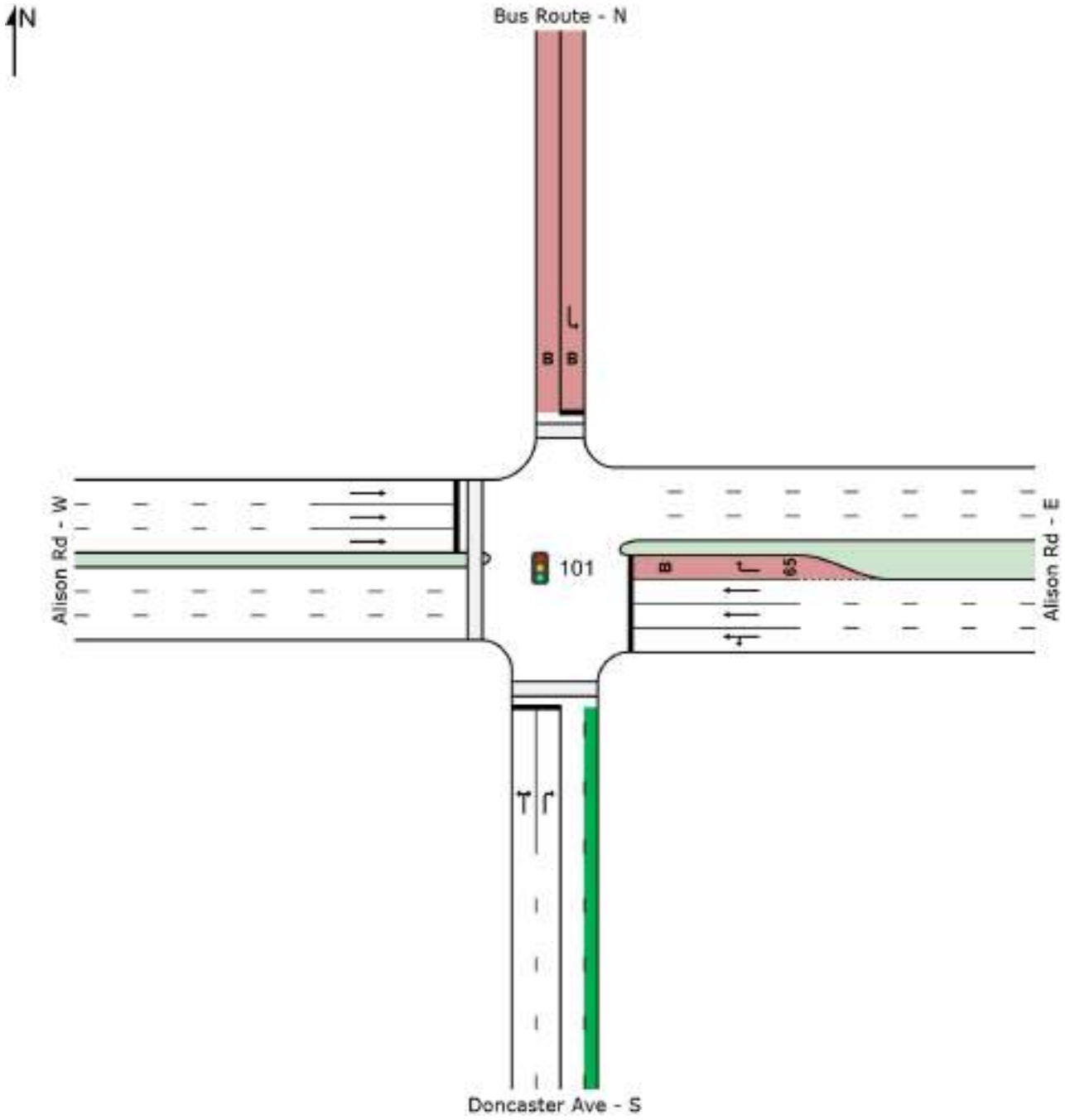
## Post-development SIDRA Layouts and Summary

# SITE LAYOUT

## Site: 101 [1. Alison Rd/ Doncaster Ave AM - Design]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated

Proposed Layout



# PHASING SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave AM - Design]

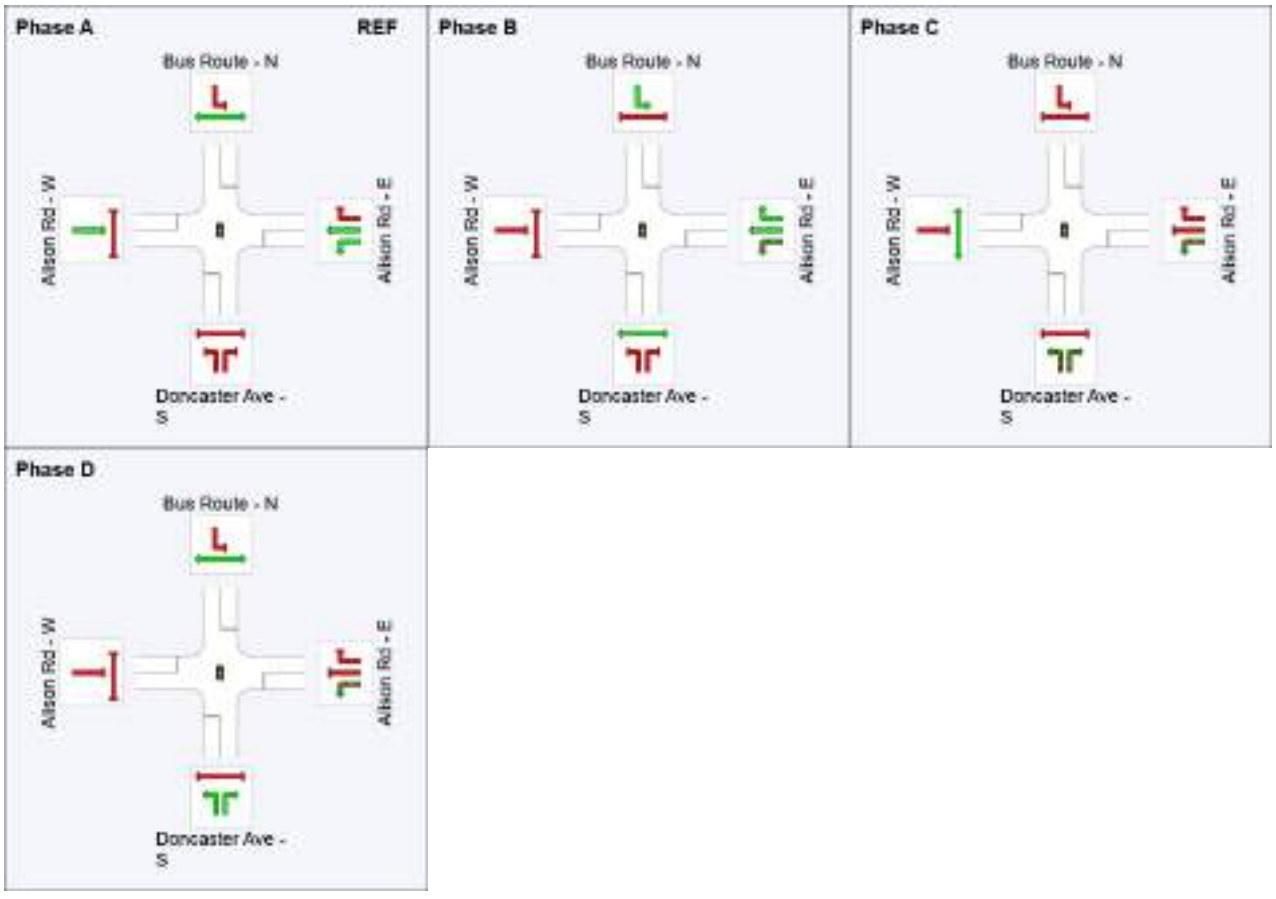
Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 0 | 50 | 66 | 88 |
| Green Time (sec) | 44 | 10 | 16 | 6 |
| Phase Time (sec) | 50 | 16 | 22 | 12 |
| Phase Split | 50% | 16% | 22% | 12% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave PM - Design]

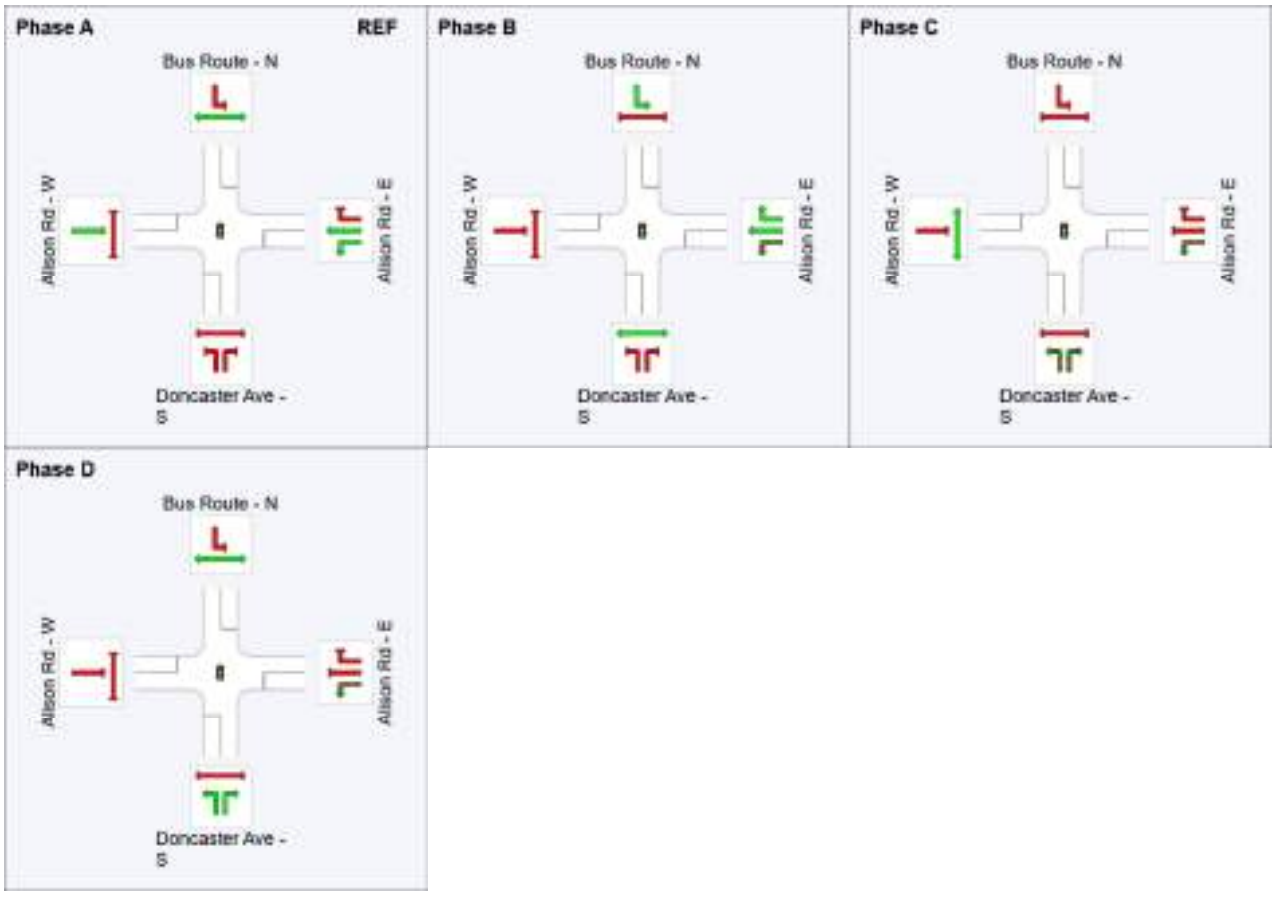
Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C, D**
**Output Phase Sequence: A, B, C, D**

**Phase Timing Results**

| Phase | A | B | C | D |
|---|---|---|---|---|
| Phase Change Time (sec) | 0 | 50 | 66 | 88 |
| Green Time (sec) | 44 | 10 | 16 | 6 |
| Phase Time (sec) | 50 | 16 | 22 | 12 |
| Phase Split | 50% | 16% | 22% | 12% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



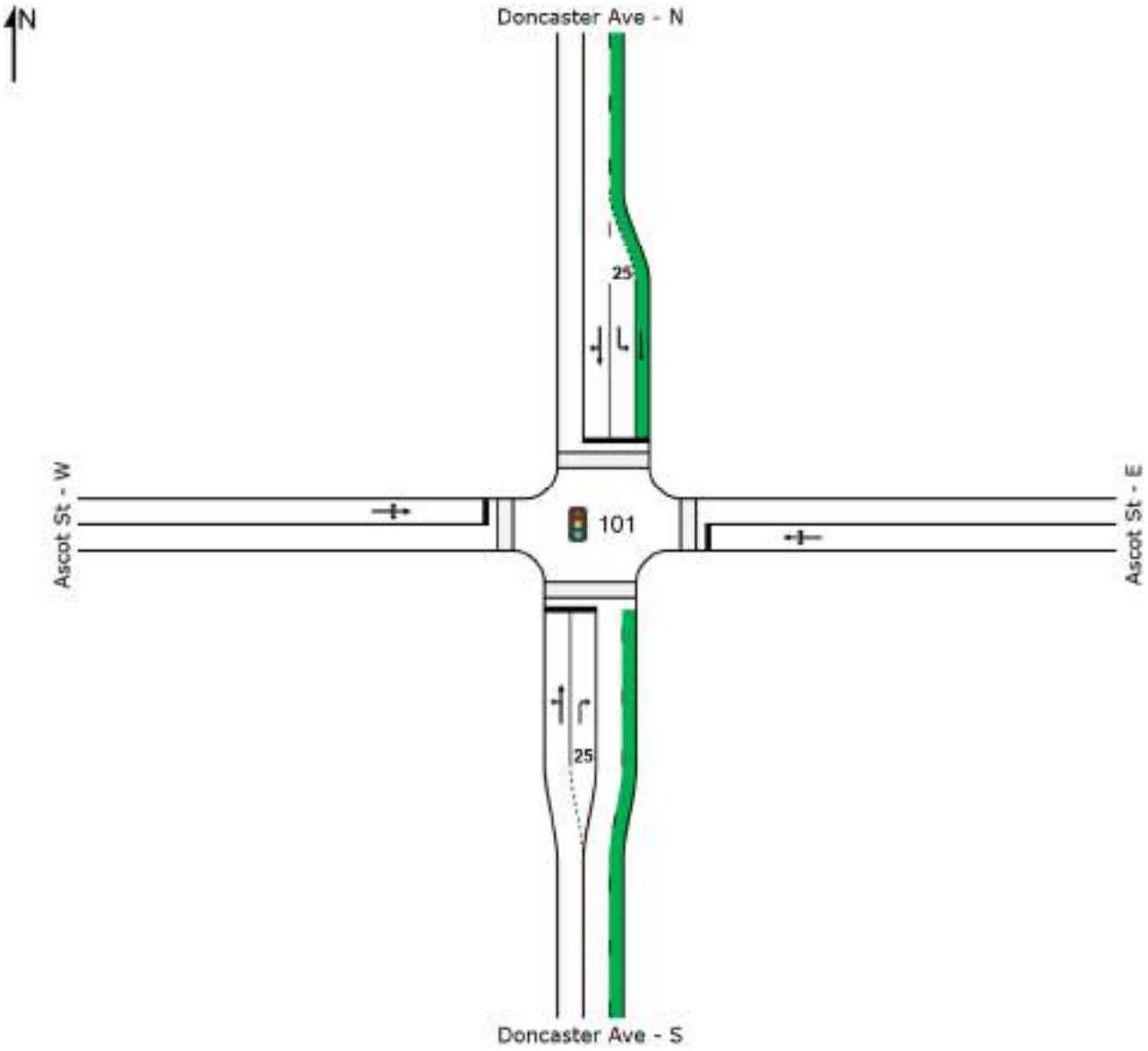

REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101 [7. Doncaster Ave/ Ascot St AM - Design]

Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated



# PHASING SUMMARY

## Site: 101 [7. Doncaster Ave/ Ascot St AM - Design]

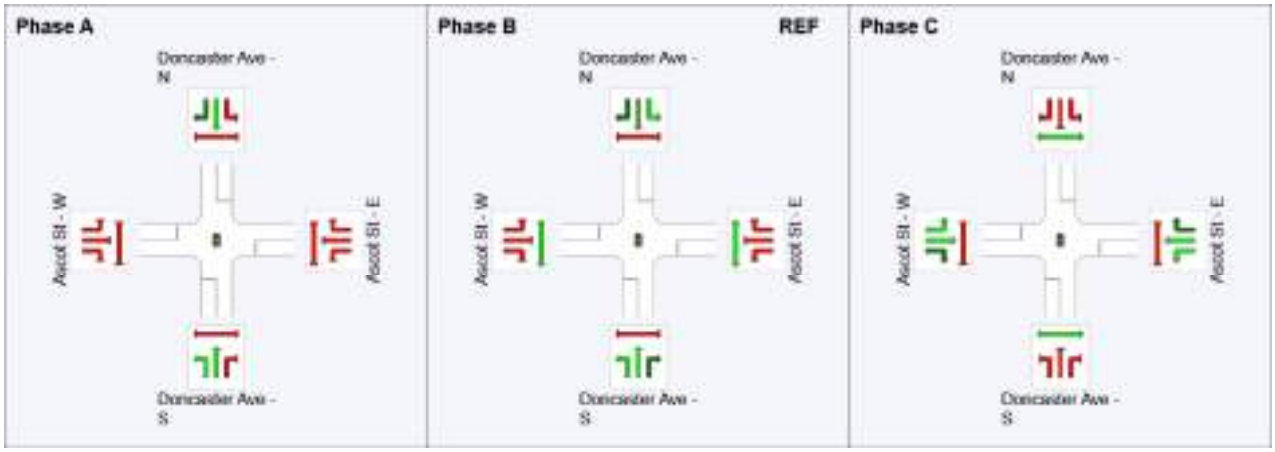
Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Phase Times)

**Phase Times specified by the user**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase B**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 33 | 0 | 16 |
| Green Time (sec) | 53 | 10 | 11 |
| Phase Time (sec) | 59 | 16 | 15 |
| Phase Split | 66% | 18% | 17% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [7. Doncaster Ave/ Ascot St PM - Design]

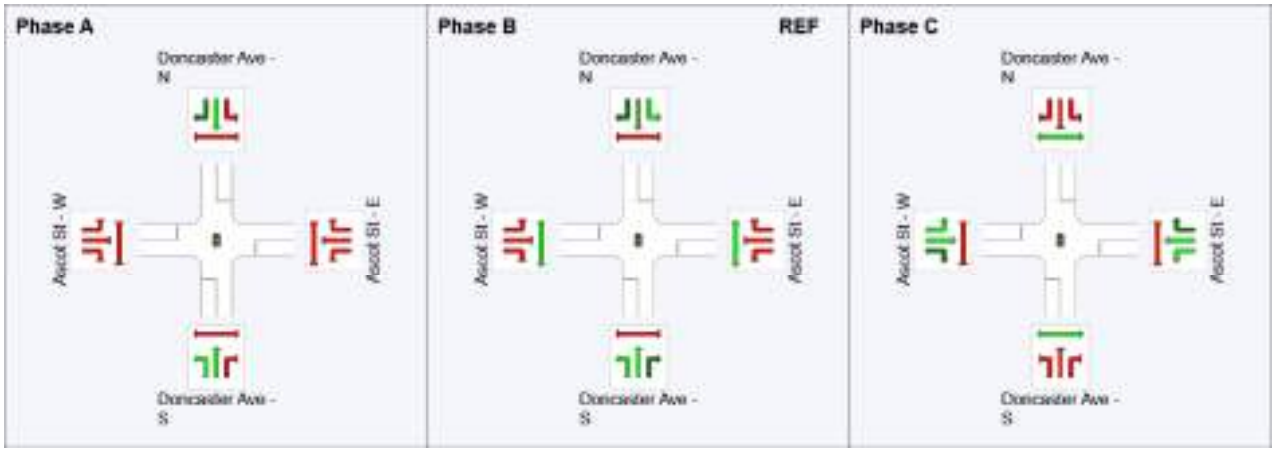
Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase B**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 59 | 0 | 44 |
| Green Time (sec) | 25 | 38 | 9 |
| Phase Time (sec) | 31 | 44 | 15 |
| Phase Split | 34% | 49% | 17% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



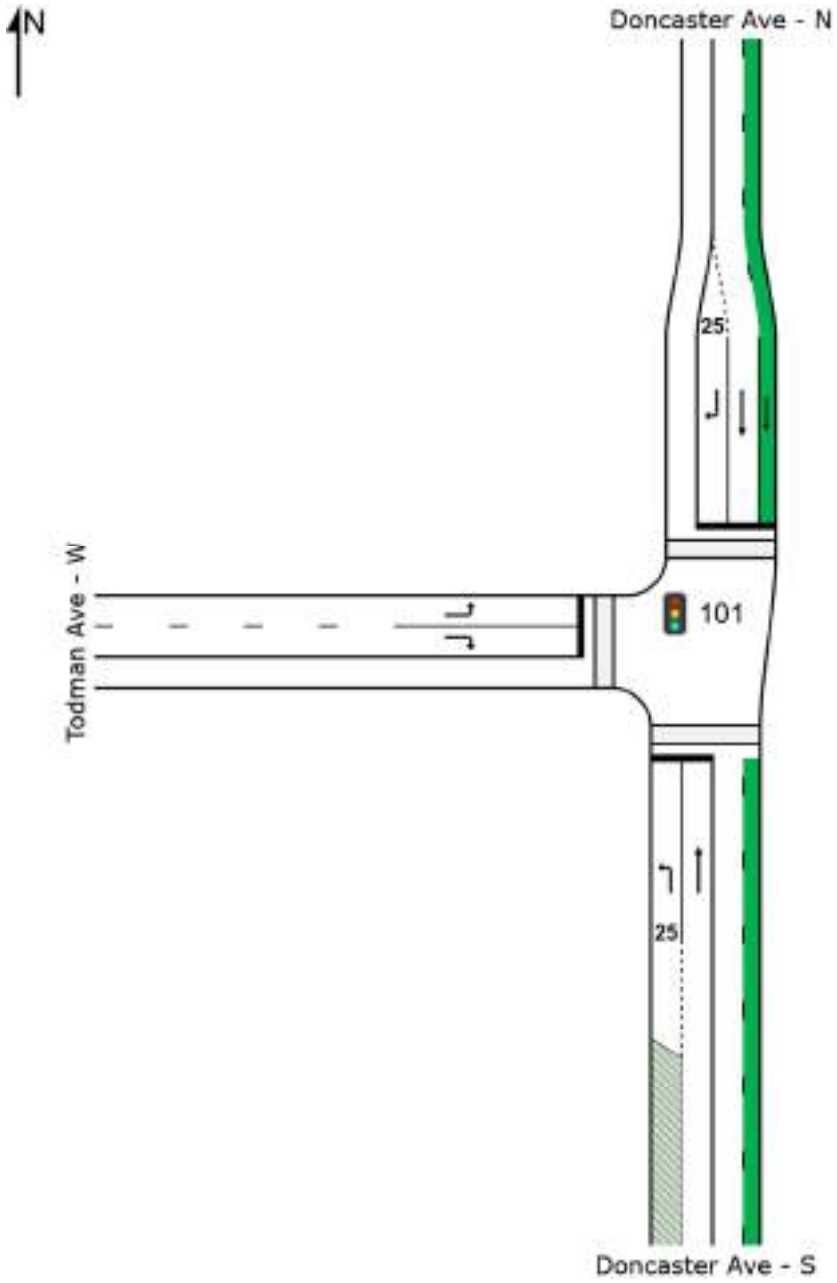

REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101 [2. Doncaster Ave/ Todman Ave AM - Design]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated



# PHASING SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM - Design - Check1_TCS]

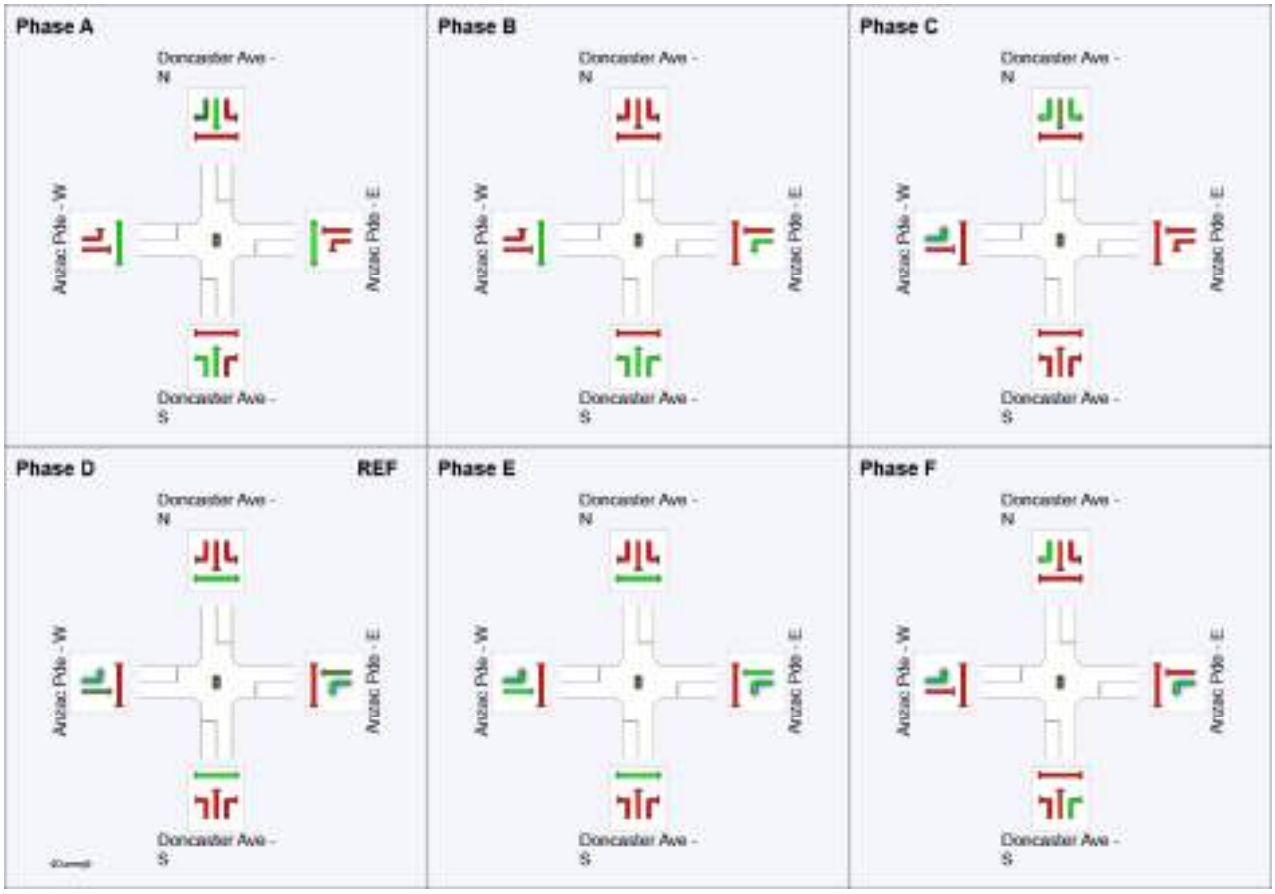
Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

**Phase Times determined by the program**
**Phase Sequence: TCS plan**
**Reference Phase: Phase D**
**Input Phase Sequence: A, B, C, D, E, E1*, E2*, F, F1*, F2***
**Output Phase Sequence: A, B, C, D, E, F**
(* Variable Phase)

**Phase Timing Results**

| Phase | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| Phase Change Time (sec) | 57 | 81 | 97 | 0 | 12 | 45 |
| Green Time (sec) | 18 | 10 | 7 | 6 | 27 | 6 |
| Phase Time (sec) | 24 | 16 | 13 | 12 | 33 | 12 |
| Phase Split | 22% | 15% | 12% | 11% | 30% | 11% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

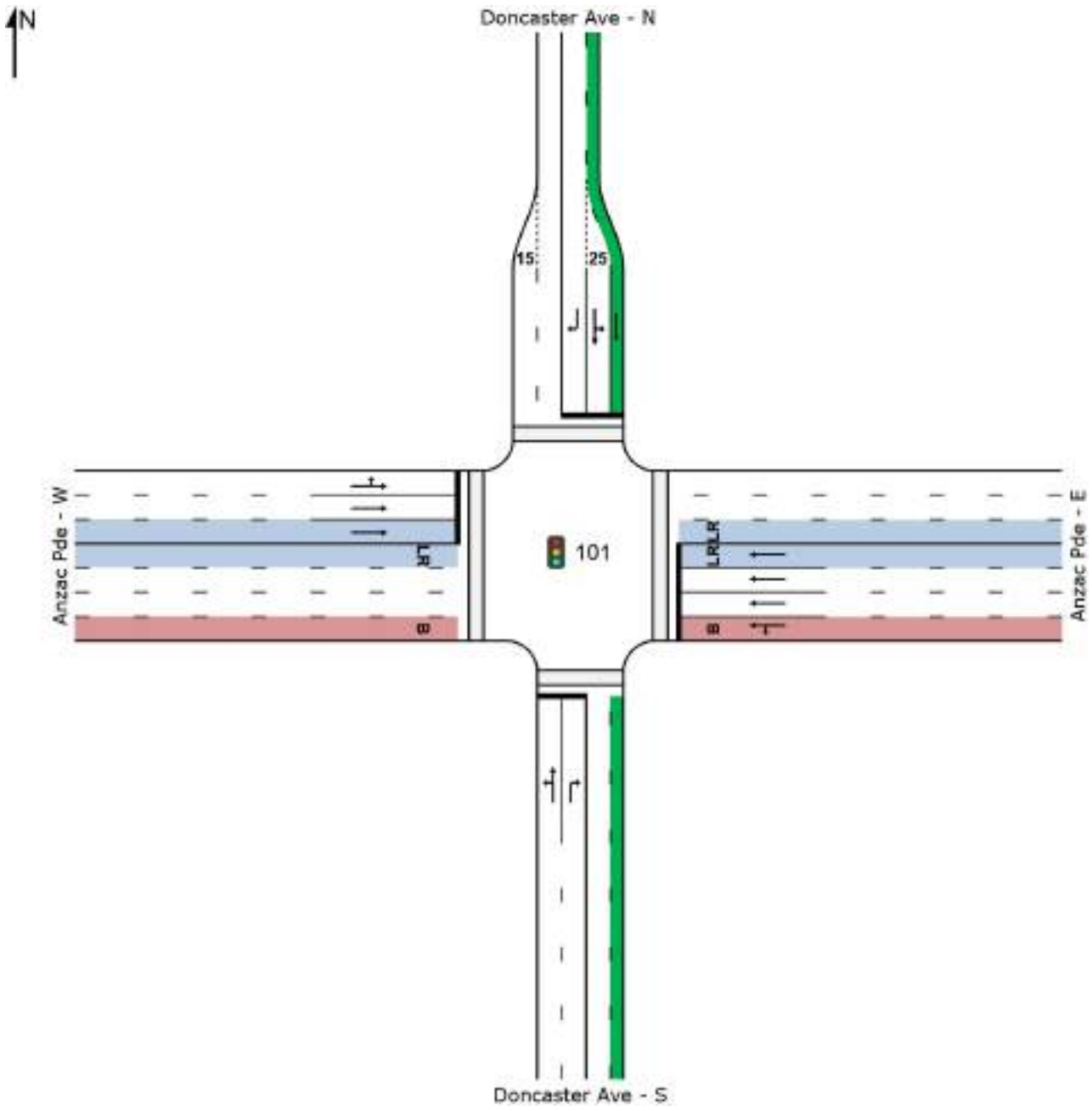
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |

# SITE LAYOUT

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM - Design]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated

Proposed Layout



# PHASING SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM - Design]

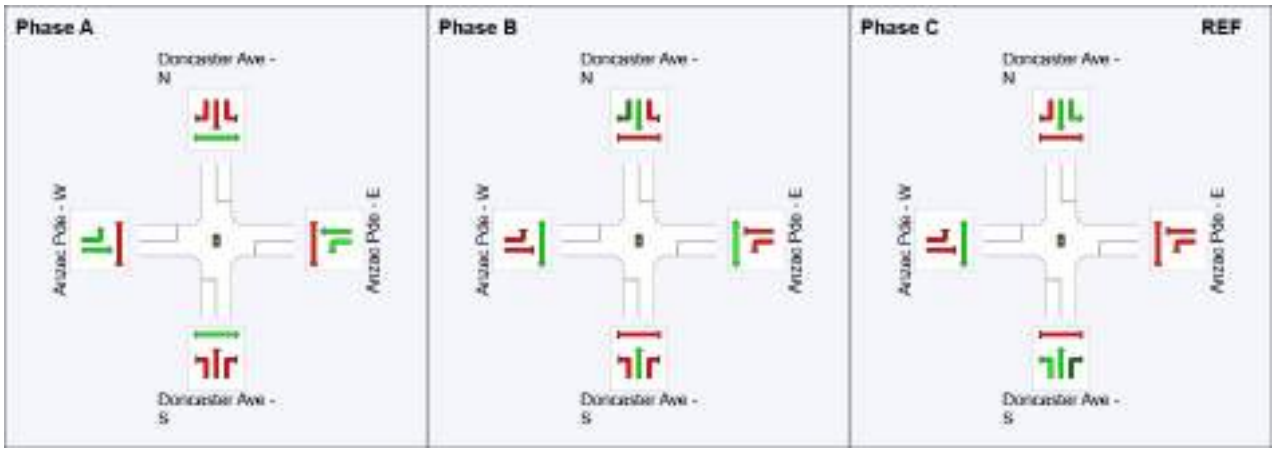
Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 19 | 68 | 0 |
| Green Time (sec) | 43 | 16 | 13 |
| Phase Time (sec) | 49 | 22 | 19 |
| Phase Split | 54% | 24% | 21% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# PHASING SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade PM - Design]

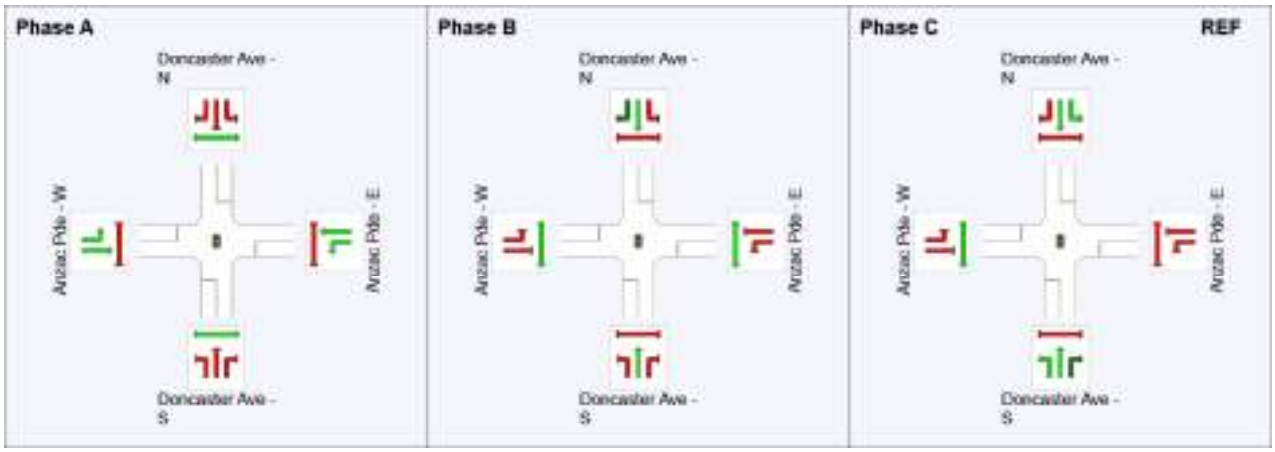
Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated  Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: Variable Phasing**
**Reference Phase: Phase C**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 15 | 68 | 0 |
| Green Time (sec) | 47 | 16 | 9 |
| Phase Time (sec) | 53 | 22 | 15 |
| Phase Split | 59% | 24% | 17% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

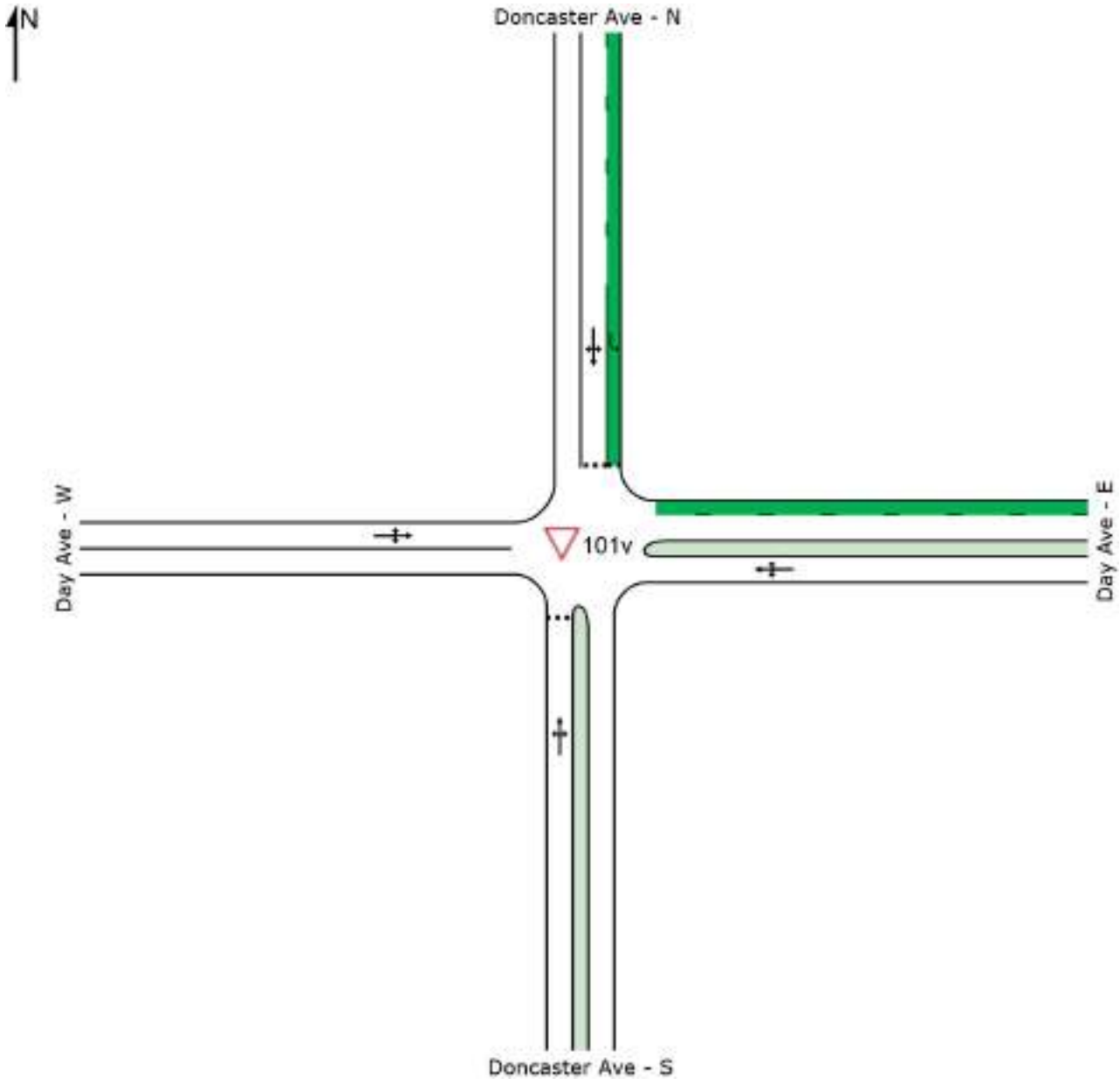
| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101v [9. Doncaster Ave/ Day Ave AM - Design - Priority]

Doncaster Avenue/ Day Avenue, Kensington
Giveway / Yield (Two-Way)

Proposed Layout





Organisation: GTA CONSULTANTS | Created: Thursday, 1 March 2018 10:33:56 AM
Project: P:\N13800-13899\N138320 Randwick Cycleways - Centennial Park to Kingsford\Modelling\180228sid-N138320 Randwick Cycleways Base SIDRAs - Survey Volumes.sip7

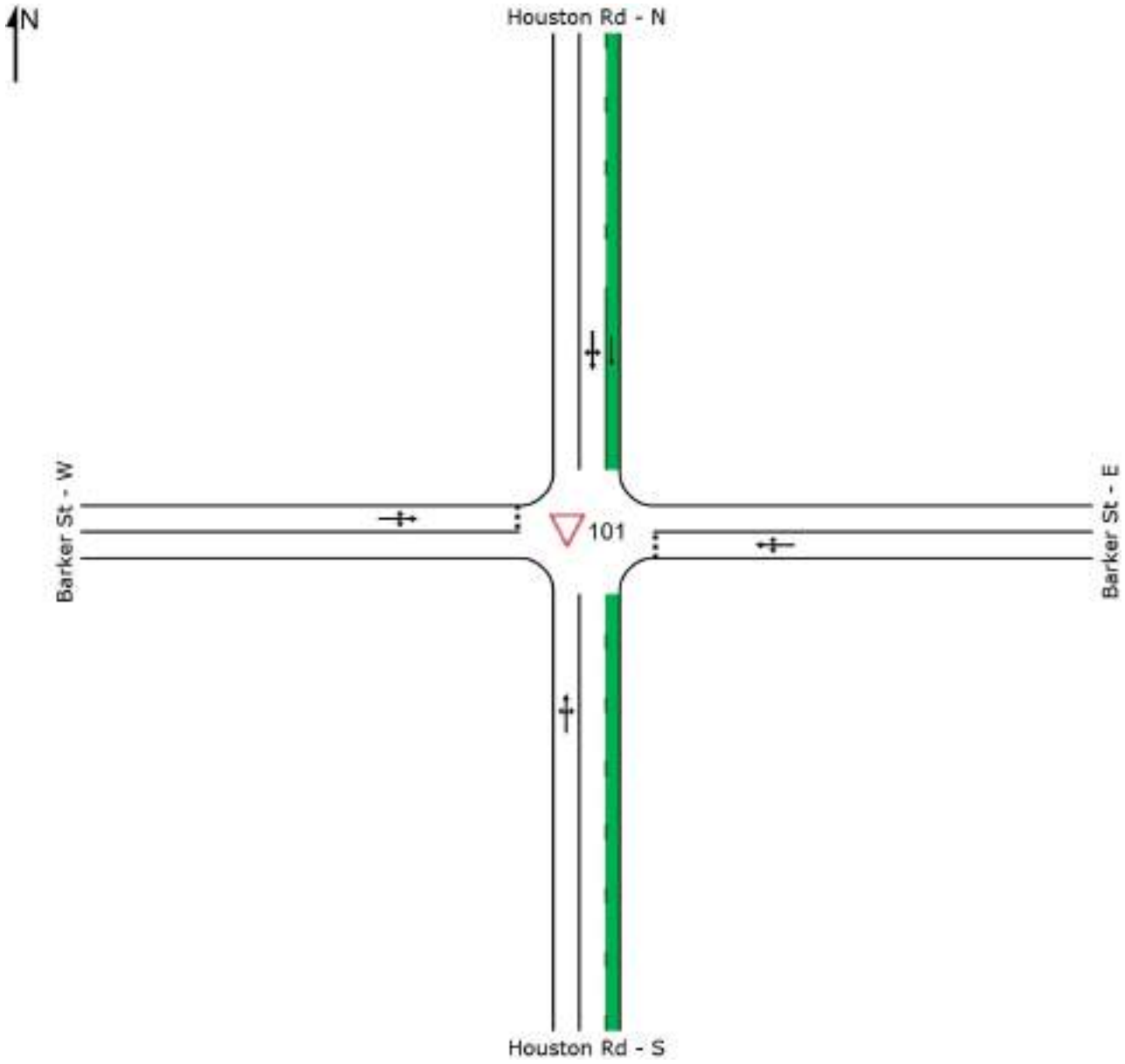
# SITE LAYOUT

## Site: 101 [4. Houston Rd/ Barker St AM - Design - Priority]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

Proposed Layout

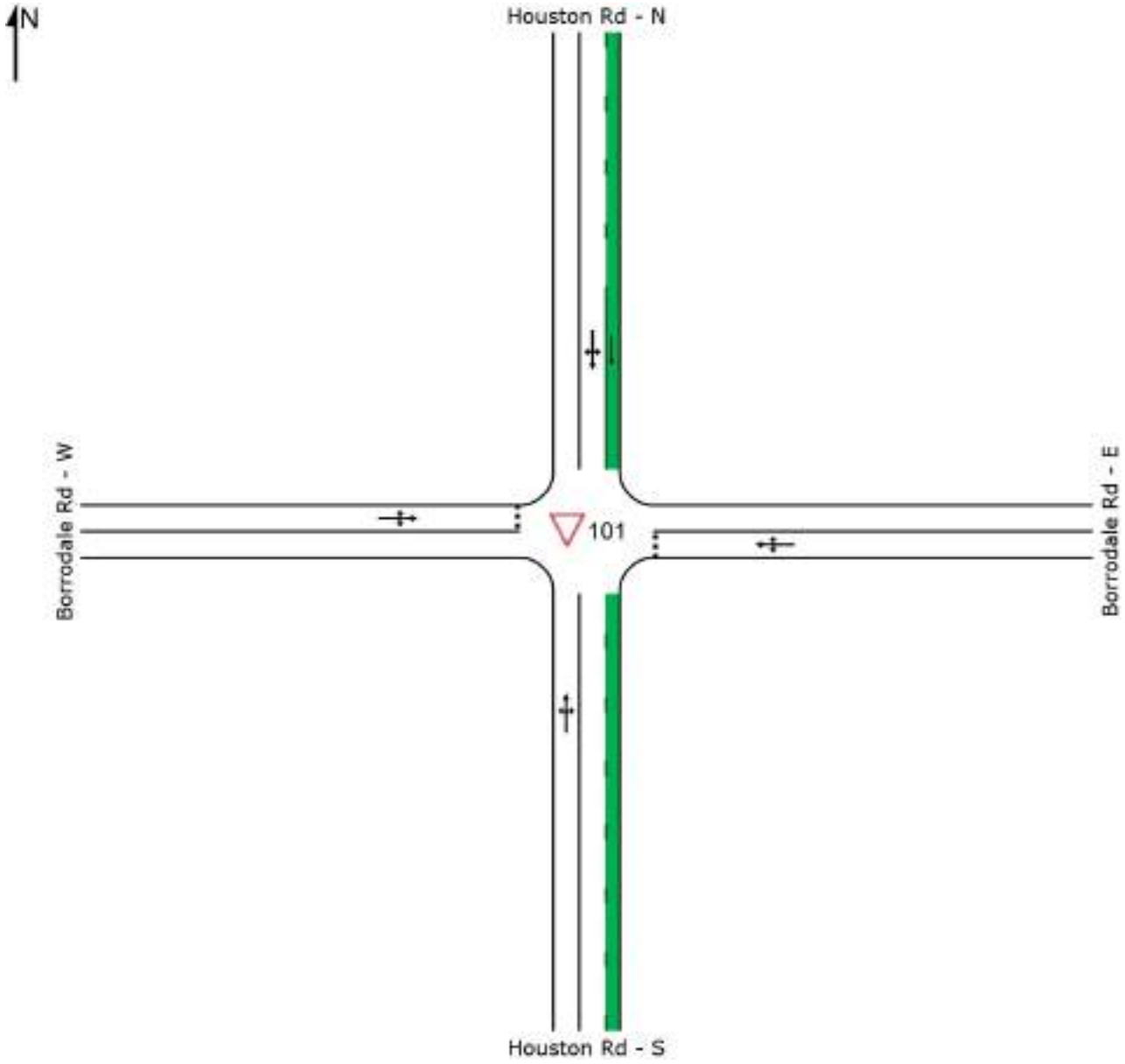


# SITE LAYOUT

## Site: 101 [8. Houston Rd/ Borrodale Rd AM - Design - Priority]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

Proposed Layout



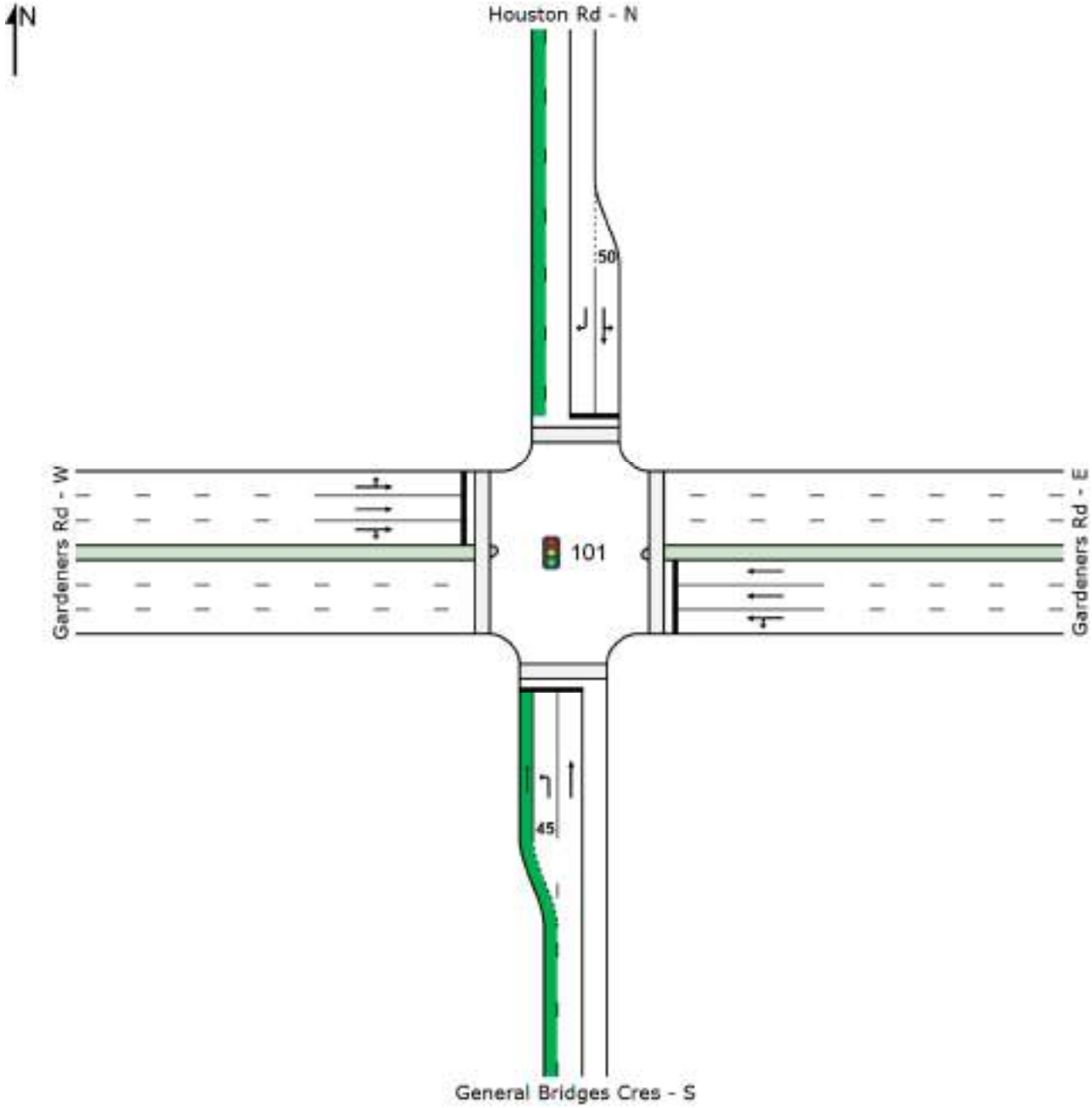


Organisation: GTA CONSULTANTS | Created: Monday, 19 February 2018 6:43:12 PM
Project: P:\N13800-13899\N138320 Randwick Cycleways - Centennial Park to Kingsford\Modelling\180219sid-N138320 Randwick Cycleways Base SIDRAs - Survey Volumes.sip7

# SITE LAYOUT

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM - Design]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated



# PHASING SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM - Design - for review]

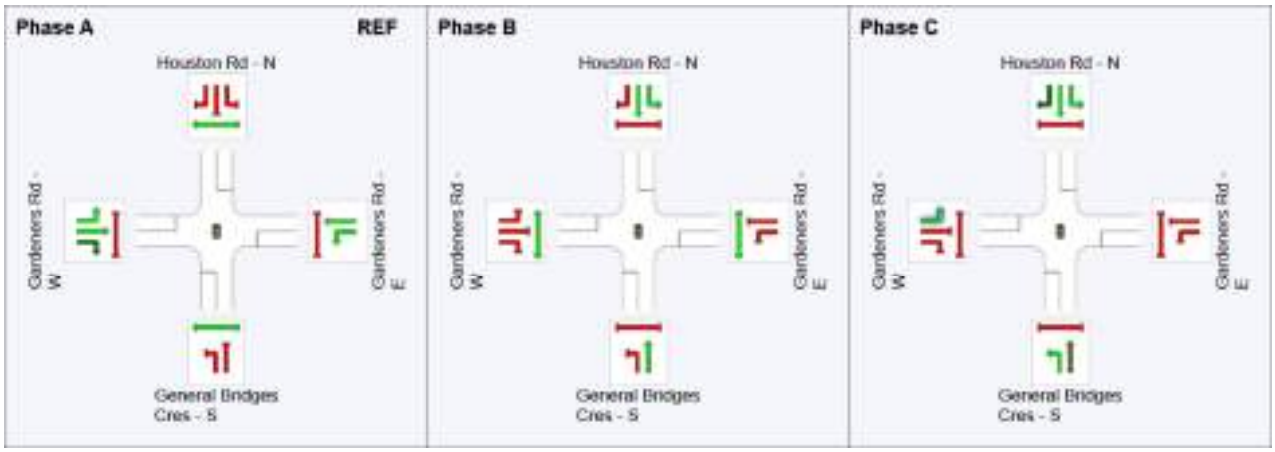
Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated  Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: TCS Plan**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 0 | 42 | 64 |
| Green Time (sec) | 36 | 16 | 30 |
| Phase Time (sec) | 42 | 22 | 36 |
| Phase Split | 42% | 22% | 36% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



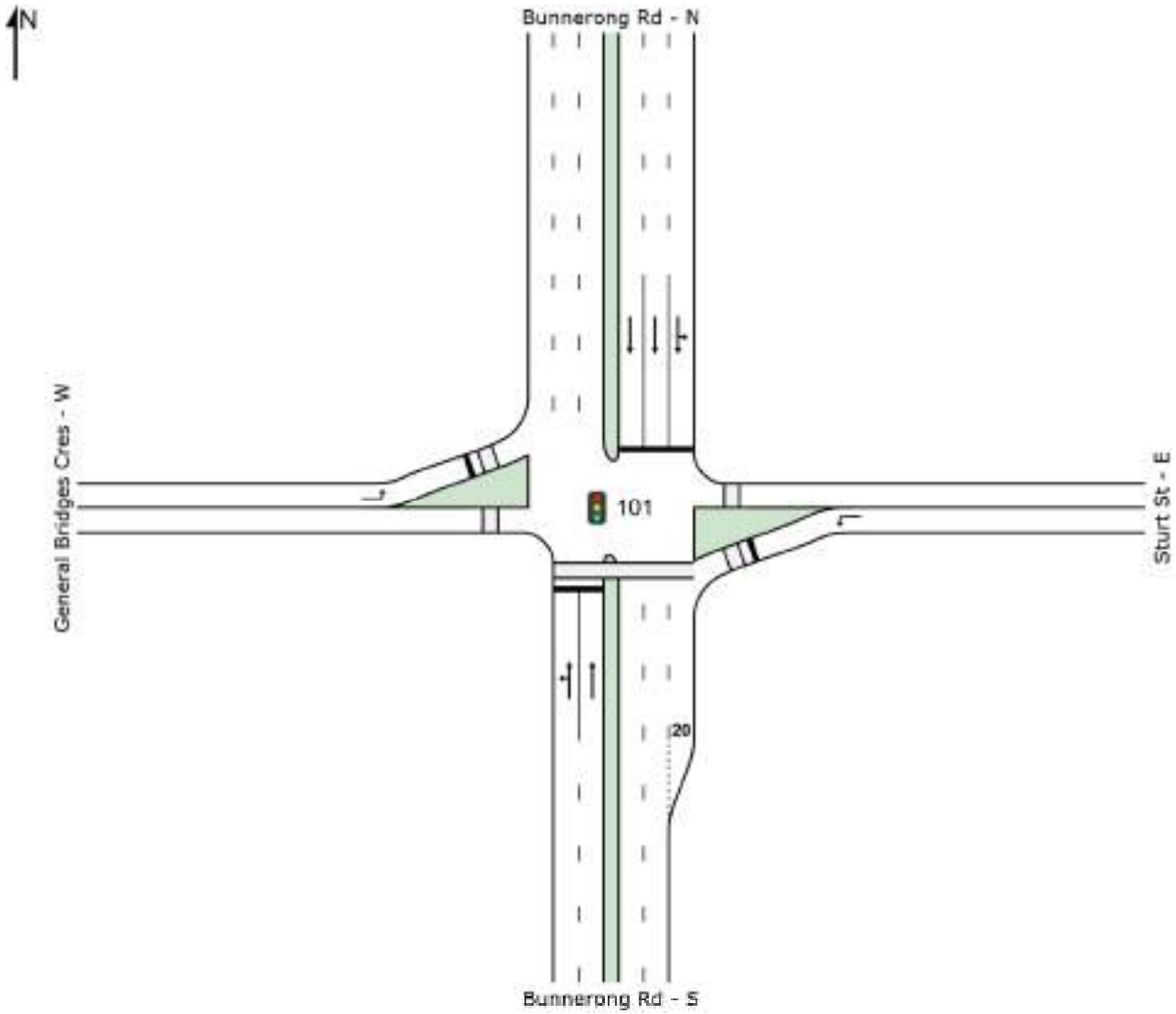

REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# SITE LAYOUT

## Site: 101 [6. Bunnerong Rd/ General Bridges Cres/ Sturt St AM - Design - Pedestrian Test]

Bunnerong Rd/ Sturt St/ General Bridges Cres, Kingsford
Signals - Fixed Time Isolated



# PHASING SUMMARY

## Site: 101 [6. Bunnerong Rd/ General Bridges Cres/ Sturt St AM - Design - Pedestrian Test - check1]

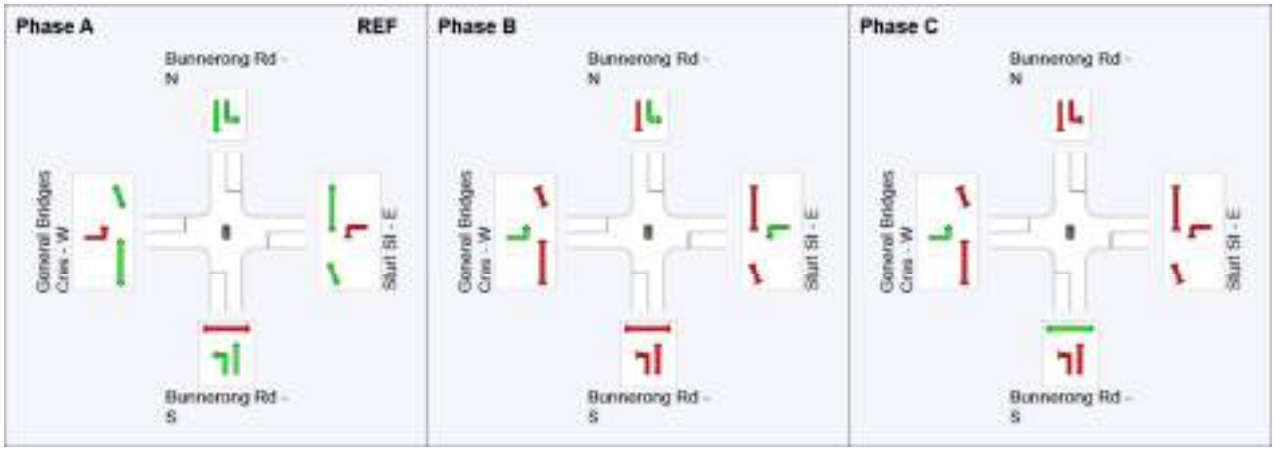
Bunnerong Rd/ Sturt St/ General Bridges Cres, Kingsford
Signals - Fixed Time Isolated  Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

**Phase Times determined by the program**
**Phase Sequence: TCS**
**Reference Phase: Phase A**
**Input Phase Sequence: A, B, C**
**Output Phase Sequence: A, B, C**

**Phase Timing Results**

| Phase | A | B | C |
|---|---|---|---|
| Phase Change Time (sec) | 0 | 63 | 75 |
| Green Time (sec) | 57 | 6 | 15 |
| Phase Time (sec) | 63 | 11 | 21 |
| Phase Split | 66% | 12% | 22% |

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.




REF: Reference Phase
VAR: Variable Phase

| | |
|---|---|
| Normal Movement | Permitted/Opposed |
| Slip/Bypass-Lane Movement | Opposed Slip/Bypass-Lane |
| Stopped Movement | Turn On Red |
| Other Movement Class (MC) Running | Undetected Movement |
| Mixed Running & Stopped MCs | Continuous Movement |
| Other Movement Class (MC) Stopped | Phase Transition Applied |

# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave AM - Design]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 71 | 0.0 | 0.512 | 37.4 | LOS C | 11.0 | 77.2 | 0.89 | 0.81 | 33.5 |
| 3 | R2 | 462 | 0.0 | 0.512 | 37.4 | LOS C | 11.0 | 77.2 | 0.89 | 0.81 | 34.3 |
| Approach | | 533 | 0.0 | 0.512 | 37.4 | LOS C | 11.0 | 77.2 | 0.89 | 0.81 | 34.2 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 606 | 0.0 | 0.596 | 18.0 | LOS B | 20.3 | 139.8 | 0.64 | 0.77 | 44.7 |
| 5 | T1 | 1500 | 0.0 | 0.596 | 13.1 | LOS A | 21.0 | 146.7 | 0.67 | 0.62 | 54.8 |
| 6 | R2 | 1 | 100.0 | 0.010 | 52.2 | LOS D | 0.0 | 0.6 | 0.92 | 0.61 | 31.4 |
| Approach | | 2107 | 0.0 | 0.596 | 14.6 | LOS B | 21.0 | 146.7 | 0.66 | 0.66 | 51.6 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| Approach | | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1014 | 0.0 | 0.394 | 20.3 | LOS B | 11.1 | 77.6 | 0.72 | 0.62 | 49.4 |
| Approach | | 1014 | 0.0 | 0.394 | 20.3 | LOS B | 11.1 | 77.6 | 0.72 | 0.62 | 49.4 |
| All Vehicles | | 3655 | 0.1 | 0.596 | 19.5 | LOS B | 21.0 | 146.7 | 0.71 | 0.67 | 47.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 12.0 | LOS B | 0.1 | 0.1 | 0.49 | 0.49 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 158 | 33.5 | LOS D | | | 0.79 | 0.79 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [1. Alison Rd/ Doncaster Ave PM - Design]

Alison Road/ Doncaster Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 160 | 0.0 | 0.497 | 37.3 | LOS C | 10.6 | 74.5 | 0.89 | 0.81 | 33.6 |
| 3 | R2 | 357 | 0.0 | 0.497 | 37.2 | LOS C | 10.6 | 74.5 | 0.89 | 0.81 | 34.4 |
| Approach | | 517 | 0.0 | 0.497 | 37.3 | LOS C | 10.6 | 74.5 | 0.89 | 0.81 | 34.1 |
| East: Alison Rd - E | | | | | | | | | | | |
| 4 | L2 | 514 | 0.0 | 0.478 | 15.8 | LOS B | 14.2 | 97.4 | 0.55 | 0.74 | 46.0 |
| 5 | T1 | 1187 | 0.0 | 0.478 | 11.8 | LOS A | 15.1 | 105.7 | 0.60 | 0.55 | 56.1 |
| 6 | R2 | 1 | 100.0 | 0.010 | 52.2 | LOS D | 0.0 | 0.6 | 0.92 | 0.61 | 31.4 |
| Approach | | 1702 | 0.1 | 0.478 | 13.0 | LOS A | 15.1 | 105.7 | 0.59 | 0.61 | 52.7 |
| North: Bus Route - N | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| Approach | | 1 | 100.0 | 0.010 | 50.1 | LOS D | 0.0 | 0.6 | 0.92 | 0.60 | 31.2 |
| West: Alison Rd - W | | | | | | | | | | | |
| 11 | T1 | 1461 | 0.0 | 0.568 | 22.4 | LOS B | 17.7 | 123.6 | 0.80 | 0.71 | 47.9 |
| Approach | | 1461 | 0.0 | 0.568 | 22.4 | LOS B | 17.7 | 123.6 | 0.80 | 0.71 | 47.9 |
| All Vehicles | | 3681 | 0.1 | 0.568 | 20.1 | LOS B | 17.7 | 123.6 | 0.71 | 0.68 | 47.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 12.0 | LOS B | 0.1 | 0.1 | 0.49 | 0.49 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 158 | 33.5 | LOS D | | | 0.79 | 0.79 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [7. Doncaster Ave/ Ascot St AM - Design]

Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Phase Times)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 1 | 0.0 | 0.392 | 7.0 | LOS A | 7.7 | 54.2 | 0.35 | 0.31 | 36.6 |
| 2 | T1 | 551 | 0.0 | 0.392 | 3.6 | LOS A | 7.7 | 54.2 | 0.35 | 0.31 | 37.6 |
| 3 | R2 | 26 | 0.0 | 0.179 | 44.9 | LOS D | 1.1 | 7.8 | 0.94 | 0.72 | 13.5 |
| Approach | | 578 | 0.0 | 0.392 | 5.5 | LOS A | 7.7 | 54.2 | 0.38 | 0.33 | 36.3 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 7 | 0.0 | 0.113 | 42.5 | LOS C | 0.9 | 6.3 | 0.92 | 0.69 | 14.6 |
| 5 | T1 | 5 | 0.0 | 0.113 | 39.3 | LOS C | 0.9 | 6.3 | 0.92 | 0.69 | 13.3 |
| 6 | R2 | 9 | 0.0 | 0.113 | 42.5 | LOS C | 0.9 | 6.3 | 0.92 | 0.69 | 19.9 |
| Approach | | 22 | 0.0 | 0.113 | 41.7 | LOS C | 0.9 | 6.3 | 0.92 | 0.69 | 16.9 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.010 | 42.2 | LOS C | 0.1 | 0.6 | 0.91 | 0.60 | 19.5 |
| 8 | T1 | 559 | 0.0 | 0.537 | 5.3 | LOS A | 11.8 | 82.5 | 0.46 | 0.46 | 36.2 |
| 9 | R2 | 98 | 0.0 | 0.537 | 8.8 | LOS A | 11.8 | 82.5 | 0.46 | 0.46 | 35.8 |
| Approach | | 659 | 0.0 | 0.537 | 6.0 | LOS A | 11.8 | 82.5 | 0.46 | 0.46 | 36.1 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 23 | 0.0 | 0.255 | 43.6 | LOS D | 2.2 | 15.6 | 0.94 | 0.73 | 22.3 |
| 11 | T1 | 17 | 0.0 | 0.255 | 40.2 | LOS C | 2.2 | 15.6 | 0.94 | 0.73 | 13.1 |
| 12 | R2 | 14 | 0.0 | 0.255 | 43.7 | LOS D | 2.2 | 15.6 | 0.94 | 0.73 | 18.3 |
| Approach | | 54 | 0.0 | 0.255 | 42.6 | LOS D | 2.2 | 15.6 | 0.94 | 0.73 | 19.0 |
| All Vehicles | | 1313 | 0.0 | 0.537 | 7.9 | LOS A | 11.8 | 82.5 | 0.45 | 0.42 | 34.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P2 | East Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 39.3 | LOS D | | | 0.94 | 0.94 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [7. Doncaster Ave/ Ascot St PM - Design]

Doncaster Avenue/ Ascot Street, Kensington
Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Phase Times)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 1 | 0.0 | 0.379 | 10.4 | LOS A | 9.1 | 63.5 | 0.44 | 0.39 | 40.6 |
| 2 | T1 | 508 | 0.0 | 0.379 | 5.8 | LOS A | 9.1 | 63.5 | 0.44 | 0.39 | 44.2 |
| 3 | R2 | 4 | 0.0 | 0.379 | 10.4 | LOS A | 9.1 | 63.5 | 0.44 | 0.39 | 35.2 |
| Approach | | 514 | 0.0 | 0.379 | 5.9 | LOS A | 9.1 | 63.5 | 0.44 | 0.39 | 44.1 |
| East: Ascot St - E | | | | | | | | | | | |
| 4 | L2 | 14 | 0.0 | 0.098 | 42.5 | LOS D | 0.8 | 5.7 | 0.92 | 0.69 | 15.4 |
| 5 | T1 | 1 | 0.0 | 0.098 | 39.1 | LOS C | 0.8 | 5.7 | 0.92 | 0.69 | 14.1 |
| 6 | R2 | 5 | 0.0 | 0.098 | 42.5 | LOS D | 0.8 | 5.7 | 0.92 | 0.69 | 21.6 |
| Approach | | 20 | 0.0 | 0.098 | 42.3 | LOS C | 0.8 | 5.7 | 0.92 | 0.69 | 17.2 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.013 | 45.7 | LOS D | 0.1 | 0.6 | 0.93 | 0.61 | 20.4 |
| 8 | T1 | 481 | 0.0 | 0.337 | 3.3 | LOS A | 6.3 | 44.2 | 0.33 | 0.31 | 46.3 |
| 9 | R2 | 25 | 0.0 | 0.337 | 7.7 | LOS A | 6.3 | 44.2 | 0.32 | 0.31 | 44.8 |
| Approach | | 508 | 0.0 | 0.337 | 3.7 | LOS A | 6.3 | 44.2 | 0.33 | 0.31 | 46.1 |
| West: Ascot St - W | | | | | | | | | | | |
| 10 | L2 | 32 | 0.0 | 0.217 | 44.5 | LOS D | 1.9 | 13.1 | 0.94 | 0.73 | 24.3 |
| 11 | T1 | 3 | 0.0 | 0.217 | 40.0 | LOS C | 1.9 | 13.1 | 0.94 | 0.73 | 13.6 |
| 12 | R2 | 11 | 0.0 | 0.217 | 44.6 | LOS D | 1.9 | 13.1 | 0.94 | 0.73 | 19.3 |
| Approach | | 45 | 0.0 | 0.217 | 44.2 | LOS D | 1.9 | 13.1 | 0.94 | 0.73 | 22.7 |
| All Vehicles | | 1087 | 0.0 | 0.379 | 7.1 | LOS A | 9.1 | 63.5 | 0.42 | 0.37 | 42.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P2 | East Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 39.3 | LOS D | | | 0.94 | 0.94 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave AM - Design]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 111 | 0.0 | 0.205 | 33.5 | LOS C | 4.1 | 28.5 | 0.79 | 0.75 | 25.1 |
| 2 | T1 | 208 | 0.0 | 0.417 | 30.5 | LOS C | 8.1 | 56.8 | 0.84 | 0.70 | 27.1 |
| Approach | | 319 | 0.0 | 0.417 | 31.5 | LOS C | 8.1 | 56.8 | 0.83 | 0.71 | 26.4 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 214 | 0.0 | 0.127 | 2.8 | LOS A | 2.2 | 15.7 | 0.26 | 0.21 | 46.4 |
| 9 | R2 | 284 | 0.0 | 0.443 | 18.6 | LOS B | 6.8 | 47.8 | 0.79 | 0.78 | 29.5 |
| Approach | | 498 | 0.0 | 0.443 | 11.8 | LOS A | 6.8 | 47.8 | 0.56 | 0.54 | 36.1 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 355 | 0.0 | 0.324 | 16.6 | LOS B | 8.7 | 60.6 | 0.54 | 0.74 | 32.0 |
| 12 | R2 | 44 | 0.0 | 0.238 | 52.0 | LOS D | 2.1 | 14.5 | 0.96 | 0.74 | 19.7 |
| Approach | | 399 | 0.0 | 0.324 | 20.5 | LOS B | 8.7 | 60.6 | 0.59 | 0.74 | 29.6 |
| All Vehicles | | 1216 | 0.0 | 0.443 | 19.8 | LOS B | 8.7 | 60.6 | 0.64 | 0.65 | 30.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 30.5 | LOS D | 0.1 | 0.1 | 0.78 | 0.78 |
| All Pedestrians | | 158 | 39.7 | LOS D | | | 0.89 | 0.89 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [2. Doncaster Ave/ Todman Ave PM - Design]

Doncaster Avenue/ Todman Avenue, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 89 | 0.0 | 0.193 | 36.5 | LOS C | 3.5 | 24.2 | 0.83 | 0.74 | 24.0 |
| 2 | T1 | 148 | 0.0 | 0.304 | 33.0 | LOS C | 5.9 | 41.4 | 0.86 | 0.70 | 26.2 |
| Approach | | 238 | 0.0 | 0.304 | 34.3 | LOS C | 5.9 | 41.4 | 0.84 | 0.71 | 25.3 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 8 | T1 | 233 | 0.0 | 0.139 | 2.6 | LOS A | 2.5 | 17.4 | 0.25 | 0.21 | 46.6 |
| 9 | R2 | 171 | 0.0 | 0.224 | 15.7 | LOS B | 3.4 | 23.9 | 0.69 | 0.73 | 31.5 |
| Approach | | 403 | 0.0 | 0.224 | 8.2 | LOS A | 3.4 | 23.9 | 0.43 | 0.43 | 39.9 |
| West: Todman Ave - W | | | | | | | | | | | |
| 10 | L2 | 362 | 0.0 | 0.309 | 14.6 | LOS B | 8.0 | 56.0 | 0.49 | 0.72 | 33.6 |
| 12 | R2 | 43 | 0.0 | 0.232 | 52.0 | LOS D | 2.0 | 14.1 | 0.96 | 0.74 | 19.7 |
| Approach | | 405 | 0.0 | 0.309 | 18.5 | LOS B | 8.0 | 56.0 | 0.54 | 0.72 | 30.9 |
| All Vehicles | | 1046 | 0.0 | 0.309 | 18.1 | LOS B | 8.0 | 56.0 | 0.57 | 0.61 | 32.0 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 53 | 33.7 | LOS D | 0.1 | 0.1 | 0.82 | 0.82 |
| All Pedestrians | | 158 | 40.7 | LOS E | | | 0.90 | 0.90 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade AM - Design - Check1_TCS]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 162 | 0.0 | 0.880 | 54.4 | LOS D | 29.8 | 208.6 | 1.00 | 1.02 | 22.2 |
| 2 | T1 | 342 | 0.0 | 0.880 | 49.8 | LOS D | 29.8 | 208.6 | 1.00 | 1.02 | 20.2 |
| 3 | R2 | 42 | 0.0 | 0.156 | 31.2 | LOS C | 1.4 | 10.1 | 0.91 | 0.71 | 23.0 |
| Approach | | 546 | 0.0 | 0.880 | 49.7 | LOS D | 29.8 | 208.6 | 0.99 | 1.00 | 21.0 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 52 | 2.0 | 0.786 | 47.5 | LOS D | 25.7 | 180.0 | 0.96 | 0.92 | 19.3 |
| 5 | T1 | 1560 | 0.4 | 0.786 | 37.8 | LOS C | 27.0 | 188.8 | 0.96 | 0.89 | 27.6 |
| Approach | | 1612 | 0.5 | 0.786 | 38.1 | LOS C | 27.0 | 188.8 | 0.96 | 0.89 | 27.4 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 118 | 0.9 | 1.012 | 105.2 | LOS F | 9.2 | 64.9 | 1.00 | 1.22 | 12.2 |
| 8 | T1 | 245 | 0.0 | 0.587 | 40.7 | LOS C | 11.1 | 78.0 | 0.93 | 0.88 | 23.0 |
| 9 | R2 | 18 | 0.0 | 0.587 | 45.3 | LOS D | 11.1 | 78.0 | 0.94 | 0.90 | 27.8 |
| Approach | | 381 | 0.3 | 1.012 | 60.9 | LOS E | 11.1 | 78.0 | 0.95 | 0.98 | 18.4 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 25 | 4.2 | 1.020 | 105.2 | LOS F | 59.5 | 417.3 | 1.00 | 1.42 | 16.4 |
| 11 | T1 | 1364 | 0.5 | 1.020 | 98.8 | LOS F | 61.1 | 427.9 | 1.00 | 1.42 | 14.7 |
| Approach | | 1389 | 0.5 | 1.020 | 98.9 | LOS F | 61.1 | 427.9 | 1.00 | 1.42 | 14.7 |
| All Vehicles | | 3928 | 0.4 | 1.020 | 63.4 | LOS E | 61.1 | 427.9 | 0.98 | 1.10 | 19.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 29.2 | LOS C | 0.1 | 0.1 | 0.73 | 0.73 |
| P2 | East Full Crossing | 53 | 49.3 | LOS E | 0.2 | 0.2 | 0.95 | 0.95 |
| P3 | North Full Crossing | 53 | 31.4 | LOS D | 0.1 | 0.1 | 0.76 | 0.76 |
| P4 | West Full Crossing | 53 | 40.3 | LOS E | 0.1 | 0.1 | 0.86 | 0.86 |
| All Pedestrians | | 211 | 37.5 | LOS D | | | 0.82 | 0.82 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [3. Doncaster Ave/ Anzac Parade PM - Design - Check1_TCS]

Doncaster Avenue/ Anzac Parade, Kensington
Signals
Signals - Fixed Time Isolated Cycle Time = 145 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 136 | 0.0 | 0.796 | 63.8 | LOS E | 24.7 | 173.1 | 1.00 | 0.91 | 20.0 |
| 2 | T1 | 221 | 0.0 | 0.796 | 59.3 | LOS E | 24.7 | 173.1 | 1.00 | 0.91 | 18.1 |
| 3 | R2 | 33 | 0.0 | 0.085 | 35.8 | LOS C | 1.4 | 10.0 | 0.84 | 0.69 | 21.3 |
| Approach | | 389 | 0.0 | 0.796 | 58.9 | LOS E | 24.7 | 173.1 | 0.99 | 0.89 | 19.0 |
| East: Anzac Pde - E | | | | | | | | | | | |
| 4 | L2 | 52 | 2.0 | 0.688 | 50.5 | LOS D | 28.1 | 197.2 | 0.90 | 0.83 | 18.5 |
| 5 | T1 | 1457 | 0.4 | 0.688 | 41.6 | LOS C | 29.9 | 209.3 | 0.90 | 0.81 | 26.2 |
| Approach | | 1508 | 0.5 | 0.688 | 41.9 | LOS C | 29.9 | 209.3 | 0.90 | 0.81 | 25.9 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 174 | 0.6 | 0.908 | 67.9 | LOS E | 9.6 | 67.8 | 1.00 | 1.04 | 16.8 |
| 8 | T1 | 303 | 0.0 | 0.904 | 51.7 | LOS D | 17.1 | 119.8 | 0.99 | 0.98 | 20.2 |
| 9 | R2 | 13 | 0.0 | 0.904 | 54.7 | LOS D | 17.1 | 119.8 | 0.99 | 1.01 | 25.1 |
| Approach | | 489 | 0.2 | 0.908 | 57.5 | LOS E | 17.1 | 119.8 | 1.00 | 1.01 | 19.0 |
| West: Anzac Pde - W | | | | | | | | | | | |
| 10 | L2 | 22 | 0.0 | 0.952 | 78.7 | LOS F | 58.7 | 410.6 | 1.00 | 1.11 | 20.3 |
| 11 | T1 | 1364 | 0.5 | 0.952 | 72.7 | LOS F | 60.4 | 422.7 | 1.00 | 1.10 | 18.5 |
| Approach | | 1386 | 0.5 | 0.952 | 72.8 | LOS F | 60.4 | 422.7 | 1.00 | 1.10 | 18.5 |
| All Vehicles | | 3774 | 0.4 | 0.952 | 57.0 | LOS E | 60.4 | 422.7 | 0.96 | 0.95 | 21.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 33.9 | LOS D | 0.1 | 0.1 | 0.68 | 0.68 |
| P2 | East Full Crossing | 53 | 66.8 | LOS F | 0.2 | 0.2 | 0.96 | 0.96 |
| P3 | North Full Crossing | 53 | 36.0 | LOS D | 0.2 | 0.2 | 0.70 | 0.70 |
| P4 | West Full Crossing | 53 | 55.7 | LOS E | 0.2 | 0.2 | 0.88 | 0.88 |
| All Pedestrians | | 211 | 48.1 | LOS E | | | 0.81 | 0.81 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101v [9. Doncaster Ave/ Day Ave AM - Design - Priority]

Doncaster Avenue/ Day Avenue, Kensington
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 25 | 0.0 | 0.096 | 5.4 | LOS A | 0.4 | 2.5 | 0.41 | 0.61 | 41.6 |
| 2 | T1 | 57 | 0.0 | 0.096 | 5.5 | LOS A | 0.4 | 2.5 | 0.41 | 0.61 | 44.6 |
| 3 | R2 | 6 | 0.0 | 0.096 | 7.6 | LOS A | 0.4 | 2.5 | 0.41 | 0.61 | 40.8 |
| Approach | | 88 | 0.0 | 0.096 | 5.6 | LOS A | 0.4 | 2.5 | 0.41 | 0.61 | 43.7 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 12 | 0.0 | 0.212 | 4.8 | LOS A | 0.8 | 5.7 | 0.11 | 0.18 | 46.0 |
| 5 | T1 | 255 | 0.0 | 0.212 | 0.1 | LOS A | 0.8 | 5.7 | 0.11 | 0.18 | 46.7 |
| 6 | R2 | 125 | 0.0 | 0.212 | 4.8 | LOS A | 0.8 | 5.7 | 0.11 | 0.18 | 47.0 |
| Approach | | 392 | 0.0 | 0.212 | 1.7 | NA | 0.8 | 5.7 | 0.11 | 0.18 | 46.8 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 48 | 0.0 | 0.088 | 4.6 | LOS A | 0.3 | 2.2 | 0.10 | 0.55 | 44.2 |
| 8 | T1 | 11 | 0.0 | 0.088 | 5.5 | LOS A | 0.3 | 2.2 | 0.18 | 0.56 | 44.0 |
| 9 | R2 | 37 | 0.0 | 0.088 | 7.8 | LOS A | 0.3 | 2.2 | 0.18 | 0.56 | 43.0 |
| Approach | | 96 | 0.0 | 0.088 | 6.0 | LOS A | 0.3 | 2.2 | 0.14 | 0.55 | 43.7 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 16 | 0.0 | 0.032 | 4.7 | LOS A | 0.0 | 0.2 | 0.04 | 0.16 | 47.7 |
| 11 | T1 | 42 | 0.0 | 0.032 | 0.1 | LOS A | 0.0 | 0.2 | 0.04 | 0.16 | 47.5 |
| 12 | R2 | 2 | 0.0 | 0.032 | 5.4 | LOS A | 0.0 | 0.2 | 0.04 | 0.16 | 45.7 |
| Approach | | 60 | 0.0 | 0.032 | 1.5 | NA | 0.0 | 0.2 | 0.04 | 0.16 | 47.5 |
| All Vehicles | | 636 | 0.0 | 0.212 | 2.9 | NA | 0.8 | 5.7 | 0.15 | 0.30 | 45.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101v [9. Doncaster Ave/ Day Ave PM - Design - Priority]

Doncaster Avenue/ Day Avenue, Kensington
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Doncaster Ave - S | | | | | | | | | | | |
| 1 | L2 | 4 | 0.0 | 0.015 | 4.9 | LOS A | 0.1 | 0.4 | 0.26 | 0.49 | 42.6 |
| 2 | T1 | 12 | 0.0 | 0.015 | 4.2 | LOS A | 0.1 | 0.4 | 0.26 | 0.49 | 45.3 |
| 3 | R2 | 1 | 0.0 | 0.015 | 5.8 | LOS A | 0.1 | 0.4 | 0.26 | 0.49 | 41.8 |
| Approach | | 17 | 0.0 | 0.015 | 4.5 | LOS A | 0.1 | 0.4 | 0.26 | 0.49 | 44.6 |
| East: Day Ave - E | | | | | | | | | | | |
| 4 | L2 | 8 | 0.0 | 0.098 | 4.7 | LOS A | 0.4 | 2.5 | 0.11 | 0.20 | 45.7 |
| 5 | T1 | 109 | 0.0 | 0.098 | 0.1 | LOS A | 0.4 | 2.5 | 0.11 | 0.20 | 46.4 |
| 6 | R2 | 62 | 0.0 | 0.098 | 4.8 | LOS A | 0.4 | 2.5 | 0.11 | 0.20 | 46.8 |
| Approach | | 180 | 0.0 | 0.098 | 1.9 | NA | 0.4 | 2.5 | 0.11 | 0.20 | 46.6 |
| North: Doncaster Ave - N | | | | | | | | | | | |
| 7 | L2 | 41 | 0.0 | 0.041 | 4.6 | LOS A | 0.1 | 1.0 | 0.08 | 0.52 | 44.9 |
| 8 | T1 | 8 | 0.0 | 0.041 | 4.3 | LOS A | 0.1 | 1.0 | 0.16 | 0.52 | 45.1 |
| 9 | R2 | 18 | 0.0 | 0.041 | 5.8 | LOS A | 0.1 | 1.0 | 0.16 | 0.52 | 44.0 |
| Approach | | 67 | 0.0 | 0.041 | 4.9 | LOS A | 0.1 | 1.0 | 0.11 | 0.52 | 44.7 |
| West: Day Ave - W | | | | | | | | | | | |
| 10 | L2 | 16 | 0.0 | 0.033 | 4.6 | LOS A | 0.0 | 0.1 | 0.02 | 0.15 | 47.9 |
| 11 | T1 | 45 | 0.0 | 0.033 | 0.0 | LOS A | 0.0 | 0.1 | 0.02 | 0.15 | 47.7 |
| 12 | R2 | 2 | 0.0 | 0.033 | 4.9 | LOS A | 0.0 | 0.1 | 0.02 | 0.15 | 45.9 |
| Approach | | 63 | 0.0 | 0.033 | 1.3 | NA | 0.0 | 0.1 | 0.02 | 0.15 | 47.7 |
| All Vehicles | | 327 | 0.0 | 0.098 | 2.5 | NA | 0.4 | 2.5 | 0.10 | 0.27 | 46.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St AM - Design - Priority]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 14 | 0.0 | 0.208 | 5.8 | LOS A | 0.8 | 5.9 | 0.11 | 0.21 | 51.4 |
| 2 | T1 | 222 | 0.0 | 0.208 | 0.1 | LOS A | 0.8 | 5.9 | 0.11 | 0.21 | 56.0 |
| 3 | R2 | 116 | 0.0 | 0.208 | 5.7 | LOS A | 0.8 | 5.9 | 0.11 | 0.21 | 51.3 |
| Approach | | 353 | 0.0 | 0.208 | 2.2 | NA | 0.8 | 5.9 | 0.11 | 0.21 | 54.3 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 38 | 0.0 | 0.265 | 4.7 | LOS A | 0.9 | 6.5 | 0.09 | 0.53 | 42.3 |
| 5 | T1 | 52 | 0.0 | 0.265 | 6.7 | LOS A | 0.9 | 6.5 | 0.09 | 0.53 | 38.7 |
| 6 | R2 | 60 | 0.0 | 0.265 | 14.9 | LOS B | 0.9 | 6.5 | 0.09 | 0.53 | 35.1 |
| Approach | | 149 | 0.0 | 0.265 | 9.5 | LOS A | 0.9 | 6.5 | 0.09 | 0.53 | 38.5 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 3 | 0.0 | 0.025 | 6.0 | LOS A | 0.0 | 0.2 | 0.07 | 0.08 | 51.3 |
| 8 | T1 | 62 | 0.0 | 0.025 | 0.1 | LOS A | 0.0 | 0.2 | 0.05 | 0.05 | 58.8 |
| 9 | R2 | 4 | 0.0 | 0.025 | 6.2 | LOS A | 0.0 | 0.2 | 0.07 | 0.08 | 49.8 |
| Approach | | 68 | 0.0 | 0.025 | 0.6 | NA | 0.0 | 0.2 | 0.05 | 0.06 | 58.1 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 23 | 0.0 | 0.605 | 8.3 | LOS A | 5.6 | 39.2 | 0.70 | 1.03 | 39.6 |
| 11 | T1 | 351 | 0.0 | 0.605 | 10.5 | LOS A | 5.6 | 39.2 | 0.70 | 1.03 | 37.5 |
| 12 | R2 | 63 | 0.0 | 0.605 | 14.1 | LOS A | 5.6 | 39.2 | 0.70 | 1.03 | 42.9 |
| Approach | | 437 | 0.0 | 0.605 | 10.9 | LOS A | 5.6 | 39.2 | 0.70 | 1.03 | 38.6 |
| All Vehicles | | 1006 | 0.0 | 0.605 | 7.0 | NA | 5.6 | 39.2 | 0.36 | 0.61 | 44.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [4. Houston Rd/ Barker St PM - Design - Priority]

Houston Rd/ Barker St, Kensington

Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 4 | 0.0 | 0.076 | 7.1 | LOS A | 0.3 | 2.0 | 0.26 | 0.18 | 51.2 |
| 2 | T1 | 84 | 0.0 | 0.076 | 0.7 | LOS A | 0.3 | 2.0 | 0.26 | 0.18 | 55.6 |
| 3 | R2 | 31 | 0.0 | 0.076 | 7.1 | LOS A | 0.3 | 2.0 | 0.26 | 0.18 | 51.0 |
| Approach | | 119 | 0.0 | 0.076 | 2.6 | NA | 0.3 | 2.0 | 0.26 | 0.18 | 54.3 |
| East: Barker St - E | | | | | | | | | | | |
| 4 | L2 | 76 | 0.0 | 0.239 | 4.6 | LOS A | 0.9 | 6.3 | 0.05 | 0.52 | 45.3 |
| 5 | T1 | 67 | 0.0 | 0.239 | 5.9 | LOS A | 0.9 | 6.3 | 0.05 | 0.52 | 41.4 |
| 6 | R2 | 59 | 0.0 | 0.239 | 10.0 | LOS A | 0.9 | 6.3 | 0.05 | 0.52 | 38.7 |
| Approach | | 202 | 0.0 | 0.239 | 6.6 | LOS A | 0.9 | 6.3 | 0.05 | 0.52 | 42.4 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 271 | 0.0 | 0.182 | 5.5 | LOS A | 0.0 | 0.1 | 0.00 | 0.46 | 44.5 |
| 8 | T1 | 91 | 0.0 | 0.182 | 0.0 | LOS A | 0.0 | 0.1 | 0.00 | 0.36 | 54.8 |
| 9 | R2 | 1 | 0.0 | 0.182 | 5.8 | LOS A | 0.0 | 0.1 | 0.00 | 0.46 | 46.0 |
| Approach | | 362 | 0.0 | 0.182 | 4.2 | NA | 0.0 | 0.1 | 0.00 | 0.44 | 47.9 |
| West: Barker St - W | | | | | | | | | | | |
| 10 | L2 | 24 | 0.0 | 0.352 | 5.4 | LOS A | 1.9 | 13.6 | 0.50 | 0.73 | 42.0 |
| 11 | T1 | 158 | 0.0 | 0.352 | 8.3 | LOS A | 1.9 | 13.6 | 0.50 | 0.73 | 40.1 |
| 12 | R2 | 74 | 0.0 | 0.352 | 8.2 | LOS A | 1.9 | 13.6 | 0.50 | 0.73 | 45.0 |
| Approach | | 256 | 0.0 | 0.352 | 8.0 | LOS A | 1.9 | 13.6 | 0.50 | 0.73 | 42.0 |
| All Vehicles | | 939 | 0.0 | 0.352 | 5.5 | NA | 1.9 | 13.6 | 0.18 | 0.50 | 45.4 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [8. Houston Rd/ Borrodale Rd AM - Design - Priority]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 20 | 0.0 | 0.128 | 5.7 | LOS A | 0.3 | 1.9 | 0.05 | 0.13 | 50.6 |
| 2 | T1 | 181 | 0.0 | 0.128 | 0.0 | LOS A | 0.3 | 1.9 | 0.05 | 0.13 | 57.7 |
| 3 | R2 | 33 | 0.0 | 0.128 | 5.6 | LOS A | 0.3 | 1.9 | 0.05 | 0.13 | 50.1 |
| Approach | | 234 | 0.0 | 0.128 | 1.3 | NA | 0.3 | 1.9 | 0.05 | 0.13 | 56.2 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 60 | 0.0 | 0.194 | 4.6 | LOS A | 0.8 | 5.8 | 0.06 | 0.51 | 41.2 |
| 5 | T1 | 63 | 0.0 | 0.194 | 5.3 | LOS A | 0.8 | 5.8 | 0.06 | 0.51 | 43.6 |
| 6 | R2 | 44 | 0.0 | 0.194 | 10.2 | LOS B | 0.8 | 5.8 | 0.06 | 0.51 | 45.2 |
| Approach | | 167 | 0.0 | 0.194 | 6.3 | LOS A | 0.8 | 5.8 | 0.06 | 0.51 | 43.4 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 5 | 0.0 | 0.017 | 5.8 | LOS A | 0.0 | 0.2 | 0.09 | 0.15 | 53.1 |
| 8 | T1 | 44 | 0.0 | 0.017 | 0.1 | LOS A | 0.0 | 0.2 | 0.05 | 0.08 | 47.4 |
| 9 | R2 | 3 | 0.0 | 0.017 | 6.0 | LOS A | 0.0 | 0.2 | 0.09 | 0.15 | 51.1 |
| Approach | | 53 | 0.0 | 0.017 | 1.0 | NA | 0.0 | 0.2 | 0.05 | 0.09 | 46.1 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 108 | 0.0 | 0.346 | 5.3 | LOS A | 1.8 | 12.3 | 0.45 | 0.62 | 47.7 |
| 11 | T1 | 164 | 0.0 | 0.346 | 5.6 | LOS A | 1.8 | 12.3 | 0.45 | 0.62 | 43.8 |
| 12 | R2 | 55 | 0.0 | 0.346 | 8.9 | LOS A | 1.8 | 12.3 | 0.45 | 0.62 | 45.0 |
| Approach | | 327 | 0.0 | 0.346 | 6.1 | LOS A | 1.8 | 12.3 | 0.45 | 0.62 | 45.5 |
| All Vehicles | | 781 | 0.0 | 0.346 | 4.4 | NA | 1.8 | 12.3 | 0.22 | 0.42 | 47.6 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [8. Houston Rd/ Borrodale Rd PM - Design - Priority]

Houston Road/ Borrodale Road, Kingsford
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Houston Rd - S | | | | | | | | | | | |
| 1 | L2 | 15 | 0.0 | 0.080 | 5.7 | LOS A | 0.2 | 1.5 | 0.06 | 0.18 | 50.1 |
| 2 | T1 | 99 | 0.0 | 0.080 | 0.0 | LOS A | 0.2 | 1.5 | 0.06 | 0.18 | 57.0 |
| 3 | R2 | 28 | 0.0 | 0.080 | 5.6 | LOS A | 0.2 | 1.5 | 0.06 | 0.18 | 49.2 |
| Approach | | 142 | 0.0 | 0.080 | 1.7 | NA | 0.2 | 1.5 | 0.06 | 0.18 | 54.9 |
| East: Borrodale Rd - E | | | | | | | | | | | |
| 4 | L2 | 35 | 0.0 | 0.063 | 4.6 | LOS A | 0.3 | 1.8 | 0.04 | 0.51 | 42.7 |
| 5 | T1 | 20 | 0.0 | 0.063 | 4.4 | LOS A | 0.3 | 1.8 | 0.04 | 0.51 | 44.5 |
| 6 | R2 | 14 | 0.0 | 0.063 | 8.0 | LOS A | 0.3 | 1.8 | 0.04 | 0.51 | 46.5 |
| Approach | | 68 | 0.0 | 0.063 | 5.2 | LOS A | 0.3 | 1.8 | 0.04 | 0.51 | 44.2 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 5 | 0.0 | 0.015 | 5.6 | LOS A | 0.0 | 0.1 | 0.02 | 0.13 | 54.0 |
| 8 | T1 | 44 | 0.0 | 0.015 | 0.0 | LOS A | 0.0 | 0.1 | 0.01 | 0.07 | 47.8 |
| 9 | R2 | 1 | 0.0 | 0.015 | 5.8 | LOS A | 0.0 | 0.1 | 0.02 | 0.13 | 51.6 |
| Approach | | 51 | 0.0 | 0.015 | 0.7 | NA | 0.0 | 0.1 | 0.01 | 0.07 | 46.2 |
| West: Borrodale Rd - W | | | | | | | | | | | |
| 10 | L2 | 100 | 0.0 | 0.269 | 4.9 | LOS A | 1.3 | 9.3 | 0.32 | 0.54 | 48.2 |
| 11 | T1 | 137 | 0.0 | 0.269 | 4.7 | LOS A | 1.3 | 9.3 | 0.32 | 0.54 | 44.5 |
| 12 | R2 | 54 | 0.0 | 0.269 | 6.7 | LOS A | 1.3 | 9.3 | 0.32 | 0.54 | 45.7 |
| Approach | | 291 | 0.0 | 0.269 | 5.1 | LOS A | 1.3 | 9.3 | 0.32 | 0.54 | 46.2 |
| All Vehicles | | 552 | 0.0 | 0.269 | 3.9 | NA | 1.3 | 9.3 | 0.19 | 0.40 | 47.7 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres AM - Design - for review]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 62 | 0.0 | 0.111 | 31.7 | LOS C | 2.2 | 15.3 | 0.76 | 0.72 | 23.6 |
| 2 | T1 | 551 | 0.0 | 0.522 | 17.7 | LOS B | 16.9 | 118.0 | 0.71 | 0.63 | 35.0 |
| Approach | | 613 | 0.0 | 0.522 | 19.2 | LOS B | 16.9 | 118.0 | 0.72 | 0.64 | 33.3 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 29 | 0.0 | 0.623 | 33.9 | LOS C | 17.0 | 118.9 | 0.88 | 0.78 | 21.8 |
| 5 | T1 | 1266 | 0.0 | 0.623 | 28.5 | LOS B | 17.7 | 123.6 | 0.88 | 0.77 | 21.7 |
| Approach | | 1296 | 0.0 | 0.623 | 28.6 | LOS C | 17.7 | 123.6 | 0.88 | 0.77 | 21.7 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 92 | 1.1 | 0.096 | 18.4 | LOS B | 2.2 | 15.7 | 0.53 | 0.70 | 28.4 |
| 8 | T1 | 148 | 0.0 | 0.636 | 33.9 | LOS C | 10.9 | 76.2 | 0.91 | 0.81 | 24.6 |
| 9 | R2 | 105 | 0.0 | 0.636 | 38.2 | LOS C | 10.9 | 76.2 | 0.91 | 0.81 | 23.7 |
| Approach | | 345 | 0.3 | 0.636 | 31.1 | LOS C | 10.9 | 76.2 | 0.81 | 0.78 | 25.0 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 178 | 0.0 | 0.549 | 32.9 | LOS C | 14.6 | 102.0 | 0.85 | 0.78 | 25.9 |
| 11 | T1 | 937 | 0.0 | 0.549 | 27.7 | LOS B | 15.0 | 105.0 | 0.85 | 0.75 | 21.9 |
| 12 | R2 | 5 | 100.0 | 0.549 | 34.3 | LOS C | 14.1 | 100.0 | 0.86 | 0.74 | 25.7 |
| Approach | | 1120 | 0.5 | 0.549 | 28.6 | LOS C | 15.0 | 105.0 | 0.85 | 0.75 | 22.7 |
| All Vehicles | | 3374 | 0.2 | 0.636 | 27.1 | LOS B | 17.7 | 123.6 | 0.84 | 0.74 | 24.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 26.7 | LOS C | 0.1 | 0.1 | 0.73 | 0.73 |
| P2 | East Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 26.7 | LOS C | 0.1 | 0.1 | 0.73 | 0.73 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 35.5 | LOS D | | | 0.84 | 0.84 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [5. Houston Rd/ Gardeners Rd/ General Bridges Cres PM - Design - for review]

Houston Rd/ Gardeners Rd/ General Bridges Cres, Kingsford
Signals
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: General Bridges Cres - S | | | | | | | | | | | |
| 1 | L2 | 80 | 0.0 | 0.160 | 34.6 | LOS C | 3.0 | 20.9 | 0.80 | 0.73 | 22.5 |
| 2 | T1 | 242 | 0.0 | 0.231 | 17.7 | LOS B | 6.1 | 42.9 | 0.63 | 0.53 | 35.3 |
| Approach | | 322 | 0.0 | 0.231 | 21.9 | LOS B | 6.1 | 42.9 | 0.68 | 0.58 | 31.0 |
| East: Gardeners Rd - E | | | | | | | | | | | |
| 4 | L2 | 31 | 0.0 | 0.375 | 28.7 | LOS C | 9.5 | 66.5 | 0.76 | 0.66 | 24.2 |
| 5 | T1 | 813 | 0.0 | 0.375 | 23.4 | LOS B | 9.9 | 69.2 | 0.76 | 0.65 | 24.5 |
| Approach | | 843 | 0.0 | 0.375 | 23.6 | LOS B | 9.9 | 69.2 | 0.76 | 0.65 | 24.5 |
| North: Houston Rd - N | | | | | | | | | | | |
| 7 | L2 | 179 | 0.6 | 0.423 | 23.1 | LOS B | 12.3 | 86.2 | 0.69 | 0.72 | 20.1 |
| 8 | T1 | 216 | 0.0 | 0.423 | 18.7 | LOS B | 12.3 | 86.2 | 0.69 | 0.72 | 32.0 |
| 9 | R2 | 226 | 0.0 | 0.773 | 49.5 | LOS D | 11.5 | 80.3 | 0.99 | 0.91 | 19.3 |
| Approach | | 621 | 0.2 | 0.773 | 31.2 | LOS C | 12.3 | 86.2 | 0.80 | 0.79 | 23.1 |
| West: Gardeners Rd - W | | | | | | | | | | | |
| 10 | L2 | 181 | 0.0 | 0.782 | 35.9 | LOS C | 25.9 | 181.0 | 0.94 | 0.87 | 24.9 |
| 11 | T1 | 1561 | 0.0 | 0.782 | 30.6 | LOS C | 26.4 | 184.7 | 0.94 | 0.87 | 20.6 |
| 12 | R2 | 7 | 100.0 | 0.782 | 36.8 | LOS C | 25.4 | 179.7 | 0.94 | 0.87 | 24.6 |
| Approach | | 1749 | 0.4 | 0.782 | 31.2 | LOS C | 26.4 | 184.7 | 0.94 | 0.87 | 21.2 |
| All Vehicles | | 3536 | 0.2 | 0.782 | 28.5 | LOS B | 26.4 | 184.7 | 0.85 | 0.78 | 23.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 24.6 | LOS C | 0.1 | 0.1 | 0.70 | 0.70 |
| P2 | East Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 53 | 24.6 | LOS C | 0.1 | 0.1 | 0.70 | 0.70 |
| P4 | West Full Crossing | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 211 | 34.4 | LOS D | | | 0.82 | 0.82 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [6. Bunnerong Rd/ General Bridges Cres/ Sturt St AM - Design - Pedestrian Test - check1]

Bunnerong Rd/ Sturt St/ General Bridges Cres, Kingsford
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Bunnerong Rd - S | | | | | | | | | | | |
| 1 | L2 | 275 | 0.0 | 0.441 | 18.1 | LOS B | 12.4 | 86.6 | 0.62 | 0.68 | 43.8 |
| 2 | T1 | 709 | 0.0 | 0.441 | 11.4 | LOS A | 12.9 | 90.0 | 0.59 | 0.56 | 49.9 |
| Approach | | 984 | 0.0 | 0.441 | 13.3 | LOS A | 12.9 | 90.0 | 0.60 | 0.60 | 48.0 |
| East: Sturt St - E | | | | | | | | | | | |
| 4 | L2 | 26 | 0.0 | 0.224 | 53.1 | LOS D | 1.2 | 8.7 | 0.98 | 0.71 | 30.3 |
| Approach | | 26 | 0.0 | 0.224 | 53.1 | LOS D | 1.2 | 8.7 | 0.98 | 0.71 | 30.3 |
| North: Bunnerong Rd - N | | | | | | | | | | | |
| 7 | L2 | 88 | 0.0 | 0.071 | 11.1 | LOS A | 1.4 | 9.6 | 0.36 | 0.66 | 46.4 |
| 8 | T1 | 663 | 0.0 | 0.283 | 9.7 | LOS A | 7.3 | 51.1 | 0.52 | 0.45 | 51.7 |
| Approach | | 752 | 0.0 | 0.283 | 9.9 | LOS A | 7.3 | 51.1 | 0.50 | 0.47 | 51.0 |
| West: General Bridges Cres - W | | | | | | | | | | | |
| 10 | L2 | 27 | 0.0 | 0.054 | 31.8 | LOS C | 0.9 | 6.5 | 0.77 | 0.68 | 36.7 |
| Approach | | 27 | 0.0 | 0.054 | 31.8 | LOS C | 0.9 | 6.5 | 0.77 | 0.68 | 36.7 |
| All Vehicles | | 1789 | 0.0 | 0.441 | 12.7 | LOS A | 12.9 | 90.0 | 0.57 | 0.55 | 48.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 41.8 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P2 | East Full Crossing | 53 | 8.4 | LOS A | 0.1 | 0.1 | 0.42 | 0.42 |
| P2S | East Slip/Bypass Lane Crossing | 53 | 8.4 | LOS A | 0.1 | 0.1 | 0.42 | 0.42 |
| P4 | West Full Crossing | 53 | 8.4 | LOS A | 0.1 | 0.1 | 0.42 | 0.42 |
| P4S | West Slip/Bypass Lane Crossing | 53 | 8.4 | LOS A | 0.1 | 0.1 | 0.42 | 0.42 |
| All Pedestrians | | 263 | 15.1 | LOS B | | | 0.53 | 0.53 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101 [6. Bunnerong Rd/ General Bridges Cres/ Sturt St PM - Design - Pedestrian Test - check1]

Bunnerong Rd/ Sturt St/ General Bridges Cres, Kingsford
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Bunnerong Rd - S | | | | | | | | | | | |
| 1 | L2 | 102 | 0.0 | 0.293 | 16.3 | LOS B | 7.5 | 52.5 | 0.54 | 0.56 | 45.6 |
| 2 | T1 | 564 | 0.0 | 0.293 | 10.2 | LOS A | 7.6 | 53.2 | 0.53 | 0.49 | 50.9 |
| Approach | | 666 | 0.0 | 0.293 | 11.1 | LOS A | 7.6 | 53.2 | 0.53 | 0.50 | 50.0 |
| East: Sturt St - E | | | | | | | | | | | |
| 4 | L2 | 48 | 0.0 | 0.413 | 54.1 | LOS D | 2.3 | 16.3 | 1.00 | 0.74 | 30.1 |
| Approach | | 48 | 0.0 | 0.413 | 54.1 | LOS D | 2.3 | 16.3 | 1.00 | 0.74 | 30.1 |
| North: Bunnerong Rd - N | | | | | | | | | | | |
| 7 | L2 | 94 | 0.0 | 0.094 | 12.4 | LOS A | 1.9 | 13.3 | 0.40 | 0.62 | 46.2 |
| 8 | T1 | 1119 | 0.0 | 0.471 | 11.2 | LOS A | 14.1 | 98.6 | 0.60 | 0.54 | 50.6 |
| Approach | | 1213 | 0.0 | 0.471 | 11.3 | LOS A | 14.1 | 98.6 | 0.58 | 0.54 | 50.2 |
| West: General Bridges Cres - W | | | | | | | | | | | |
| 10 | L2 | 35 | 0.0 | 0.068 | 31.9 | LOS C | 1.2 | 8.3 | 0.77 | 0.69 | 36.7 |
| Approach | | 35 | 0.0 | 0.068 | 31.9 | LOS C | 1.2 | 8.3 | 0.77 | 0.69 | 36.7 |
| All Vehicles | | 1962 | 0.0 | 0.471 | 12.7 | LOS A | 14.1 | 98.6 | 0.58 | 0.54 | 49.0 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 53 | 41.8 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 |
| P2 | East Full Crossing | 53 | 8.4 | LOS A | 0.1 | 0.1 | 0.42 | 0.42 |
| P2S | East Slip/Bypass Lane Crossing | 53 | 8.4 | LOS A | 0.1 | 0.1 | 0.42 | 0.42 |
| P4 | West Full Crossing | 53 | 8.4 | LOS A | 0.1 | 0.1 | 0.42 | 0.42 |
| P4S | West Slip/Bypass Lane Crossing | 53 | 8.4 | LOS A | 0.1 | 0.1 | 0.42 | 0.42 |
| All Pedestrians | | 263 | 15.1 | LOS B | | | 0.53 | 0.53 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# Appendix I

Community Consultation Report to Randwick City Council

# Director City Services Report No. CS35/18

CS35/18

**Subject:** **Kingsford to Centennial Park Walking and Cycling Streetscape Improvements - Results of Public Consultation**

**Folder No:** PROJ/10180/1527782/6

**Author:** Tony Lehmann, Manager Integrated Transport

**Introduction**

Randwick City Council has over many years supported the use of bicycles as a sustainable, healthy transport mode. Since the 1990's the Council has identified and worked toward the delivery of a number of local routes as cycle routes. In 2015 the community was consulted and eleven specific routes were endorsed by the Council as the high priority routes. The cycle route identified as the highest priority for Randwick City Council is the 'Doncaster Avenue / Houston Road' route.

Randwick Council received Roads and Maritime Services (RMS) funding in the 2017-18 Financial Year to plan two new cycleways in our city. One is to connect the new Kingsford Light Rail Terminus with Centennial Park (the Doncaster / Houston route), the other is to connect South Coogee to the Kingsford Light Rail Terminus. These initiatives, which align with the Council's adopted priorities for cycleway planning, will promote active transport in our city by providing safe and pleasant routes for people who choose to walk or cycle to key destinations.

The cycleway projects were reported to the Ordinary Council meeting on 28 November 2017, (Streetscape and Cycleway Improvement Project – Kingsford to Centennial Park, and South Coogee to Kingsford Light Rail Terminus) where Council resolved that:

a) *Council Officers report back to Council with the final concept design and the results of the community consultation;*

b) *further routes be considered to service the south of the Randwick city area; and*

c) *the General Manager have discussions with the light rail construction company with the intent of integrating the bike path concepts we are generating with the unfolding design of the light rail.*

A concept design for the Kingsford to Centennial Park walking and cycling streetscape improvements was prepared first and exhibited to the public for feedback over a five week period between the 25 May and 2 July 2018. The consultation drawings are found in Appendix 1 – Community Consultation drawings. The concept design received in-principle approval by RMS prior to exhibition.

This report responds to Council resolution (a) above, and outlines the community consultation activities and outcomes for the proposal. It addresses the key themes and issues and makes recommendations on the concept design to improve the amenity of the streets along the route.

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**Background**

Strategic framework

In 2015, Randwick City Council undertook significant community consultation to review our bicycle routes and to establish priorities for constructing routes within the city. The connection from Kingsford to Centennial Park was identified as the top priority route in Randwick (see Appendix 2 - Randwick City Council Priority Construction Routes). The route was also identified by the NSW State Government in its 'Sydney's Cycling Future' strategy, and is a significant step to achieving Council's 20 year City Plan objective of providing safe and convenient walking paths and cycleways.

Route Description

The route is approximately 2.6 kilometres long, and extends northerly from the Light Rail Terminus at Anzac Parade, Kingsford via Sturt Street, General Bridges Crescent, Houston Road, Day Avenue and Doncaster Avenue. At the Doncaster Avenue and Alison Road intersection, the route connects to the existing shared path on Alison Road for access to Centennial Park and the City of Sydney. The location of the cycleway within the road corridor was determined by factors such as the number of intersections, driveways, school and loading zones, as well as connections to existing cycleways and shared paths.

Figure 1 below shows the route from the Kingsford Light Rail Terminus to Centennial Park as a solid orange line. The dotted line shows the proposed route from the Kingsford Light Rail Terminus to South Coogee. This is a separate project currently being undertaken by Randwick City Council, also with RMS funding. The concept design for this route is currently being finalised, with community consultation planned for late 2018. Results of the community consultation for the Kingsford to South Coogee route will be reported separately to Council.


*Figure 1: Proposed Kingsford to Centennial Park route*

Design Elements

Wherever possible the cycleway is designed to provide full separation from other road users. Two types of bi-directional cycleway feature in the design, being the 'interrupted median' (separation of bike riders from the road by 0.4m wide spaced concrete blocks) and 'flush-to-footpath' (kerb extension to create a cycleway at the same level as the existing footpath). The design detail along the route was determined by a number of technical factors identified in the site analysis, including existing services, road gradients and susceptibility to flooding.

Figure 2 below shows a diagram of a typical bi-directional cycleway. The existing road corridor width and footpath conditions vary along the route.

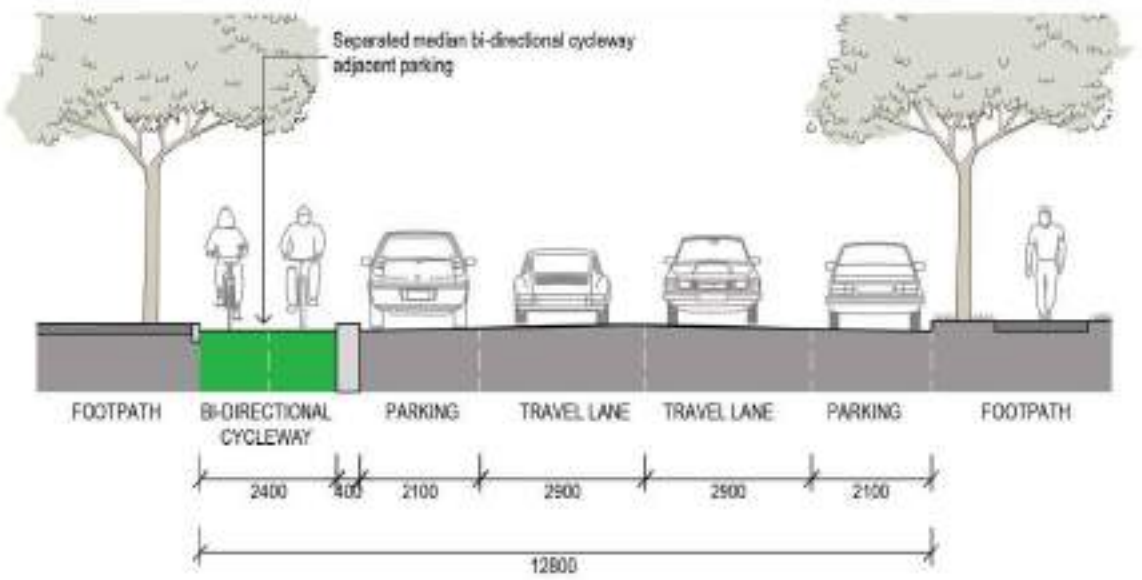


*Figure 2: Typical street section showing a bi-directional separated cycleway*

General Streetscape upgrade works

The implementation of the active transport route is an opportunity to increase the amenity for people who walk or cycle, and to improve safety for motorists. Aside from providing a bidirectional cycleway to separate bike riders from cars and pedestrians wherever possible, a number of other streetscape upgrade proposals are included in the concept designs including:

- An overall increase of approximately 50 new trees along the route;
- New garden beds and enhancement of existing verges and streetscape;
- Improved safety with new intersection improvements and traffic calming devices;
- New pedestrian crossings;
- Calmer traffic through implementation of clear markings and separation;
- Pavement and kerb ramp upgrades for improved pedestrian access; and
- New shared zone markings to improve awareness and safety where pedestrians, bike riders and vehicles cross paths.

Figure 3 shows the location of proposed new pedestrian crossings, new signalised intersections with improved pedestrian access, pedestrian refuges and bent-out intersections (which incorporate a pedestrian crossing). These elements will make it easier and safer for pedestrians crossing the road and for bike riders traveling from Kingsford to Kensington.

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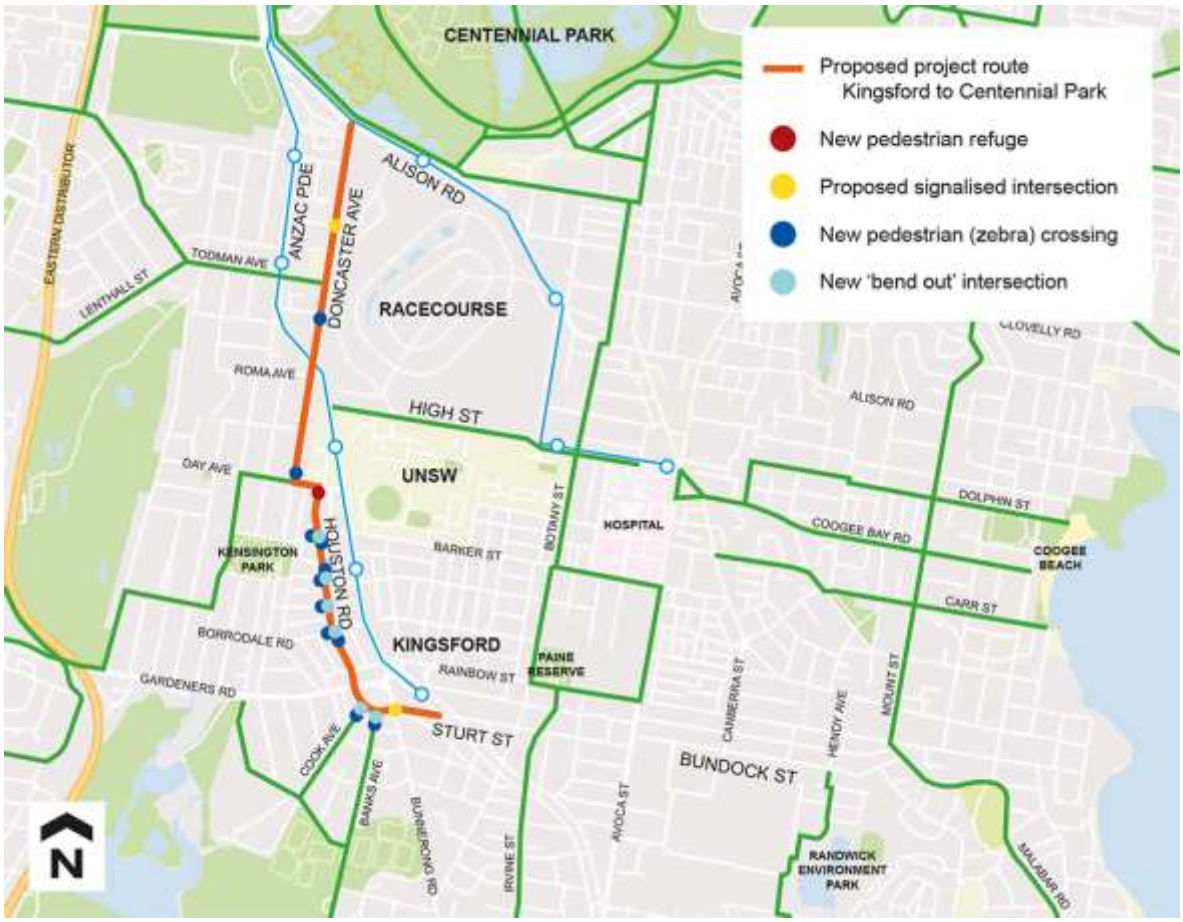


*Figure 3: Proposed pedestrian improvements along the Kingsford to Centennial Park route*

**Consultation activities**

Community consultation of the design plans for the proposed new cycleway and streetscape upgrade works was conducted over a 5-week period between May 25 and July 2 2018 (extended from the original consultation closing date of 22 June).

The consultation activities included:

- Your Say Randwick project page, including: detailed designs for each section of the route, Frequently Asked Questions, Question and Answer forum, as well as options to make a submission and register for future project updates;
- Advertising for the consultation in the Southern Courier, Daily Telegraph online, Council Weekly email bulletin and on Facebook;
- A letter mailed to all residents and owners along the route informing them of the consultation (see Appendix 3 – Letter to Residents and Owners);
- Concept designs exhibited at the Administration Building and Randwick City Council Libraries;
- Door knocking of all households along the Kingsford to Centennial Park route to offer an opportunity to discuss the project, and inform residents on the ways they could make a submission;
- Two pop up stalls with free coffee, one on the route and one near Centennial Park; and
- Information session at Kensington Public School.

A full report of consultation activities and results can be found in Appendix 4 – Community Consultation Report.

It should also be noted that the General Bridges Crescent portion of the route is located in Bayside Council's local government area. Bayside Council has provided support and approval for this project, and carried out their own community consultation regarding the proposal between 6 June and 1 July 2018. Submissions were received through "Have Your Say Bayside" and concept design exhibition at Bayside Council customer service centres.



**Submissions received**

As outlined in Appendix 4 – Community Consultation Report, the concept designs for the Walking and Cycling Streetscape Improvements Kingsford to Centennial Park received a significant amount of interest, including:

- 3310 visitors to Your Say Randwick website;
- 2077 pages downloaded;
- 9 questions asked and responded to;
- 396 Have Your Say submissions; and
- 38 email submissions

The majority of submissions received for the project were supportive (approximately 70%), with reasons most cited being safety improvements for pedestrians and bike riders along with the tree planting and streetscape improvements.

Approximately 30% of respondents were either neutral or opposed to the project, citing concerns including impacts on traffic and parking, loss of trees, and impacts on driveways.

A full list of the submissions received is included in Appendix 5 – Community Consultation Responses.

The general themes raised by respondents are explored in further detail below.

**Issues**

Main themes
Although there was a wide range of issues raised in the submissions, a number of prominent recurring themes have been identified for further discussion in this report.

These are:

1. Safety for bike riders
2. Cycle network, including links to Centennial Park and University of New South Wales (UNSW)
3. Trees and streetscape improvements, including traffic calming
4. Pedestrian safety
5. Intersections
6. Parking and disability parking
7. Kensington Public School
8. Driveway access

A full list of all issues raised in the submissions, along with the response provided by Council officers, is provided in Appendix 5 – Community Consultation Responses. Each of the key themes above is discussed in more detail below.

1. Safety for bike riders

A key outcome for this project is to improve safety for bike riders and pedestrians along this priority route. A cycleway that is separated from the footpath and the road significantly reduces the conflict and likelihood of accidents between people who walk, people on bikes and motor vehicles. It is widely acknowledged that providing safe cycling infrastructure is the key in making bike riding a viable transportation option for many in the community.

The route, in its current state, provides an on-road bike facility. This requires the bike rider to mix with traffic, often forcing the bike rider to ride close to parked cars where there is a risk of 'car dooring' (when a driver opens the car door onto a bike rider, causing a crash). Many submissions made by bike riders as part of this consultation considered the existing route to be particularly unsafe and often stressful, especially along Doncaster Avenue between Alison Road and Anzac Parade where traffic volume is high.

A significant number of respondents noted that the proposed design would improve safety for bike riders traveling along the route. This in turn was seen to encourage more people to cycle, especially those with the noted safety concerns regarding the current on-road cycle lane. Benefits to health and to the environment were also noted.

Discussion – Safety for bike riders

The proposed design significantly increases safety for people on bikes as;

- They would be located between the kerb and the parking lane, and with a 400mm separated buffer;
- The cycleway would be adjacent to the passenger door side, reducing the frequency of car doors opening onto the cycleway (as many cars are occupied by the driver only); and
- Due to the bi-directional nature of the cycleway, the bike riders closest to the parked cars would be travelling facing the parked cars. This provides greater visibility of possible upcoming conflicts.

Outcome - Safety for bike riders

The proposed cycleway will increase the safety of bike riders, and provide a safer transport option for those in our community who wish to use it.

2. Cycle network, including links to Centennial Park and University of New South Wales (UNSW)

Support for an expansion of the cycleway network was a common theme amongst written responses through the Your Say Randwick website.

Comments relating to the project include improving connections to:

- UNSW
- Sturt St, east of Anzac Parade
- Alison Rd shared path, next to Centennial Park
- Centennial Park, via a bridge.

A number of respondents requested more separated cycleways be constructed in Randwick City. Safer cycling infrastructure was requested for:

- Todman Avenue
- Anzac Parade, between Doncaster Avenue and High Street
- High Street
- Anzac Parade, from Kingsford to Maroubra and La Perouse

Discussion – Cycle network

Randwick City Council will explore the following future projects to address the desire for a more legible and connected cycle network in our area:

- Strengthening the connection to UNSW by creating a shared path on the eastern side of Anzac Parade between Doncaster Avenue and High Street. This will be addressed once light rail construction is completed.
- Strengthening the connection from Doncaster Avenue to the Alison Road shared path at Centennial Park by continuing to work with Light Rail and RMS. The establishment of a shared path on the southern side of Alison Road between Doncaster Avenue and Darley Road would help improve this access, and create a smoother and more efficient connection to the shared path on Alison Road between Darley Road and Wansey Road.

Outcome – Cycle network

Reinforcement of cycling connections as suggested by respondents will be actively considered and all suggested additional routes are noted. Council is committed to providing safe bicycle infrastructure in accordance with the 2015 Randwick City Council Priority Construction Routes established by community consultation in 2015 (see Appendix 2 – RCC Priority Construction Routes).

3. Trees and streetscape improvements

A number of respondents stated that they supported the proposed trees and landscaping along the route, with the streetscape improvements contributing to the amenity of the area. Some also noted that the proposed improvements, such as planter beds, would assist in calming traffic along the route.

Some residents express concerns about the impact which the project will have upon some street trees.

Discussion – Trees and streetscape improvements

Although every endeavour has been made to accommodate the existing trees into the design where possible, some trees are planned for removal in the concept to accommodate traffic changes or to meet minimum safe sight lines. A total of 21 trees are proposed to be removed with 72 new trees to be planted along the route. This results in a net gain of 51 street trees which will significantly add to the amenity of the area.

In addition to the new trees, it is proposed to install new 'kerb build outs' (see Figure 4) at intersections and pedestrian crossings. These are specifically designed as planter beds to further improve the greening of the streetscape.

Outcome – Trees and streetscape improvements

The project increases the number of trees and landscaping along the route. Further opportunities for planting of trees and planter beds along the route will be considered during design development of the project.

4. Pedestrian Safety

Improving pedestrian safety was a key consideration in the consultation responses, and submissions that raised this issue were generally supportive of the proposed improvements, such as:

- The proposal discourages bike riders from riding on the footpath by providing a dedicated space for people who ride;
- Pedestrians, bike riders and cars are separated wherever possible; and

- Pedestrian crossings and signalised intersections along Doncaster Avenue and Houston Road will improve safety for residents and others who walk in the neighbourhood.

There was, however, some concern that the safety of passengers exiting parked cars next to the cycleway would be compromised. The design has considered this issue by providing a 0.4m separation from parking and cycle path areas. The bi-directional design allows vehicle passengers and approaching riders to have clearer views of each other, reducing the likelihood of collision.

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Discussion – Pedestrian Safety

The community consultation raised valuable suggestions for further pedestrian improvements along the route. This included incorporating kerb 'build outs' at intersections opposite the cycleway.

Incorporating kerb build outs into the design serves to improve safety by:

- Reducing the distance pedestrians have to walk across the road;
- Improving sight lines for pedestrians crossing the road; and
- Providing additional traffic calming along the route.

As detailed earlier in this report, kerb build outs also provide increased opportunities for planting along the route. They can also provide opportunities for additional parking spaces by reducing the required set-back to the intersection allowable for parked cars.

A typical design of kerb buildouts is shown in Figure 4 below.

Outcome – Pedestrian Safety

The kerb build outs opposite the cycleway should be incorporated where feasible into the design.

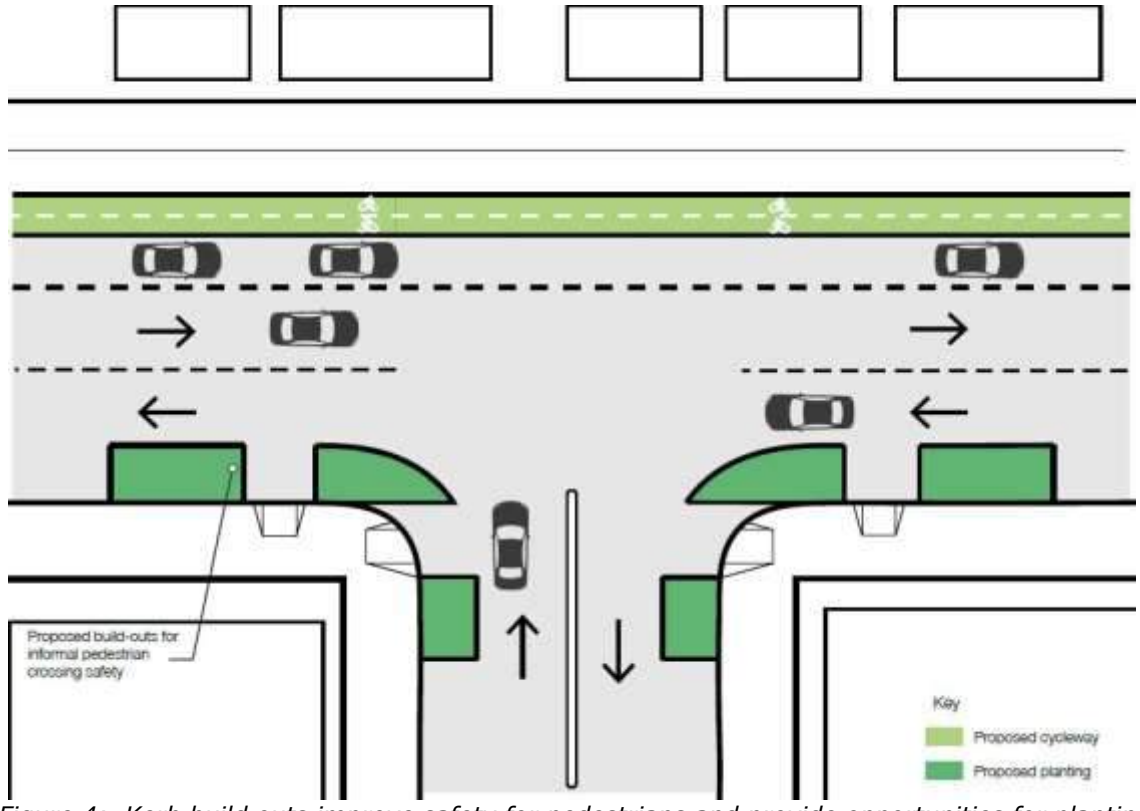


*Figure 4: Kerb build outs improve safety for pedestrians and provide opportunities for planting.*

5. Intersections

Some respondents made detailed comments regarding particular intersections along the route. Detailed intersection analysis was used to determine the most appropriate intersection treatments. Traffic counts were analysed and the likely traffic impacts were modelled using a SIDRA analysis for each key intersection.

The existing roundabouts on the route are not compatible with bi-directional cycleways, as illustrated in Figure 5 following. In a roundabout arrangement, vehicles have no storage space and would regularly block the cycleway. There are poor sight lines and the arrangement leaves bike riders and pedestrians vulnerable. There is also an increased risk of head-on collisions for bike riders traveling in the 'opposing' direction along the bidirectional cycleway.

As a result of this incompatibility, roundabouts along the route will be converted to either a signalised or priority controlled intersection.

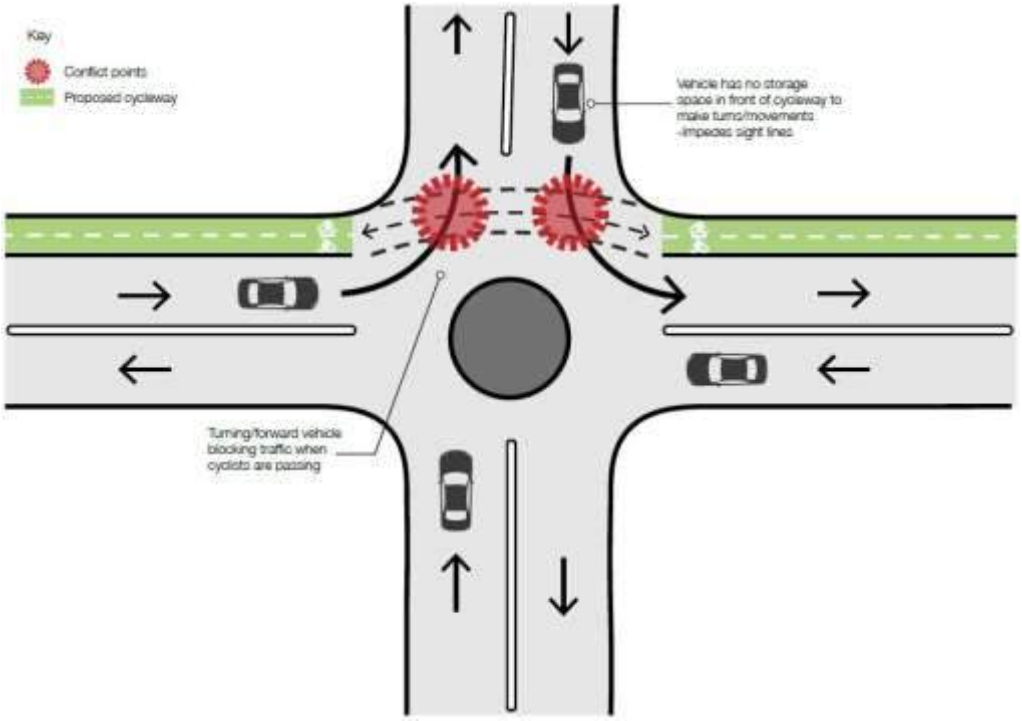


*Figure 5: Conflict points at roundabouts for cycleways.*

Discussion – Intersections

Based on the modelling, it was determined that the following intersections could be converted to priority controlled intersections (with the removal of existing roundabouts) with minimal impact on traffic flows:

- Doncaster Avenue and Day Avenue
- Houston Road and Barker Street
- Houston Road and Strachan Street
- Houston Road and Borrowdale Road

Determination as to the most appropriate treatment at the Doncaster Avenue and Ascot Street intersection is subject to further investigation and discussion with RMS.

A number of respondents were concerned with the bicycle wait times at signalised intersections. Light phasing is the responsibility of Roads and

Maritime Services. We are working closely with RMS on the light phasing to ensure all road users are efficiently accommodated.

Outcome – Intersections
Further analysis of all intersections will be undertaken during the detailed design of the project and suggestions from the public consultation will be incorporated where feasible. These will include:

a) Doncaster Avenue and Alison Road intersection
This intersection is currently restricted by light rail design. We will continue to explore ways to improve the separation for bike riders at this intersection and will work with RMS to try to reduce wait times at traffic lights.

b) Doncaster Avenue and Ascot intersection
The current design shows a signalised intersection at Doncaster Avenue and Ascot Street. We will conduct further investigation with RMS to determine whether the Doncaster Avenue and Ascot Street intersection should be signalised or adjusted to be priority controlled.

c) Doncaster Avenue and Todman Avenue intersection
We will investigate ways to improve bicycle access to Todman Avenue while actively discouraging illegal riding on the footpath. We will investigate ways to improve access to Kensington Public School for people either walking or riding (see also Section 7 following).

d) Doncaster Avenue and Day Avenue intersection
We will improve bike connectivity to the cycleway from west of Day Avenue and south of Doncaster Avenue.

e) Houston Road and Day Avenue intersection
We will investigate ways to further improve the safety of bike riders and pedestrians at this intersection.

6. General Parking and Mobility Parking
Many respondents were concerned with the parking loss along the route.

Although every effort has been made to minimise any parking loss along the route, some spaces are proposed to be removed in order to accommodate new pedestrian crossings and the like. New parking spaces have been created wherever possible.

| Street | Parking Spaces Removed | New Parking Spaces Gained | Outcome |
|---|---|---|---|
| Doncaster Avenue | 21 | 3 | 18 spaces removed<br>(mainly to provide for required sightlines at new pedestrian crossings) |
| Houston Road | 9 | 9 | Total supply remains unchanged |
| *General Bridges Crescent** | *1* | *2* | *1 additional space *(Bayside Council area)* |
| Sturt Street | 3 | 0 | 3 spaces removed<br>(to provide for three new street trees) |
| **Total** | **34** | **14** | **-20** |

Table 1 – Street by street Impact of proposal on parking supply

Overall, there will be a nett loss of 20 parking spaces along the full 2.6 kilometre length of the route; being a removal of 34 spaces, with 14 new spaces created.

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There were also some concerns raised regarding specific mobility impaired persons' parking spaces affected by the route.

Discussion – General Parking and Mobility Impaired Persons' Parking
In recent times, due to the light rail project, Randwick Council has increased the parking supply in some Kensington and Kingsford side streets. This was undertaken to address concerns about parking loss along Anzac Parade. An increase in the total parking supply in these side streets was achieved and for some streets, the new full time parking supply even exceeded the previous 'Clearway' affected parking spaces which were removed due to the light rail project.

Implementing new locations for people to more safely walk across the road has resulted in an adjustment to some of the parking spaces along the cycleway route.

This is considered a balanced outcome for our community.

Outcome – Parking and Mobility Parking
We have commenced discussions with stakeholders and residents along the route where mobility parking may be subject to change. These discussions will continue in the next stage of the project to accommodate concerns.

7. Kensington Public School

Kensington Public School is located on the west side of Doncaster Avenue. While not on the same side of the road as the proposed cycleway, the school is seen as an important stakeholder along the route – especially given the intense parking activity at certain times of the day.

Council officers have met with the Principal of Kensington Public School a number of times and with representatives of the Parents and Citizens' Association regarding the project. The following issues were raised by the school. An indication of the Council's response to their issues is shown in italics:

*a)* Car parking – *provision of the required sightlines at proposed pedestrian crossings has resulted in a net loss of only 2 spaces on Doncaster Ave, within 100 metres of the school.*
b) Pedestrian safety - *The design of the cycleway is arranged to accommodate people walking, cycling and driving.*
*c)* Mobility parking – *The Council has incorporated existing mobility parking spaces into the design.*
d) Footpath access during events – *Adequate footpath access will be maintained along the whole route; sufficient to meet the needs of nearby events.*
e) Todman Ave and Doncaster Ave intersection – *The school has raised concerns about the current operation of this intersection with regard to pedestrian movements. We will continue to work with the Principal to ensure the needs of the school are considered within the final design.*

Discussion – Kensington Public School
The wider community consultation highlighted that many bike riders currently feel quite unsafe as they navigate cars (and sometimes, buses) pulling into and out of the Kensington Public School pick up and drop off zone on Doncaster Avenue.

Some respondents supported the project as it will make it safer for parents dropping and picking up their kids and for bike riders as they will be fully separated from each other. Respondents also noted that providing a separated cycleway will encourage more children to cycle to Kensington Public School.

There was also some concern regarding potential conflict between bike riders and pedestrians at this 'pinch point'.

Outcome – Kensington Public School
Although this project will improve the safety of the Kensington Public School drop off and pick up zone by separating the bike riders from cars and pedestrians, it is acknowledged that the Doncaster and Todman intersection has the potential for conflicting requirements and desire lines.

In the next stage of the project we will investigate ways to strengthen safe connections to Kensington Public School for parents and children (whether they be riding or walking to school), and into Todman Avenue for bike riders.



8. Driveways

There were some respondents who were concerned about how driveway access would be impacted by the project, including:

- Safety concerns when exiting driveways, with drivers having to look out for bike riders, pedestrians and vehicles in both directions; and
- The large number of driveways along the route creating many points of potential conflict.

Discussion – Driveways
Residents with driveways located on the cycleway will need to take care when entering and exiting, as per existing conditions. There will be additional care required due to the bi-directional nature of the cycleway. Bike riders using the route will also need to be alert when crossing driveways.

The design will include green surface paint and bicycle symbols at all driveways to alert drivers and bike riders of the potential conflict and the need for care.

Council will continue to consider new driveway construction requests as per current practices.

Outcome – Driveways
Design measures as noted such as green paint and bicycle symbols will be used at each driveway to alert all road users of the potential conflict point.

**Relationship to City Plan**

The relationship with the City Plan is as follows:

Outcome 3: An informed engaged community.
Direction 3c: The community has increased opportunities to participate in decision making progress.
Outcome 4: Excellence in urban design and development.
Direction 4a: Improved design and sustainability across all development.
Outcome 5: Excellence in recreation and lifestyle opportunities.
Direction 5a: Maximise opportunities for residents and visitors to enjoy both active and passive open space uses.
Outcome 6: A liveable city.
Direction 6a: Our public assets are planned, managed and funded to meet the community expectations and defined levels of service.

Outcome 9: Integrated and accessible transport.

Direction 9a: A network of safe and convenient walking paths and cycleways linking major land uses and recreational opportunities.

**Financial impact statement**

Randwick City Council was successful at obtaining funding for the development of a concept design for this project under the RMS Active Transport Program. Further design phases and construction of the cycleway and streetscape improvements are eligible for full NSW Government funding under this program. However, this funding has not yet been allocated.

The community consultation process was funded through the project budget.

**Conclusion**

The existing bike facilities that connect Kingsford to Centennial Park are perceived by many as unsafe. They are not utilised by the wider public due to the fear of bicycle/car collisions. This project will separate bike riders from the cars, providing a safe environment for all road users. The project also strengthens the amenity of walking connections within parts of Kingsford and Kensington with proposals for new pedestrian crossings and refuges, and via the many proposed trees, planter beds and intersection treatments.

The community consultation resulted in 3310 visits to the 'Your Say Randwick' website. 2077 pages were downloaded and we received 434 written submissions. Of the written submissions received, approximately 70% supported the project.

Loss of parking, driveway access, and some proposed intersection treatments were of concern to the community. However, the majority of participants were in favour of the proposed walking and cycling streetscape improvements. The additional trees and street calming improvements were welcomed by our community, as was the higher degree of safety and separation afforded to all road users by the project.

The proposed walking and cycling streetscape improvements between Kingsford and Centennial Park will provide a strong and safe link between these key destinations, and to links into the City of Sydney. This will greatly benefit those in our community who choose to walk or cycle, whether as commuters or for recreation. Providing this alternative active transport option for short trips to work, school, shops and parks also serves to reduce the loads on our roads and public transport.

**Recommendation:**

That:

1. Council adopt the concept plans for the Kingsford to Centennial Park cycleway and streetscape improvements as the foundation to finalise design development and proceed to construction of the project, when funded; and

2. Council seek funding from RMS for the implementation of the project.

**Attachment/s:**

**1.**⇨ Use this link to view the Community Consultation Drawings
**2.**⇩ RCC Priority Construction Routes
**3.**⇩ Letter to Residents and Owners
**4.**⇩ Community Consultation Report
**5.**⇨ Use this link to view the Community Consultation Responses

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Randwick City Council Priority Construction Routes

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Randwick City Council
a sense of community

Randwick City Council
30 Frances Street
Randwick NSW 2031
**Phone** 1300 722 542
**Fax** (02) 9319 1510
ABN: 77 362 844 121

council@randwick.nsw.gov.au
www.randwick.nsw.gov.au

Follow us here

25 May 2018

Name
Address
SUBURB NSW 1234

Dear *Name*

Re: *Property address*

## Walking and cycling improvements: Kingsford to Centennial Park

We contacted you in November last year about Randwick City Council's planned streetscape improvement projects, including a new cycleway in your street.

The proposed improvements will provide safer walking and cycling connections to key destinations in our City, including to Centennial Park, the University of New South Wales, local shops and businesses, and the new light rail stops along Anzac Parade.

The route (shown overleaf) has been identified in line with Council's adopted cycleway construction priorities from 2015 and aligns with NSW Government key strategic cycling corridors.

With funding from the NSW Roads and Maritime Services (RMS), we have completed a concept design for the project.

The concept is now on public exhibition for community feedback from 25 May to 22 June 2018.

Council staff will be door knocking in your street during the day over a two-week period commencing Thursday 31 May 2018 to discuss the plans in person and chat about the project.

You can have your say, view the concept plans and our frequently asked questions online at **www.yoursayrandwick.com.au**. Printed copies of the plans will also be on display at Council's Administration Building (30 Frances Street, Randwick) and Randwick City libraries.

Please email **council@randwick.nsw.gov.au** or contact Sarah Thorne or Ken Shepherd on 1300 722 542 if you have any further questions.

Yours faithfully,

**Tony Lehmann**
Manager Integrated Transport
Randwick City Council

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# KINGSFORD TO CENTENNIAL PARK – STREETSCAPE IMPROVEMENT PROJECT


Doncaster Avenue and Carlton Street – looking south

Doncaster Avenue near Todman Avenue – looking south

General Bridges Crescent, Daceyville – looking south

CS35/18

# Community Consultation Report:

## Walking and cycling improvements: Kingsford to Centennial Park

25 May to 2 July 2018

Prepared by: Amanda Mather
Community Consultation Officer

CS35/18

## Contents

## 1.0 Overview

A community consultation program was undertaken to consult with the community on Council's proposed streetscape improvements from Kingsford to Centennial Park, including a new cycleway.

The main objective of the consultation was to exhibit detailed designs of the proposed improvements and encourage community feedback on the designs.

## 2.0 Consultation activities

| | |
|---|---|
| Your Say Randwick project page | www.yoursayrandwick.com.au/StreetscapeUpgradesKingsfordCentennial<br><br>The site included downloadable PDFs of the detailed designs, FAQs, Q&A forum, register for updates and survey submission option. |
| Advertising | *Southern Courier*<br>Mayor's column and notification 29 May 2018. |
| Media coverage | *The Southern Courier*<br>22 May 2018.<br>*Daily Telegraph online*<br>26 May 2018. |
| Randwick News | (Weekly email bulletin to 22,000 subscribers)<br>30 May 2018; 692 clicks<br>27 June 2018; 358 clicks |
| Media release | 25 May 2018. See *Attachment A* |
| Facebook | Post 25 May 2018; reached 3,648 people and generated 86 reactions, 44 comments and 12 shares.<br>*See Attachment B* |
| Mail out | Letter to all households, properties and property owners along the Kingsford to Centennial Park route. Sent 25 May 2018. |
| Randwick Council website | Dedicated page on RCC website:<br>http://www.randwick.nsw.gov.au/planning-and-building/council-works-and-upgrades/major-projects/pedestrian-cycling-streetscape-improvements<br><br>Notification on the front page of Council's website and on 'Current Consultations' page. |
| Precinct committees | Email to all Resident Precinct Committees |
| Councillor briefing and memo | Councillor Briefing 8 May 2018.<br>Memo to Councillors 25 May 2018. |

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<table>
<tr><td>Exhibit at Administration Building and Libraries</td><td>Detailed design panels displayed at:<br>Administration Building, Margaret Martin Library, Lionel Bowen Library and Malabar Community Library.<br><br>  <br>Image: Display at Lionel Bowen Library, Maroubra.</td></tr>
<tr><td>Door knocking</td><td>Door knocking all households along the Kingsford to Centennial Park route.<br>Council knocked on 810 doors along the proposed route. 149 doors were answered; 28 interactions were positive about the proposed improvements, 96 were neutral and 25 were negative.<br>See Attachment C for report on door knocking campaign.</td></tr>
<tr><td>Pop up stall</td><td>Staff on site with coffee cart:<br>1. Wednesday 13 June 2018 – Corner Anzac Pde and Alison Road on the shared path<br>2. Friday 22 June 2018 – Corner Anzac Pde and Doncaster Ave<br><br>Feedback 13 June – 25 people:<br><table><tr><td>Positive</td><td>Neutral</td><td>Negative</td></tr><tr><td>13</td><td>7</td><td>4</td></tr></table><br>Feedback 22 June - 58 people:<br><table><tr><td>Positive</td><td>Neutral</td><td>Negative</td></tr><tr><td>38</td><td>17</td><td>3</td></tr></table></td></tr>
</table>

| | |
|---|---|
| |  <br>Image: Pop up coffee cart on Anzac Pde/Alison Rd shared path – 13 June<br><br>  <br>Image: Pop up coffee cart on Corner Anzac Pde and Doncaster Ave – 22 June |
| Information sessions | Meeting with Kensington Public School, Thursday 28 June 2.30pm in the school library. 3 council staff, 5 parents and the Principal were in attendance. |

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## 3.0 Examples of communications and media coverage

Southern Courier article – 22 May 2018:

RANDWICK CITY

# New cycle network unveiled

## Council's bid to boost city riding

**Marie Hogg**

DESIGNS for an interconnected cycleway network in Sydney's southeast have now been released, a year after Randwick Council first announced its pedal power priorities.

The 11-point plan has begun with the "highest priority route", connecting Centennial Parklands to Kingsford.

Randwick Mayor Lindsay Shurey said the council's cycle strategy was part of a raft of improvements along the route.

"(They) are designed to inspire people to explore alternatives to hopping in the car to get to school or to the shops," she said.

The 2.4km separated bi-directional cycleway starts at Doncaster Ave, goes down Day Ave, Houston Rd, General Bridges Cres and Sturt St.

In addition, improvements will be made to paving and footpaths, lighting, with new garden beds, trees and streetscapes.

Powerlines to the north end of Doncaster Ave will also be moved underground.

"It's time to make it easier for people to walk or ride in Randwick," Cr Shurey said.

"We're adopting a people-first approach, and I think the results will create beautiful public spaces and encourage more foot traffic on our streets."

**A full concept drawing package of the entire cycle route can be viewed at randwick.nsw.gov.au**

**Southern Courier Mayor's Column – 29 May:**

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**Randwick News**

As part of our ongoing commitment to providing safe and healthy transport options for our community, I'm pleased to announce concept designs for walking and cycling improvements which will better connect the community with light rail and Centennial Park.

The Kingsford to Centennial Park route will start at the new Light Rail Terminus at Kingsford and will travel through Dacey Gardens, along Houston Road, Day Avenue and Doncaster Avenue and connect with existing shared paths at Centennial Park. The improvements planned are designed to inspire people to explore alternatives to hopping in the car to get to school or to the shops.

We're also making improvements to paving and footpaths, lighting and adding new garden beds, trees and streetscapes. It's a people-first approach, and I think the results will create beautiful public spaces and encourage more foot traffic on our streets.

You can have your say on the plans by visiting: **www.yoursayrandwick.com.au** before **22 June.**

***Councillor Lindsay Shurey***
***Mayor of Randwick***

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**Southern Courier – 29 May 2018:**

*Have your say*

**Walking and cycling improvements: Kingsford to Centennial Park**

Council is proposing streetscape improvements from Kingsford to Centennial Park, including a new cycleway.

The improvements will provide safer walking and cycling connections to key destinations in our City, including to Centennial Park, UNSW, local shops and the new light rail stops along Anzac Parade. Concept plans are now on exhibition for community feedback.

To view the plans and have your say, visit **www.yoursayrandwick.com.au** before **22 June 2018**. Hard copies of the plans can also be viewed at Council's Administration Building and libraries.

**eNews – 30 May:**


**Improved walking and cycling routes for Randwick City**

We've unveiled plans to improve walking and cycling routes across Randwick City to make it easier for residents to walk or ride. The community consultation details a 2.6km route that will stretch from Centennial Park to Kingsford. Have your say and read more: [More]

**eNews – 27 June:**


**Last chance to comment on separated cycleway plans**

We're planning improvements to provide better walking and cycling connections to Centennial Park, local shops, schools and the new light rail stops along Anzac Parade. Have your say on plans before 2 July. [More]

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**A3 Poster:**

# WALKING AND CYCLING IMPROVEMENTS KINGSFORD TO CENTENNIAL PARK

HAVE YOUR SAY

Randwick City Council is committed to providing safe and healthy transport options to improve our streets and make them easier to walk and cycle along.

The project includes:
- safer pedestrian crossings
- new trees and plants
- separated, bi-directional cycleway
- enhanced streetscape
- improved lighting
- traffic calming

You are invited to view the detailed plans and provide feedback on this project:
- Online: **www.yoursayrandwick.com.au**
- Randwick Administration Building – 30 Frances St, Randwick
- Margaret Martin Library – Level 1, Royal Randwick Shopping Centre
- Lionel Bowen Library – 669-673 Anzac Parade, Maroubra
- Malabar Library – 1203 Anzac Parade, Matraville

Consultation period: Friday 25 May 2018 to Friday 22 June 2018

For more information please contact Council's Sustainable Transport team on 1300 722 542 or email **council@randwick.nsw.gov.au.**

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1300 722 542
council@randwick.nsw.gov.au

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**Door knocking card:**

**Front**


Randwick City Council
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1300 722 542
council@randwick.nsw.gov.au

**Back**


**Sorry we missed you!**

We dropped by today to chat about Randwick City Council's planned improvements to your street, including a proposed new cycleway.

Sadly, we missed you, but you can view the concept design and make comments online at **www.yoursayrandwick.com.au**

Printed copies are also on exhibition at Council's Administration Building (30 Frances St, Randwick) and Randwick City libraries.

If you would like to chat about the design, please contact Sarah Thorne or Ken Shepherd at Council on 1300 722 542.

Have a great day,

Randwick City Council Sustainable Transport Team

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1300 722 542
council@randwick.nsw.gov.au

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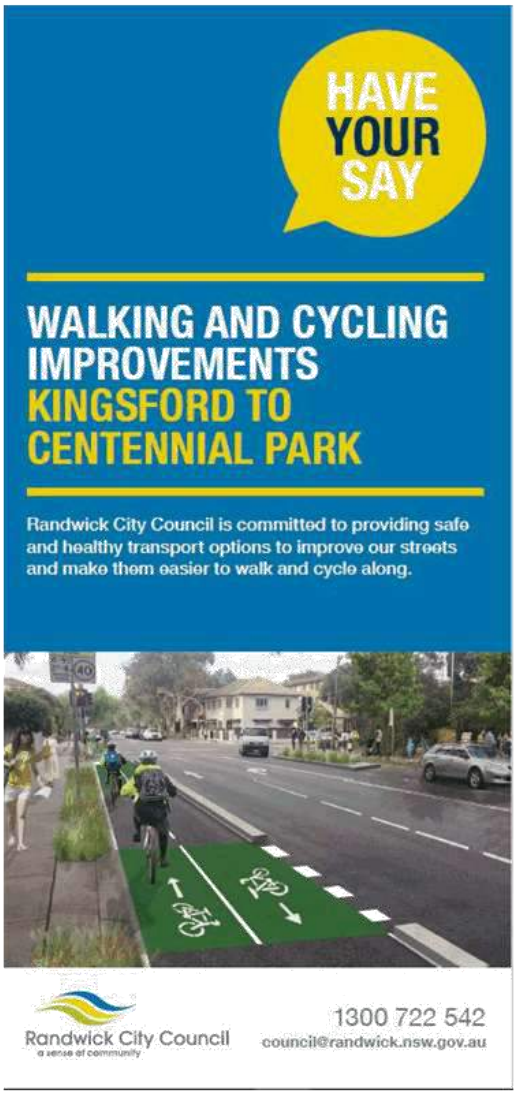
**DL Flyer:**

**Front**




**Back**

We are planning some improvement works to provide better walking and cycling connections to Centennial Park, local shops, schools and the new light rail stops along Anzac Parade.

**The project includes:**
- safer pedestrian crossings
- new trees and plants
- separated, bi-directional cycleway
- enhanced streetscape
- improved lighting
- traffic calming

Our 2015 community consultation, which established our commitment to prioritising walking and cycling upgrades, identified the Kingsford to Centennial Park route as a high priority.

The design development of the project is funded by Roads and Maritime Services (RMS) as part of the Active Transport Program. The route is a key strategic cycling corridor identified by the NSW Government.

Construction of the project is anticipated to take place in future years, subject to funding from the NSW Government.

You are invited to view the detailed plans and provide feedback on this project:

- Online: **www.yoursayrandwick.com.au**
- Randwick Administration Building – 30 Frances St, Randwick
- Margaret Martin Library – Level 1, Royal Randwick Shopping Centre
- Lionel Bowen Library – 669-673 Anzac Parade, Maroubra
- Malabar Library – 1203 Anzac Parade, Matraville

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1300 722 542
council@randwick.nsw.gov.au

## 4.0 Your Say summary and results

| | |
|---|---|
| Days open | 39 days open: 25 May to 2 July 2018 |
| Number of visitors to Your Say Randwick | 3310 |
| Document downloads | Number of downloads: 2077<br><br>Breakdown of downloads: |

| | |
|---|---|
| Project overview | 1204 |
| Doncaster Ave: near Abbotford, Carlton & Goodwood Sts | 397 |
| Doncaster Ave: near Ascot St, Bowral St & Todman Ave | 403 |
| Doncaster Ave: near Darling St, Anzac Pde & Roma Ave | 316 |
| Sturt Street | 197 |
| Houston Rd: near Barker St, Barker Ln, Strachan St & Strachan Ln | 155 |
| Houston Rd: near See St, See Ln, Borrodale St, Gardeners Ln & Gardeners Rd | 147 |
| Doncaster Ave: near Koorinda Ave, Day Ave & Houston Rd | 146 |
| General Bridges Crescent | 135 |
| FAQs | 181 |

| | |
|---|---|
| Q&A Forum | 9 questions asked and responded to. |
| Number of survey submissions | 396 |

## 5.0 Submissions

Council received 396 submissions via the Your Say Randwick website. An additional 38 submissions were sent via email to Council.

All submissions, including Council's response to each, can be viewed in the Council Report, 28 August 2018.

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## 6.0 Attachments

### Attachment A: Media Release 25 May 2018


**Friday 25 May 2018**

## Sustainable modes of transport the focus of new improvements for Randwick City

Plans unveiled to the community for improved walking and cycling connections between Centennial Park, local shops, schools and new light rail stops are designed to make it easier for people to walk or ride around Randwick City, Mayor Lindsay Shurey announced today.

The community consultation, which opens today Friday May 25, details the 2.4km route that will stretch from Centennial Park to Kingsford.

The route, which was identified as a priority in a 2015 community consultation, will connect with existing cycleways and provide easy access through Kensington to the Kingsford light rail terminus.

"We're committed to prioritising walking and cycling as viable transport options," said Mayor Shurey. "These new plans will make it easier for people to choose more sustainable options for moving around Randwick City. The results will create lovelier public spaces and encourage more foot traffic on our streets."

The streetscape improvements will also include safer pedestrian crossings, additional landscaping, separated, bi-directional cycleways, improved lighting and traffic calming designs.

Detailed plans and images can be seen online and feedback offered at www.yoursayrandwick.com.au.

They can also be viewed in person at Council's Administration office and all three libraries.

- Randwick Administration Building -30 Frances St, Randwick
- Margaret Martin Library- Level I, Royal Randwick Sliopping Centre
- Lionel Bowen Library- 669-673 Anzac Parade, Maroubra
- Malabar Library -1203 Anzac Parade, Matraville

**For more information visit www.randwick.nsw.gov.au**

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## Attachment B: Facebook Comments

### Randwick City Council Facebook

**Chris Daly** The current challenge with Doncaster Ave is the the cycle denoted path is blocked once a week with garbage bins. I assume this will not change

Like · Reply · Message · 5w · Edited 1

**Andrew Hope** They can take parking away on one side surely

Like · Reply · Message · 5w

**Chris Daly** Could be wrong but wouldn't it upset some residents?

Like · Reply · Message · 5w

**Randwick City Council** Andrew Hope Good news - the cycle way will fit while maintaining parking lanes on both sides.

Like · Reply · Commented on by Joshua Hay [?] · 5w

**Randwick City Council** It should be better Chris as the cycle way will be between parked cars and the footpath.

Like · Reply · Commented on by Joshua Hay [?] · 5w

**Chris Daly** If that is the case it must mean that Doncaster Avenue lanes will be narrower than they are now?

Like · Reply · Message · 5w

**Randwick City Council** Chris Daly the traffic lanes will be narrowed slightly

Like · Reply · Commented on by Joshua Hay [?] · 5w

**Andrew Hope** Chris Daly it's related to bikes Chris. Of course it'll upset people.

Like · Reply · Message · 5w

**Randwick City Council** Chris - roundabouts proposed for removal. Check the plans on the website. Garbage bins- same as now, put on kerb/footpath & council contractors move them to road for collection and return to kerb.

Like · Reply · Commented on by Joshua Hay [?] · 5w

CS35/18

**Bronwyn Delaney** I know... 😍 I want to know if it's the north or south side of Sturt St - so exciting.

Like · Reply · Message · 5w

**Randwick City Council** South side... check out the plans here: https://www.yoursayrandwick.com.au/.../doc.../78464/download

Like · Reply · Commented on by Joshua Hay [?] · 5w

**Bronwyn Delaney** The Ask a QUESTION feature does not work on the link.

Like · Reply · Message · 5w

**Randwick City Council** Thanks for letting us know, I will look into it now

Like · Reply · Commented on by Joshua Hay [?] · 5w

**Jean-Marc Annonier** I do like it. Although the existing bike lanes aren't too bad, I use them everyday. I just hope the residents on Houston and Doncaster won't get too cranky with the disruption and impact on street parking.

Like · Reply · Message · 5w

**Al Mac** If you could please flatten Cowper Street that will be great. Will make my walk to the DOG that much easier

Like · Reply · Message · 5w

**Randwick City Council** wish we could, but we'd probably start with Arden St! 😜

Like · Reply · Commented on by Joshua Hay [?] · 5w 1

**Iggi Gershon** So pissed off at Randwick City COUNCIL! Not only have they turned Randwick into one big disgusting construction site but they want to increase rates by a staggering 19%!

Like · Reply · Message · 5w

**Randwick City Council** Hi Iggi, I'm sorry you're upset with us. The construction you refer to is probably light rail. It's a state gov project not randwick. And the rate rise for residential ratepayers is 5.5%pa. The 19% figure is total cumulative change to councils rate base over three years. This video might be helpful https://m.youtube.com/watch?feature=youtu.be&v=SXKLxgo-ni8

YOUTUBE.COM

**Your Rates Explained**

**Chris Daly** Many thanks - one more comment - currently despite the 'cycle path' around Centennial Park along Alison Rd and north along Darley Rd built at some expense some years ago - it is essentially ignored by cyclists who continue to use the main roads. I do not understand why but assume this will continue! Darley Rd is basically single lane and not all safe for cyclists.

Like · Reply · Message · 5w · Edited

**Mark Hastings** Chris Daly If a dedicated cycleway is present, cyclists who ride on the road should be fined.

Like · Reply · Message · 5w · Edited

**Frank Moran** We need it all the way to la perouse, especially dangerous around the goal

Like · Reply · Message · 5w

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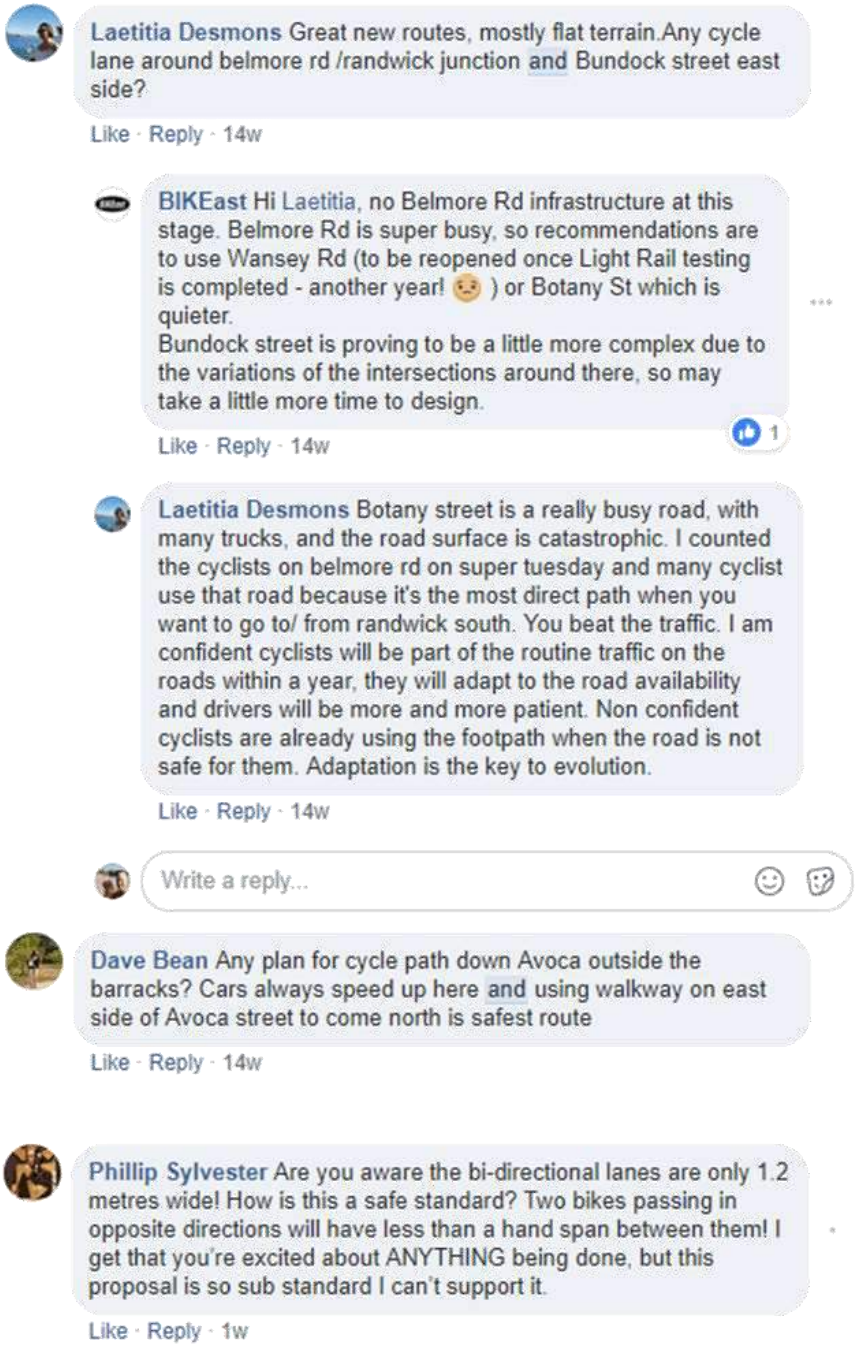
## Comments on BIKEast Facebook



Laetitia Desmons Great new routes, mostly flat terrain.Any cycle lane around belmore rd /randwick junction and Bundock street east side?

Like · Reply · 14w

BIKEast Hi Laetitia, no Belmore Rd infrastructure at this stage. Belmore Rd is super busy, so recommendations are to use Wansey Rd (to be reopened once Light Rail testing is completed - another year! ) or Botany St which is quieter.
Bundock street is proving to be a little more complex due to the variations of the intersections around there, so may take a little more time to design.

1

Like · Reply · 14w

Laetitia Desmons Botany street is a really busy road, with many trucks, and the road surface is catastrophic. I counted the cyclists on belmore rd on super tuesday and many cyclist use that road because it's the most direct path when you want to go to/ from randwick south. You beat the traffic. I am confident cyclists will be part of the routine traffic on the roads within a year, they will adapt to the road availability and drivers will be more and more patient. Non confident cyclists are already using the footpath when the road is not safe for them. Adaptation is the key to evolution.

Like · Reply · 14w

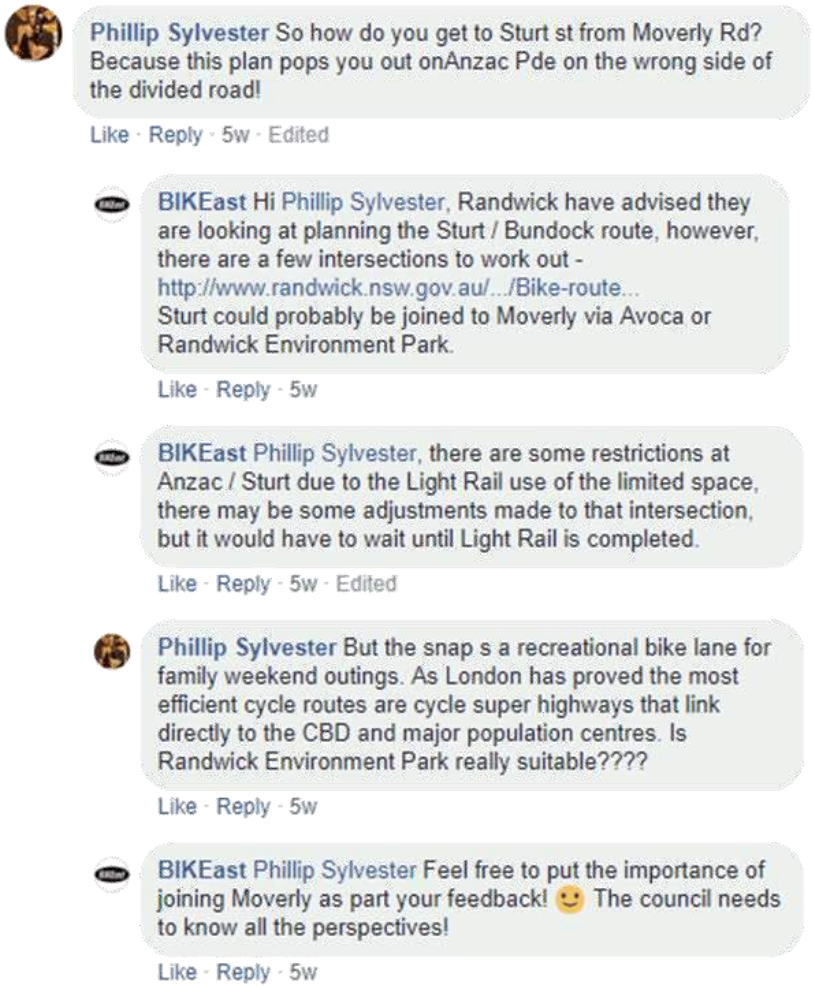
Write a reply...

Dave Bean Any plan for cycle path down Avoca outside the barracks? Cars always speed up here and using walkway on east side of Avoca street to come north is safest route

Like · Reply · 14w

Phillip Sylvester Are you aware the bi-directional lanes are only 1.2 metres wide! How is this a safe standard? Two bikes passing in opposite directions will have less than a hand span between them! I get that you're excited about ANYTHING being done, but this proposal is so sub standard I can't support it.

Like · Reply · 1w


Phillip Sylvester So how do you get to Sturt st from Moverly Rd? Because this plan pops you out onAnzac Pde on the wrong side of the divided road!
Like · Reply · 5w · Edited
BIKEast Hi Phillip Sylvester, Randwick have advised they are looking at planning the Sturt / Bundock route, however, there are a few intersections to work out - http://www.randwick.nsw.gov.au/.../Bike-route... Sturt could probably be joined to Moverly via Avoca or Randwick Environment Park.
Like · Reply · 5w
BIKEast Phillip Sylvester, there are some restrictions at Anzac / Sturt due to the Light Rail use of the limited space, there may be some adjustments made to that intersection, but it would have to wait until Light Rail is completed.
Like · Reply · 5w · Edited
Phillip Sylvester But the snap s a recreational bike lane for family weekend outings. As London has proved the most efficient cycle routes are cycle super highways that link directly to the CBD and major population centres. Is Randwick Environment Park really suitable????
Like · Reply · 5w
BIKEast Phillip Sylvester Feel free to put the importance of joining Moverly as part your feedback! The council needs to know all the perspectives!
Like · Reply · 5w

## Attachment C: Door knocking report

### Door knocking outcomes

| Street | Section | Date | Total doors knocked | Interactions | Positive | Neutral | Negative |
|---|---|---|---|---|---|---|---|
| Doncaster Ave | Alison Rd to Goodwood St | 4/6/18 | **104** | 27 | 5 | 16 | 6 |
| Doncaster Ave | Goodwood St to Ascot St | 5/6/18 | **62** | 16 | 2 | 8 | 6 |
| Doncaster Ave | Ascot St to Todman Ave | 15/6/18 | **55** | 8 | 1 | 6 | 1 |
| Doncaster Ave | Todman Ave to Darling St | 7/6/18 | **56** | 14 | 7 | 5 | 2 |
| Doncaster Ave | Darling St to Anzac Parade | 19/6/18 | **40** | 11 | 1 | 9 | 1 |
| Doncaster Ave | Anzac Parade to Korinda Ave | 7/6/18 | **47** | 14 | | 11 | 3 |
| Doncaster Ave | Korinda Ave to Day Ave | 7/6/18 | **27** | 15 | 4 | 8 | 3 |
| Houston Road | Day Ave to Barker St | 28/5/18 | **97** | 4 | | 3 | 1 |
| Houston Road | Barker St to Strachan St | 13/6/18 | **46** | 13 | 3 | 10 | |
| Houston Road | Strachan St to Borrodale St | 18/6/18 | **153** | 9 | 3 | 6 | |
| Houston Road | Borrodale St to Gardeners Ln | 21/6/18 | **96** | 14 | 2 | 10 | 2 |
| Sturt Street | Bunnerong Rd to Anzac Parade | 18/6/18 | **27** | 4 | | 4 | |
| | | **Totals:** | **810** | 149 | 28 | 96 | 25 |

## Main issues discussed:

| Issue: | Number of times discussed: |
|---|---|
| Parking | 22 |
| Trees | 3 |
| Driveways | 10 |
| Bike rider safety | 1 |
| Pedestrian Safety | 5 |
| Bin Collection | 0 |
| Construction | 6 |
| Traffic Congestion | 8 |
| Light Rail | 4 |

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