

# Homebush Bay Drive and Australia Avenue, Homebush intersection upgrade

## Preferred Option Report

April 2022



Australian Government

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## Table of Contents

Executive Summary .....	4
1 Introduction.....	9
1.1 Background .....	9
1.2 Proposal objectives and guiding principles .....	10
1.3 Purpose of this report.....	10
2 Need for the proposal .....	11
2.1 Strategic planning context .....	14
2.2 Road network conditions.....	18
2.2.1 Existing traffic volumes and congestion.....	18
2.2.2 Traffic growth.....	18
2.2.3 Road safety.....	18
3 Issues and constraints.....	20
3.1 Landscape character and visual amenity.....	20
3.2 Biodiversity .....	21
3.3 Hydrogeology, water quality and groundwater .....	22
3.4 Geology and soils .....	25
3.5 Noise and vibration .....	26
3.6 Air quality .....	27
3.7 Socio-economic and land use .....	27
3.8 Aboriginal and non-Aboriginal heritage.....	27
3.9 Utilities .....	28
4 Community and stakeholder engagement .....	29
4.1 Government agency and council involvement .....	29
4.2 Future community and stakeholder involvement .....	29
5 Options identification .....	30
5.1 Longlisted options.....	30
5.2 Shortlisted options .....	31
5.3 Shortlisted options assessment .....	32
5.3.1 Option 5.....	33
5.3.2 Option 16B.....	34
5.3.3 Option 15D.....	35
6 The preferred option.....	38
6.1 Key benefits of the preferred option .....	39
6.2 Key features of the preferred option .....	39
6.2.1 Homebush Bay Drive northbound off ramp.....	40
6.2.2 Homebush Bay Drive southbound off ramp .....	41
6.2.3 Australia Avenue .....	41
6.2.4 Underwood Road.....	42
6.3 How the preferred option will support traffic movements.....	42
6.4 How the preferred option will support active and public transport use .....	43
7 Next steps .....	45

## List of Tables

Table 1 Strategic alignment .....	15
Table 2 Draft long list of potential options for preliminary investigation .....	31
Table 3 Agreed assessment criteria for Value Management .....	36

## List of Figures

Figure 1 location of the proposal and investigation area .....	11
Figure 2 existing intersection configuration .....	12
Figure 3 Queueing along Underwood Road in 2019 during a peak period .....	13
Figure 4 Crash history (Transport for NSW Centre for Road Safety, 2020) .....	19
Figure 5 Landscape features surrounding the intersection (September 2021) .....	20
Figure 6 Threatened Plant Community Type mapping (2019) .....	21
Figure 7 Coastal zone management areas in vicinity of investigation area ( 2019) .....	22
Figure 8 Boundary Creek fishway photos .....	22
Figure 9 Water features of investigation area (2019) .....	23
Figure 10 Peak flood contours and depths for PMF event (2019) .....	24
Figure 11 Known contaminated sites in vicinity of the investigation area (2019) .....	26
Figure 12 Options assessment approach .....	30
Figure 13 Shortlisted Option 5 .....	33
Figure 14 Shortlisted Option 16B .....	34
Figure 15 Shortlisted Option 15D .....	35
Figure 16 Strategic design for the preferred option (15D) .....	38
Figure 17 Proposed intersection upgrades .....	39
Figure 18 Artist impression of Homebush Bay Drive northbound off ramp .....	40
Figure 19 Artist impression of Homebush Bay Drive southbound off ramp .....	41
Figure 20 Artist impression of Australia Avenue eastbound .....	41
Figure 21 Artist impression of Underwood Road westbound .....	42
Figure 22 Preferred option traffic movements through the intersection .....	43
Figure 23 Artist impression of shared use crossing on Underwood Road at Bressington Park .....	43
Figure 24 Preferred option active transport movements through the intersection .....	44
Figure 25 Artist impression of shared use crossing and on-road bicycle lane on Australia Avenue .....	44

# Executive Summary

## Background

The Australian and NSW Governments are investing \$100 million to upgrade the intersection of Homebush Bay Drive, Australia Avenue and Underwood Road to ease congestion and increase safety at the intersection and improve travel times and connectivity to Homebush and Sydney Olympic Park for all road users.

Transport for NSW has identified a preferred option for the Homebush Bay Drive, Australia Avenue and Underwood Road intersection upgrade. The identification of a preferred option follows an extensive process of investigation and assessment, planning, design, and government stakeholder and subject matter expert consultation based on strategic designs developed by Transport for NSW over the last year.

## Purpose of this report

The report aims to:

- explain the strategic context and need for the upgrade
- identify the relevant issues and constraints at the intersection and its surrounds
- describe the options development and evaluation process undertaken to identify the preferred option
- present the preferred option
- outline the next steps for proposal development.

## Need for the proposed upgrade

Currently the intersection consists of a four-leg roundabout connecting Homebush Bay Drive to Australia Avenue and Underwood Road. Homebush Bay Drive is grade separated from the roundabout and passes over the centre of the intersection, with connecting on and off ramps in both directions.

Roundabout metering signals, which are used primarily during special event peak periods and to provide pedestrian connectivity, are present on all approaches. There are two lanes on all approaches to the roundabout, as well as continuous left turn slip lanes on the north and west approaches. There are three lanes in each direction on Homebush Bay Drive.

The intersection plays a pivotal role in accessing Sydney Olympic Park and the commercial, recreational and residential centres surrounding the intersection. In particular, the intersection acts as the primary eastern gateway to Sydney Olympic Park.

More broadly, Homebush Bay Drive represents a key north-south state arterial, linking the M4 Western Motorway (650 metres to the south) to Victoria Road, the M2 Motorway and Pacific Highway to the north. Homebush Bay Drive and Australia Avenue provides access to Sydney Olympic Park and Bicentennial Park, while Homebush Bay Drive and Underwood Road provide access to Parramatta Road and Bressington Park, and to Direct Factory Outlet (DFO) Homebush and other commercial, recreational, and residential centres surrounding the intersection.

Currently, the intersection does not operate satisfactorily, with all road users (including 525 and 526 bus route users), experiencing significant delays, long queues and wait times at the intersection, particularly during AM, PM, and weekend peak periods, and during special events at Sydney Olympic Park.

The intersection also has a poor safety and crash history, with a total of 44 crashes reported at the intersection between 2016 and 2020.

Congestion at the intersection also impacts the reliable and efficient movement of commuters and freight movements within the wider regional traffic network.

These traffic impacts not only undermine the efficiency of the existing road network but also threaten to undermine the future traffic demands and expected growth and development in the area, particularly in Sydney Olympic Park. Furthermore, the congestion present at peak times significantly detracts from the amenity of the area and poses significant safety risks to the relatively large number of pedestrians and cyclists accessing the area for shopping, commercial and recreational purposes.

## Proposal objectives

The objectives are to:

- support current and future traffic demands and expected growth in the area
- improve connectivity to and from Sydney Olympic Park and surrounds
- improve road safety for all users
- improve the movement of goods and trucks
- support public transport use
- facilitate safe and efficient travel for pedestrians and cyclists
- minimise environmental and community impacts
- improve amenity
- facilitate safe and efficient travel for pedestrians and cyclists.

## Guiding principles

The proposal objectives are supported by guiding principles that will shape how the proposal objectives are achieved, and the option decision making processes adopted to identify a preferred option.

These principles are for Transport for NSW to:

- minimise visual impact
- reduce impact to open space
- minimise traffic disruption during construction
- minimise access impacts to adjacent land uses
- provide value for money.

## Options identification and assessment

The options evaluation process involved information gathering (environmental investigations, design development, traffic modelling analysis), a value management process and a multi-criteria analysis, which assessed options against agreed criteria.

The agreed criteria included:

- road safety
- traffic efficiency and capacity
- pedestrian and cyclist connectivity
- environmental impacts
- property and community needs
- construction and design benefits
- delivery cost and budget.

## Options considered

Initially, over 12 options were identified for assessment. Options identified and considered included roundabout improvements, overpasses, underpasses, and various signalised intersection options.

## Longlisted options

Transport for NSW worked with key government stakeholders and subject matter experts over the course of several workshops to assess the impacts and constraints of the 12 options, using a number of technical studies and investigations.

In October 2019 an initial shortlisting workshop was held to assess the 12 longlisted options. As a result of this assessment, and an option elimination process, six options were considered to be consistent with the project objectives and guiding principles, practicable in terms of constructability, feasible in terms of economic impacts and realistic in terms of likely budgetary constraints.

The six options included three grade-separated solutions and three at-grade solutions.

In January 2021, a second shortlisting workshop was held to assess the six options. Each of the six options were presented and assessed in terms of:

- intersection performance and safety
- visual impacts
- environmental impacts
- potential impacts to private property, public space access and functionality
- pedestrian and cyclist access and connectivity
- traffic impacts during construction
- maintenance.

As a result of this assessment, three options were shortlisted.



## Shortlisted options

The three short listed options selected were:

- **Option 5:** upgrading the existing roundabout to a conventional signalised intersection, with a single diamond phasing arrangement, allowing right turn movements from Australia Avenue and Underwood Road approaches to the intersection to turn in unison.

The Homebush Bay Drive overpass would remain in place.

- **Option 16B:** upgrading the existing roundabout to a signalised intersection with a double diamond phasing arrangement. This would allow right turn movements from Australia Avenue and Underwood Road approaches to the intersection to turn in unison. It would also allow the Homebush Bay Drive northbound and southbound approaches to the intersection to turn in unison. The intent of this option is to enable right turning movements to pass through the intersection more efficiently, minimising traffic delays.

The Homebush Bay Drive overpass would have to be modified to facilitate the phasing arrangements; two piers supporting the overpass (the southwest and northeast piers) would require demolition and relocation in order to enable the turning movements to occur in unison.

- **Option 15D:** upgrading the existing roundabout to a signalised intersection, configured to an intersection arrangement known as a Diverging Diamond Interchange. This would require traffic to briefly drive on the opposite side of the road from what is customary, as traffic safely moves through the intersection. The design would allow traffic movements to be controlled by traffic signals with simplified traffic signal phasing, when compared with conventional intersection layouts which consist of six or more phases.

The Homebush Bay Drive overpass would remain in place with no bridge pier adjustment expected.

## Preferred option

In July and September 2021 three value management workshops were undertaken to explore the performance of the three shortlisted options against the project objectives and guiding principles, drawing upon key government stakeholder and subject matter expertise for opinions and input.

Each of the three options was compared against a base case, 'do minimum' scenario, in which the current intersection infrastructure is maintained into the future.

As a result of the value management workshops Option 15D was identified as the preferred option to be taken forward for further development. Option 15D proposes to replace the existing roundabout with an at-grade signalised intersection, configured as a Diverging Diamond Interchange. Homebush Bay Drive would continue to pass over the intersection, with on and off ramp access maintained and improved.

Option 15D was shown to best meet the project objectives and guiding principles and have the least issues and constraints.

In particular, the preferred option was found:

- to significantly improve traffic flow at the intersection and exceed the performance offered by either Option 5 or 16B
- to significantly improve traffic performance and traffic flow across the modelled network
- when compared to Option 5, the environmental, amenity and construction impacts are greater. However, as Option 5 has limited design life in addressing the transport need for the project and the established objectives, Option 5 was not seen to be a valid preferred option to be taken forward
- when compared to Option 16B, while likely to have marginally greater environmental footprint and amenity impacts, Option 15D was seen to be significantly less complex to construct, lowering costs, time and impacts to the road network during construction.

## Next steps

Transport for NSW will now seek public feedback on the preferred option. This will provide an opportunity for the community and stakeholders to review the preferred option and provide feedback. Transport for NSW will use this feedback to refine the preferred option through the development of a concept design and environmental assessment for the proposal.

Transport for NSW will continue community and stakeholder consultation during the next stages of the proposal. The Transport for NSW website will be periodically updated with information about the progress of the proposal.

The community will also be provided with periodic project updates via community notifications and project webpage updates.



# 1 Introduction

## 1.1 Background

The Australian and NSW Governments are planning to widen and upgrade the intersection of Homebush Bay Drive, Australia Avenue and Underwood Road to ease congestion, increase safety, improve travel times and connectivity to Homebush and Sydney Olympic Park for all road users.

Currently, the intersection does not operate satisfactorily, with all road users (including 525 and 526 bus route users) experiencing significant delays, long queues and wait times at the intersection, particularly during AM, PM, and weekend peak periods, and during special events at Sydney Olympic Park.

Much of the intersection demand is associated with access to Sydney Olympic Park precinct immediately to the west of the intersection and its associated recreational and event-based activities. The intersection provides the primary eastern gateway to Sydney Olympic Park.

Traffic impacts at the existing intersection, which is configured as a four-legged roundabout, not only undermines the efficiency of the existing road network but also threatens to undermine future traffic demands and expected growth and development in the area, particularly in Sydney Olympic Park. Congestion at the intersection also impacts the reliable and efficient movement of commuters and freight movements within the regional traffic network.

Further, the congestion present at peak times significantly detracts from the amenity of the area, while posing significant safety risks to the relatively large number of active transport users accessing the area for shopping, commercial and recreational purposes. The intersection also has a poor safety and crash history, with a total of 44 crashes reported at the intersection between 2016 and 2020.

Transport for NSW has now carried out site investigations and an extensive options selection and assessment process to identify a preferred option to upgrade the intersection. A signalised intersection, configured as a Diverging Diamond Interchange performed best overall when compared with the other options. This innovative intersection arrangement will improve safety, efficiency, and capacity at the intersection more effectively than a conventional signalised intersection.

This report provides a summary of the options identification and assessment process that was undertaken to identify the preferred option.

## 1.2 Proposal objectives and guiding principles

The proposal objectives that have shaped identification of upgrade options and design to date, and that will continue to shape the role of the preferred solutions are to:

- support current and future traffic demands and expected growth in the area
- improve connectivity to and from Sydney Olympic Park and surrounds
- improve road safety for all users
- improve the movement of goods and trucks
- support public transport use
- facilitate safe and efficient travel for pedestrians and cyclists
- minimise environmental and community impacts
- improve amenity
- facilitate safe and efficient travel for pedestrians and cyclists.

The proposal objectives are supported by guiding principles that have helped shape the option identification and assessment processes, and how the identified solutions may be delivered.

These principles are for Transport for NSW to:

- minimise visual impact
- reduce impact to open space
- minimise traffic disruption during construction
- minimise access impacts to adjacent land uses
- provide value for money.

## 1.3 Purpose of this report

The purpose of this report is to:

- explain the strategic context and need for the upgrade
- identify the relevant issues and constraints at the intersection and its surrounds
- describe the options development and evaluation process taken to identify the preferred option
- present the preferred option
- outline the next steps for proposal development.

## 2 Need for the proposal

The intersection of Homebush Bay Drive, Australia Avenue and Underwood Road is located in Homebush, Sydney.

Homebush Bay Drive is a key north-south arterial forming part of the A3 road corridor and linking the M4 Western Motorway (650 metres to the south) to Victoria Road and the M2 Motorway and Pacific Highway to the north. Homebush Bay Drive and Australia Avenue provide the primary eastern gateway to Sydney Olympic Park and Bicentennial Park, while Homebush Bay Drive and Underwood Road provide access to Parramatta Road and Bressington Park, and to Direct Factory Outlet (DFO) Homebush and other commercial, recreational, and residential centres surrounding the intersection.

The intersection also provides connectivity to the developing suburbs of Wentworth Point, Newington, Rhodes and Liberty Grove.

The intersection is located in the Sydney Olympic Park precinct, which is part of the Greater Parramatta and the Olympic Peninsula (GPOP) Priority Growth Area as outlined in the Greater Sydney Commission's *Central City District Plan*. Figure 1 below further illustrates the project location and investigation area.

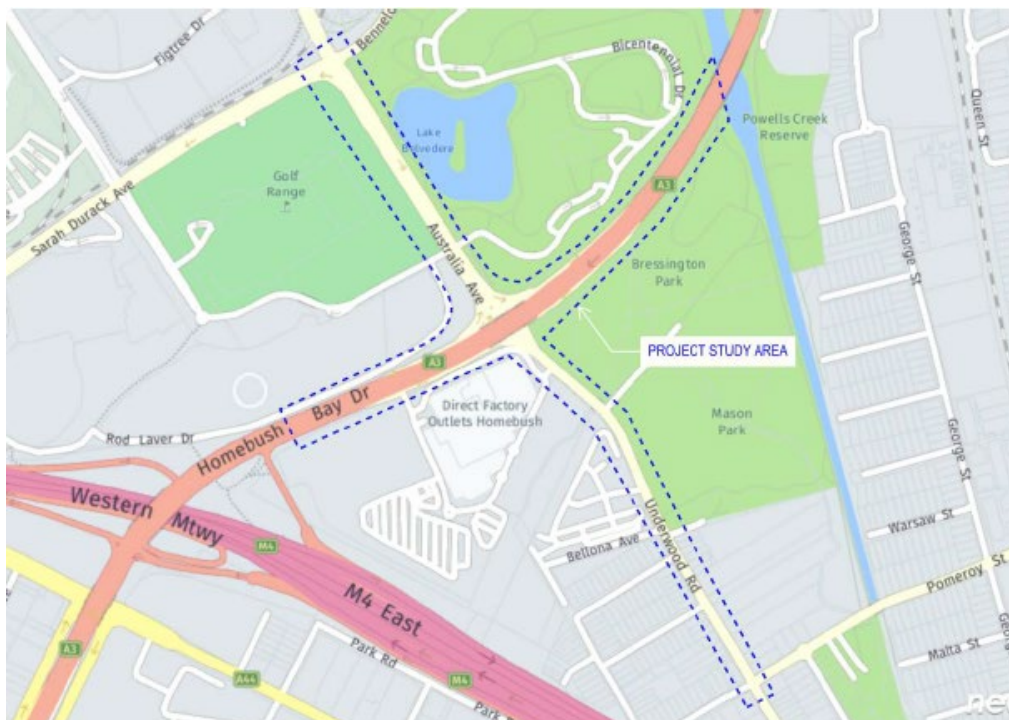


Figure 1 location of the proposal and investigation area

Currently, the intersection consists of a four-leg roundabout connecting Homebush Bay Drive to Australia Avenue and Underwood Road. Homebush Bay Drive is grade separated from the roundabout and passes over the centre of the intersection, with connecting on and off ramps in both directions.

Roundabout metering signals, which are used primarily during special event peak periods and to provide pedestrian connectivity, are present on all approaches.

There are two lanes on all approaches to the roundabout, as well as continuous left turn slip lanes on the north and west approaches. There are three lanes in each direction on Homebush Bay Drive. Figure 2 below illustrates the existing intersection configuration.

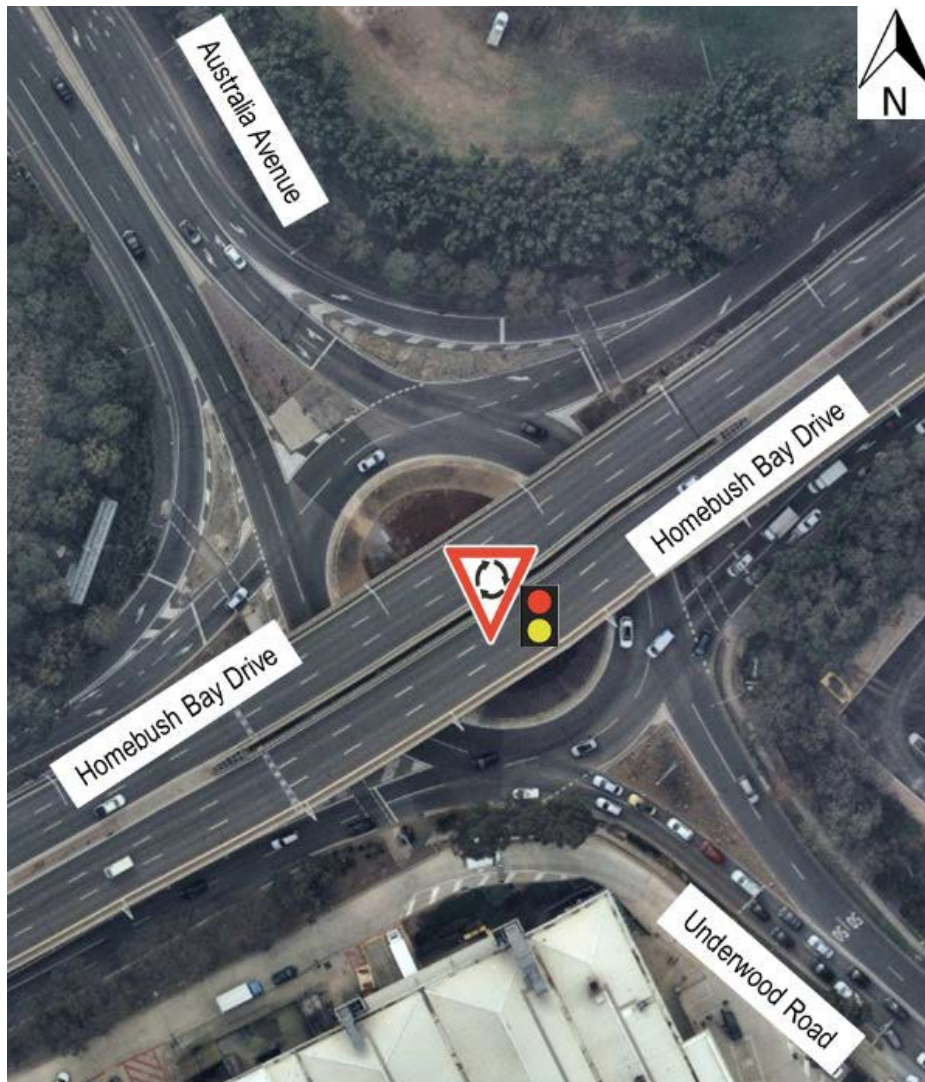


Figure 2 existing intersection configuration

Despite the grade separation, the level of demand at peak times is such that, in its current configuration, the intersection is operating at Level of Service (LoS) F during AM, PM and weekend peaks, and during special events at Sydney Olympic Park.

Pre COVID-19 (December 2018) traffic counts, indicate that around 4,500 vehicles per hour travel through the intersection during the various peak periods (not including traffic volumes on the Homebush Bay Drive overpass). The intersection will see increasing traffic use in the years to come as Sydney Olympic Park and surrounds continue to develop.

There are significant delays and long queuing seen on Underwood Road (northbound) and Homebush Bay Drive (southbound) off ramp in the weekday and weekend peaks. In the PM peak, queuing extends back to the southbound mainline



carriageway of Homebush Bay Drive, affecting both through traffic as well as traffic seeking to access Underwood Road and Australia Avenue.

Current poor performance at the intersection has been identified as:

- primary eastern gateway into Sydney Olympic Park; with limited alternative access points (total of four) between Sydney Olympic Park and surrounding arterial road network
- unbalanced traffic flows at the roundabout
- insufficient capacity on Underwood Road (northbound) and Homebush Bay Drive southbound off ramp (about 500 metres) during weekday and weekend peaks
- external congestion on Homebush Bay Drive main line
- slow-moving traffic on Homebush Bay Drive southbound PM peak
- slow-moving traffic on Pomeroy Street eastbound PM peak
- congestion at Direct Factory Outlet (DFO) Homebush Underwood Road access.

Figure 3 below shows queueing along Underwood Road to access Homebush Bay Drive in 2019, during a peak period.



Figure 3 Queueing along Underwood Road in 2019 during a peak period

Congestion at the intersection also impacts bus service reliability for 525 and 526 bus routes and the broader efficient and reliable movement of people and goods within the regional traffic network.

Traffic modelling of the intersection in future year demand scenarios (2026, 2036) indicates that the intersection performance is expected to deteriorate further as proposed development plans for the Sydney Olympic Park precinct and surrounds are realised. Based on the future year base models, the existing roundabout would not satisfactorily cater for traffic demands from Underwood Road, Australia Avenue and Homebush Bay Drive southbound off ramp and northbound on ramp movements. This would significantly impact on the efficient movement of people and goods accessing Sydney Olympic Park by increasing travel times and delays.

The existing intersection also performs poorly in terms of road safety, with 44 crashes reported at the intersection between 2016 and 2020. Contributing factors

to this poor crash history could include congested traffic conditions, poor gap acceptance for vehicles entering the roundabout, poor legibility and signage, and poor lighting underneath the existing Homebush Bay Drive overbridge. Of the crashes, almost half were associated with rear-end crashes, reflecting the congested conditions during peak hours.

The existing intersection also provides limited infrastructure to support active transport use and access to Sydney Olympic Park, immediately to the west of the intersection, and poses safety risks to the relatively large number of active transport users accessing the area for shopping, commercial and recreational purposes.

Intersection congestion, and long queuing, especially during peak times also significantly detracts from the amenity of the area, and air quality, for road users, pedestrians and cyclists using the intersection and surrounding parks.

The key benefits of the proposal would include:

- improved connectivity to Sydney Olympic Park and Homebush
- reduced congestion and queuing at the intersection and its approaches
- improved travel times particularly during AM, PM and weekend peaks, and during special events at Sydney Olympic Park for all road users
- increased lanes to allow more motorists to use the intersection
- a more reliable road network for commuters and freight movements
- improved service reliability for 525 and 526 bus routes users
- improved safety for all road users
- safer and more efficient travel for pedestrians and cyclists
- reduced vehicle operating costs for all road users
- improved environmental and visual amenity.

## 2.1 Strategic planning context

The following major strategic planning and policy documents provide direction and establish priorities that are relevant to the proposal, as summarised in Table 1 below.



Table 1 Strategic alignment

Government Strategy	Relevance	Contributing project outcome
Government commitments	<ul style="list-style-type: none"> <li>The Australian and NSW Governments have jointly committed \$100 million funding for the upgrade. In 2019, the NSW Government committed \$10 million through a Housing Acceleration Fund program administered by the Department of Planning and Environment, with a further \$40 million allocated in 2020. In 2020 the Federal Government further announced a \$50 million election commitment to the upgrade, through the Urban Congestion Fund Program</li> </ul>	<ul style="list-style-type: none"> <li>A failure to deliver the project would not meet government commitments, exposing the government to reputational risks</li> </ul>
Future Transport Strategy 2056	<ul style="list-style-type: none"> <li>The NSW Future Transport Strategy 2056 outlines a clear framework to address transport challenges in NSW over the next 40 years</li> </ul>	<ul style="list-style-type: none"> <li>Two key state-wide principles of the strategy relevant to the project include: <ul style="list-style-type: none"> <li>Successful places: the liveability, amenity and economic success of communities and places should be enhanced by transport</li> <li>Safety and performance: every customer should enjoy safe travel across a high performing, efficient network</li> </ul> </li> </ul>
NSW State Infrastructure Strategy 2018 -2038	<ul style="list-style-type: none"> <li>The strategy sets out the government's priorities for the next 20 years, and combined with the Future Transport Strategy 2056, the Greater Sydney Region Plan and the Regional Development Framework, brings together infrastructure investment and land-use planning for our cities and regions. The SIS makes recommendations for NSW's key infrastructure sectors to provide a positive impact on the future of the State</li> </ul>	<ul style="list-style-type: none"> <li>The strategic objective for transport in the strategy is: ensure the transport system creates opportunities for people and businesses to access the services and support they need</li> <li>One of the responses to this strategic objective is: Integrate transport with land use, and in order to improve connectivity within Greater Parramatta and the Olympic Peninsula (GPOP).</li> <li>Recommendation 68 states: Infrastructure NSW recommends that by the end of 2018, Transport for NSW and the Greater Sydney Commission develop a Greater Parramatta Access Plan leading to a strategic business case for a program of works under the pilot growth infrastructure compact</li> <li>This project would directly contribute to meeting this INSW recommendation as the GPOP</li> </ul>

Government Strategy	Relevance	Contributing project outcome
		Place-based Infrastructure Compact includes: <ul style="list-style-type: none"> <li>Planning for road improvements at Australia Avenue, Homebush Bay Drive and Underwood Road to improve access to Sydney Olympic Park</li> </ul>
Road Safety Plan 2021: Towards Zero	<ul style="list-style-type: none"> <li>The plan sets forward aspiration targets including to reduce road fatalities by at least 30 per cent from 2008-2010 levels by 2021 and zero fatalities/serious injuries by 2056</li> </ul>	<ul style="list-style-type: none"> <li>The provision of the project would provide a safer road environment for users and reduce congestion associated risks at the intersection</li> </ul>
Greater Sydney Region Plan – A Metropolis of Three Cities (2018)	<ul style="list-style-type: none"> <li>The Plan is built on a vision of three cities where most residents live within 30 minutes of their jobs, education and health facilities, services and great places. To meet the needs of a growing and changing population the vision seeks to transform Greater Sydney into a metropolis of three cities: <ul style="list-style-type: none"> <li>Western Parkland City</li> <li>Central River City</li> <li>Eastern Harbour City</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Objectives 1, 2, 3 and 4 of the Plan are that infrastructure: <ul style="list-style-type: none"> <li>supports the three cities</li> <li>aligns with forecast growth – growth infrastructure compact</li> <li>adapts to meet future needs, use is optimised</li> </ul> </li> <li>Objective 2 in this instance refers to the pilot PIC for GPOP</li> <li>This project would directly deliver on Objectives 1, 2 3 and 4 in the Plan</li> </ul>
Our Greater Sydney 2056 – Central City District Plan (2018)	<ul style="list-style-type: none"> <li>The Central City District Plan provides a 20-year plan to manage growth and achieve the 40-year vision, while enhancing Greater Sydney's liveability, productivity and sustainability into the future. It is a guide for implementing the Greater Sydney Region Plan – A Metropolis of Three Cities at a District level, and structured around the strategies for infrastructure and collaboration, liveability, productivity and sustainability and implementation</li> </ul>	<ul style="list-style-type: none"> <li>The Plan includes Planning Priority C9: Delivering integrated land use and transport planning and a 30-minute city as one of the directions for productivity.</li> <li>As the population of the Central City District grows, land use, transport and infrastructure planning will be integrated. Initiatives to support integration in line with population and economic growth includes improvements to the strategic road network to prioritise the efficient movement of people and goods on transport corridors, and key intersections to improve movement through the district and access to strategic centres</li> <li>This project would directly deliver on this initiative, meeting Planning Priority C9</li> </ul>
GPOP vision document (2016)	<ul style="list-style-type: none"> <li>The vision for GPOP over the next 20 years is for a city and urban hub at Greater Sydney's heart - Our true centre: the connected, unifying heart</li> </ul>	<ul style="list-style-type: none"> <li>The GPOP vision document notes that Sydney Olympic Park was designed for the Olympic Games and accordingly, it has limited road transport access and</li> </ul>

Government Strategy	Relevance	Contributing project outcome
		<p>‘special-events’ style rail access. The document indicates that a total transport solution is needed to support a permanent community who live and work in there</p> <ul style="list-style-type: none"> <li>This project would directly deliver on this vision</li> </ul>
A City Supported by Infrastructure Place-based Infrastructure Compact Pilot – Draft for Feedback for GPOP (2019)	<ul style="list-style-type: none"> <li>In November 2019, the Greater Sydney Commission (GSC) released the draft pilot Place-based Infrastructure Compact (PIC) for GPOP. The GPOP PIC aims to ensure infrastructure delivery is matched with growth across 26 precincts within the GPOP corridor. In March 2020 the GSC released its final recommendations on the GPOP PIC to Government</li> </ul>	<ul style="list-style-type: none"> <li>The pilot PIC identifies the following existing project in the GPOP: Planning for road improvements at Australia Avenue, Homebush Bay Drive and Underwood Road to improve access to Sydney Olympic Park</li> <li>This project, as mentioned in the pilot PIC, is currently underway, in the planning phase</li> </ul>
Sydney Olympic Park Master Plan 2030 (2018 Review)	<ul style="list-style-type: none"> <li>Master Plan 2030 is a comprehensive plan guiding the long-term development of Sydney Olympic Park. Major transport infrastructure projects will support the evolution of the precinct and enhance Sydney Olympic Park’s role as a premier destination for cultural, entertainment, recreation and sporting events</li> </ul>	<ul style="list-style-type: none"> <li>There is a recommendation in the Traffic and Transport Strategy (2016 Review) to upgrade the Australia Avenue/Homebush Bay Drive intersection. It is indicated as a Priority 1 intersection under investigation as part of Olympic Peninsula Regional Transport Infrastructure Investigations (RMS)</li> <li>This project would directly deliver on this recommendation</li> </ul>

## 2.2 Road network conditions

### 2.2.1 Existing traffic volumes and congestion

Currently, around 30,000 vehicles pass through the Homebush Bay Drive, Australia Avenue and Underwood Road intersection each day, with the heavy vehicle proportion averaging out at around 2.5%.

Road users experience significant delays, long queues and wait times at the intersection, particularly during AM, PM, and weekend peak periods, and during special events at Sydney Olympic Park. There are significant delays and long queuing seen on Underwood Road (northbound) and Homebush Bay Drive (southbound) off ramp in the weekday and weekend peaks. In the PM peak queuing extends back to the southbound main line carriageway of Homebush Bay Drive, affecting both through traffic as well as traffic seeking to access Underwood Road and Australia Avenue for travel through to Sydney Olympic Park and Parramatta Road and other commercial, recreational, and residential centres surrounding the intersection.

Congestion at the intersection also impacts reliable and efficient movement of commuters and freight movements within the regional traffic network.

Pre COVID-19 (December 2018) traffic counts, indicate that around 4,500 vehicles per hour travel through the intersection during the various peak periods. The intersection will see increasing traffic use in the years to come as Sydney Olympic Park and surrounds continue to develop.

### 2.2.2 Traffic growth

The existing traffic congestion at the intersection is predicted to intensify in the future as a result of future traffic demands and expected growth and development in the area, particularly in Sydney Olympic Park and the developing suburbs of Wentworth Point, Newington, Rhodes and Liberty Grove. The intersection is forecasted to rise to 36,000 vehicles per day by 2036<sup>1</sup> as estimated from the Transport for NSW Traffic Volume Viewer (2021).

Future traffic modelling (2026, 2036) and analysis further indicates that that if no action is taken to improve the traffic flow at the intersection, or its approaches, the intersection will deteriorate further.

### 2.2.3 Road safety

The existing intersection currently performs poorly in terms of road safety with 44 crashes at the intersection reported over a five-year period between 2016 and 2020. Contributing factors to this poor crash history could include congested traffic conditions, poor gap acceptance for vehicles entering the roundabout, poor legibility and signage, and poor lighting underneath the existing Homebush Bay Drive overbridge.

An analysis of crash history for Australia Avenue and Underwood Road can further be seen in Figure 4 below. The crash history is equivalent to a crash rate of 80.4 crashes per 100 million vehicle movements (100 MVM), as the intersection carries approximately 30,000 vehicles per day.

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<sup>1</sup> Based on VISSIM microsimulation modelling growth forecasts and Transport for NSW Traffic Volume Viewer (2021) estimates  
Homebush Bay Drive and Australia Avenue intersection upgrade – Preferred Option Report April 2022 **18**

The casualty crash rate is 56.6 crashes per 100 MVM, although it is noted that there have been no fatal or serious injury crashes at this intersection.

A breakdown of the crashes at this intersection is further provided below:

- 0 fatal crashes
- 0 serious injury crash
- 13 moderate injury crashes
- 18 minor/other injury crashes
- 13 non-casualty (towaway) crashes.

Of the crashes, almost half (19) were associated with rear-end crashes, reflecting the congested conditions during peak hours.

It is likely that without improvements, increased traffic volumes and congestion would see safety deteriorate further at the intersection.

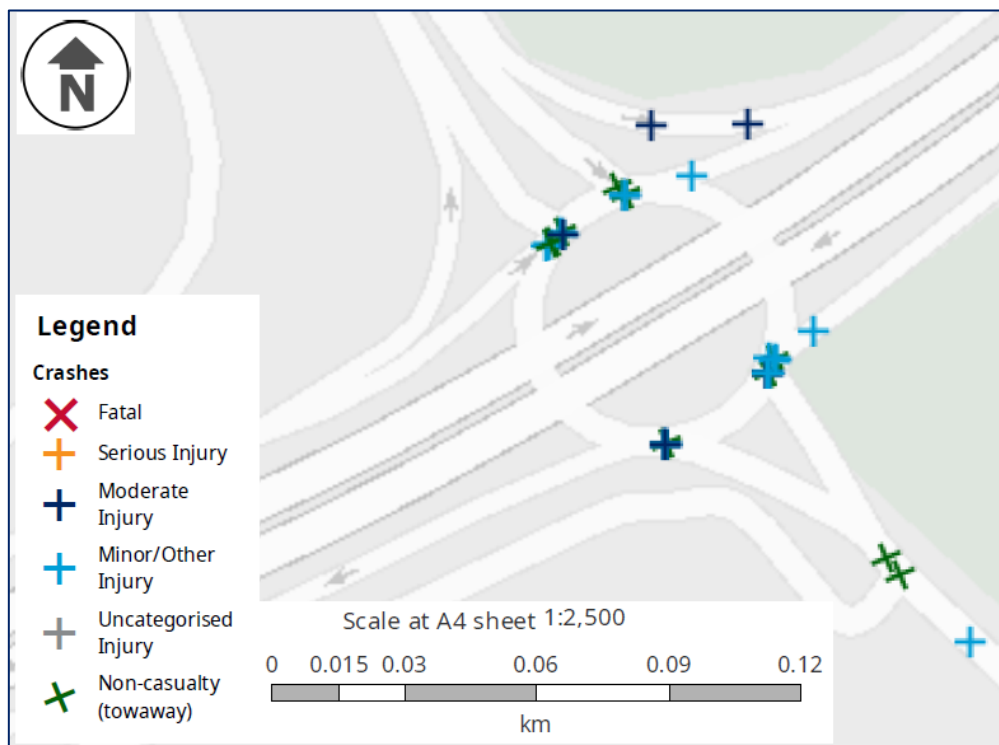


Figure 4 Crash history (Transport for NSW Centre for Road Safety, 2020)

The existing intersection also provides limited infrastructure to support active transport use and access to Sydney Olympic Park, immediately to the west of the intersection, and poses safety risks to the relatively large number of active transport users accessing the area for shopping, commercial and recreational purposes.

### 3 Issues and constraints

A range of investigations have occurred to support the proposal design development and option evaluation processes. The following section provides an overview of the main issues and constraints identified for the proposal.

#### 3.1 Landscape character and visual amenity

Due to the range of landscape features around the investigation area (electricity substation, commercial premises, parkland, native vegetation) the area has a moderate sensitivity to change. A future Landscape Character and Visual Impact Assessment, however, will be required to confirm this.

Landscape features of the investigation area include:

- Direct Factory Outlet (DFO) Homebush, alongside the Homebush Bay Drive overpass, is a dominant feature
- sporting arenas and large residential buildings to the north of Homebush Bay Drive
- Bicentennial Park, which is the most vegetated area
- Bressington Park, which is low lying and vegetated around its perimeter, and contains several modern amenity buildings
- screening and landscape heritage significant trees surrounding the intersection including the Framework of Figs within Bicentennial Park, planted in the mid 1980's in the north-east quadrant of the intersection and the pre-Olympic planting in the south-east quadrant as part of the Olympic games, planted in the mid 1990's, as seen in Figure 5 below.

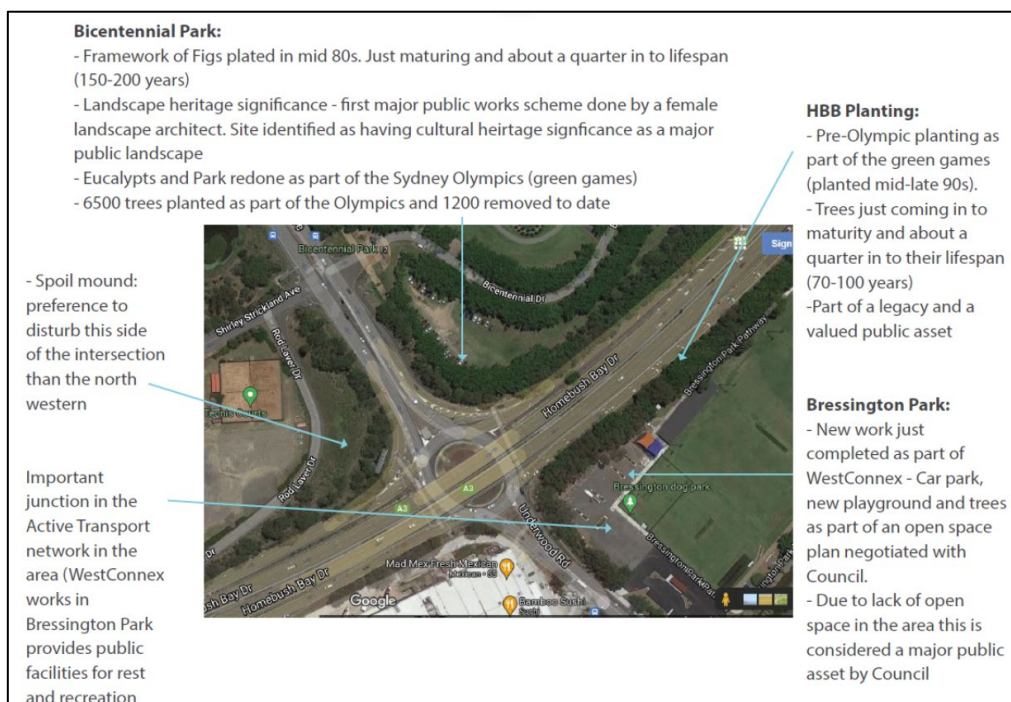


Figure 5 Landscape features surrounding the intersection (September 2021)



## 3.2 Biodiversity

Significant native and protected species and communities are recorded as inhabiting portions of the Sydney Olympic Park along Powells Creek.

The only threatened plant community types within the investigation area are those along Powells Creek. The vegetation in this area is also listed in SEPP State Significant Precinct 2005 as an Environmental Conservation area, the SREP Sydney Harbour Catchment 2005 as a Wetlands Protection Area, the Coastal Management SEPP as Coastal Wetland area and coastal wetland proximity area and the City of Canada Bay LEP as environmentally sensitive land.

No vulnerable or protected species were identified in the investigation area, nor habitat suitable for those species. Further information is contained in Figures 6 to 8 below.

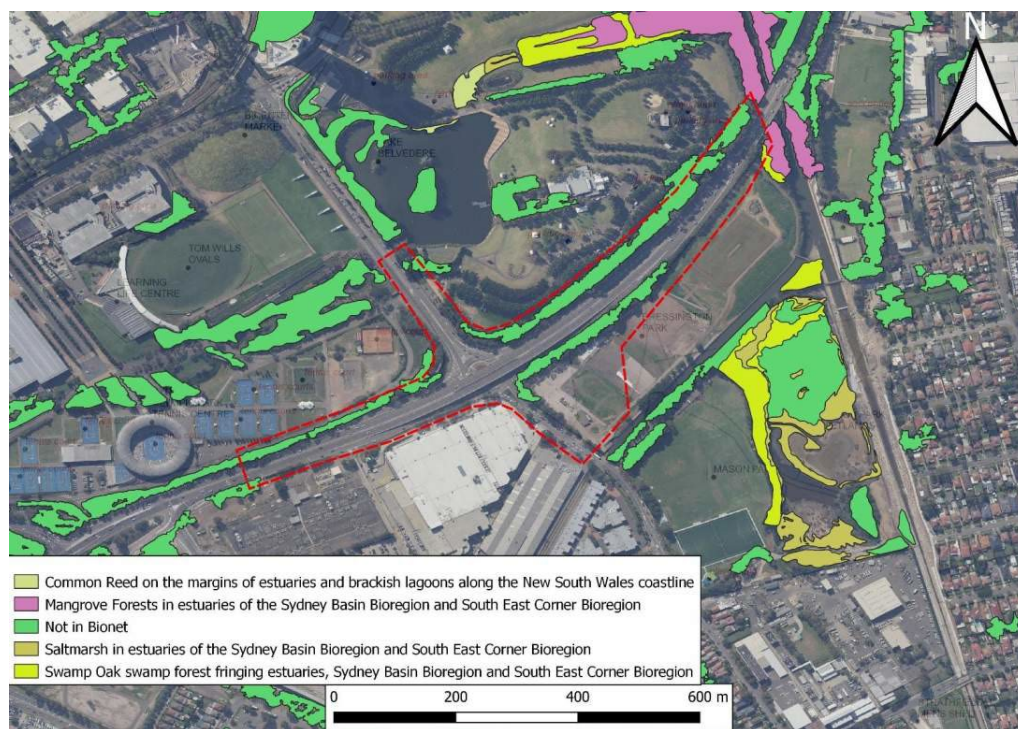


Figure 6 Threatened Plant Community Type mapping (2019)

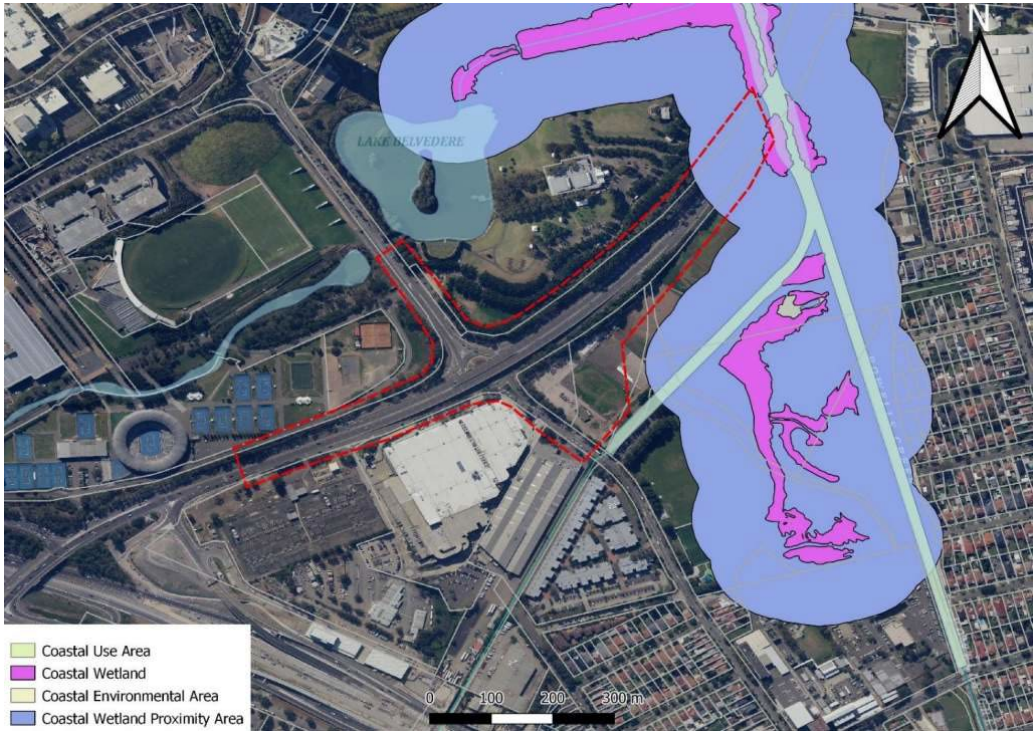


Figure 7 Coastal zone management areas in vicinity of investigation area ( 2019)



Photo 1: Boundary Creek fishway signage

Photo 2: Boundary Creek fishway under Australia Avenue

Figure 8 Boundary Creek fishway photos

### 3.3 Hydrogeology, water quality and groundwater

The investigation area lies in the Saleyards Creek catchment, which forms part of the Parramatta River Sub-catchment of Sydney Harbour Catchment. Powells Creek drains through Homebush Bay to the Parramatta River. The investigation area is confined to the east by Powells Creek, of which Saleyards Creek flows from the south-west, under Underwood Road, in a concrete lined culvert.



The water channel to the east of Underwood Road divides the low-lying lands of Bressington Park and Mason Park. Water features of the investigation area can be further seen in Figure 9 below.

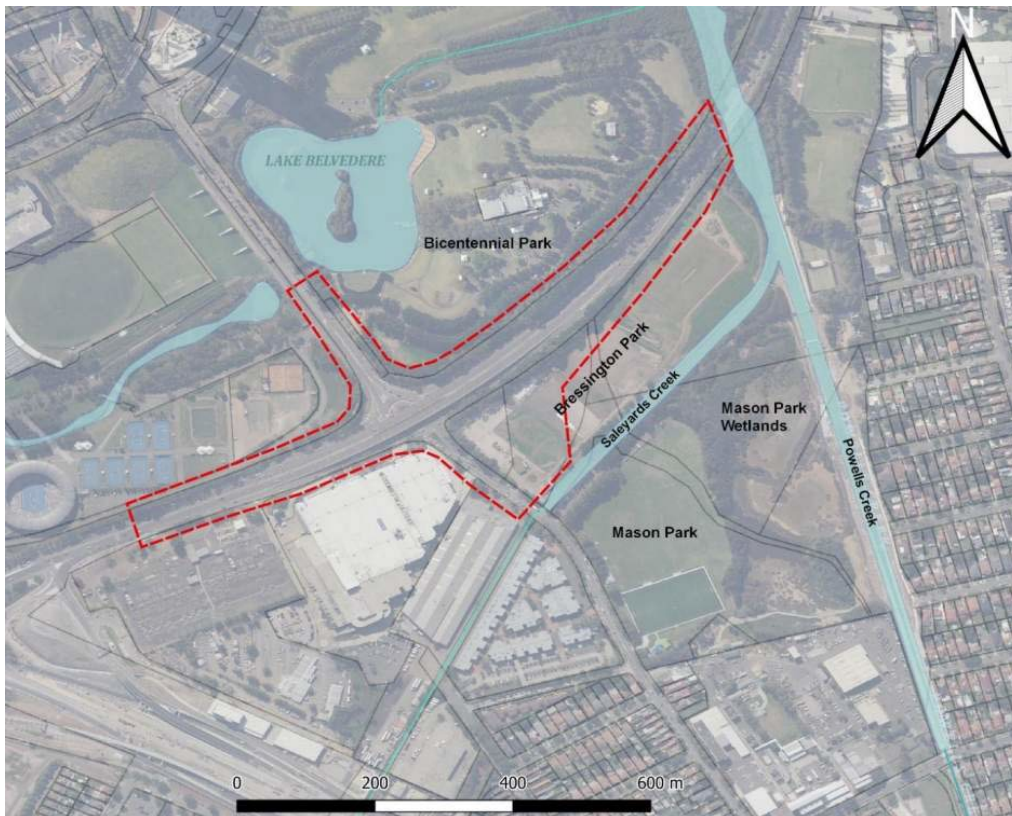


Figure 9 Water features of investigation area (2019)

The most recent flood study, Powells Creek and Saleyards Creek Revised Flood Study (WMA Water, 2016), commissioned by Strathfield Municipal Council, relates to the southern half of the investigation area only.

This Flood Study indicates that the land surrounding Underwood Road is the area most at risk of inundation during a flood event. During a Probable Maximum Flood (PMF) event large areas of Bressington Park would be inundated, by up to two metre depth near Saleyards Creek Canal. Floodwaters on Bressington Park and Underwood Road would flow into Saleyards Creek Canal during a flood event at a relatively high flow rate. The Flood Study indicates that even during a 1% Annual Exceedance Probability (AEP) event, floodwaters over 0.3 metre depth on Underwood Road could remain for durations of up to one to two hours.

Impacts of flooding will need to be considered during the project design phase to improve the safety of the road section. Improvements to the hydrological capacity of the drainage system to cater for at least a 1 in 100-year flood event should be considered.

Local groundwater depth should be determined by a geotechnical assessment and the potential for proposed earthworks to intercept groundwater should be confirmed in the environmental assessment. This should include an assessment of contamination.

At the Options Workshop on 28 September 2021 the depth to groundwater was noted to be approximately four metres AHD (Australian Height Datum) for the Homebush Bay Drive and Australia Avenue intersection upgrade – Preferred Option Report April 2022 [23](#)



investigation area. Refer to Figure 10 below for further information on peak flood contours and depths for a PMF event.

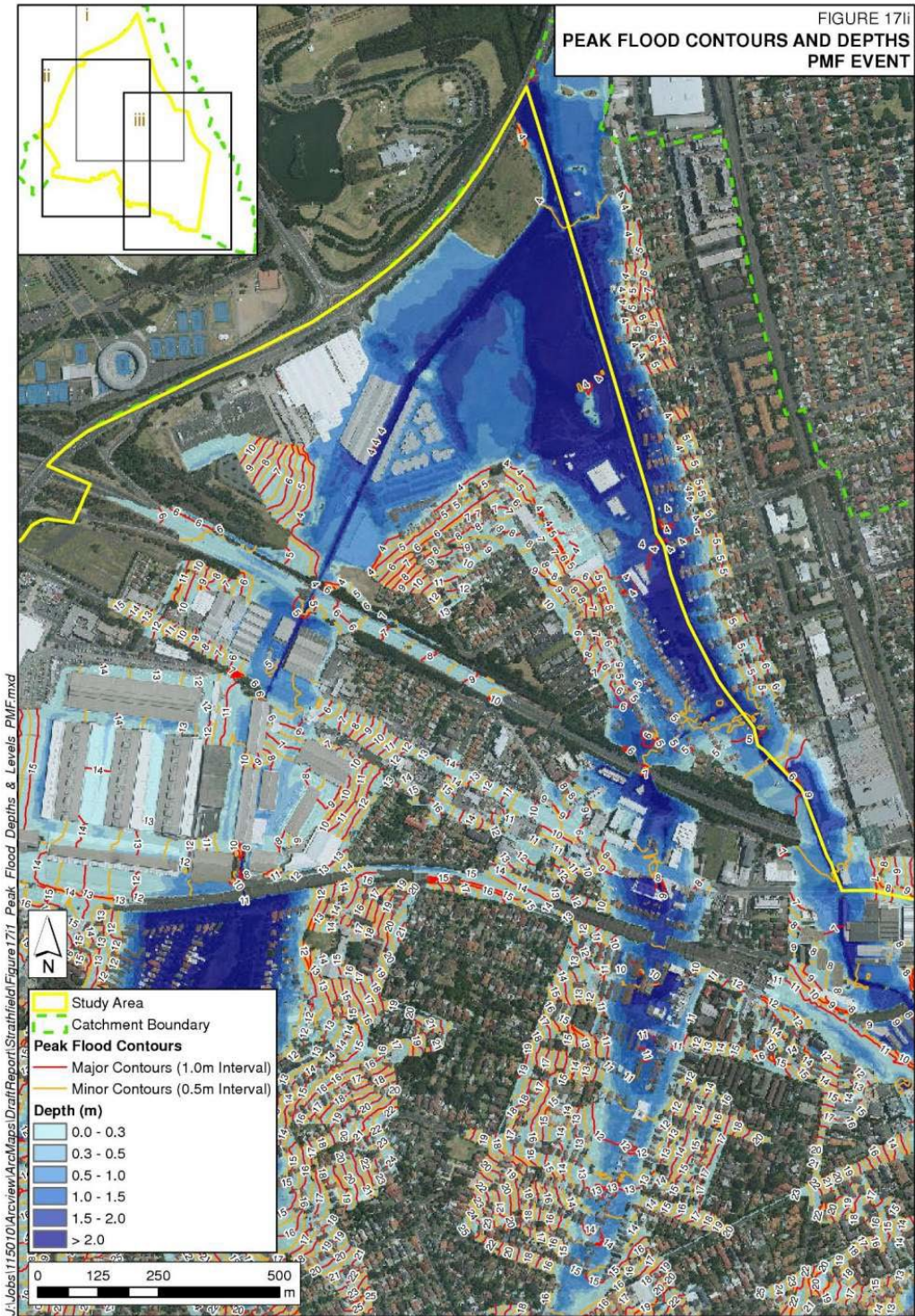


Figure 10 Peak flood contours and depths for PMF event (2019)

### 3.4 Geology and soils

The low lying Bressington Park and Mason Park to the south-east of the intersection are at high risk of Acid Sulphate Soils (ASS) due to their marine origin, low relief and poor drainage. According to the Strathfield Local Environmental Plan 2021, the area to the south-east of the investigation area is identified as Class 2 Acid Sulphate Soils.

Bressington Park has recently undergone a major redevelopment by Strathfield Municipal Council, with construction of a new carpark, playing fields and an amenities block which contains dressing rooms, a kiosk and public toilet facilities.

Over half the existing land area in Sydney Olympic Park was originally saltmarsh and wetlands which have progressively been reclaimed. During the 1960's, 70s and 80s, and up until Bicentennial Park was planned, Homebush Bay was the dumping site for much of Sydney's household and industrial waste. The types of contaminants found here included petroleum waste, industrial rubble, asbestos and fly ash, unexploded ordinance, putrescible municipal waste, abattoir discharge and dumped or spilled chemical wastes. Remediation of 760 hectares of degraded and contaminated land commenced in 1992, and an estimated 9,000,000 cubic metres of waste treated in situ.

Due to the extensive history of industrial activity and unregulated infill, the area north of the intersection is to be presumed contaminated land, so would require extensive geotechnical investigations and groundwater testing prior to any proposed ground disturbance activities.

Known contaminated sites in the vicinity of the investigation area are shown in Figure 11 below. Bicentennial Park to the north-east is a semi-encapsulated contaminated landfill site, with groundwater monitoring pits along its northern boundary. The list of sites notified to the NSW Environment Protection Authority (EPA) returned nine results for Sydney Olympic Park with eight of those, including Bicentennial Park and Golf Driving Range Landfill, requiring ongoing maintenance to manage residual contamination under the *Contaminated Lands Management Act 1997*. Mason Park Substation is also listed on the EPA register of contaminated sites.



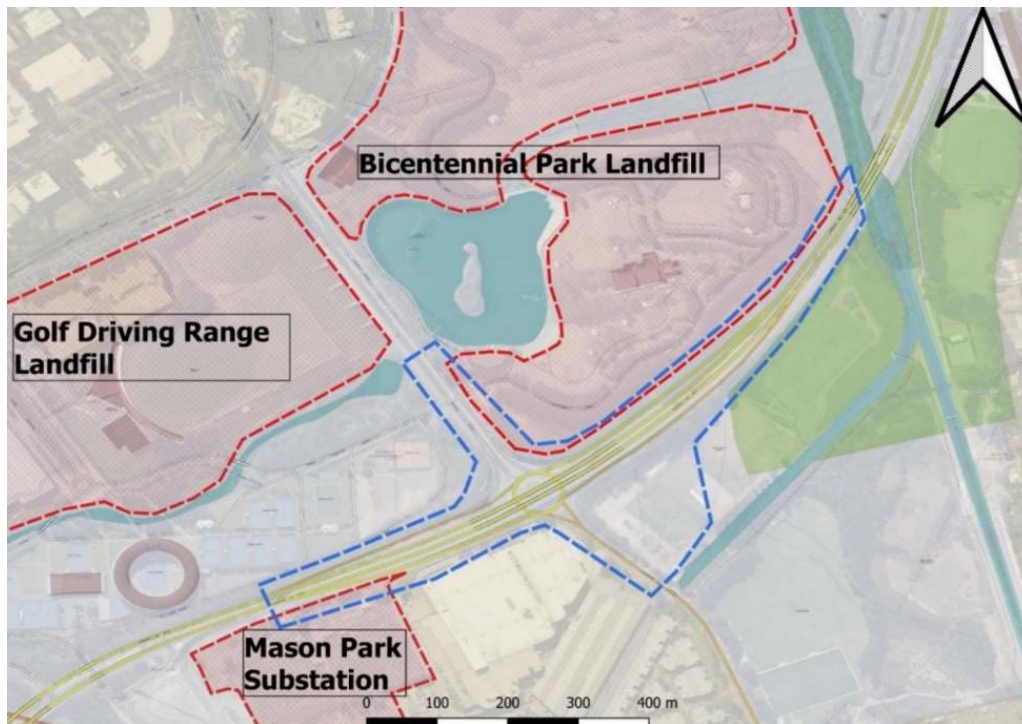


Figure 11 Known contaminated sites in vicinity of the investigation area (2019)

### 3.5 Noise and vibration

Sensitive receivers have been identified within a radius of 600 metres from the boundary of the investigation area. Construction noise would be primarily a construction management issue for the proposal.

Recreational receivers to the north-east and south-east of the intersection are predominately active, that is sporting events, but due to the nature of Sydney Olympic Park venues receivers could also be musical or cultural events. Commercial receivers in the area are mostly within the Direct Factory Outlet (DFO) Homebush shopping centre complex or the Homebush Business Village on Underwood Road, so are within structures which insulate the receivers from noise to a certain extent.

The mixed-use zone within Sydney Olympic Park contains multiple sporting courts and arenas, however, many commercial operations and an unknown number of residential receivers also occupy this mixed-use zone. Residential receivers likely to be impacted by noise are located south of Homebush Business Village, between Underwood Road and Wentworth Road.

The most likely to be affected are recreational users of Bressington Park, where school sporting events are held during weekdays, and Bicentennial Park. If works are scheduled to occur out of hours, or during the night, then the radius of affected receivers would be greater, affecting a greater number of residential premises.



### 3.6 Air quality

Air quality at the investigation area would mostly be influenced by exhaust fumes from vehicles. Congestion at the intersection has led to worsening air quality as cars queue for longer periods of time. Sensitive receivers may be impacted and should be identified during the environmental impact assessment stage.

### 3.7 Socio-economic and land use

The investigation area is surrounded by an urban environment, including commercial properties and electrical infrastructure, and environmental and recreational areas.

The northern half of the investigation area sits within the Sydney Olympic Park and is a sports and entertainment complex 14 kilometres west of Sydney central business district.

The investigation area is bound on the eastern side by land zoned for recreation purposes.

Land to the south of the intersection and west of Underwood Road is zoned for industrial and commercial activity and is currently occupied by the Direct Factory Outlet (DFO) Homebush shopping centre and the Homebush Business Village. Land in the south-western corner of the investigation area is zoned for special infrastructure and is occupied by Ausgrid's Mason Park substation.

Land to the north-west of the intersection is zoned B4 for mixed use under the planning controls contained in the State Significant Precincts State Environmental Planning Policy (SEPP).

### 3.8 Aboriginal and non-Aboriginal heritage

No items of Aboriginal heritage were identified within or adjacent to the investigation area. The Aboriginal Heritage Information Management System (AHIMS) search indicated no Aboriginal objects or places within 50 metres of the investigation area. Aboriginal relics may be encountered, but are unlikely to be unearthed, due to significant prior disturbance.

The investigation area does not contain landscape features that indicate the presence of Aboriginal objects, based on the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW, 2010) and *Roads and Maritime Services Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) (RMS, 2011)

The cultural heritage potential of the investigation area appears to be reduced due to past disturbance. Nevertheless, during the next phase of project development the PACHCI should be followed.

No items of non-Aboriginal heritage were identified within, or adjacent, to the investigation area. One heritage item is listed in state registers near the investigation area, this being a sewerage pumping station south of Mason Park.

The investigation area is extensively modified and landscaped. Although no heritage items were identified within the investigation area, considering the history of Sydney the potential to uncover relics or other features with heritage potential cannot be excluded.

### 3.9 Utilities

Extensive and varied utility infrastructure assets transect and exist in the investigation area, with gas, electricity, stormwater, and many telecommunications assets identified, constituting a substantial design constraint.

There are several utilities in the area that would be variously impacted by the three shortlisted options, including the following major utilities, in that the protection or relocation of these would be costly and time-consuming undertakings:

- Ausgrid 132kV twin Feeders 90U and 90G
- Sydney Water 600 x 900 sewer
- Telecommunications.

The east side of Australia Avenue and Underwood Road are the most densely utilities-occupied parts of the investigation area, as well as the northern side of the Direct Factory Outlet (DFO) Homebush shopping centre, which is a thoroughfare for many electrical and communications conduits, leading to the Ausgrid Mason Park electricity substation.

High pressure water, sewer and gas lines also pass under the intersection.

The piers supporting the Homebush Bay Drive overpass are another constraint as these piers would considerably affect any realignment of lanes. One concrete pier in particular (the south-west pier), limits the degree that lanes can be realigned to on the south-west side of the intersection.

Telecommunications assets are typically run in a shared conduit, so the various providers cables would likely be located within Telstra conduits. Ausgrid also has substantial electricity transmission infrastructure in the investigation area.

Assets within the existing roundabout pass under the road near the pedestrian crossing on the eastern side, as well as under the roundabout just east of the two western pylons. Notes on plans for electricity assets indicate they were laid deeper than usual to account for future roadwork disturbance.

## 4 Community and stakeholder engagement

### 4.1 Government agency and council involvement

Transport for NSW has worked with key government stakeholders and subject matter experts over the course of several workshops to identify the preferred option. This has included two shortlisting workshops in October 2019 and June 2021 and three value management workshops in July and September 2021.

Representatives for workshops were invited from Transport for NSW, City of Parramatta Council, Strathfield Municipal Council, NSW Department of Planning and Environment (DPE), Sydney Olympic Park Authority and the Federal Department of Infrastructure, Transport, Regional Development and Communications (DITRC).

### 4.2 Future community and stakeholder involvement

Transport for NSW proposes to seek public comment on the preferred option and will publicly release this Preferred Option Report. Comments received from the public display will be considered as part of the proposal development process.

Further consultation will be carried out in the future when community members and stakeholders will be invited to provide feedback on the proposed concept design and Review of Environmental Factors.

The following stakeholders have been identified as having a potential interest in the proposal.

This list is not exhaustive and will be refined during the course of detailed design and environmental assessment.

- Transport for NSW
- Federal Department of Infrastructure, Transport, Regional Development and Communications
- NSW Department of Planning and Environment
- Sydney Olympic Park Authority
- City of Parramatta Council
- Strathfield Municipal Council
- Environmental Protection Agency
- Direct Factory Outlet (DFO) Homebush (Direct Factory Outlet Vicinity Centres)
- Homebush Business Village
- 525 and 526 bus routes users and operators
- Landowners, residents and local businesses
- Emergency services and utility providers.

## 5 Options identification

Transport for NSW established an initial longlist of over 12 project options in December 2018, to upgrade the Homebush Bay Drive, Australia Avenue and Underwood Road intersection.

Options identified and considered included roundabout improvements, overpasses, underpasses, and various signalised intersection options.

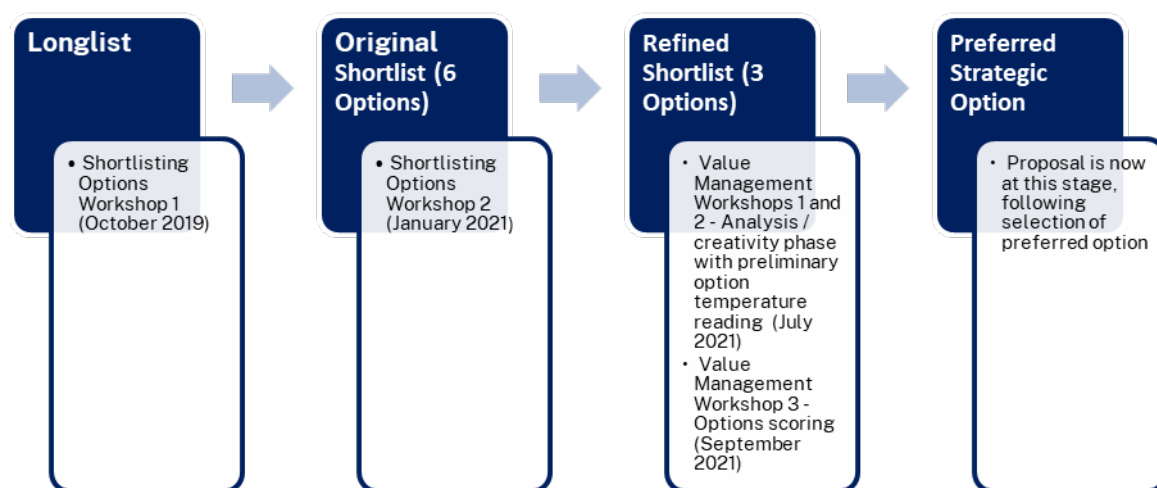


Figure 12 Options assessment approach

Transport for NSW worked with key government stakeholders and subject matter experts over the course of several workshops in 2019 and 2021, to assess the impacts and constraints of the 12 options, using a number of technical studies and investigations.

During the initial shortlisting workshop, in October 2019, the 12 longlisted options were reduced to six options, which were further assessed in a second shortlisting workshop in January 2021.

Over the course of two value management workshops in July 2021 a shortlist of three options was identified and in the final value management workshop held in September 2021 the preferred option (Option 15D) was identified.

### 5.1 Longlisted options

Based on the established set of proposal objectives and principles, as described in Section 1.2, Transport for NSW developed an initial longlist of over 12 project options in December 2018, to upgrade the Homebush Bay Drive, Australia Avenue and Underwood Road intersection.

The final agreed longlist of 12 options have been summarised in Table 2 below and included roundabout improvements, overpasses, underpasses, and various signalised intersection options.

Table 2 Draft long list of potential options for preliminary investigation

Options Development (Draft Longlist)	Description
Retain existing roundabout layout + minor improvements ('do minimum')	Three-lane roundabout
	Australia Avenue and Underwood Road through movements between existing piers ('sandwich')
Signalised	Square approaches. Split approach phasing for right turn into Australia Avenue and Underwood Road; right turns into Homebush Bay Drive northbound on ramp and southbound on ramp
	Right turns into Homebush Bay Drive northbound on ramp and southbound on ramp
	Diverging Diamond Interchange (DDI)
Grade-separated movements	Overpass for right turn into Australia Avenue
	Underpass for right turn into Australia Avenue and Underwood Road
	Underpass for right turn into Australia Avenue and through movement to Australia Avenue
	Underpass for through movements on Australia Avenue and Underwood Road
	Loop underpass for right turn into Homebush Bay Drive southbound on ramp
	Overpass into Australia Avenue and Underpass into Homebush Bay Drive southbound on ramp
	Underpass for right turn into Homebush Bay Drive northbound on ramp and southbound on ramp

## 5.2 Shortlisted options

In October 2019 Transport for NSW convened an initial shortlisting workshop with invited Transport for NSW representatives, key government stakeholders and subject matter experts to assess the 12 longlisted options. As a result of this assessment, and an option elimination process, six options were considered to be consistent with the project objectives and guiding principles, practicable in terms of constructability, feasible in terms of economic impacts and realistic in terms of likely budgetary constraints.

The six options, which are further developed below, included three grade-separated solutions and three at-grade solutions.

The three at grade solutions were:

- Option 5:** upgrading the existing roundabout to a conventional signalised intersection, with a single diamond phasing arrangement for Australia Avenue and Underwood Road.  
 The Homebush Bay Drive overpass would remain the same. A single diamond phasing arrangement would allow right turn movements from Australia Avenue and Underwood Road approaches to the intersection to turn in unison.

- **Option 16B:** upgrading the existing roundabout to a signalised intersection, with a double diamond phasing arrangement.

The Homebush Bay Drive overpass would have to be modified; two piers supporting the overpass (the southwest and northeast piers) would require relocation in order to enable the phasing configuration.

A double diamond phasing arrangement would allow right turn movements from Australia Avenue and Underwood Road approaches to the intersection to turn in unison as well as the Homebush Bay Drive northbound and southbound approaches to the intersection to turn in unison.

- **Option 15D:** upgrading the existing roundabout to an unconventional signalised intersection, configured as a Diverging Diamond Interchange.

The Homebush Bay Drive overpass would remain the same.

The three grade-separated solutions were:

- **Overpass:** an overpass for right turn into Australia Avenue
- **Underpass:** underpasses for right turn and through movements into Australia Avenue
- **Underpass:** underpasses for through movements on Australia Avenue and Underwood Road.

### 5.3 Shortlisted options assessment

Four workshops were held in 2021 to assess the shortlisted options and identify a single preferred option.

In January 2021, Transport for NSW convened a second shortlisting workshop with invited Transport for NSW representatives, key government stakeholders and subject matter experts to assess the six options initially shortlisted. The workshop was conducted over two days, 18 and 19 January 2021.

Each of the six shortlisted options were presented and assessed in terms of:

- intersection performance and safety
- visual impacts
- environmental impacts
- potential impacts to private property, public space access and functionality
- pedestrian and cyclist access and connectivity
- traffic impacts during construction
- maintenance.

As a result of this assessment, it was identified that the grade separated options all provided a level of traffic benefit to the intersection. However, they also resulted in a reduction of local accessibility, would require a larger construction footprint with increased property acquisition, have a greater impact to the environment, including loss of trees and have a larger visual impact.

Overall, it was considered that of the six options presented during the shortlisting workshop the three grade separated solutions did not perform as well against the agreed assessment criteria.

It was the consensus of the workshop that the three at-grade solutions were the three best options to move forward through the option selection process for the intersection upgrade.



### 5.3.1 Option 5

This upgrade option proposed replacing the existing roundabout with a signalised intersection, with a single diamond phasing arrangement.

The Homebush Bay Drive overpass would remain in place.

The strategic design for shortlisted Option 5 is provided in Figure 13 below.

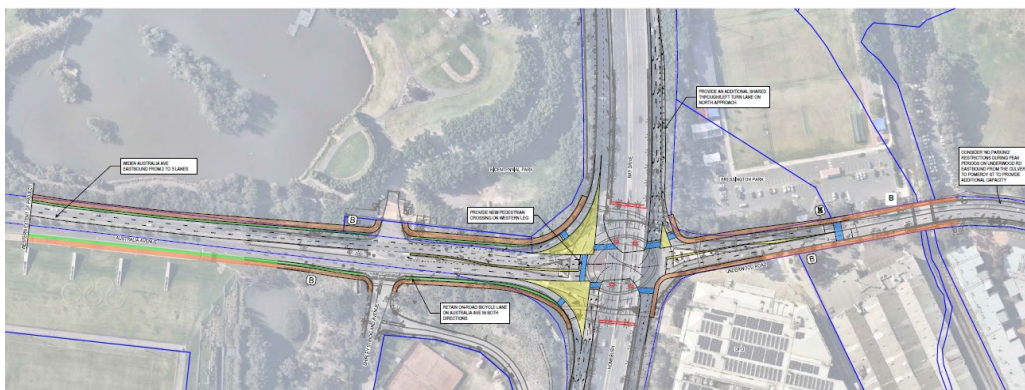


Figure 13 Shortlisted Option 5

The proposed improvements associated with Option 5 include:

- upgrading the existing roundabout to a conventional signalised intersection, with a single diverging diamond phasing arrangement for Australia Avenue and Underwood Road to allow right turn movements from Australia Avenue and Underwood Road approaches to the intersection to turn in unison
- providing two right turn lanes at Australia Avenue approach
- providing one right turn lane at Underwood Road approach
- providing the middle lane on the Australia Avenue approach as a shared right turn and through lane
- providing two through lanes on Australia Avenue and Underwood Road approaches
- providing left turn free flow lanes for all left turn movements, except for the Underwood Road approach
- providing two right turn lanes from both Homebush Bay Drive off ramps
- providing a U turn movement from the Homebush Bay Drive northbound and a through movement from Homebush Bay Drive southbound off ramps
- the layout does not service the U turn movement from Underwood Road. It is assumed that these vehicles use alternate routes via Australia Avenue.

### 5.3.2 Option 16B

This upgrade option proposed replacing the existing roundabout with a signalised intersection, with a double diamond phasing arrangement to improve the capacity of the intersection.

In order to enable this phasing configuration two piers supporting the existing Homebush Bay Drive overpass (the southwest and northeast piers) would require relocation. The pier relocation works would involve complex construction staging and high order construction techniques.

The strategic design for shortlisted Option 16B is provided in Figure 14 below.

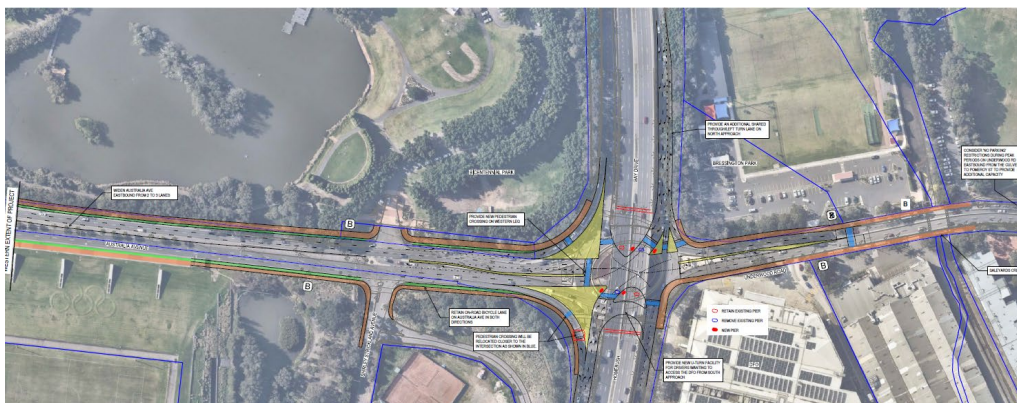


Figure 14 Shortlisted Option 16B

The proposed improvements associated with Option 16B include:

- upgrading the existing roundabout to a conventional signalised intersection, with a double diamond phasing arrangement. A double diamond phasing arrangement would allow right turn movements from Australia Avenue and Underwood Road approaches to the intersection to turn in unison as well as the Homebush Bay Drive northbound and southbound approaches to the intersection to turn in unison
- providing one right turn lane, and two through lanes on Underwood Road
- providing two right turn lanes on Australia Avenue
- providing one through, and one shared lane on Australia Avenue
- providing left turn free flow lanes on Australia Avenue and Homebush Bay Drive northbound off ramp
- providing two right turn lanes on Homebush Bay Drive off ramps
- providing U turn movements from the Homebush Bay Drive northbound and through movement from Homebush Bay Drive southbound off ramps
- the layout does not service the U turn movement from Underwood Road. It is assumed that these vehicles use alternate routes via Australia Avenue.

For this option the Homebush Bay Drive overpass would have to be modified. Two of the four piers supporting the Homebush Bay Drive overpass (the southwest and northeast piers) would require relocation in order to enable the phasing configuration.

### 5.3.3 Option 15D

This upgrade option proposed replacing the existing roundabout to an unconventional signalised intersection, configured as a Diverging Diamond Interchange. The Homebush Bay Drive overpass would remain the same.

The strategic design for shortlisted Option 15D is provided in Figure 15 below.

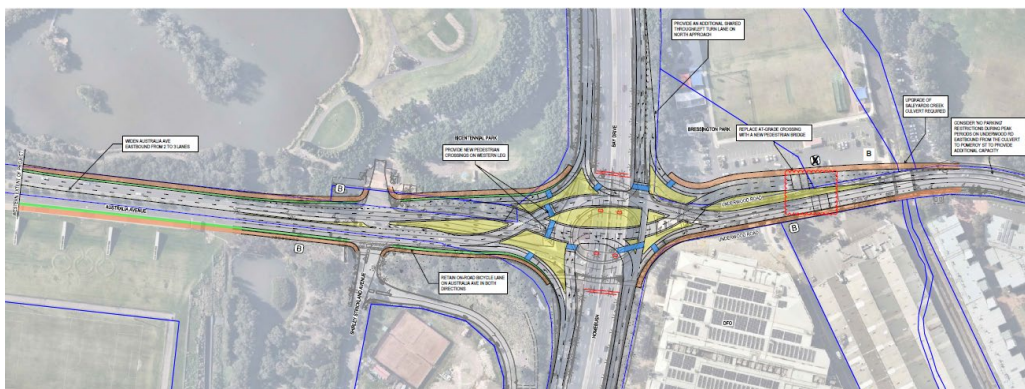


Figure 15 Shortlisted Option 15D

The proposed improvements associated with Option 15D include:

- upgrading the existing roundabout to a Diverging Diamond Interchange
- servicing the Homebush Bay Drive southbound off ramp through movement to Homebush Bay drive southbound on ramp, to access Direct Factory Outlet (DFO) Homebush
- this layout does not service the U turn movement from Underwood Road.

This option would have a maximum of four phases, instead of the standard two phases for a Diverging Diamond Interchange, in order to provide for the U turn and southbound movement to Direct Factory Outlet (DFO) Homebush.

In July 2021, Transport for NSW convened two Value Management Workshops to review and evaluate the three shortlisted options. These workshops were used to develop an agreed assessment criteria (as shown in Table 3 below), a suitable scoring system and a preliminary set of criteria weightings, against which the options could be compared.

The two Value Management Workshops focused on the analysis and creativity phase of evaluation and criteria development and included an information gap analysis to identify any further data required to aid informed decision making.

Table 3 Agreed assessment criteria for Value Management

Criteria	Description
Pedestrian and cyclist connectivity and convenience	To what extent does the option positively or negatively affect pedestrian and cyclist connectivity and convenience?
Intersection efficiency and capacity	To what extent does the option improve intersection efficiency in terms of overall delay and delays for key inbound and outbound movements for Sydney Olympic Park? Also consider to what extent does the option improve capacity of the Australian Avenue and Homebush Bay Drive intersection?
Environmental impacts	To what extent does the option enhance or detract from the existing environmental baseline conditions including contamination risk, biodiversity, and other key aspects?
Impacts to public space and private property functionality and access	To what extent is the access and functionality of private property and public space likely to be positively or negatively affected by the option?
Landscape character and visual impact	To what extent does the option enhance or detract from the existing visual conditions in terms of what is seen and experienced by pedestrians, cyclists and motorists as well as users of adjacent properties?
Impacts to all road users during construction	To what extent would the construction of the options negatively affect all road users at the intersection and its approaches, as well as on the Homebush Bay Drive mainline?
Maintenance	Whole of life maintenance impacts.

On 28 September 2021, Transport for NSW convened a third and final Value Management Workshop. This workshop evaluated each of the three shortlisted options against the agreed set of criteria. The workshop adopted a methodology of collaborative scoring lead by a subject matter expert for each set of criteria, followed by detailed sensitivity analysis of the approach and outcomes. The workshop identified the following considerations for each of the options against the criteria:

#### Intersection Efficiency and Capacity

- the workshop identified Option 5 had an insignificant improvement in increasing the traffic efficiency and capacity of the intersection and Sydney Olympic Park movements. This leads to a potentially short lived solution, with Option 5 scoring the lowest in ability to cater for future growth
- while Option 16B offers an improved capacity outcome with an increase in the number of lanes, several stakeholders pointed to Option 15D for overall greater improvement and opportunities.

#### Pedestrian/Bicycle Connectivity and Convenience

- the workshop identified that the most frequently mentioned challenges with pedestrian and cyclist connectivity and convenience related to multiple staged/phased pedestrian crossings and unclearly delineated zones
- while Option 5 and 16B are intersections that are largely familiar to participants, concerns were expressed that Option 16B would be potentially confusing and more time consuming for pedestrians navigating the numerous



crossings and would require some additional work on active transport wayfinding.

### **Environmental Impacts**

- the construction footprint and environmental impact, including encroachment on the vegetation and possible bird habitats of Bressington and Bicentennial Parks, was the common theme for all three shortlisted options
- Option 5 was identified as having the smallest environmental impact
- despite the fact that Option 16B has a smaller footprint than Option 15D, the increased contamination risk from the construction process necessary in constructing Option 16B outweighed the importance of footprint in stakeholder comments.

### **Public Space/Private Property functionality and access**

- access to public space and private property were prevalent issues across all options, most notably with regards to access to Direct Factory Outlet (DFO) Homebush and enabling U turns
- Option 5, in particular, drew concern for the constrained U turn capability and restricted access to Direct Factory Outlet (DFO) Homebush
- Option 16B and Option 15D attracted comments on the opportunity to maintain access to adjacent public spaces and private property.

### **Landscape character and visual impact**

- the main landscape concern for all three options was the impact on Bressington Park and Bicentennial Park, both in terms of encroachment on the parks and parking space within Bressington Park, and damage to the vegetation corridors. Option 5 has the smallest footprint and it scored highest on this criterion despite the fact that this option provides the least opportunity to improve the existing urban landscape. The larger footprints of Option 16B and 15 are somewhat mitigated by the opportunities for urban design improvement and Sydney Olympic Park gateway intersection identities they afford.

### **Impacts to road users during construction**

- the most frequently mentioned point on construction was the more challenging and therefore longer construction period of Option 16B and the significant traffic impact it would entail. While Option 5 and Option 15D are more similar in their construction process, several stakeholders emphasised the larger footprint of Option 16B as a reason to suspect longer construction time and interference with existing utilities.

## 6 The preferred option

In September 2021, as a conclusion to the third and final value management workshop, Option 15D was identified as the preferred option for the intersection upgrade and should proceed for further design and assessment as part of the project. The strategic design for the preferred option is provided in Figure 16 below.

The key findings of the traffic modelling assessment for Option 15D were as follows:

- when compared to the 'do minimum' scenario, the proposed signalisation of the intersection would significantly improve traffic flows at the intersection. To provide context, the 'do minimum' scenario would involve retaining the existing layout with minor delineation improvements (a dedicated left turn slip lane from Homebush Bay Drive onto Underwood Road), operating signal metering on demand via detectors and enhancing lighting at the intersection
  - Option 15D would significantly improve traffic performance
  - the total vehicle hours travelled would decrease as compared to the 'do minimum' scenario
- generally, Option 15D would substantially reduce vehicle travel time.

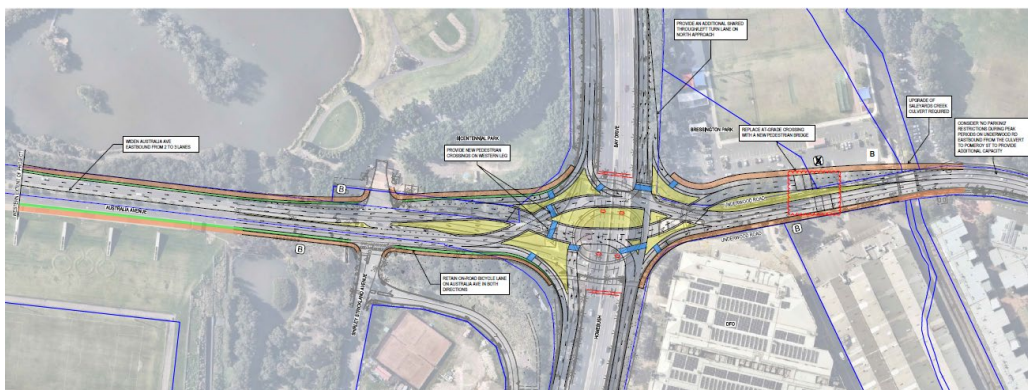


Figure 16 Strategic design for the preferred option (15D)

The final value management workshop also concluded that:

- Option 5 did not address the project objectives or address the fundamental problem with the existing intersection and should not be progressed further
- under all sensitivity scenarios Option 15D performed better than Option 16B.

In addition, the following matters were also identified:

- the design should be reviewed and improved to reduce the removal of significant trees, where possible
- opportunities to improve active transport connectivity and safety should form a key part of project value management as it proceeds.

The constructability assessment also noted that Option 15D would require acquisition of land within:

- Bicentennial Park, to enable pavement widening, relocation of Ausgrid pad mounted sub-station and construction width
- Bressington Park, to enable pavement widening and construction width.

There are no acquisition impacts to Direct Factory Outlet (DFO) Homebush.



## 6.1 Key benefits of the preferred option

Key benefits of the preferred option would include:

- improved connectivity to Sydney Olympic Park residential, recreational and commercial growth areas
- improved traffic flow and performance at the intersection
- improved travel time savings for all road users, particularly during AM, PM and weekend peaks, and during special events at Sydney Olympic Park
- improved travel times and service reliability for 525 and 526 bus routes users
- improved safety for all road users at the intersection and approaches
- safer and more efficient travel for pedestrians and cyclists
- reduced vehicle operating costs for all road users
- improved environmental and visual amenity.

## 6.2 Key features of the preferred option

Key features of the preferred option are described in the diagram below.

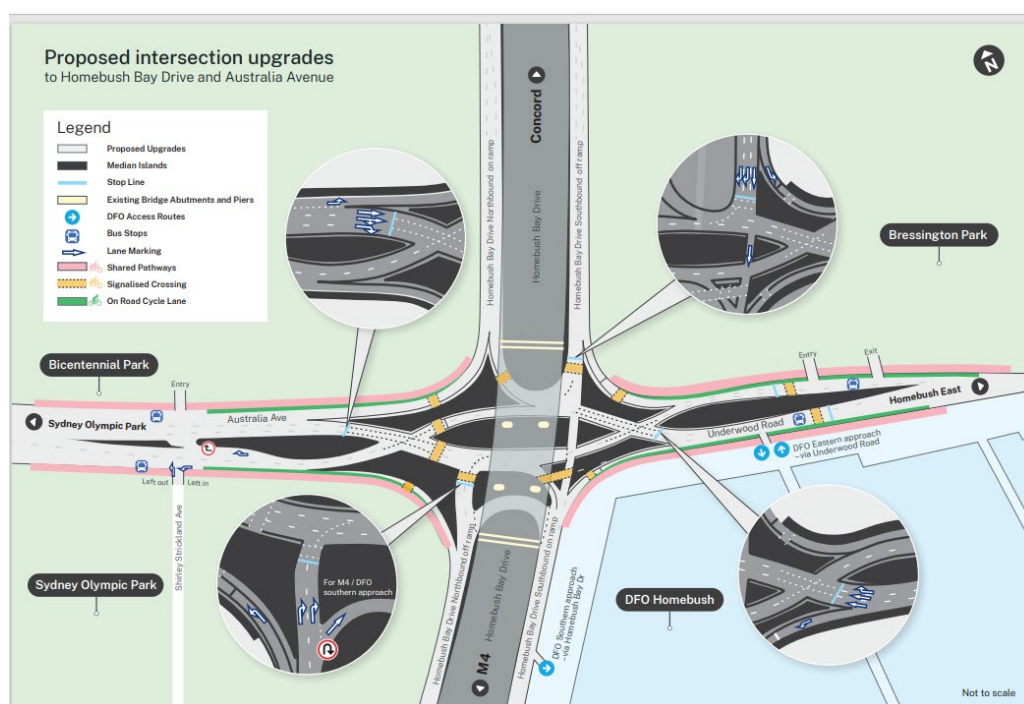


Figure 17 Proposed intersection upgrades

Key features of the preferred option would include:

- upgrading the existing roundabout to a signalised intersection to allow for real-time peak period adjustments
- widening Australia Avenue, Underwood Road and Homebush Bay Drive (southbound) off ramp approaches to three lanes
- providing a U turn lane on the Homebush Bay Drive (northbound) approach to allow traffic flow back onto Homebush Bay Drive (southbound) on ramp, towards M4 Motorway

- providing left slip lanes at all approaches
- widening existing pedestrian footpaths on Australia Avenue and Underwood Road to provide shared use (pedestrian and cyclist) pathways
- providing coordinated pedestrian activated traffic signals on all approaches
- building a signalised shared use crossing on Australia Avenue
- upgrading existing signalised pedestrian crossings on Homebush Bay Drive on and off ramp approaches and Underwood Road to signalised shared use crossings
- building new shared use refuge islands
- improving existing on-road bicycle lanes on Australia Avenue.

### 6.2.1 Homebush Bay Drive northbound off ramp



Figure 18 Artist impression of Homebush Bay Drive northbound off ramp

Key features at Homebush Bay Drive northbound off ramp would include:

- modifying the existing two lanes to provide dual right lanes towards Underwood Road
- providing a U turn lane ahead of the approach to allow traffic flow back onto Homebush Bay Drive southbound on ramp, towards M4 Motorway
- maintaining and improving the existing left slip lane onto Australia Avenue, towards Sydney Olympic Park
- upgrading the existing signalised pedestrian crossing to a shared use crossing, with pedestrian activated traffic signals
- building refuge islands to improve safety and connectivity to Bicentennial Park and Direct Factory Outlet (DFO).

## 6.2.2 Homebush Bay Drive southbound off ramp



Figure 19 Artist impression of Homebush Bay Drive southbound off ramp

Key features at Homebush Bay Drive southbound off ramp would include:

- widening the approach from two to three lanes, to provide one through lane onto Homebush Bay Drive southbound on ramp, towards M4 Motorway, and two right lanes towards Australia Avenue
- providing a left slip lane onto Underwood Road
- upgrading the existing signalised pedestrian crossing to a shared use crossing, with pedestrian activated traffic signals
- building refuge islands to improve safety and connectivity to Bicentennial Park.

## 6.2.3 Australia Avenue



Figure 20 Artist impression of Australia Avenue eastbound

Key features at Australia Avenue would include:

- widening the approach from two to three lanes to provide one through lane towards Underwood Road, one through/right lane towards Underwood Road/Homebush Bay Drive southbound on ramp and one right lane towards Homebush Bay Drive southbound on ramp, towards M4 Motorway
- maintaining and improving the existing left slip lane onto Homebush Bay Drive northbound on ramp, towards Concord
- widening the existing pedestrian footpath to provide a shared use pathway
- building a shared use crossing on Australia Avenue eastbound, with pedestrian activated traffic signals



- building refuge islands to improve safety and connectivity to Sydney Olympic Park and Bicentennial Park
- improving existing on-road bicycle lanes on Australia Avenue.

#### 6.2.4 Underwood Road



Figure 21 Artist impression of Underwood Road westbound

Key features at Underwood Road would include:

- widening the approach from two to three lanes, to provide two through lanes towards Australia Avenue and one right lane towards Homebush Bay Drive northbound on ramp, towards Concord
- providing a left slip lane onto Homebush Bay Drive southbound on ramp, towards M4 Motorway
- widening the existing pedestrian footpath to provide a shared use pathway
- upgrading the existing signalised pedestrian crossing to a shared use crossing, with pedestrian activated traffic signals
- building a new refuge island to improve safety and connectivity to Bressington Park and Direct Factory Outlet (DFO).

### 6.3 How the preferred option will support traffic movements

While the preferred option is new to NSW drivers it will be easy and safe to navigate. The Diverging Diamond Interchange design is unique, in that it requires traffic to navigate through the intersection via a crossover arrangement. The crossover of traffic will be undertaken under the safety of signalised intersections, which will provide increased traffic efficiency and remove conflicts with opposing vehicles.

The design allows traffic movements to be controlled by traffic signals, with simplified traffic signal phasing, providing increased green time within the intersection. The layout also provides a significant improvement in safety, since right turn movements no longer need to wait for opposing through traffic to clear to find a safe gap.

The design will also improve the efficiency of the intersection, as the lost time for various phases in the cycle can be redistributed as green time. By grouping traffic approaches together through the intersection there will be a significant reduction

of signal phases when compared with conventional intersection layouts which consist of six or more phases.

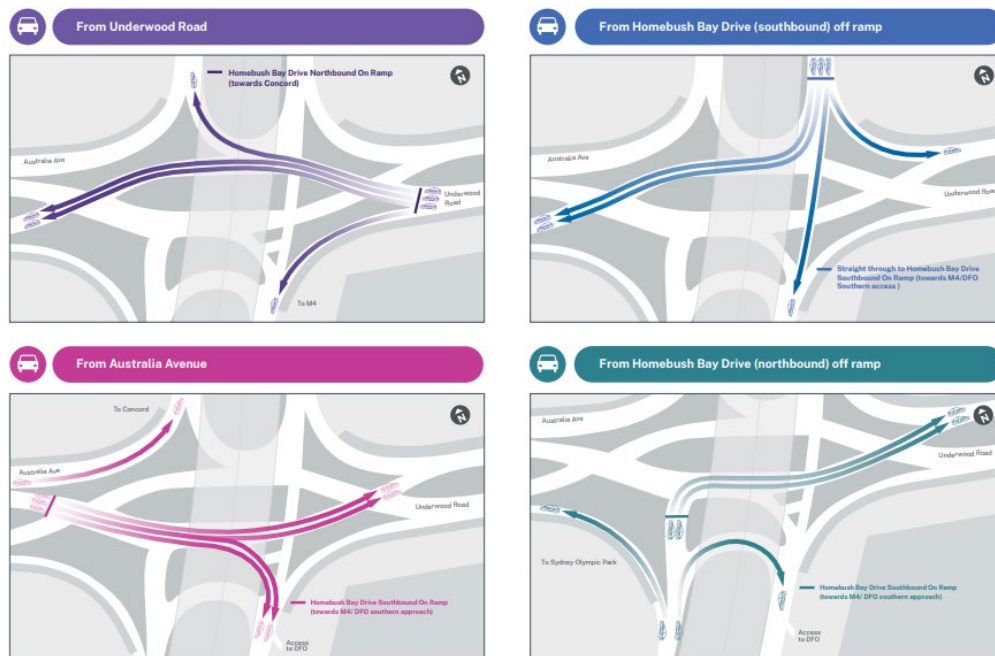


Figure 22 Preferred option traffic movements through the intersection

## 6.4 How the preferred option will support active and public transport use



Figure 23 Artist impression of shared use crossing on Underwood Road at Bressington Park

The preferred option will support improved safety, travel times and connectivity for the increasing number of active transport and bus users accessing the area for shopping, commercial and recreational purposes.

Walking, cycling and public transport will be supported by:

- providing more efficient and reliable services for 525 and 526 bus route users
- providing pedestrian activated traffic signals on all approaches
- upgrading the existing pedestrian pathways on Australia Avenue and Underwood Road to shared use pathways

- building a shared use path crossing on Australia Avenue, with pedestrian activated traffic signals
- upgrading existing signalised pedestrian crossings on Homebush Bay Drive on and off ramp approaches and Underwood Road to shared use crossings, with pedestrian activated traffic signals
- building new refuge islands
- improving existing on-road bicycle lanes on Australia Avenue.



Figure 24 Preferred option active transport movements through the intersection



Figure 25 Artist impression of shared use crossing and on-road bicycle lane on Australia Avenue



## 7 Next steps

Transport for NSW will now seek public feedback on the preferred option. This will provide an opportunity for the community and stakeholders to review the preferred option and provide feedback. Transport for NSW will use this feedback to refine the preferred option.

The preferred option will then be progressed to concept development, which will include the following activities:

- 100% concept design
- early field investigations (survey, geotechnical, biodiversity, heritage)
- environmental assessment
- detailed cost estimating, usually using probabilistic methodologies
- consultation with the community and external stakeholders
- Final Business Case.

Following the final business case, the project will proceed to detailed design and delivery phase works.

Transport for NSW will continue community and stakeholder consultation during the next stages of the proposal. The Transport for NSW website will be periodically updated with information about the progress of the proposal.

The community will also be provided with periodic project updates via community notifications and project webpage updates.

[https://transportcloud.sharepoint.com/:f/s/PLRCE/EiGkkAFiaRtKtKsDklu\\_6UoBslUWb7PGmQrDZrRrEGQtbew?e=mFfidl](https://transportcloud.sharepoint.com/:f/s/PLRCE/EiGkkAFiaRtKtKsDklu_6UoBslUWb7PGmQrDZrRrEGQtbew?e=mFfidl)



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