Sydney Olympic Park Authority

Sydney Olympic Park Master Plan 2030 (2016 Review)

Traffic and Transport Strategy (2016 Review)

5 July 2016

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Introduction

In June 2015 Parsons Brinckerhoff was engaged by Sydney Olympic Park Authority (SOPA) to undertake the first 5 year review of the *Sydney Olympic Park Master Plan 2030 Transport Strategy.* This report informs and underpins the *Sydney Olympic Park Master Plan 2030 (2016 Review)* prepared by SOPA. The following document references are used in this report:

- *Baseline Master Plan*: Sydney Olympic Park Master Plan 2030 adopted in 2010.
- *Baseline Transport Strategy*: Traffic and Transport Strategy prepared in 2008 and adopted in 2010, which supports the Sydney Olympic Park Master Plan 2030 document.
- *Master Plan 2030 (2016 Review)*: developed in 2016 as part of a 5-year review of the *Baseline Master Plan*.
- *Traffic and Transport Strategy (2016 Review) (this document):* supports the *Master Plan 2030 (2016 Review)* document by providing a 5-year review of the *Baseline Transport Strategy*.

The *Baseline Transport Strategy* identified transport upgrades including new public transport infrastructure and services, road upgrades, and travel demand management measures. Whilst the majority remain relevant, more certainty is now known around initiatives such as WestConnex, Parramatta Light Rail and the Bennelong Bridge over Homebush Bay. Also in the past 5 years, the planning and development of neighbouring precincts at Wentworth Point and Carter Street, the proposed urban renewal of Parramatta Road, and regional traffic growth have seen more pressure placed on the traditional gateways to the Olympic Peninsula.

This *Traffic and Transport Strategy (2016 Review)* also considers impacts on events to understand how integrated land use and transport outcomes can be maximised for the benefit of both event operations and development yields.

Master Plan 2030

Master Plan 2030 (2016 Review) seeks to build upon the plans, provisions, and objectives of the *Baseline Master Plan*. On this basis:

- the fundamental aspects of the *Baseline Master Plan* remain consistent, namely:
  - the regeneration of sites for commercial office development
  - the introduction of increased residential, educational and retail land uses
  - maintaining and expanding event venues
- a mixed land use development strategy for the site is still proposed, providing a precinct with both significant housing and employment opportunities
- leverage of the opportunities that the introduction of light rail into the precinct presents
- events would continue to be a fundamental feature of regular SOP operations; it would continue to be supported, protected, and promoted as a national and international location for sports, entertainment, and educational events
- additional strategies for the separation of event and non-event traffic
- expanded land use opportunities would be investigated to complement existing venues within SOP.

The *Master Plan 2030 (2016 Review)* supports the objective of SOP maintaining its status as the premier sports and entertainment precinct in Sydney and Australia. However, development is proposed to provide an increased and balanced level of activation which has been lacking in the past, resulting in a rise in the number of residents when compared to the *Baseline Master Plan*.

The objectives for the *Baseline Transport Strategy* which accompanied and influenced the *Baseline Master Plan* have generally been retained by the *Traffic and Transport Strategy (2016 Review)*, with the following modifications:

- A non-car mode share of 40% is recommended by 2030; the 25% target nominated by the *Baseline Transport Strategy* has already been exceeded.
- A higher stretch target of around 60% (when compared to the 40% baseline target) will be adopted, if and when supported by major public transport and demand management initiatives.

Strategic transport context

Transport was a key factor in determining the sustainable land use mix identified in the *Baseline Master Plan*. Determining an appropriate mode share target for non-vehicle use was a key consideration in determining achievable development.

The latest available data indicates a recent rise in public transport patronage and reduction in car use for people travelling to and from SOP. Although non-car mode share for SOP increased to 28% between 2001 and 2011, other comparable precincts in terms of transport characteristics and population currently achieve higher non-car mode shares such as Burwood (40%), Parramatta (47%), Chatswood (53%), St. Leonards (53%) Redfern/Eveleigh (57%), Pyrmont (58%), Bondi Junction (59%).

The *Traffic and Transport Strategy (2016 Review)* is aligned with and supported by State Government planning strategies and policies as outlined in Section 3. Other key transport initiatives which are identified and promoted by strategies and policies and relevant to SOP include:

- Bus service and infrastructure enhancements, including the Bennelong Bridge across Homebush Bay
- Introduction of light rail into the precinct
- *"Scoping study of rail needs for Western Sydney"* (joint Federal and State government investigation into rapid transit)

In addition to the future development of SOP and development potential through the *Parramatta Road Urban Renewal Strategy*, the Wentworth Point and Carter Street precincts are located within the Olympic Peninsula in proximity of SOP. This combined development would increase existing travel demand, but also create opportunities including:

- the potential to implement and leverage high capacity mass transit systems (i.e. rapid transit)
- increasing travel 'internal containment' through increasing the population both living and working within the Olympic Peninsula.

The creation of new jobs in the Parramatta CBD would also provide employment opportunities for the significant increase in residents of the Olympic Peninsula and reverse the dominant metropolitan commuter movement towards the Sydney CBD. Commuters travelling between these two key centres would benefit from the significant investment in public transport proposed, including potential future light rail and rapid bus services, and active transport links.

Public and active transport

Relevant existing and proposed future public and active transport networks and operations include:

- Rapid Transit (beyond 2030)
- Heavy rail
- Light rail
- Bus
- Ferry
- Walking and cycling facilities.

Existing heavy rail and bus services have increased significantly since the development of the *Baseline Transport Strategy*. Building upon this, in the future it is recommended that:

- the potential for a rapid transit line through Sydney Olympic Park has been incorporated into the current joint federal and state government study *"Scoping study of rail needs for Western Sydney"*
- the potential for a future rapid transit corridor and station within SOP will be preserved.
- train capacities and services on both the T7 Olympic and T1 Western Lines will be progressively increased in response to increased patronage at Sydney Olympic Park
- light rail is included and provided for as part of the *Traffic and Transport Strategy (2016 Review)*. The light rail route through SOP is yet to be determined but planning in this Strategy is consistent with planning for the Parramatta Light Rail project and the urban design controls in *Master Plan 2030 (2016 Review)* will not preclude alignment options
- the future bus infrastructure strategy includes:
  - implementation of traditional infrastructure solutions at key points of congestion e.g. bus priority
  - leveraging the benefits of the Bennelong Bridge across Homebush Bay
  - a formal on-street bus interchange in proximity of the existing heavy rail station which is accessible during events and therefore not impacted by road closures
  - the use of existing event bus priority infrastructure by timetabled services subject to Transport Management Centre (TMC) approval.
- The future active transport strategy includes:
  - leveraging the benefits of the Bennelong Bridge across Homebush Bay
  - leveraging the benefits of the new WestConnex commuter cycleway
  - leveraging opportunities to cross Duck River towards Parramatta in association with the Parramatta Light Rail project

Whilst the majority of major events occur on weekends when road capacities are less constrained, a growing number of medium and major events are staged on weekday evenings. It will therefore become increasingly important that event related journeys utilise public transport. To achieve this the maintenance of existing event operations are recommended, with the following modifications:

- consolidate all event bus operations around the Central precinct into an extended Plaza Bus Terminal to free up the road network surrounding precincts targeted for uplift (above the *Baseline Master Plan* yields)
- reduce the duration and extent of event road closures throughout SOP, particularly south of Herb Elliott Avenue.

Traffic

Strategic traffic analysis has been undertaken to identify the key local traffic impacts and recommendations of the proposed *Master Plan 2030 (2016 Review).* Based on the application of relevant set of assumptions for the yields proposed by the *Baseline Master Plan* and the *Master Plan 2030 (2016 Review)* results show that:

- the changes to land uses proposed by the *Master Plan 2030 (2016 Review)* would generate around 2,130 (17%) additional peak hour vehicles when compared to the *Baseline Master Plan of which*
  - around 625 (7% increase) are additional inbound vehicles, the critical direction
  - around 1,505 (41% increase) are additional outbound vehicles, the non-critical direction
- commercial (employment) land uses would generate the majority (around 54%) of peak hour traffic
- residential development would generate approximately 9% of total traffic under the *Master Plan 2030 (2016 Review)* scenario.
- overall this will assist in further balancing inbound and outbound vehicles travelling to and from SOP.

Many of the intersection locations where short-term upgrades were proposed by the *Baseline Transport Strategy* are currently under investigation as part of the *Olympic Peninsula Regional Transport Infrastructure Investigations* being undertaken by Roads and Maritime Services. Recommended short-term upgrades include:

- upgrades to the gateway intersections which provide access to and from the SOP precinct and adjacent priority precincts
- upgrades to local intersections within the SOP precinct
- new streets within the Town Centre to improve access and circulation for all road users

The WestConnex project is currently delivering a number of significant road upgrades which will directly support the precinct including:

- Widening of the M4 Motorway between Parramatta and Concord
- G-Ramp from Homebush Bay Drive southbound to the M4 Motorway westbound to provide uninterrupted flow
- New eastbound on-ramp from Hill Road to the M4 Motorway
- New westbound off ramp to Hill Road from the M4 Motorway
- Widening of Hill Road between the M4 Motorway and Old Hill Link
- Improved westbound G-Ramp from Hill Road southbound to the M4 Motorway westbound
- A new commuter cycleway associated with WestConnex

Recommended long-term upgrades to the road network to improve access to and from the Olympic Peninsula include:

- increasing the amount of strategic access points to and from the SOP precinct
- future upgrades to connecting arterial roads.

It is likely that more significant upgrades (than those nominated in the *Baseline Transport Strategy*) to gateway intersections and other key intersections providing access to and from SOP will be required due to the increased development proposed in surrounding areas.

The following key adjustments to the future SOP precinct road network are recommended to facilitate the separation of pedestrian and vehicle movements within the Central precinct:

- a new east-west access street north of Figtree Drive, primarily providing service vehicle access for the Central precinct
- a new north-south street aligned with a proposed pedestrian bridge to and from the Boundary Creek precinct.

SOPA will continue to work with TfNSW and RMS in the further development of integrated, collaborative traffic modelling process to confirm and further develop the strategic analysis provided by this *Traffic and Transport Strategy (2016 Review).*

Parking

With the successful implementation of the first 5 years of the *Baseline Master Plan* in terms of parking, and in the absence of a metropolitan wide strategy for parking, the *Traffic and Transport Strategy (2016 Review)* seeks to maintain the car parking strategies outlined in the *Baseline Transport Strategy*.

Analysis indicates that the *Master Plan 2030 (2016 Review)* would create an increase in parking demand of 6,560 spaces within SOP when compared to the *Baseline Master Plan*. A large proportion of this demand would be generated by residential development (11,650 total spaces). Consequently it is recommended that the parking provisions for this land use type are monitored and reviewed as development progresses. Further consideration of the separation of parking spaces and dwellings during the sale of residential units will also be considered in the future, in line with current market trends for lower car ownership. Together these measures could achieve a significant drop in the provision of parking whilst also supporting more sustainable travel.

Commercial development proposed by the *Baseline Master Plan* and *Master Plan 2030 (2016 Review)* will also create significant parking demand. However, the quantum of additional office worker parking generated by *Master Plan 2030 (2016 Review)* has reduced by 840 spaces. Consequently the continued gradual decrease in the provision of parking for commercial land uses is recommended in line with public transport improvements focussed around the transport interchange in the Town Centre. A commercial office parking rate of one space per 80m^2 has also been maintained for *Master Plan 2030 (2016 Review).* Parking provisions by land use type as development progresses will be assessed on a case by case basis. Any future reductions in parking provisions would need to be linked to and supported by major public transport and demand management improvements and initiatives to provide practical alternatives to car travel.

Travel demand management

Continued growth in non-car mode shares would be required to enable the development yields proposed by the *Master Plan 2030 (2016 Review)*. Factors which would assist in managing the increased levels of demand include:

- increased ‘internal containment’ of trips
- increased walking and cycling trips
- increased public transport patronage
- limiting parking supply.

The *Baseline Transport Strategy* traffic assessment assumed the maximum rate of self-containment to be 5%. This *Traffic and Transport Strategy (2016 Review)* adopts the same assumption, although this is considered to be conservative. In comparison, travel self-containment rates of up to 14% have been achieved in Western Sydney low density residential developments (Harrington Park) (Yigitcanlar et al, 2005).

Due to this SOPA will continue to contribute to RMS' investigations, which will ultimately provide quantitative estimates of future internal containment and dictate the road network upgrades required at key intersections within and surrounding SOP.

The benefits and principles of Transit Orientated Development were acknowledged in the *Baseline Transport Strategy*. This *Traffic and Transport Strategy (2016 Review)* recommends the location of light rail and bus stops along major spines, such as Australia Avenue and Dawn Fraser Avenue, to maximise service to the largest potential passenger catchments and adjacent development precincts.

SOPA will collaborate with the Travel Demand Management team at TfNSW to continue to develop and apply targeted, local demand management policies and initiatives. This will include the consideration of the establishment of a Transport Management Association (TMA) for the precinct.

Key findings

Sydney Olympic Park will continue to evolve and improve as a key centre in Western Sydney. This *Traffic and Transport Strategy (2016 Review)* has identified a target journey to work non-car mode share of 40%, which can be achieved through high capacity public transport infrastructure and service upgrades, regional road upgrades, the implementation of workplace travel plans, and careful control of the supply of parking.

The future development of a potential rapid transit line passing through Sydney Olympic Park (currently under investigation jointly between the federal and state governments) would provide the opportunity to further realise higher development potentials in a sustainable way beyond 2030, creating potential for a higher journey to work non-car mode share target of around 60%.

Increased emphasis on residential land uses as well as education, and venue expansion will provide opportunities to control traffic generation and increase the use of public transport. This can be achieved through the generation of trips in the reverse peak direction, and during non-commuter peaks. The development of additional dwellings on site could encourage a greater proportion of people living and working at Sydney Olympic Park and increase internal trip containment from the 5% of trips modelled as part of this analysis to a higher rate of around 10% as experienced in other parts of Sydney and Australia. Proposed changes to land use and density will generate an additional 2,130 vph during the AM peak. It is anticipated this can be accommodated through planned improvements to existing local street network, regional upgrades and reductions in through traffic.

Public transport can be increased through the introduction of increased rail and bus frequencies as well as the introduction of light rail, which is likely to commence operation around 2025 to meet demand from developments in planning.

The capacity of regional road upgrades to accommodate the *Master Plan 2030 (2016 Review)* yields is greater than the previous Master Planning for the site through the improvements associated with WestConnex. Traffic generation levels travelling to the precinct will also be less due to the reduction in levels of commercial office development (the highest generator of traffic). The construction of new ramps to the M4 Motorway at Homebush Bay Drive and Hill Road, as well as the widening of Hill Road from the M4 Motorway to Old Hill Link will be the first of a number of regional road projects required to improve access for Sydney Olympic Park and will effectively create a second major gateway into SOP and the Olympic Peninsula.

The amounts of car and coach parking provided on site will be maintained to meet long term venue agreements, ensuring efficient transport management during events. Parking supply will be controlled to balance the needs of development and venues, the need to increase the ridership of public transport to meet mode share targets, and the management of traffic on the local and regional road networks.

Medium and large sized events will be supported through enhanced levels of public transport service provision, and preferably staged outside the peak commuter travel periods to and from Sydney Olympic Park.

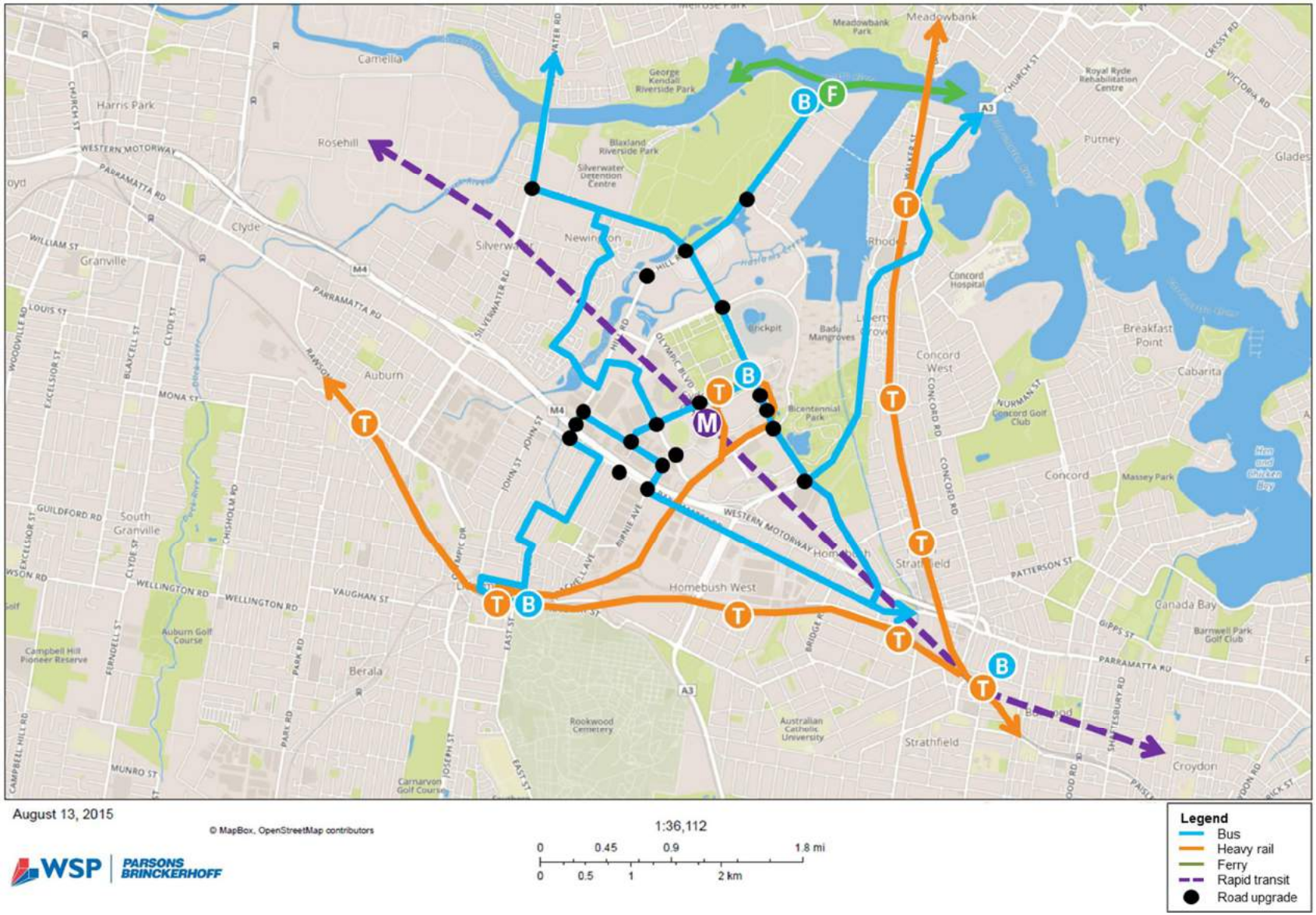


Figure E.1.1 Sydney Olympic Park Master Plan 2030 (Baseline) Transport Strategy

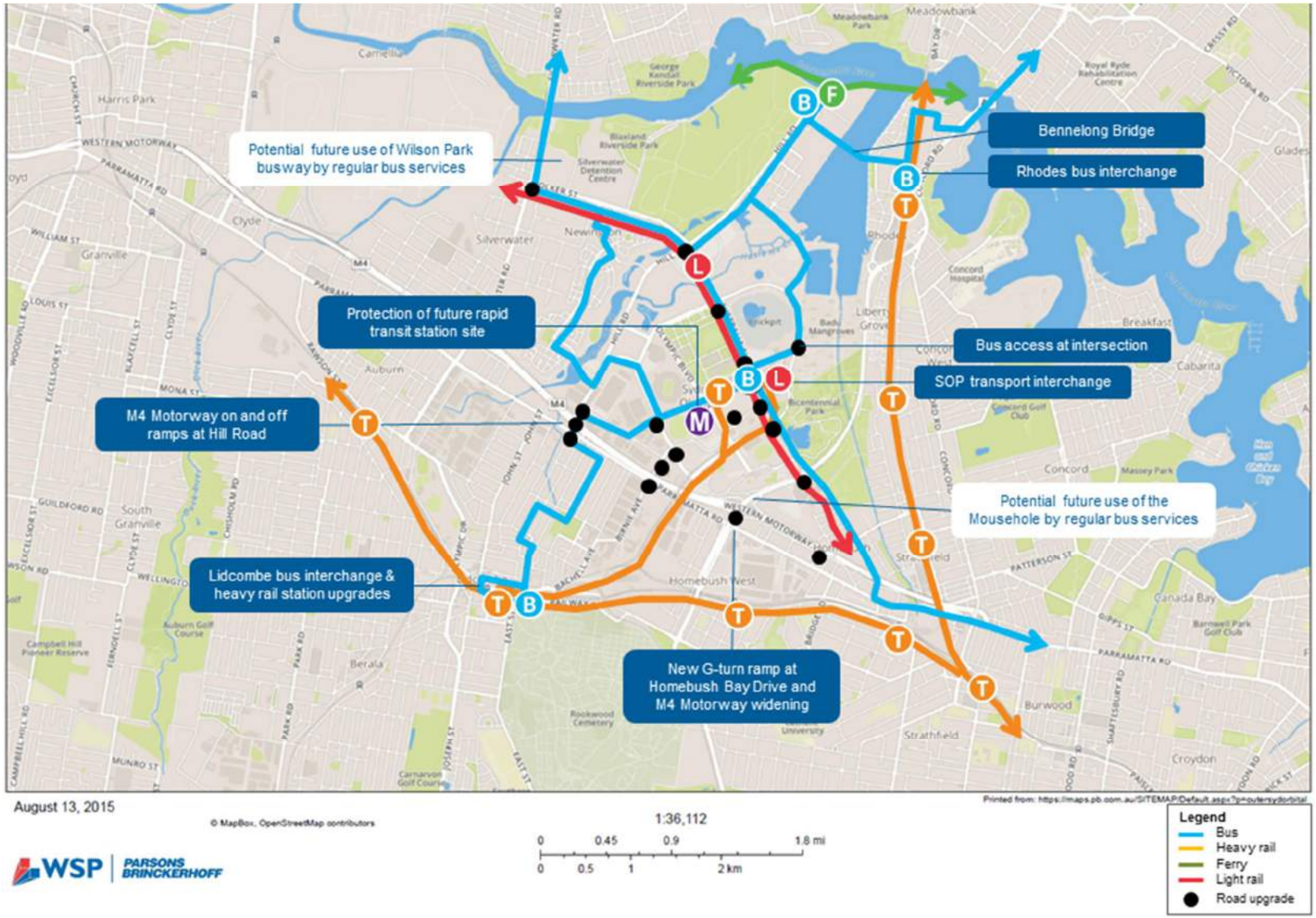


Figure E.1.2 Sydney Olympic Park Master Plan 2030 (2016 Review) Traffic and Transport Strategy (2016 Review)

1. Introduction

In June 2015 Parsons Brinckerhoff was engaged by Sydney Olympic Park Authority (SOPA) to undertake the first 5 year review of the *Sydney Olympic Park Master Plan 2030 Transport Strategy*. In addition to previous work on this strategy, Parsons Brinckerhoff has also previously worked with SOPA to develop transport strategies for the *2002 Master Plan* and *Vision 2025*.

This document represents the final outcome of the transport planning process which has involved the testing of various development scenarios, including consultation and collaboration with key stakeholders.

1.1 Document references

This report underpins *Master Plan 2030 (2016 Review)* prepared by SOPA. Table 1.1 provides a summary of documents relevant to the *Sydney Olympic Park Master Plan 2030* which are referenced in this report.

Table 1.1 Sydney Olympic Park Master Plan 2030 document reference summary

Reference	Document	Description
Baseline Master Plan	*Sydney Olympic Park Master Plan 2030* (SOPA, 2010)	Baseline Master Plan 2030 document developed and published in 2010.
Baseline Transport Strategy	*Sydney Olympic Park Master Plan 2030 Transport Strategy* (Parsons Brinckerhoff, 2008)	Baseline Transport Strategy document developed in 2008 and adopted in 2010, which supports the Master Plan 2030 document.
Master Plan 2030 (2016 Review)	*Sydney Olympic Park Master Plan 2030 (2016 Review)* (SOPA, 2016)	Master Plan 2030 (2016 Review) document, developed and published in 2016 as part of a 5-year review of the Baseline Master Plan.
Traffic and Transport Strategy (2016 Review) ***(This document)***	*Sydney Olympic Park Master Plan 2030 (2016 Review) – Traffic and Transport Strategy (2016 Review)* (Parsons Brinckerhoff, 2016)	Traffic and Transport Strategy (2016 Review) (this document), which supports the Master Plan 2030 2016 Review document, providing a 5-year review of the Baseline Transport Strategy.

1.2 Traffic and Transport Strategy (2016 Review) context

The *Master Plan 2030 (2016 Review)* provides the opportunity to revisit the *Baseline Master Plan*. This document, the *Traffic and Transport Strategy (2016 Review*) provides a review of the *Baseline Transport Strategy*, and integrates with and informs the *Master Plan 2030 (2016 Review)*.

The *Baseline Master Plan* was approved by the NSW Department of Planning in 2010. At this time the increase in redevelopment targets above those of the initial post-Olympic *2002 Master Plan* were viewed as progressive in terms of the scale of development taking place within Sydney.

Since this time, the Government's plans for urban development have changed from greenfield sites on the city's fringes to urban renewal of inner city brownfield sites. Sydney Olympic Park (SOP) continues to be one of Sydney's most successful mixed use urban regeneration areas.

The *Baseline Transport Strategy* identified transport upgrades including new public transport infrastructure and services, road upgrades, and travel demand management measures. Whilst the majority remain relevant, more certainty is now known around initiatives such as WestConnex, Parramatta Light Rail and the Bennelong Bridge over Homebush Bay. Also in the past 5 years, the planning and development of neighbouring precincts at Wentworth Point and Carter Street together with regional traffic growth have seen more pressure placed on the traditional gateways to the Olympic Peninsula.

The influence of proposed road upgrades at Hill Road and those associated with WestConnex and Parramatta Road will be important. So too will the potential impact on traffic capacity of the proposed Parramatta Light Rail project and the *Parramatta Road Urban Renewal Strategy*. These projects will alter the precinct's road network and gateway capacity.

Opportunities such as a light rail line through the SOP precinct, upgrades to the T1 Western Line and bus services connecting with Rhodes could all assist in increasing public transport mode share. With the proposed mix of residential and commercial development at SOP, demand management strategies to maximise trip containment are also possible, helping to further reduce traffic generation and impacts.

The Traffic and *Transport Strategy (2016 Review)* also considers impacts on events staged in the SOP precinct to understand how integrated land use and transport outcomes can be maximised for the benefit of both event operations and development yields.

1.3 Study area

The location of Sydney Olympic Park (SOP) is illustrated in Figure 1.1. It is located 14 km from the Sydney CBD and 8 km from Parramatta. It is located at the centre of the Sydney metropolitan area. Sydney Olympic Park was the main site of the Sydney 2000 Olympic Games. The site was transformed from an urban wasteland into a high quality urban and parkland environment which showcased Sydney to the world.

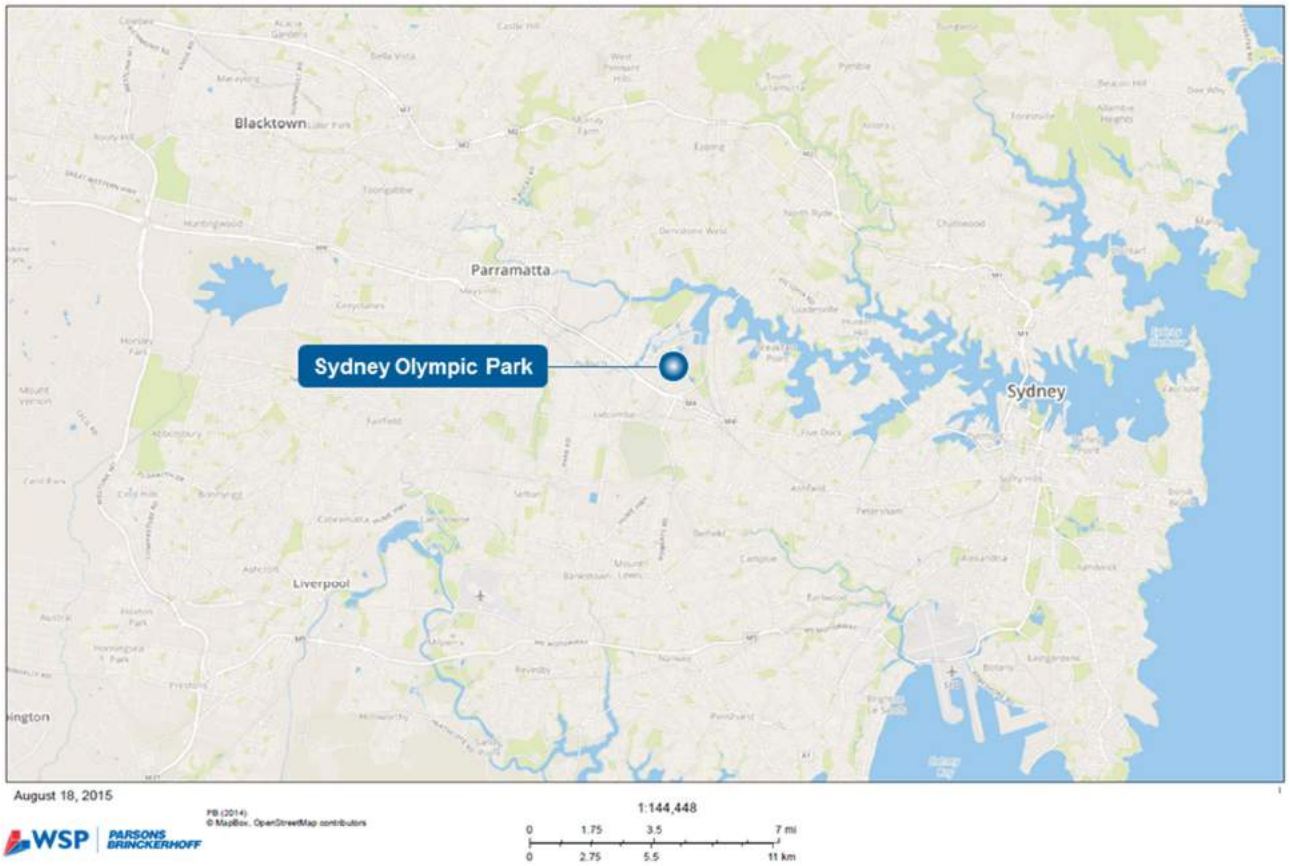


Figure 1.1 Location of Sydney Olympic Park

A map of the SOP Town Centre and its surrounds is provided in Figure 1.2. SOP Town Centre is broadly bounded by:

- North: Kevin Coombs Avenue/Hill Road
- East: Australia Avenue/Bennelong Parkway
- South: Homebush Bay Drive
- West: Edwin Flack Avenue/Hill Road.

Figure 1.2 Sydney Olympic Park site map

The precincts within SOP Town Centre are illustrated in Figure 1.3, which comprise:

- Boundary Creek
- Central
- Haslams
- Parkview
- Southern Sports
- Central Sports
- Stadia
- Sydney Showground
- Tennis.

Source: Sydney Olympic Park Master Plan 2030 (2015 Review) (SOPA, 2016)

Figure 1.3 Sydney Olympic Park precinct overview

1.4 Consultation

The following State Government stakeholders have been consulted during the preparation of *Master Plan 2030 (2016 Review)* and the *Traffic and Transport Strategy (2016 Review)*:

- NSW Department of Planning and Environment (DP&E)
- NSW Roads and Maritime Services (RMS)
- Transport for NSW (TfNSW).

1.5 Report structure

This report is structured as follows:

- Section 2 outlines the land uses and yields proposed by the *Baseline Master Plan and Master Plan 2030 (2016 Review)*
- Section 3 reviews existing travel behaviours and the strategic context of Sydney Olympic Park and its surroundings
- Section 4 describes existing and planned public transport services and infrastructure. It also describes the existing and future facilities to proposed to support the sustainable modes of walking and cycling
- Section 5 analyses anticipated traffic impacts on local and regional road network
- Section 6 outlines the existing and future provision of car and coach parking
- Section 7 describes the travel demand management measures proposed to support the development
- Section 8 outlines the key findings of this strategy

2. Master Plan 2030

This section provides an overview and comparison of key features of the:

- *Baseline Master Plan* determined and published by SOPA in 2010
- Modifications proposed by the *Master Plan 2030 (2016 Review).*

2.1 Overview

2.1.1 Baseline Master Plan 2030

The *Baseline Master Plan* was developed to provide the framework through which the SOP site will grow. The key features are:

- the continued development of a vibrant and attractive mixed use centre
- the regeneration of sites for commercial office development
- identification of additional sites for development within the Town Centre
- the introduction of increased residential, educational and retail land uses
- maintaining and expanding event venues.

2.1.2 Master Plan 2030 (2016 Review)

The *Master Plan 2030 (2016 Review)* seeks to build upon the plans, provisions, and objectives of the *Baseline Master Plan*. On this basis:

- The fundamental aspects of the *Baseline Master Plan* remain consistent, namely:
  - the regeneration of sites for commercial office development
  - the introduction of increased residential and retail land uses
  - maintaining and expanding event venues.
- A mixed land use development strategy for the site is still proposed, providing a precinct with both significant housing and employment opportunities.
- Events would continue to be a fundamental feature of regular SOP operations; it would continue to be supported, protected, and promoted as a national and international location for sports, entertainment, and educational events.
- Expanded land use opportunities would be investigated to complement existing venues within SOP.

The following sections of this chapter detail changes proposed as a result of the *Master Plan 2030 (2016 Review)* and other key factors and features relevant to the *Traffic and Transport Strategy (2016 Review)*.

2.2 Land use

A mixed land use development strategy is proposed for the site. Table 2.1 provides a summary of the proposed *Baseline Master Plan* and *Master Plan 2030 (2016 Review)* land uses and development yields.

Table 2.1 Proposed land use and development yield summary

Land use development	Development yield	
	Baseline Master Plan	***Master Plan 2030 (2016 Review)[1]***
Residential	575,000 m^2	855,000 m^2
Commercial office	479,000 m^2	412,000 m^2
Venues (additions to existing)	130,000 m^2	110,000 m^2
Education	105,000 m^2	186,000 m^2
Temporary accommodation	81,000 m^2	192,000 m^2
Transport infrastructure	51,000 m^2	51,000 m^2
Retail	33,000 m^2	100,000 m^2
Community facilities	31,000 m^2	37,000 m^2
Entertainment	15,000 m^2	17,000 m^2
Total		
All land uses	**1,500,000 m^2**	**1,960,000 m^2**

(1) Provided by SOPA (23 June 2016)

Land use development is proposed to provide an increased and balanced level of activity which has been lacking in the past, outside of events, by increasing the numbers of workers, students and residents working, learning and living on site. The resulting *Baseline Master Plan* and *Master Plan 2030 (2016 Review)* population and employment yields anticipated are summarised in Table 2.2.

Table 2.2 Proposed population and employment yield summary

Forecast	Development yield	
	Baseline Master Plan	*Master Plan 2030 (2016 Review)*
Residential (Residents)	14,000	23,500[1]
Commercial (Workers)	27,000	26,300[2]
Venues (Workers)	1,350	1,100[3]
Education (Workers)	1,000	1,900[3]
Education (Students)	5,000	5,000
Temporary accommodation (Workers)	800	1,900
Retail (Workers)	650	2,000[4]
Community facilities (Workers)	300	370[3]
Entertainment (Workers)	400	430[5]
Totals		
Residents	**14,000 residents**	**23,500 residents**
Workers	**31,500 workers**	**34,000 workers**

(1) Assumes 80 m^2 per dwelling unit and 2.2 residents per dwelling.
(2) Assumes 15-18 m^2 per commercial office job.
(3) Assumes 100 m^2 per venue, education, hotels and community job.
(4) Assumes 50 m^2 per retail job.
(5) Assumes 40 m^2 per entertainment job.

The worker numbers shown in Table 2.2 are presented throughout this report to maintain consistency with the *Baseline Master Plan.* However, the *Master Plan 2030 (2016 Review)* proposes a 14% reduction in commercial office development (479,000m^2 GFA to 412,000m^2 GFA), plus increases to temporary accommodation, education, and retail land uses when compared to the *Baseline Master Plan*. The overall increase in development yield would be expected to increase the overall number of workers within SOP.

Figure 2.1 illustrates the land uses proposed by the *Baseline Master Plan*. Figure 2.2 illustrates the revised land uses proposed by the *Master Plan 2030 (2016 Review)*.

Source: Sydney Olympic Park Master Plan 2030 (SOPA, 2010)

Figure 2.1 *Baseline Master Plan* land uses

Source: Sydney Olympic Park Master Plan 2030 (2016 Review) (SOPA, 2016)

Figure 2.2 *Master Plan 2030 (2016 Review)* revised land uses

2.3 Event operations

Both the *Baseline Master Plan* and the *Master Plan 2030 (2016 Review)* support the objective of SOP maintaining its status as the premier sports and entertainment precinct in Sydney and Australia, acknowledging that:

- The existing world class event traffic and transport facilities and operations will not be compromised through the conflicting needs of increased development.
- Event operations will minimise the extent and duration of road closures to reduce impacts on local businesses and residents.
- Regular transport operations will utilise event transport infrastructure where possible to maximise the use of government assets.

The classifications of events staged at venues within SOP are summarised in Table 2.3.

Table 2.3 Master Plan 2030 (2016 Review) event classifications

Event type	Examples
Minor (up to 10,000 attendees)	Business events, tour groups, promotions, school sports carnivals, conferences.
Medium (10,000 to 25,000 attendees)	Regular rugby league, AFL matches, community events (e.g. fun runs), marathons, exhibitions, concerts, basketball matches, netball, tennis tournaments, religious gatherings, swimming events.
Major (more than 25,000 attendees)	Major sporting events including Rugby League, Football, and Rugby Union internationals, AFL matches, Finals matches, stadium concerts, public gatherings (e.g. arts and music festivals), motorsport events, world events (e.g. Commonwealth Games, World Expos, Football and Rugby World Cups).

SOPA has transport management plans that effectively deal with the spectators and their associated transport needs. Minor events staged on weekdays are most likely to be impacted by increased levels of development if they are not considered adequately in planning and delivery.

Whilst the majority of major events occur on weekends when road capacities are less constrained, a growing number of medium and major events are being staged on weekday evenings where it will become increasingly important that event related journeys utilise public transport.

2.4 Traffic and Transport Strategy objectives

The objectives for the *Baseline Transport Strategy* which accompanied and influenced the *Baseline Master Plan,* and changes recommended by the *Traffic and Transport Strategy (2016 Review)* are summarised in Table 2.4.

Table 2.4 Transport Strategy objectives summary

***Baseline Transport Strategy* objective**	***Traffic and Transport Strategy (2016 Review)* recommendation**
Targeting an initial journey to work non-car mode share split of 25% in line with other specialised activity centres in the metropolitan area	An existing non-car mode share of 28% for SOP is estimated by the latest available census data (2011, see section 3.1.1), which exceeds the 25% target nominated by the *Baseline Transport Strategy*. This *Traffic and Transport Strategy (2016 Review)* recommends that a non-car mode share of 40% is targeted by 2030.
Adopting a stretch target journey to work non-car mode share split of 40% with the introduction of a major public transport initiative such as metro rail in conjunction with increasing the level of commercial development	This *Traffic and Transport Strategy (2016 Review)* recommends that a higher stretch target of around 60% will be adopted based on: ■ Recent significant increases in public transport patronage to and from SOP ■ Increased residential development within SOP, which is likely to increase the population which both lives and works within SOP ■ Continued future focus on, and investment in, public transport servicing SOP such as Parramatta Light Rail.
Monitoring and, if necessary, adjusting the quantity of high traffic generating land uses to match road and public transport capacities	No change.
Strategically locating commercial and retail land uses around Olympic Park Station and close to local bus service corridors	No change.
Maintaining sufficient road capacity to support all levels of events, particularly during weekday commuter peak periods	Upgrades to direct connections from and to the M4 Motorway will greatly improve the traffic operation for events, particularly during weekdays
Improving road connections to surrounding areas such as Newington and Bay West	No change. Bay West now known as Wentworth Point. Wentworth Point and Carter Street have emerged as Priority Precincts and share key road connections and gateways to Sydney Olympic Park
Limiting the provision of parking spaces for new developments to encourage public transport use	No change.
Continuing the operation of high quality major event public transport services to sustain existing high public transport mode shares	No change.
Maintaining regular public transport services, road access and parking supply sufficiently during major events	No change.
Designing a street network that supports bicycles, vehicles and pedestrian use	No change.
Building more efficient metropolitan and inter-city rail and bus connections	No change.
Integrating transport service planning with adjacent suburbs, especially to reduce the reliance on private vehicle use for trips under 5 km	No change.
Spreading commuter peak hours and promoting public and shared private commuter transport as alternatives to private motor cars	No change.

Baseline Transport Strategy objective	*Traffic and Transport Strategy (2016 Review)* recommendation
Meeting accessibility needs across the entire local transport and street network	No change.
Provide for new streets within development sites to facilitate vehicle access.	No change.

2.5 Master Plan 2030: Traffic and Transport Strategy (2016 Review) summary

Table 2.5 summarises the key findings of the *Traffic and Transport Strategy (2016 Review)* relating to Master Plan 2030 (2016 Review).

Table 2.5 Master Plan 2030 (2016 Review): *Traffic and Transport Strategy (2016 Review)* summary

Feature	Review findings/recommendations
Overview	■ The fundamental aspects of the *Baseline Master Plan* remain consistent, namely: ▸ the regeneration of sites for commercial office development ▸ the introduction of increased residential and retail land uses ▸ maintaining and expanding event venues. ■ A mixed land use development strategy for the site is still proposed, providing a precinct with both significant housing and employment opportunities. ■ Events would continue to be a fundamental feature of regular SOP operations.
Land use	■ Development of an additional 460,000 m^2 GFA when compared to the *Baseline Master Plan.* ■ a 14% reduction in commercial office development (from 479,000m^2 GFA to 412,000m^2 GFA) ■ Increase in residential development yield, resulting in 9,500 additional residents when compared to the *Baseline Master Plan.*
Event operations	■ Maintain the status and capability of event operations at SOP: ▸ to ensure that the existing world class event traffic and transport facilities and operations are not compromised through increased development ▸ to minimise the extent and duration of road closures to reduce impacts on local businesses and residents ▸ to ensure regular transport operations will utilise event transport infrastructure where possible to maximise the use of government assets.
***Transport Strategy* objectives**	■ Target an increased journey to work non-car mode share of 40%; the 25% mode share targeted by the *Baseline Transport Strategy* has already been achieved. ■ A higher stretch target of around 60% could be achievable based on: ▸ recent significant increases in public transport patronage to and from SOP ▸ increased residential development within SOP, which is likely to increase the population which both lives and works within SOP ▸ continued future focus on, and investment in, public transport servicing SOP like Parramatta Light Rail.

3. Strategic transport context

As in the *Baseline Master Plan*, traffic and transport are key factors in determining the sustainable land use mix for *Master Plan 2030 (2016 Review)*. Determining an appropriate mode share target for non-vehicle use is a key consideration in determining the amount of traffic generating development that would be achievable. Previous studies and master plans for the site adopted ambitious non-car mode share targets to achieve their development outcomes without focussing on traffic growth. In light of this, to ensure its assumptions could be linked to revealed behaviour and realistic outcomes, the issue of mode share was reviewed to consider:

- state government policies and planning strategies
- travel behaviour from the 2001 and 2011 Census
- existing travel behaviour
- mode share targets for similar centres in Sydney.

3.1 Existing travel behaviour

The *Baseline Transport Strategy* noted that to achieve the development yields identified in the *Baseline Master Plan* in a sustainable way, an increase in the use of public transport would be required to reduce generated car trips. This applied to trips made by both workers and residents.

The ability for a strategic centre such as SOP to attain higher public transport use depends upon both the level of public transport service provided and the constraints on parking. The emphasis on increased public transport use needs to be focussed on the critical weekday commuter peak periods, although there would be flow-on effects to non-work and non-peak travel.

3.1.1 Journey to Work data

Table 3.1 provides an overview of Journey to Work mode shares for SOP, Parramatta CBD, and Sydney CBD.

Table 3.1 Transport mode share overview (2001 & 2011) – Sydney Olympic Park, Parramatta CBD, and Sydney CBD

Location		Mode share (priority mode)[1]			
		Car	Train	Bus	Other
Sydney Olympic Park	*Baseline Transport Strategy* (2001 data)[2]	84%	11%	1%	4%
	***Traffic and Transport Strategy (2016 Review)* (2011 data)**	**72%**	**21%**	**4%**	**3%**
	Change	**-12%**	**+10%**	**+3%**	**-1%**
Parramatta CBD	*Baseline Transport Strategy* (2001 data)	62%	27%	5%	6%
	***Traffic and Transport Strategy (2016 Review)* (2011 data)**	57%	28%	9%	6%
	Change	-5%	+1%	+4%	-
Sydney CBD	*Baseline Transport Strategy* (2001 data)	20%	51%	20%	9%
	***Traffic and Transport Strategy (2016 Review)* (2011 data)**	17%	48%	22%	13%
	Change	-3%	-3%	+2%	+4%

Source: Journey to Work Data (Transport for NSW, 2001 and 2011 data analysis)

(1) Indicates the primary mode used to travel to work on census day

(2) 2001 data for Homebush Bay Area (Sydney Olympic Park; Carter Street Precinct; Newington, and; area south of Parramatta Road between Centenary Drive and Birnie Avenue)

Table 3.1 indicates that in the 10 years between 2001 and 2011:

- Although car transport is still the dominant mode for travel to and from SOP, this mode dropped by 12% to 72%.
- Train travel to and from SOP doubled to 21%.
- Bus travel to and from SOP increased from 1% to 4%.
- Car mode share for Parramatta remained relatively constant at around 60%; this is a result of the high level of public transport service and limited parking supply.
- Car mode share for Sydney CBD reduced to below 20%; other transport mode shares, including walking and cycling, continued to grow in response to continued investment in these modes.

The increase in non-car mode share to and from SOP is a result of infrastructure and service improvements over this period. Changes to existing public and active transport services which have occurred between the development of the *Baseline Transport Strategy* and *Traffic and Transport Strategy (2016 Review)* are summarised in section 4.

Table 3.2 provides an overview of existing Journey to Work mode shares for SOP in comparison to other strategic centres in Sydney. Although non-car mode share for SOP increased significantly between 2001 and 2011, other strategic precincts have achieved non-car mode shares as high as 45%.

Table 3.2 Existing transport mode share overview – key centres (2011)

Location	Mode share (priority mode)[1]			
	Car	Train	Bus	Other
Westmead	80%	11%	2%	7%
Macquarie Park	75%	14%	6%	5%
Sydney Olympic Park	**72%**	**21%**	**4%**	**3%**
Rhodes	71%	23%	1%	5%
Randwick	64%	7%	12%	17%
Burwood	60%	28%	4%	8%
Parramatta	53%	30%	10%	7%
St Leonards	47%	37%	8%	8%
Chatswood	47%	36%	6%	11%
Redfern/Eveleigh	43%	41%	2%	14%
Pyrmont	42%	28%	11%	19%
Bondi Junction	41%	32%	15%	12%

Source: Journey to Work Data (Transport for NSW, 2011 data analysis)

(1) Indicates the primary mode used to travel to work on census day

3.1.2 Sydney Olympic Park workforce studies

This section provides a summarised analysis of the results of the following SOP workforce travel studies, which were commissioned by SOPA:

- *Sydney Olympic Park Workforce Research Studies* (2014 & 2006)
- *Sydney Olympic Park Transport Survey* (2008).

These studies assist in understanding the workforce's transport needs, and subsequently developing targeted strategic transport planning measures. The following sections provide a summary of relevant key results of these studies.

Sydney Olympic Park Workforce Research Studies (Micromex Research, 2014 & 2006)

These studies provide an analysis of the following key information:

- Geographic distribution of the SOP workforce (Table 3.3).
- Typical working hours of the SOP workforce (Table 3.4).
- Rail station use by the SOP workforce (Table 3.5).
- Bus service use by the SOP workforce (Table 3.6).

Table 3.3 Geographic distribution of SOP workforce

Place of residence	Proportion of workforce/students	
	2006 study	2014 study
North West	29%	23%
South West	27%	16%
North	16%	35%
City/East/Inner West	12%	16%
South & Illawarra	11%	7%
Central Coast	3%	2%
Other	2%	1%
Total	**100%**	**100%**

Source: (Micromex Research, 2014 & 2006)

Table 3.4 Working hours of SOP workforce

Employee type	Typical working hours					
	Early morning (12.00 am–8.00 am)		Regular office hours (8.00 am–6.00 pm)		Late night (6.00 pm–12.00 am)	
	2006 study	2014 study	2006 study	2014 study	2006 study	2014 study
Full time	4%	~4%	86%	~85%	10%	~11%
Part time/Casual	3%		79%		18%	

(1) 2014 study working hours estimated based on reported work/study start times and end times.

Source: (Micromex Research, 2014 & 2006)

Table 3.5 Rail stations used to travel to and from SOP

Station	Proportion of rail travellers	
	2006 study	2014 study
Olympic Park	61%	74%
Lidcombe	17%	3%
Concord West	9%	4%
Strathfield	9%	17%
North Strathfield	1%	0%
Other	3%	2%
Total	**100%**	**100%**

Source: (Micromex Research, 2014 & 2006)

Table 3.6 Bus services used to travel to and from SOP

Service	Proportion of bus travellers	
	2006 study	2014 study
525 (to/from Burwood/Strathfield)	43%	34%
401/404 (to/from Lidcombe)	30%	6%
CBA bus (to/from Strathfield station)	-	20%
525 (to/from Parramatta)	15%	16%
533 (to/from Chatswood)	-	12%
401 (to/from Sydney Olympic Park Ferry Wharf)	4%	1%
450 (to/from Hurstville)	-	4%
Other	9%	7%
Total	**100%**	**100%**

Source: (Micromex Research, 2014 & 2006)

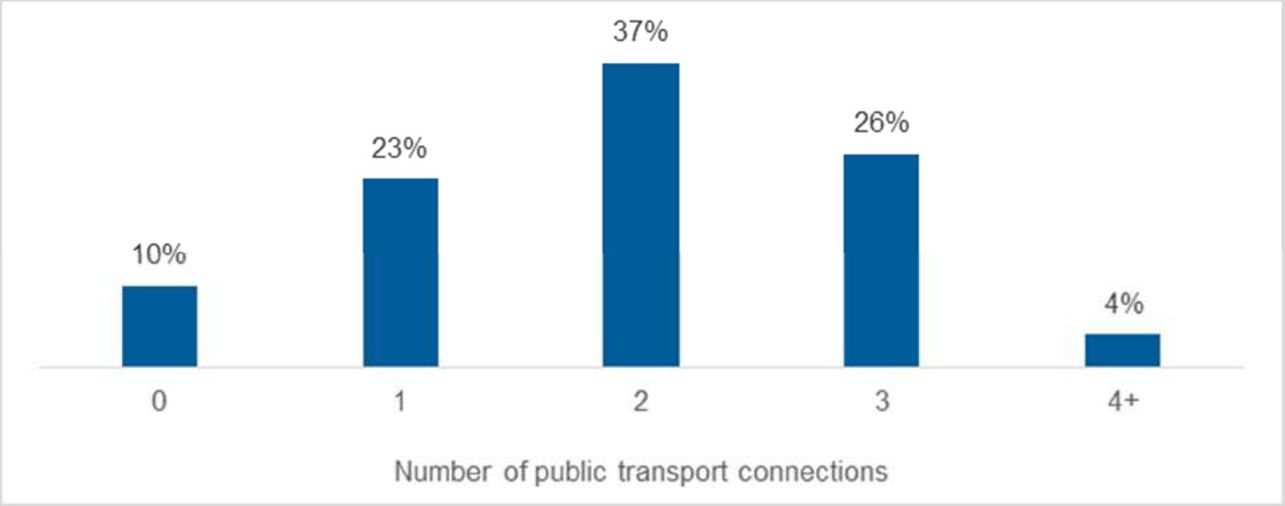
The results of the studies illustrate the following trends:

- Place of residence:
  - In 2006 around 55% of the workforce resided in North West and South West areas of Sydney; in 2014 this had reduced to around 40%.
  - In 2006 16% of the workforce resided in areas north and 12% in areas east of SOP; in 2014 this had increased to 35% and 16% respectively.
  - Overall, the place of residence of the majority of workers within SOP has shifted from the west of SOP to the east of SOP.
- Working hours:
  - Most employees in SOP work during typical office hours.
- Rail travel:
  - In 2006, in addition to Olympic Park station (60%), relatively high proportions of rail travellers used Lidcombe, Concord West, and Strathfield stations (and connected via other modes) when travelling to and from SOP.
  - By 2014, the use of Olympic Park station (75%) and Strathfield station (17%) increased significantly, while the use of Lidcombe (3% as a final station) reduced significantly.
  - The increase in the use of Olympic Park station and reduction in the use of Lidcombe station was likely influenced by the increased frequency of services on the T7 Olympic Line. The increase in the use of Strathfield station was likely influenced by the introduction of the free CBA bus service between Strathfield station and SOP.
- Bus travel:
  - Around 60–75% of bus users travel between SOP and areas to its south (Burwood, Strathfield, and Lidcombe).
  - Around 15% of bus users travel to and from Parramatta.

Sydney Olympic Park Travel Survey (Sydney Olympic Park Business Association, 2008)

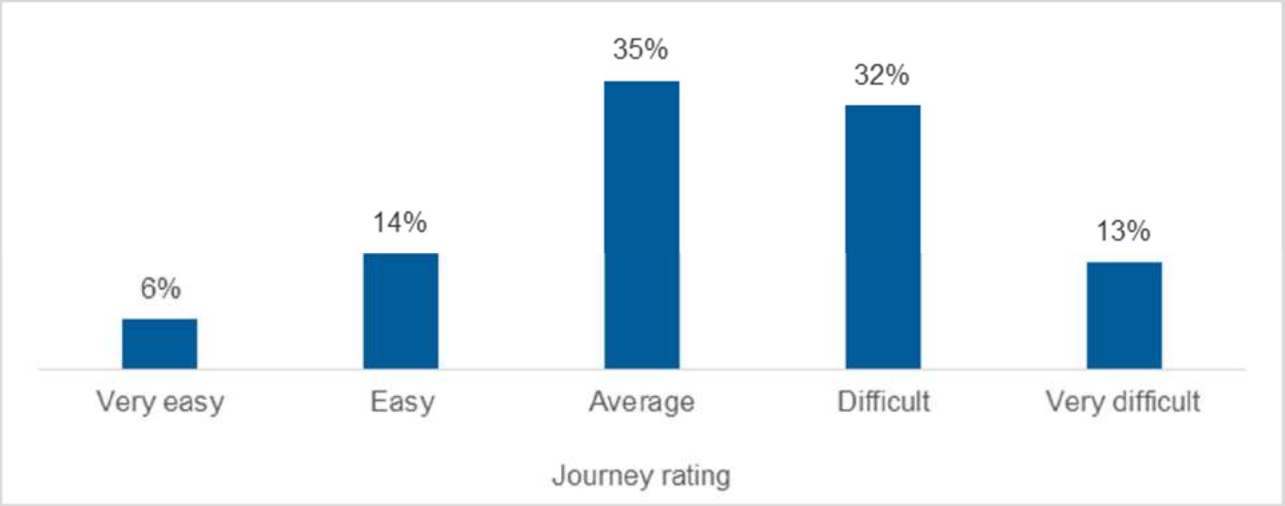
This study provided an analysis of the following key information:

- Number of connections made by public transport users (Figure 3.1).
- Perceived difficulty of journeys to and from work by public transport users (Figure 3.2).



Source: (Sydney Olympic Park Business Association, 2008)

Figure 3.1 Number of connections for SOP public transport commuters



Source: (Sydney Olympic Park Business Association, 2008)

Figure 3.2 Perceived journey difficulty for SOP public transport commuters

The results of the Sydney Olympic Park Travel Survey illustrate that:

- Only 10% of public transport users used a single, direct service to access SOP (i.e. required no connections).
- Around 60% of public transport users made at least two connections to access SOP.
- Consequently, 45% of public transport users considered their journeys to be either difficult or very difficult.

3.2 Strategic plans and policies

Since the development of the *Baseline Master Plan* and the accompanying *Baseline Transport Strategy*, additional strategies, policies, and information have become available. An overview of the information relevant to the *Baseline Transport Strategy* and subsequently this *Traffic and Transport Strategy (2016 Review)* is provided in Table 3.7.

Table 3.7 Strategic transport context overview

Source	Publisher	Relevant to:		Details
		Baseline Transport Strategy	*Traffic and Transport Strategy (2016 Review)*	
Parramatta Light Rail	Transport for NSW, December 2015	N/A	✓	Conceived after completion of the *Baseline Transport Strategy*.
Sydney CBD to Parramatta Strategic Transport Plan	Transport for NSW, September 2015	N/A	✓	Published after completion of the *Baseline Transport Strategy*.
A Plan for Growing Sydney	Department of Planning and Environment, 2014	N/A	✓	Published after completion of the *Baseline Transport Strategy*.
NSW 2021 – State Plan	NSW Government, 2011	N/A	✓	Published after completion of the *Baseline Transport Strategy*.
NSW Long Term Transport Master Plan	Transport for NSW, 2012	N/A	✓	Published after completion of the *Baseline Transport Strategy*.
NSW State Infrastructure Strategy	Infrastructure NSW, 2014	N/A	✓	Published after completion of the *Baseline Transport Strategy*.
Sydney's Modal Future Plans	Transport for NSW, 2012–2013	N/A	✓	Published after completion of the *Baseline Transport Strategy*.
WestConnex and Managed Motorways	NSW Roads and Maritime Services, ongoing	N/A	✓	Conceived after completion of the *Baseline Transport Strategy*.
Parramatta Road Urban Renewal	Urban Growth, ongoing	N/A	✓	Conceived after completion of the *Baseline Transport Strategy*.
Sydney Metropolitan Strategy	NSW Department of Planning, 2005	✓	N/A	Now superseded.
Draft West Central Subregional Strategy	NSW Government, updated 2014	✓	✓	Updated subregional strategy included in *A Plan for Growing Sydney*.
Urban Transport Statement	NSW Government, 2006	✓	N/A	Now superseded.

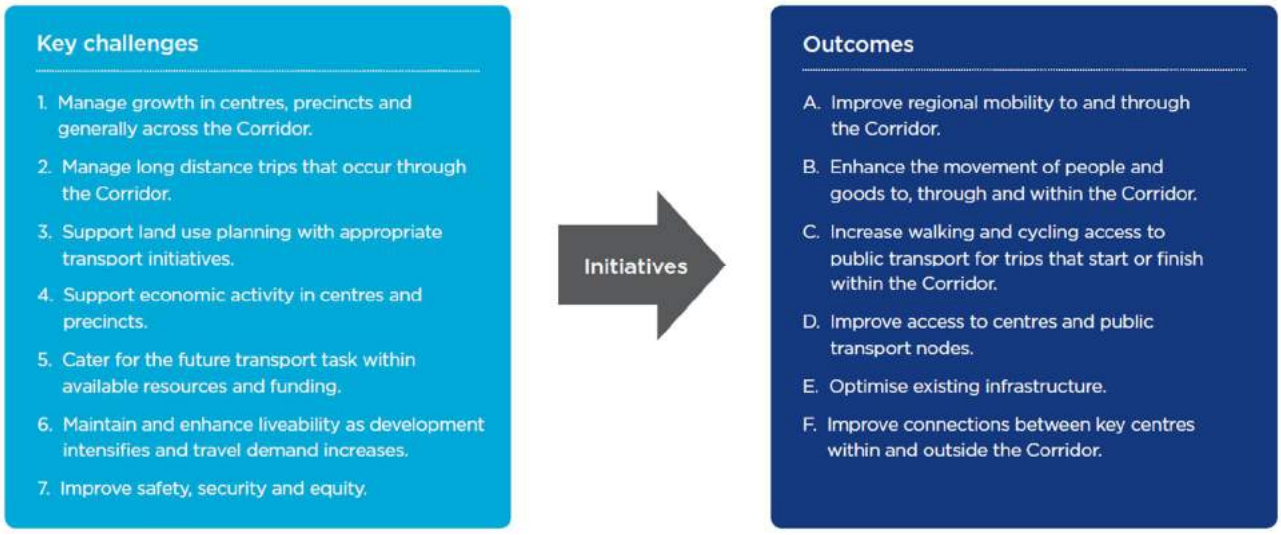
The proposed *Master Plan 2030 (2016 Review)* is aligned with and supported by State Government planning strategies and policies. The most relevant information is summarised in this section.

3.2.1 Sydney CBD to Parramatta Strategic Transport Plan

The *Sydney CBD to Parramatta Strategic Transport Plan* brings relevant measures and initiatives together into one document, setting out the clear strategic context for integrated transport and land use planning in the Corridor. Specifically, the plan was prompted by and considers:

- *A Plan for Growing Sydney*
- *NSW Long Term Transport Master Plan*
- *NSW State Infrastructure Strategy*
- *Sydney's Modal Future Plans*
- WestConnex
- The *Parramatta Road Urban Renewal Strategy.*

The plan brings together a response to the corridor's challenges, opportunities and vision, as well as wider NSW Government objectives for Sydney's growth. It is not intended as a strategy that details or announces new infrastructure; rather, it brings together all activity within this area, and shows how the many initiatives, when working to agreed, Corridor-wide principles, can work together to meet wider metropolitan goals. The key challenges, initiatives, and proposed outcomes identified for the corridor are summarised in Figure 3.3.



Source: Sydney CBD to Parramatta Strategic Transport Plan (TfNSW, 2015)

Figure 3.3 Key challenges and outcomes for the Sydney CBD to Parramatta corridor

An illustration of current land use and transport initiatives identified and considered by the plan is provided in Figure 3.4. Transport initiatives include:

- Light rail routes linking to Parramatta, including a route between Parramatta and Strathfield via SOP
- The Homebush Bay Bridge, facilitating bus and active transport movements between the Olympic Peninsula and Rhodes
- The Western Sydney Rail Upgrade Program (capacity upgrades to the T1 North Shore, Northern, & Western Line)
- Sydney Metro City & Southwest
- Parramatta River ferry initiatives

Further relevant details of these initiatives are provided in the following sections of this report.

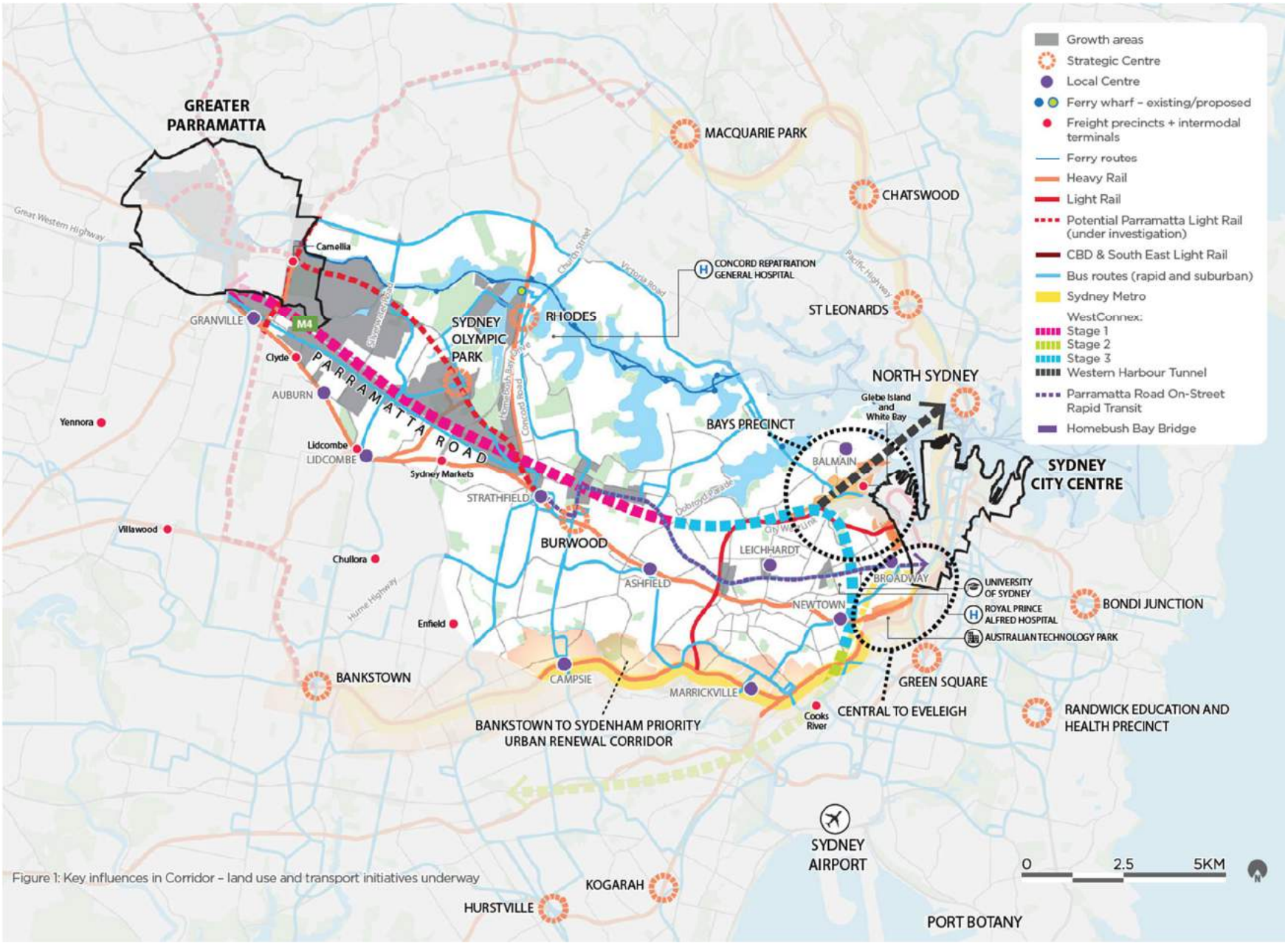


Figure 1: Key influences in Corridor – land use and transport initiatives underway

Source: Sydney CBD to Parramatta Strategic Transport Plan (TfNSW, 2015)

Figure 3.4 Land use and transport initiatives in the Sydney CBD to Parramatta corridor

3.2.2 A Plan for Growing Sydney

A Plan for Growing Sydney (NSW Government, December 2014) has been developed to guide land use planning decisions over the next 20 years. It identifies:

- locations for future urban development
- strategic transport corridors
- major centres proposed for future residential and employment growth.

A Plan for Growing Sydney includes a strong focus on SOP, where it features as:

- a Strategic Centre within Sydney's Global Economic Corridor (Figure 3.5 and Figure 3.6)
- a key part of Greater Parramatta to Olympic Peninsula Growth Area, on the route of a proposed Parramatta Light Rail corridor (Figure 3.7 and Figure 3.8).

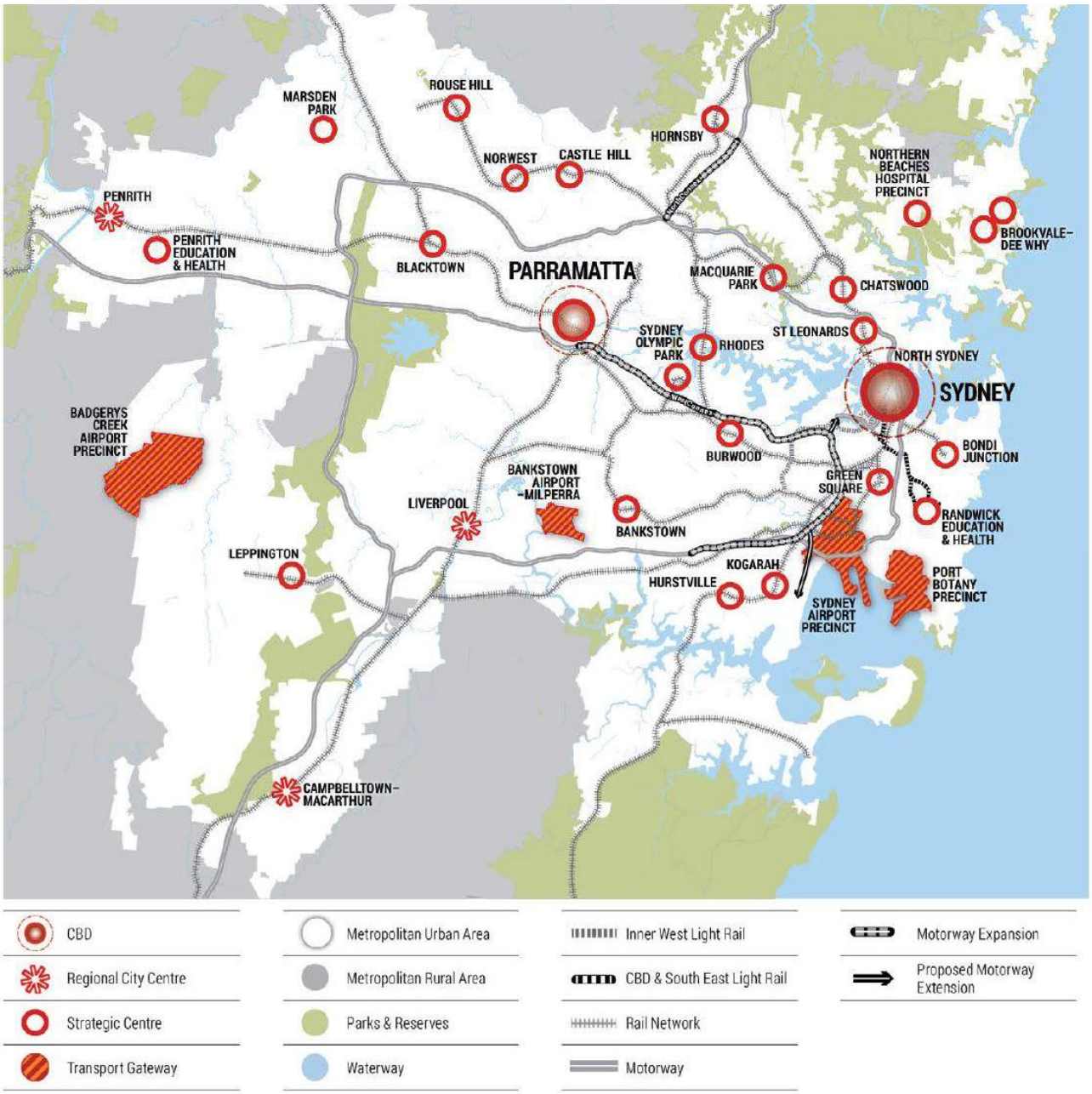
A key direction identified is the establishment of the new Greater Parramatta to Olympic Peninsula Growth Area. Overarching actions to achieve this include:

- establish a new partnership to manage renewal of the Greater Parramatta to Olympic Peninsula Priority Growth Area
- identify and deliver enabling infrastructure to support growth and urban renewal
- deliver priority revitalisation precincts
- grow the knowledge economy as part of the extension of the Global Economic Corridor.

Specifically the priorities relevant to SOP identified in the West Central Subregional strategy comprise:

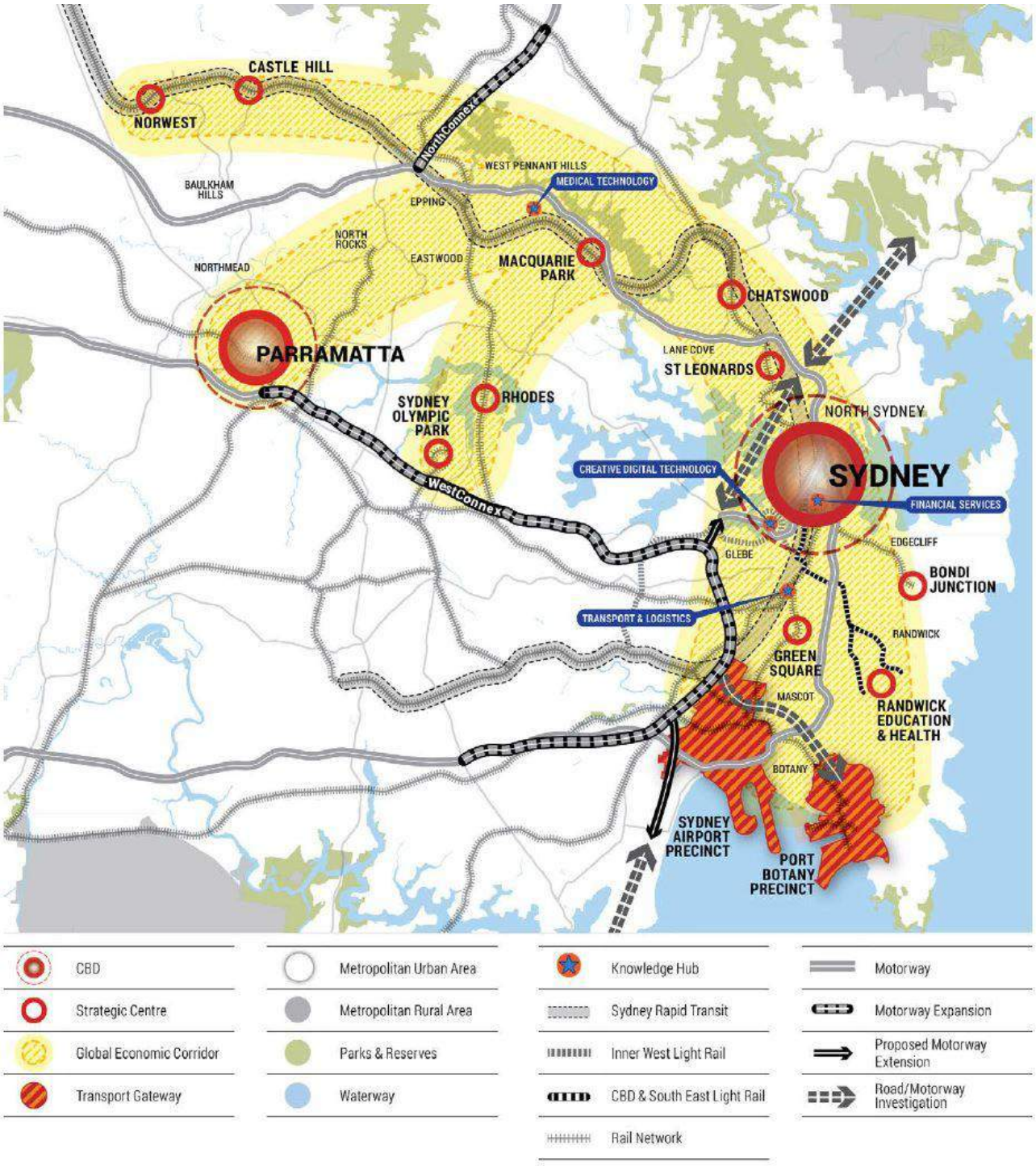
- work with council to provide capacity for additional mixed-use development in Sydney Olympic Park including offices, retail, services and housing
- investigate a potential light rail corridor from Parramatta CBD to Sydney Olympic Park
- work with council to improve walking and cycling connections from Sydney Olympic Park train station: west towards Newington, north towards Wentworth Point, east towards Concord West train station and south towards Lidcombe train station
- facilitate delivery of Carter Street Priority Precinct, Lidcombe Priority Precinct and Wentworth Point Priority Precinct.

A Plan for Growing Sydney also identifies a concept for an interconnected system of natural landscapes, local open spaces and strategic parks within major commercial, employment and residential precincts, known as the Sydney Green Grid. The Green Grid will promote more walking and cycling for healthy lifestyles.



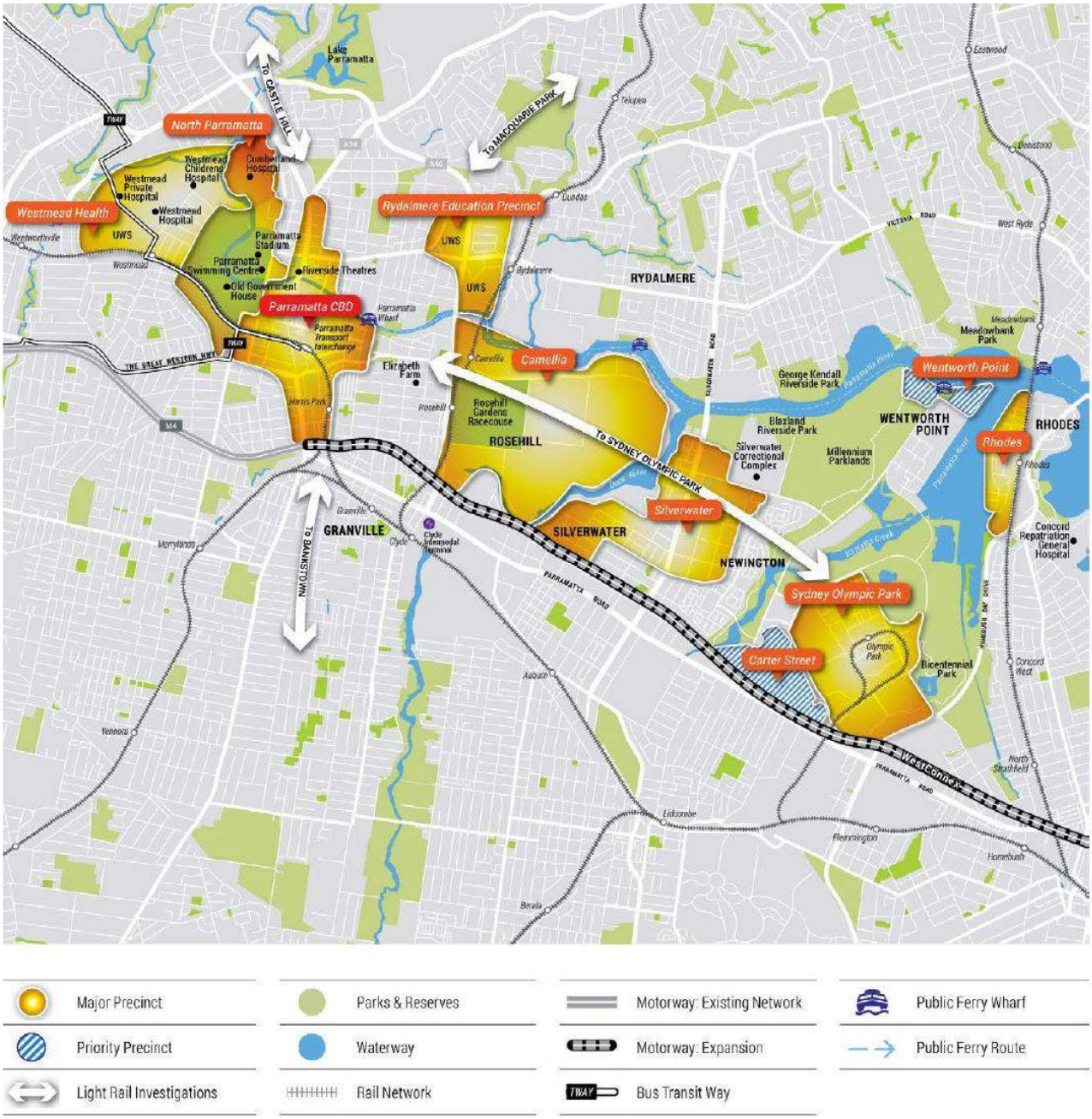
Source: A Plan for Growing Sydney (DP&E, 2014)

Figure 3.5 A Plan for Growing Sydney – Strategic Centres and Transport Gateways



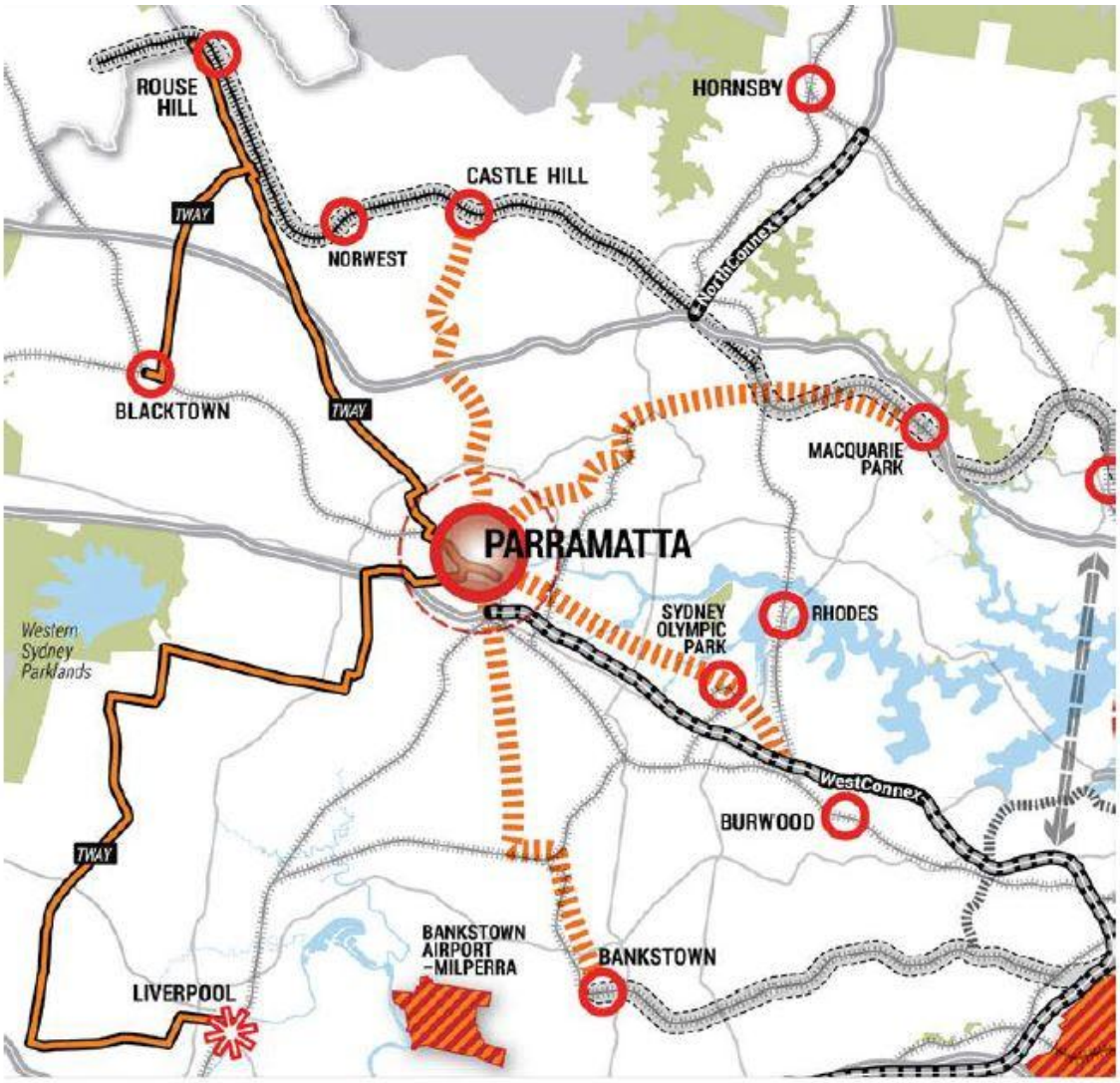
Source: A Plan for Growing Sydney (DP&E, 2014)

Figure 3.6 A Plan for Growing Sydney – Global Economic Corridor



Source: A Plan for Growing Sydney (DP&E, 2014)

Figure 3.7 A Plan for Growing Sydney – Greater Parramatta to Olympic Peninsula Growth Area



Source: A Plan for Growing Sydney (DP&E, 2014)

Figure 3.8 A Plan for Growing Sydney – Greater Parramatta and surrounds

3.2.3 NSW 2021 – State Plan

The NSW 2021 10-Year plan (NSW Government, 2011) contains targets for 100,000 new jobs as part of the strategy to improve the performance of the NSW economy. It also contains targets for improving transport services and shifting trips away from the use of private vehicles towards public transport, walking and cycling. The plan specifies targets including:

- 28% public transport mode share across the Sydney Metropolitan Region
- doubling cycling mode share
- 25% walking mode share.

These targets are assisted through another aim of the plan – to create planning policy that encourages job growth in centres close to where people live.

The proposed development of the SOP precinct will support these targets and goals by providing a location for residential, commercial, and retail development. In combination with the *Long Term Transport Master Plan* (section 3.2.4) and *Sydney's Modal Future Plans* (section 3.2.6), it would place more people within easy access of high-frequency public transport services and/or active transport links. Appropriate planning within the precinct will help to ensure that walking and cycling to the station and within the precinct are encouraged.

3.2.4 NSW Long Term Transport Master Plan

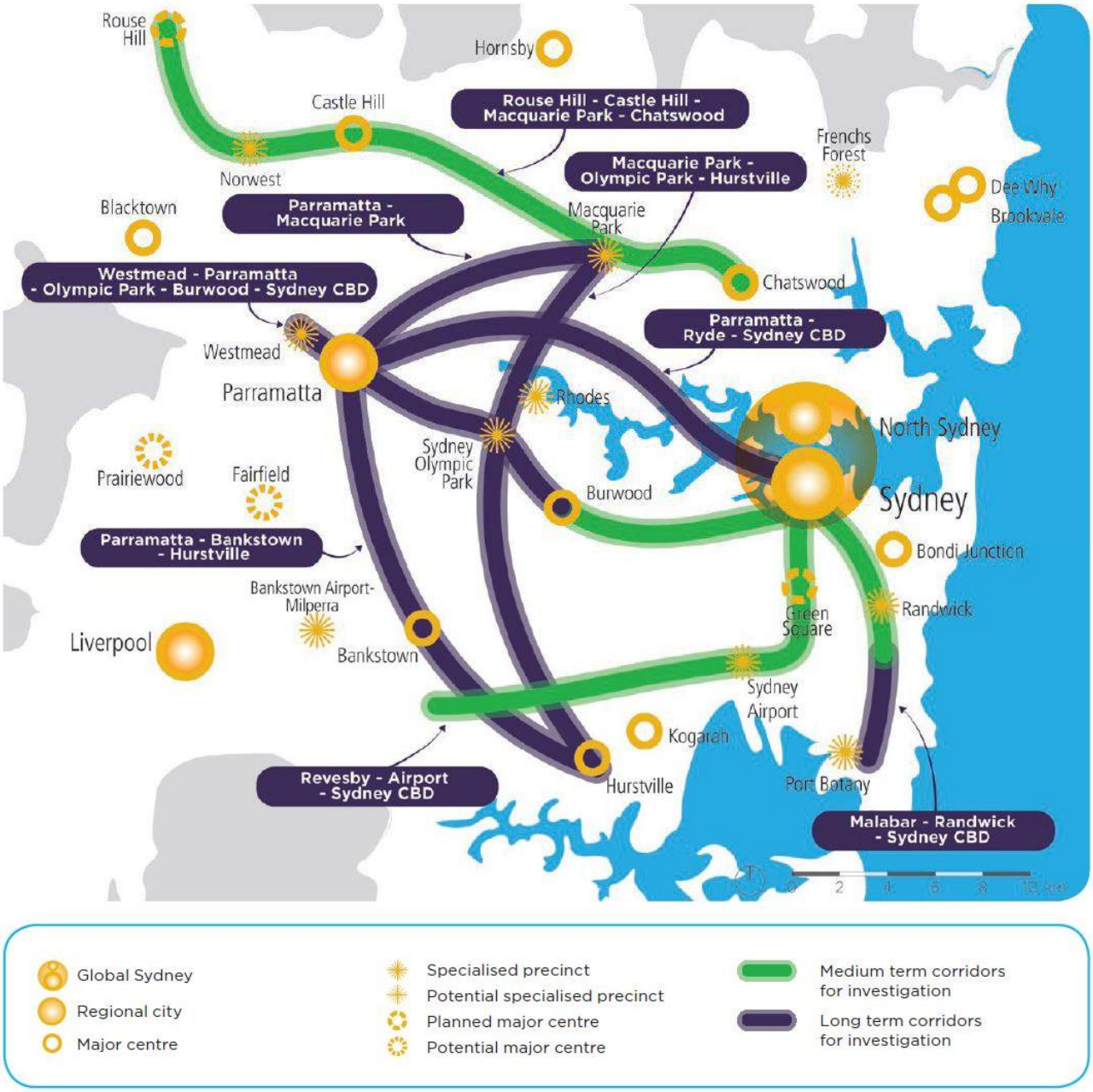
The *NSW Long Term Transport Master Plan* (LTTMP) (Transport for NSW, 2012) provides a framework for addressing transport challenges over the next 20 years. It supports the strategies of *A Plan for Growing Sydney* by integrating land use and transport planning, locating increased development in locations with increased transit capacity to make more efficient use of transport infrastructure.

Specifically, the LTTMP identifies:

- SOP as a key employment centre for workers from across metropolitan Sydney
- Parramatta to Sydney CBD via SOP and Burwood/Strathfield as a constrained corridor
- investigation of the following key corridors to support urban renewal, as shown in Figure 3.9:
  - Westmead-Parramatta-Sydney Olympic Park–Burwood
  - Macquarie Park to Sydney Olympic Park.

It identifies the Parramatta to Sydney CBD via SOP as a corridor under pressure, with trains on the T1 Western Line experiencing high congestion and the M4 Western Motorway and Parramatta Road operating at capacity during peak periods. Proposed key actions include:

- increasing rail service frequency (capacity)
- M4 widening and connections to Port Botany/Sydney Airport through the WestConnex project
- development of mixed land uses to balance the movement of people in and out of areas.



Source: NSW Long Term Transport Master Plan (Transport for NSW, 2012)

Figure 3.9 Corridors for investigation to support urban renewal

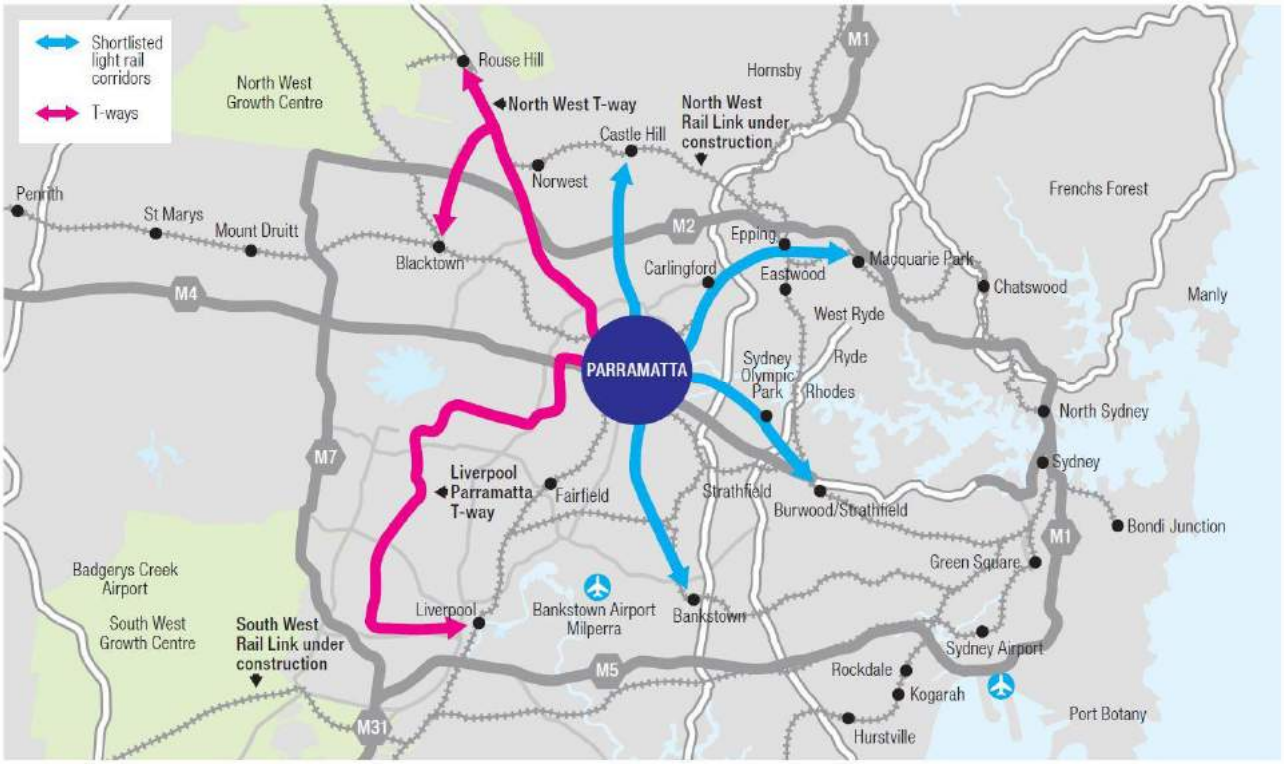
3.2.5 NSW State Infrastructure Strategy

The *State Infrastructure Strategy* (SIS) (Infrastructure NSW, November 2014) outlines the priorities for NSW Government infrastructure funding for the next 20 years. The latest update indicates the projects to be prioritised for the second round of funding.

A primary goal is to support population and economic growth in Greater Sydney. The report recognises the additional pressure on infrastructure that population and employment growth in Western Sydney will create. Analysis for the SIS identifies train crowding on the T1 Western Line as a significant issue, with the volume to capacity ratio increasing from approximately 1.0 in 2011 to 1.6 in 2036[1]. This has implications for the SOP precinct, as this rail line is a major public transport corridor to and from the area.

Projects to assist in upgrading existing capacity include $1 billion for the Western Sydney Rail Upgrade Program as part of the implementation of Stage 2 of *Sydney's Rail Future* (see section 3.2.6).

In addition, the SIS identifies a connection between Parramatta CBD and SOP as one of the most viable corridors for light rail. This connection, illustrated in Figure 3.10, would provide additional public transport capacity and a new transport mode between these centres.



Source: State Infrastructure Strategy (Infrastructure NSW, 2014)

Figure 3.10 Viable corridors for light rail

The SIS recommends a reservation of $600 million from the *Rebuilding NSW* initiative be directed towards improving public transport provision between Parramatta and other major employment centres and residential areas, in addition to $400 million previously reserved in the 2014 Budget. This investment would also leverage another key recommendation of the SIS; the maintenance and further development of the SOP international sporting hub.

1 A volume to capacity ratio of 1.0 means all seats are taken and total capacity is approaching reliable operating capacity. Above this level, overcrowding impairs reliability.

3.2.6 Parramatta Light Rail

In December 2015, the NSW Premier, Minister for Transport and Infrastructure, and Minister for Planning unveiled a preferred network for Parramatta Light Rail, which will stimulate revitalisation and jobs growth along a corridor of over 20 kilometres. The draft project vision aims to balance the light rail service that sits at the core of the project, its integration with other transport services, and its support to the significant land use outcomes envisaged for the study area.

Draft project objectives have been prepared to realise the project vision:

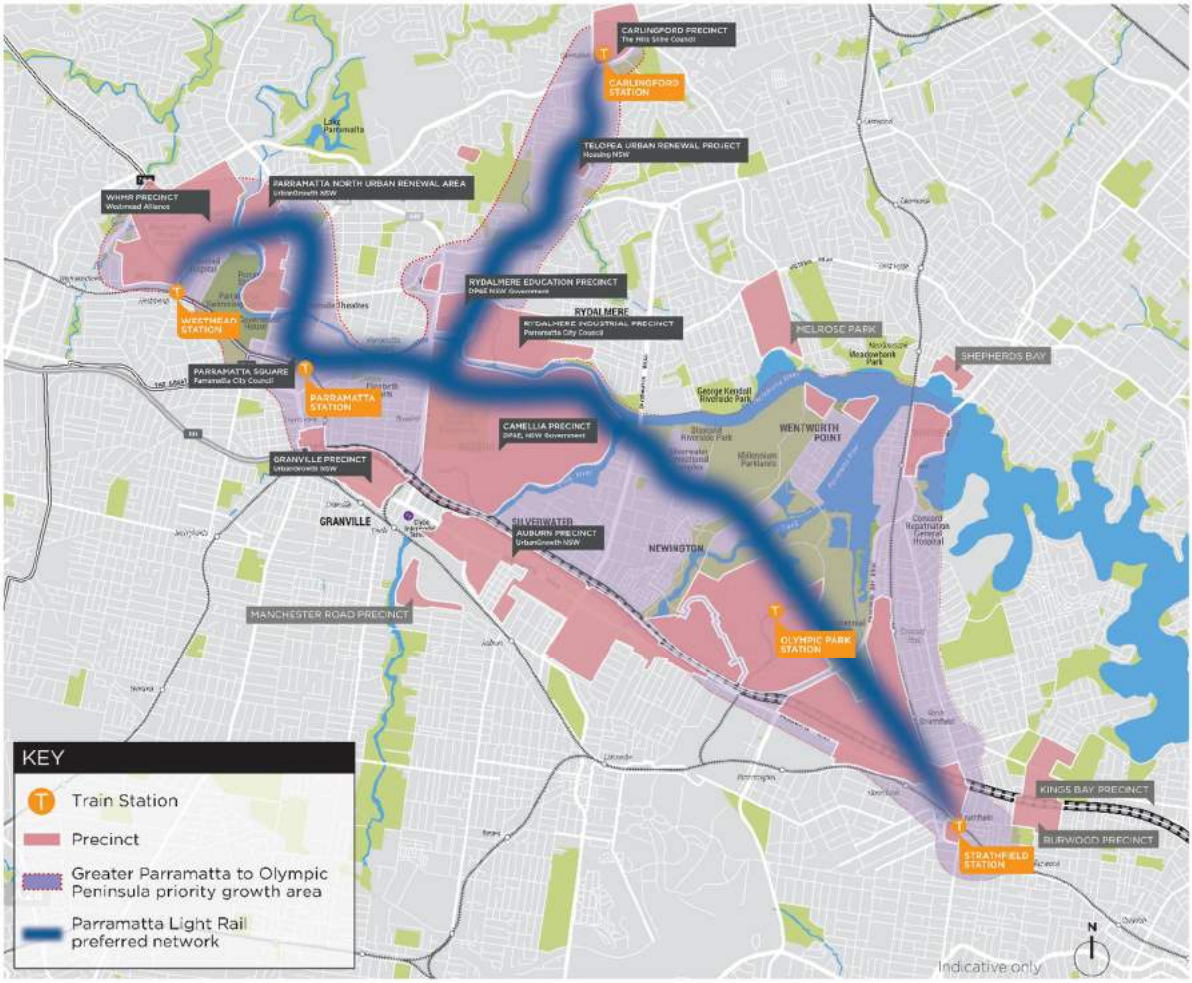
- Support Parramatta achieving 2nd CBD status - attracting new investment and economic development to realise the vision for Parramatta
- A catalyst for shaping new growth - providing sustainable transport for population and employment growth in the area, including Westmead, Parramatta, Camellia and the Olympic Peninsula
- Connecting people and places - within Parramatta City Centre, Greater Parramatta and the Olympic Peninsula
- Supporting existing and new communities - providing a high quality, accessible public transport system that supports the creation of attractive and memorable public spaces
- Providing attractive transport choices - 'turn up and go', reliable, all day light rail services integrated with traffic, transport and access

The preferred network for Parramatta Light Rail will include:

- A core spine linking precincts within Greater Parramatta including Westmead health precinct, Parramatta CBD and Camellia.
- The replacement of the existing heavy rail service between Camellia and Carlingford with a more frequent light rail service.
- A light rail service through Camellia renewal area, Sydney Olympic Park also connecting to Strathfield.

Source: Transport for NSW (March 2016)

Figure 3.11 Photomontage of light rail travelling through Sydney Olympic Park



Source: Transport for NSW, March 2016)

Figure 3.12 Parramatta Light Rail preferred network

3.2.7 Sydney's Modal Future Plans

The proposed employment growth targets for the Parramatta CBD (to further reinforce its role as Sydney's second CBD), SOP, Carter Street Priority Precinct, and Camellia, combined with new residential development throughout the corridor will create significant transport demand.

It is likely that the levels of cumulative development proposed in the Parramatta to Olympic Peninsula Priority Growth Area (identified in *A Plan for Growing Sydney*) could not be accommodated solely on the road network and the existing public transport network. Investment in high-capacity, frequent public transport would enable urban redevelopment precincts throughout this corridor.

The following sections provide details of strategies which have been developed which could benefit future public transport patronage to and from SOP and its surrounds.

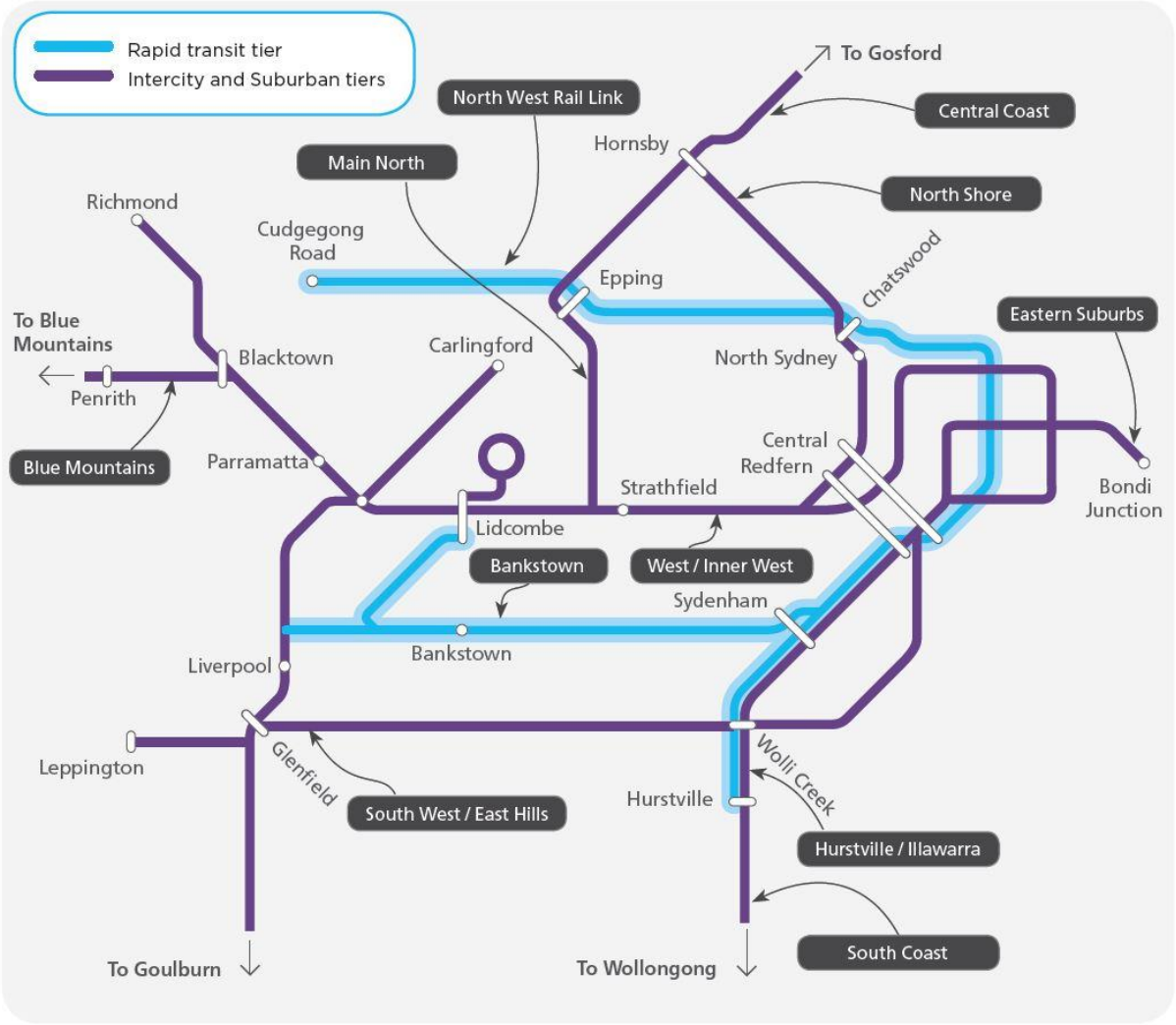
Sydney's Rail Future

Sydney's Rail Future (Transport for NSW, 2012) aims to 'transform and modernise Sydney's rail network' and improve the customer experience through a long term plan. Most relevant to the SOP area, the plan includes:

- a greater emphasis on express services from Sydney CBD to Parramatta, Blacktown and Penrith
- more efficient interchanges to other transport modes and services.

The Western Sydney Rail Upgrade Program is included as part of the implementation of Stage 2 of *Sydney's Rail Future*. This project includes targeted works to upgrade traction supply, amplifying track and lengthening platforms on the corridor, and installing an advanced train control system for signalling, train protection and train control that focuses on increasing service frequencies and capacity on parts of the network.

In addition, the plan includes the expansion of Sydney's rapid transit network through the conversion of the existing T3 Bankstown Line to Lidcombe and Cabramatta, via Bankstown, as illustrated in Figure 3.13. A rapid transit station at Lidcombe would provide a turn up and go service which would connect with the existing T7 Olympic Line, significantly improving existing rail passenger service levels to and from SOP.



Source: Sydney's Rail Future (Transport for NSW, 2012)

Figure 3.13 Proposed future Sydney heavy rail and rapid transit networks

Sydney's Light Rail Future

Sydney's Light Rail Future (Transport for NSW, 2012)*, Sydney's Bus Future*, and the LTTMP identify strategic transport corridors in Western Sydney to be considered for upgrading to rapid bus routes or light rail. TfNSW has examined potential light rail corridors and undertaken detailed studies to develop a shortlist. Routes were assessed against key criteria including:

- potential to improve accessibility
- ability to improve transport services
- integration with current and planned land uses
- potential to minimise congestion
- minimisation of impacts
- potential to support Parramatta as Sydney's second CBD.

Where routes are not shortlisted for light rail, high-frequency rapid bus routes could be progressively delivered to connect major centres to Parramatta, as outlined in *Sydney's Bus Future*. Existing bus services will also be progressively upgraded on shortlisted light rail routes while light rail is investigated to address customer needs and support growing demand.

An analysis of trip patterns from 2011 indicates that there is a strong demand from employees living in the western suburbs to employment in SOP. Light rail could provide a direct, alternative transport mode for these commuters. In addition, high-quality rail to light rail/bus rapid transit interchanges could provide attractive alternatives to car travel throughout Western Sydney and wider metropolitan Sydney.

Sydney's Bus Future

Sydney's Bus Future (Transport for NSW, 2013) is the NSW Government's long term plan to redesign Sydney city's bus network. It proposed a three-tiered bus network comprising:

- rapid bus routes (high frequency, all-day, linking centres)
- suburban bus routes (high-frequency, more closely spaced stops, linking suburban areas to major centres)
- local bus routes (increased coverage, daytime services, less frequent, more closely spaced stops).

As shown in Figure 3.14, the plan includes a key suburban bus route between SOP and Parramatta via Ryde, and states that:

- suburban routes could become rapid routes in the future
- over 60 new services will connect Parramatta to SOP.

In addition, as noted by *Sydney's Light Rail Future*, there is also the potential for rapid bus routes to be implemented as an alternative option to light rail in both the short term (i.e. in advance of light rail services, prior to conversion to light rail) and in the long term (instead of light rail services).

Source: Sydney's Bus Future (Transport for NSW, 2013)

Figure 3.14 Rapid and suburban bus routes supporting Parramatta

Sydney's Cycling Future

Sydney's Cycling Future (Transport for NSW, 2013) is a long term plan for cycling in Sydney that proposes to create safe, connected cycling networks by:

- creating new or improve existing infrastructure and facilities, particularly within 5 km of major centres or near key destinations
- fixing missing links
- creating a hierarchy of safe cycling routes
- delivering improvements with major infrastructure projects.

As noted in section 3.2.2, SOP would be connected to Parramatta City Centre by the Green Grid. *Sydney's Cycling Future* states that bicycle network plans will be developed with councils within 5 kilometre catchments of major centres including SOP.

The Parramatta Valley Urban Renewal project is proposed to complete the remaining Parramatta River foreshore public access missing links, as part of a larger urban renewal project for the valley. This would:

- create a continuous off road link between Westmead, Parramatta City Centre and SOP
- connect through the University of Western Sydney and various existing or proposed residential areas
- improve bicycle and pedestrian access to the historic foreshore.

Sydney's Walking Future

Sydney's Walking Future (Transport for NSW, 2013) is an action plan aiming to promote more walking in Sydney. This will be provided for through:

- design and development principles for interchanges prioritising walking routes
- provision for walking links from the surrounding suburbs
- A focus on safety and access for disabled persons or the mobility impaired
- the walkability index which will lead to improved standards, guidelines and benchmarks for walking solutions
- improved design of pedestrian infrastructure
- education programs and conferences
- involvement with community events and initiatives
- improved trip planning information.

Sydney's Walking Future targets increased opportunities for people to walk longer distances through the removal of barriers within approximately 2 kilometres of activity centres. Figure 3.15 illustrates the 2 kilometre catchment area from SOP rail station, which includes:

- Newington existing residential area
- Carter Street future precinct (see section 3.3)
- Concord West rail station and surrounds.

Improved walking connections to and from SOP would increase walking trips and non-car transport mode choice, complementing future plans for light rail and other public transport modes.

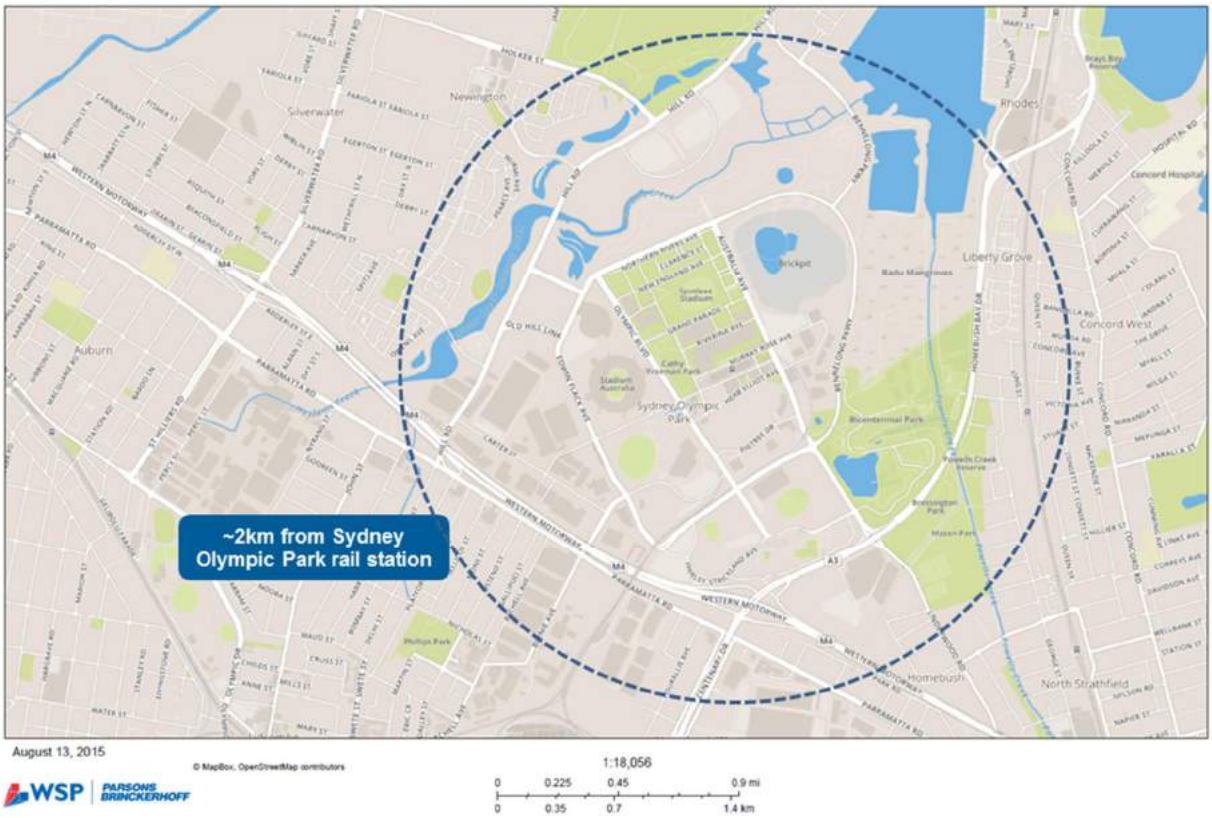


Figure 3.15 Areas within 2 km of Sydney Olympic Park rail station

3.2.8 WestConnex and Managed Motorways

WestConnex is a major road network infrastructure project that combines the following motorway projects into a package of 33 kilometres of new motorway links, illustrated in Figure 3.16:

- WestConnex M4 (Parramatta to Haberfield, due to open 2019)
- WestConnex New M5 (Beverly Hills to St Peters, due to open 2019)
- WestConnex M4–M5 Link (Haberfield to St Peters, due to open 2023).

Overall WestConnex will improve the efficiency of connections by road between SOP and Sydney CBD, Sydney Airport, and Port Botany. Key benefits relevant to SOP include:

- cutting forecast travel times between Parramatta and Sydney Airport by up to 40 minutes
- removing 3,000 trucks a day from Parramatta Road and putting them underground, leading to revitalised neighbourhoods on the surface
- improving north-south travel times across Parramatta Road for public buses accessing the T1 Western Rail line
- delivering more than $20 billion in economic benefits to NSW.

Source: WestConnex M4 East Project Overview (Australian Government, 2015)

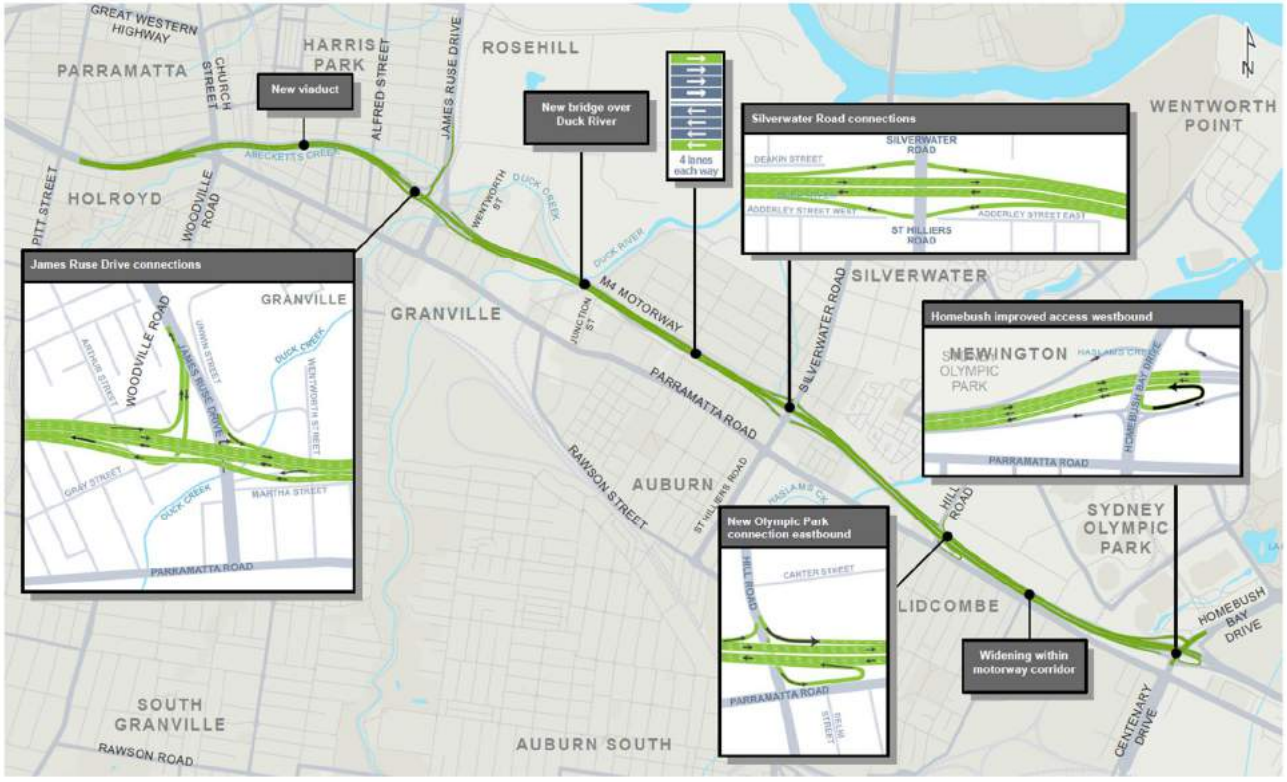
Figure 3.16 WestConnex project overview

SOP will benefit most directly from the WestConnex M4 project, which began construction in March 2015. This project will provide a widened M4, from Church Street, Parramatta to near Concord Road and an extension of the M4 via a tunnel along the Parramatta Road corridor to Parramatta Road and City West Link, Haberfield. In addition this project would include the following connection upgrades between the upgraded M4 motorway and the regional road network:

- new connections at Hill Road (onramp to M4 eastbound; off-ramp from M4 westbound) and Homebush Bay Drive (G-turn onramp to M4 westbound)
- upgrades to existing connections at Silverwater Road and Homebush Bay Drive (to M4 eastbound, including a direct entry to the new M4 east tunnel).

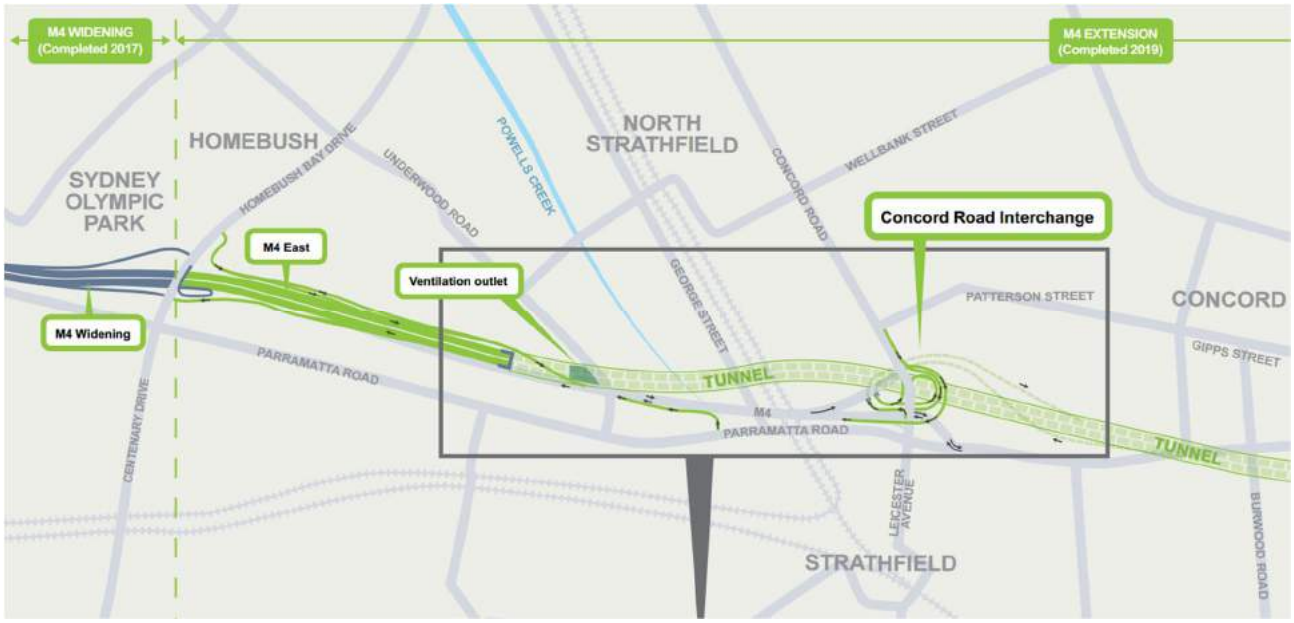
These projects are illustrated in Figure 3.17, Figure 3.18, and Figure 3.19.

In addition, RMS is proposing to undertake a trial of a Managed Motorways Scheme (MMS) on the M4 Motorway to make better use of the current motorway through the managing ('smoothing') of traffic demand to avoid/reduce the incidence of traffic flow 'breaking down'. The MMS would involve controlling the number and timing of vehicles entering the motorway to avoid stop-start conditions forming and improved detection of incidents and implementation of management strategies.



Source: WestConnex M4 Widening Submissions Report (Australian Government, 2014)

Figure 3.17 WestConnex M4 widening project overview



Source: WestConnex M4 east community update (Australian Government, June 2015)

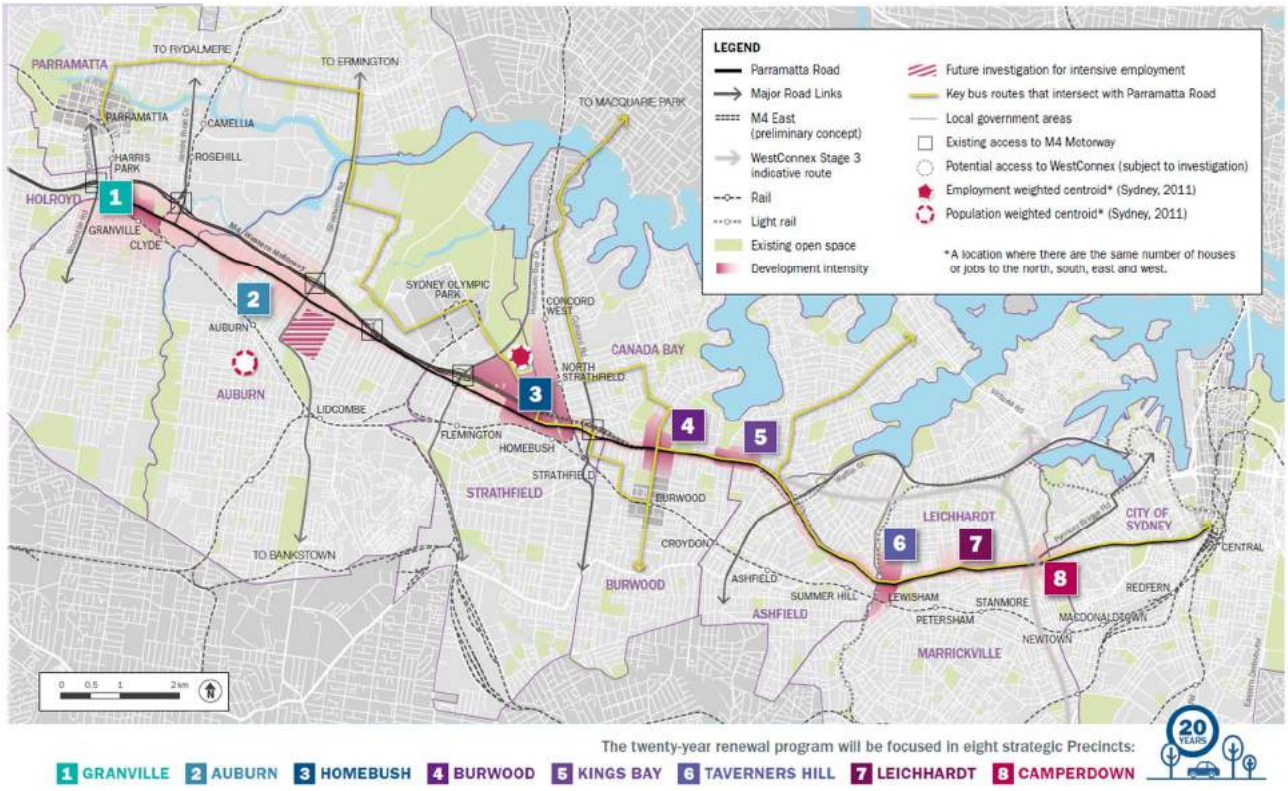
Figure 3.18 WestConnex M4 east (western section) project overview

Source: WestConnex M4 East Project Overview (Australian Government, 2015)

Figure 3.19 WestConnex M4 East improvements at Homebush Bay Drive

3.2.9 Parramatta Road Urban Renewal Strategy

The removal of traffic from the Parramatta Road corridor as a result of WestConnex (see section 3.2.7) is expected to create opportunities for urban renewal. The NSW Government is targeting 50,000 new dwellings and 50,000 jobs in the Parramatta Road corridor across the eight urban renewal precincts illustrated in Figure 3.20.



Source: Draft Parramatta Road Urban Renewal Strategy (UrbanGrowth NSW, February 2015)

Figure 3.20 Parramatta Road Urban Renewal precinct overview

The precincts closest to SOP include the following residential development potential in the long term (to 2031):

- Granville
  - 6,800 new dwellings; 560 new jobs
- Auburn
  - 1,300 new dwellings; 8,600 new jobs
- Homebush:
  - 12,500 new dwellings; 4,800 new jobs
- Burwood
  - 3,170 new dwellings; 560 new jobs

This development, combined with that planned for SOP and other surrounding developments (see section 3.3) would create a significant increase in existing travel demand in the corridor. However, increased development densities would also create opportunities for the implementation of high capacity mass transit systems and transit oriented development via integrated transport and land use planning.

3.3 Surrounding developments

3.3.1 Wentworth Point and Carter Street Priority Precincts

In addition to the future development of SOP and development potential through Parramatta Road Urban Renewal, the Wentworth Point and Carter Street Priority Precincts are located within the Olympic Peninsula in proximity of SOP. An overview of existing and future developments in these precincts is provided in Table 3.8. Figure 3.21 illustrates the future populations of these precincts in addition to the new population of SOP.

Table 3.8 Wentworth Point and Carter Street Priority Precincts development overview

Location/Timeframe		Residential development		Non-residential development			
		Dwellings	Residents	Retail (GFA, m^2)	Commercial (GFA, m^2)	Industrial (GFA, m^2)	Workers
Wentworth Point	Existing	1,200	2,800	-	-	39,000	50
	Future[1]	9,500	20,000	1,000	-	-	660
Carter Street	Existing	-	-	-	-	245,000	3,000
	Future[2]	6,400	13,440	12,000	30,140	111,000	5,200
Total	Existing	**1,200**	**2,800**	**-**	**-**	**284,000**	**3,050**
	Future	**15,900**	**33,440**	**13,000**	**30,140**	**111,000**	**5,860**
	Difference	**+14,700**	**+30,640**	**+13,000**	**+30,140**	**-173,000**	**+2,810**

(1) It is assumed that Wentworth Point would be fully developed by approximately 2030.

(2) The Carter Street Urban Activation Precinct – Transport Impact Assessment assumes that the Carter Street precinct would be fully developed by approximately 2030.

Source: Carter Street Priority Precinct Finalisation Report (Department of Planning & Environment, November 2015)

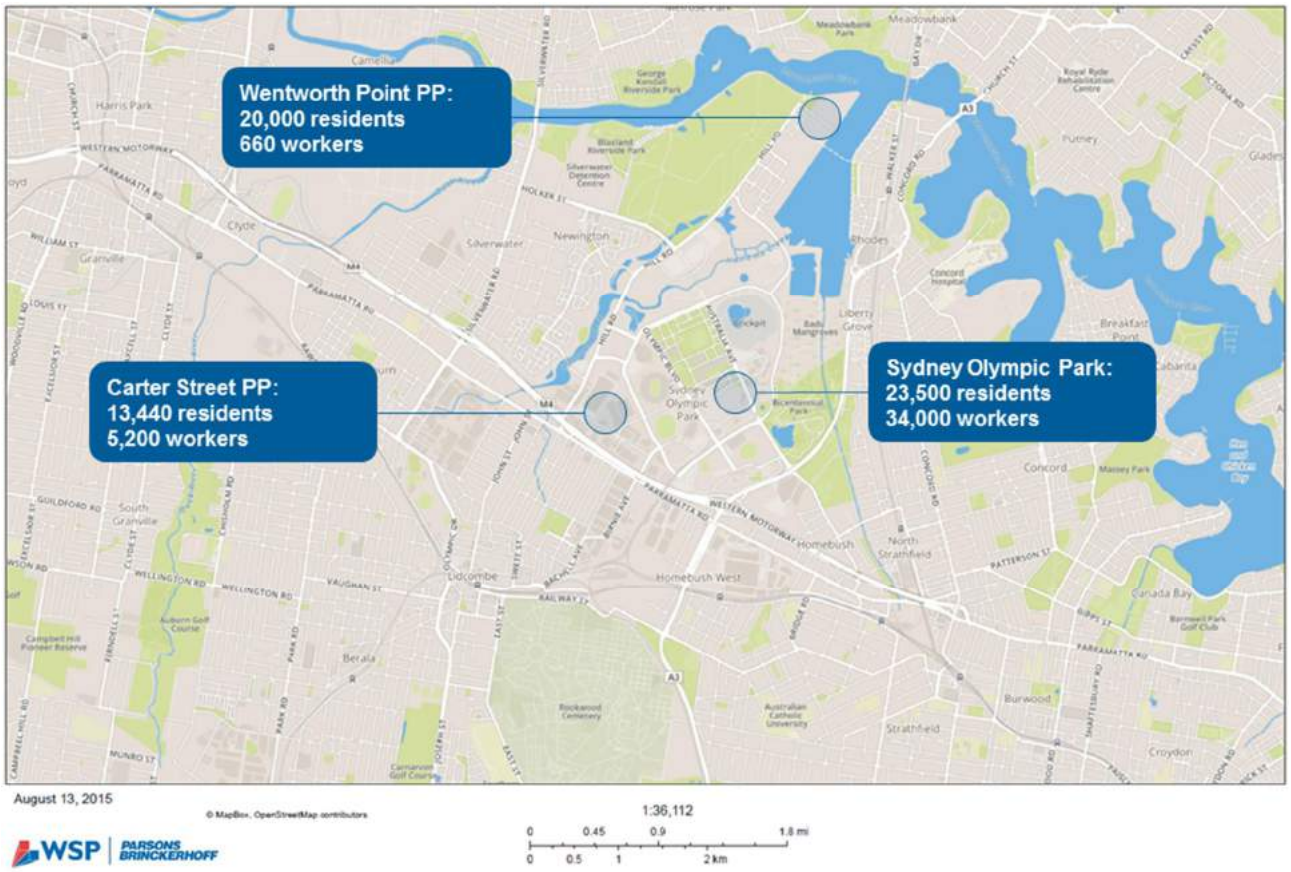


Figure 3.21 Proposed future resident and worker populations in the Olympic Peninsula

As for Parramatta Road Urban Renewal, the proposed development within the Olympic Peninsula would create a significant increase in existing travel demand, but also create opportunities including:

- potential to implement and leverage high capacity mass transit systems
- increasing travel 'internal containment' through increasing the population both living and working within the Olympic Peninsula.

3.3.2 Parramatta CBD

Parramatta CBD is expected to undergo a major change to cement its position as Sydney's second CBD. The *Parramatta CBD Planning Framework: Economic Analysis Draft Report* (SGS Economics, 2014) identifies the following growth scenarios to 2036:

- Trend scenario: 5,000 new dwellings; 27,000 new jobs
- High Growth scenario: 7,500 new dwellings; 47,000 new jobs.

The creation of new jobs in Parramatta CBD would provide employment opportunities for the significant increase in residents of the Olympic Peninsula and surrounding areas. Commuters travelling between these two key centres would benefit from the significant investment in public transport proposed by Sydney's Modal Future Plans (section 3.2.6), including potential future light rail and rapid bus services.

3.4 Strategic transport context: Traffic and Transport Strategy (2016 Review) summary

Table 3.10 summarises the key findings of the *Traffic and Transport Strategy (2016 Review)* relating to the strategic transport context.

Table 3.9 Strategic transport context: *Traffic and Transport Strategy (2016 Review)* summary

Feature	Review findings/recommendations
Existing travel behaviour	
Journey to work data	In the 10 years between 2001 and 2011: ■ car transport mode share to and from SOP decreased by 12% to 72% ■ train travel to and from SOP doubled to 21% ■ bus travel to and from SOP increased from 1% to 4%. Factors which would assist in managing increased levels of demand include: ■ increased 'internal containment' of trips ■ Increased walking and cycling trips. This would be driven primarily by the increase in internally contained, short-distance trips within SOP ■ increased public transport patronage ■ Limiting parking supply.
SOP workforce studies	The results of the *Sydney Olympic Park Workforce Research Study* illustrate that: ■ over half of the workforce resided in North West and South West areas of Sydney; 16% resided in areas north and 12% in areas east of SOP ■ most employees in SOP work during typical office hours ■ in addition to Olympic Park station (60%), relatively high proportions of rail travellers use Lidcombe, Concord West, and Strathfield stations ■ Nearly 75% of bus users travel between SOP and areas to its south; 15% of bus users travel to and from Parramatta. The results of the *Sydney Olympic Park Travel Survey* illustrate that: ■ only 10% of public transport users used a single, direct service to access SOP (i.e. required no connections) ■ around 60% of public transport users made at least two connections to access SOP ■ Consequently, 45% of public transport users considered their journeys difficult or very difficult.
Strategic plans and policies	

Feature	Review findings/recommendations
Sydney CBD to Parramatta Strategic Transport Plan	The *Sydney CBD to Parramatta Strategic Transport Plan* brings relevant measures and initiatives together into one document. Specifically, the plan was prompted by and considers: ■ *A Plan for Growing Sydney* ■ *NSW Long Term Transport Master Plan* ■ *NSW State Infrastructure Strategy* ■ *Sydney's Modal Future Plans* ■ WestConnex ■ *The Parramatta Road Urban Renewal Strategy* Transport initiatives which are identified and promoted by the plan include: ■ Light rail between Parramatta CBD and Strathfield via SOP ■ The Homebush Bay Bridge ■ The Western Sydney Rail Upgrade Program ■ Sydney Metro City & Southwest ■ Parramatta River ferry initiatives
A Plan for Growing Sydney	*A Plan for Growing Sydney* includes a strong focus on SOP, where it features as: ■ a Strategic Centre within Sydney's Global Economic Corridor ■ A key part of Greater Parramatta to Olympic Peninsula Growth Area. Specifically the priorities relevant to SOP identified in the West Central Subregional strategy include: ■ work with council to provide capacity for additional mixed-use development in SOP ■ investigate a potential light rail corridor from Parramatta CBD to SOP ■ Work with council to improve walking and cycling connections from SOP train station.
NSW 2021 – State Plan	The plan specifies targets including: ■ 28% public transport mode share across the Sydney Metropolitan Region ■ doubling cycling mode share ■ 25% walking mode share ■ encouraging job growth in centres close to where people live.
NSW Long Term Transport Master Plan	The LTTMP identifies: ■ SOP as a key employment centre for workers from across metropolitan Sydney ■ Parramatta to Sydney CBD via SOP and Burwood/Strathfield as a constrained corridor ■ investigation of the following key corridors to support urban renewal: ▸ Westmead–Parramatta-Sydney Olympic Park–Burwood ▸ Macquarie Park to Sydney Olympic Park.
NSW State Infrastructure Strategy	The SIS identifies: ■ train crowding on the T1 Western Line as a significant issue, projects to assist in upgrading existing capacity include $1 billion for the Western Sydney Rail Upgrade Program ■ a connection between Parramatta CBD and SOP as one of the most viable corridors for light rail ■ a recommended reservation of $600 million from the *Rebuilding NSW* initiative towards improving public transport provision between Parramatta and other major centres.

Feature	Review findings/recommendations
Sydney's Modal Future Plans	The following plans provide details of strategies which could benefit future public and active transport patronage to and from SOP and its surrounds: ■ *Sydney's Rail Future* ■ *Sydney's Light Rail Future* ■ *Sydney's Bus Future* ■ *Sydney's Cycling Future* ■ *Sydney's Walking Future*.
WestConnex and Managed Motorways	SOP will benefit most directly from the WestConnex M4 project, which began construction in March 2015. This project will: ■ provide a widened M4, from Church Street, Parramatta to near Concord Road ■ an extension of the M4 via a tunnel along the Parramatta Road corridor ■ include the following connection upgrades between the upgraded M4 Motorway and the regional road network: ▸ new connections at Hill Road and Homebush Bay Drive (to M4 westbound) ▸ upgrades to existing connections at Silverwater Road and Homebush Bay Drive (to M4 eastbound, including a direct entry to the new M4 east tunnel) ▸ new commuter cycleway adjacent to the M4 Motorway in each direction.
Parramatta Road Urban Renewal	■ The removal of traffic from the Parramatta Road corridor as a result of WestConnex is expected to create opportunities for urban renewal; the NSW Government is targeting 50,000 new dwellings and 50,000 jobs in the Parramatta Road corridor. ■ Increased development densities would create opportunities for the implementation of high capacity mass transit systems and transit oriented development via integrated transport and land use planning.
Parramatta Light Rail	■ Light rail connections to Parramatta and Strathfield via Sydney Olympic Park ■ Indicative stop locations at P5 Car Park and Sydney Olympic Park Town Centre
Surrounding developments	
Wentworth Point and Carter Street Priority Precincts	■ When compared to existing conditions, the development of Wentworth Point and Carter Street is expected to yield: ▸ over 14,700 new dwellings ▸ over 2,800 additional jobs. ■ This development would create opportunities including: ▸ the potential to implement and leverage transit oriented development and high capacity mass transit systems ▸ increased travel 'internal containment' through increasing the population both living and working within the Olympic Peninsula.
Parramatta CBD	■ The *Parramatta CBD Planning Framework* identifies the following growth targets to 2036: ▸ Trend scenario: 5,000 new dwellings; 27,000 new jobs ▸ High Growth scenario: 7,500 new dwellings; 47,000 new jobs. ■ New jobs in Parramatta CBD would provide employment opportunities for residents of SOP surrounding areas. Commuters travelling between these two key centres would benefit from the significant investment in public transport identified in *Sydney's Modal Future Plans*.

4. Public and active transport

The following sections provide an overview of existing and proposed future public and active transport networks and operations. Features which have changed since the *Baseline Transport Strategy* was developed such as new initiatives are also discussed in the following sections.

4.1 Existing conditions

4.1.1 Heavy rail

Rail services to SOP operate on the dedicated T7 Olympic Line off the main rail network as shown in Figure 4.1. During major events direct services to and from Central station via Strathfield on the T1 Western Line are also provided, however direct peak hour services are currently unachievable due to:

- the absence of a grade-separated connection between the T1 Western Line and T7 Olympic Line
- the absence of spare capacity (currently full utilisation of train paths during peak periods) required to enable at-grade movements between the T1 Western Line and T7 Olympic Line.

Source: Sydney Trains Network map (Sydney Trains, 2014)

Figure 4.1 Existing heavy rail network overview

In 2005, an entry at the eastern end of Olympic Park station was completed to improve access. A summary of existing heavy rail services to and from Olympic Park station is provided in Table 4.1.

Table 4.1 Existing heavy rail services at Olympic Park station

Factor | Source	2008 conditions	Existing conditions (2016)
Description	Olympic Sprint shuttle service between Lidcombe and Olympic Park	
Train configuration	2-car trains	4-car trains
Train capacity (pax/train)	210	600
Peak frequency (trains/hour)	3	6
Line capacity (pax/hour)	**630 passengers/hour**	**3,600 passengers/hour**
Event services	Direct from Central via Strathfield	

Table 4.1 illustrates that:

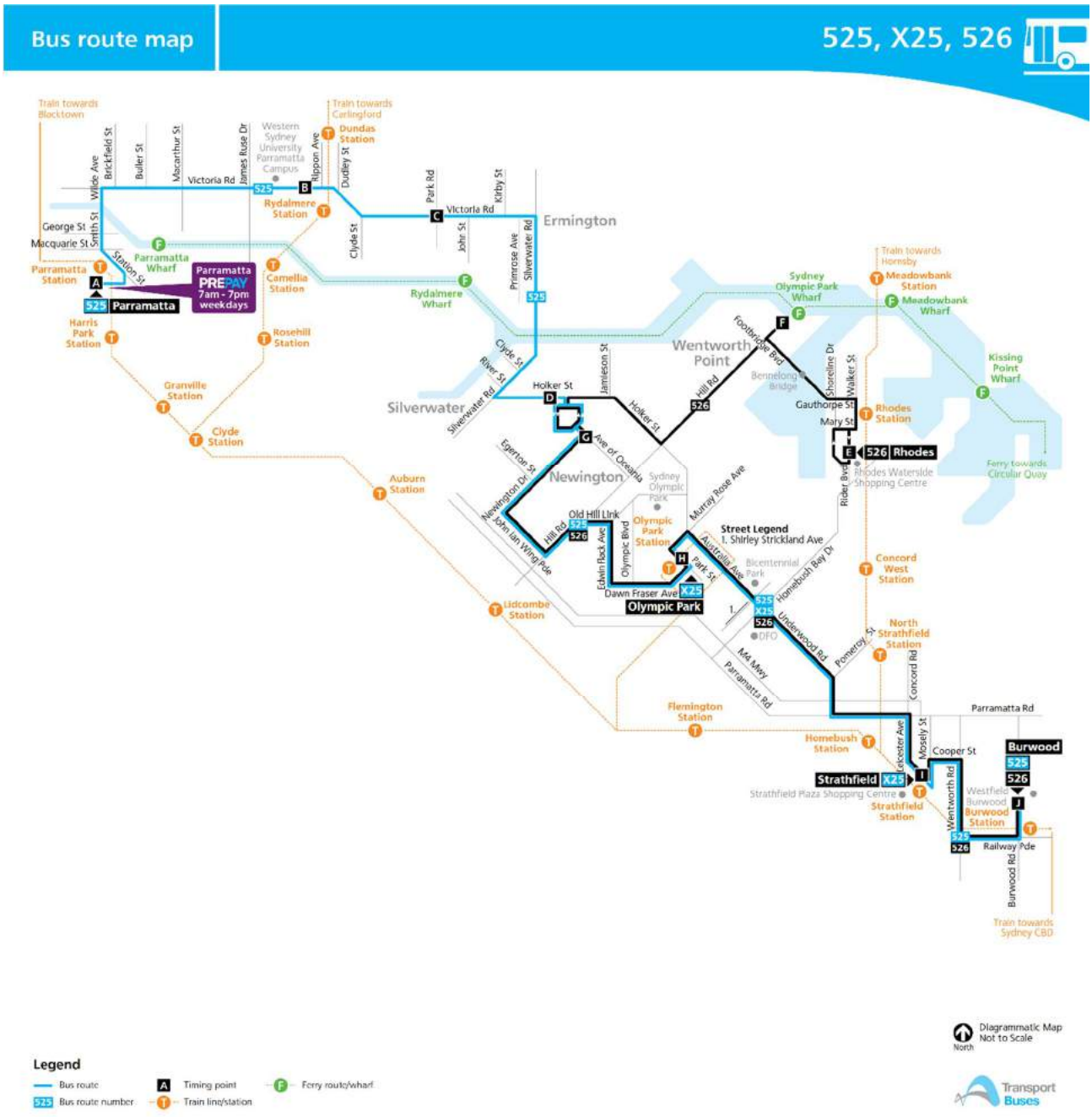
- since the development of the *Baseline Transport Strategy* in 2008, rail services have significantly increased in terms of capacity and frequency
- these service changes have increased hourly line capacity from around 600 passengers per hour to 3,600 passengers per hour.
- Daily passenger numbers (per direction) have increased from 710 passengers in 2008 to 4,090 passengers in 2014.
    - AM commuter peak passenger numbers (per direction) have increased from 250 passengers in 2008 to 2,230 passengers in 2014.

SOP is also served by rail services on the T1 Northern Line that stop at Concord West. A number rail based commuters from the northern suburbs of Sydney choose to travel to SOP via Concord West and walk through Bicentennial Park rather than interchange at Strathfield or Lidcombe Stations. The combined rail/walk trip is competitive with rail transfers at the major stations in terms of travel time and reliability of connections. SOPA supports this route through wayfinding signage and information.

The *Sydney Olympic Park Workforce Research Study* (section 3.1.2) indicates that 60% of rail commuters to and from SOP use Olympic Park station; the remaining 40% access SOP via Lidcombe, Concord West, Strathfield, and North Strathfield stations and using connecting modes.

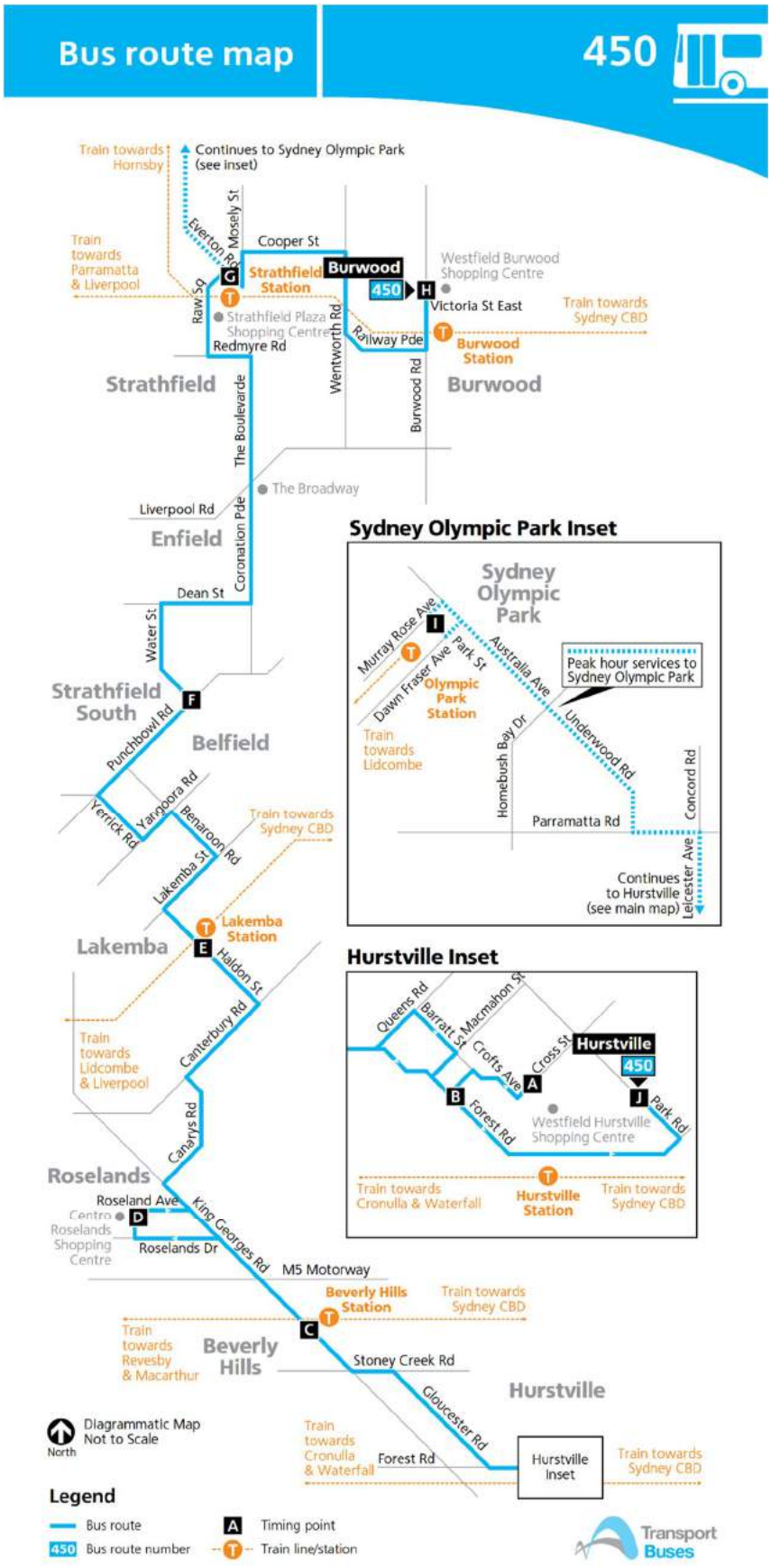
4.1.2 Bus

Existing bus routes servicing SOP are illustrated in Figure 4.2, Figure 4.3, and Figure 4.4.



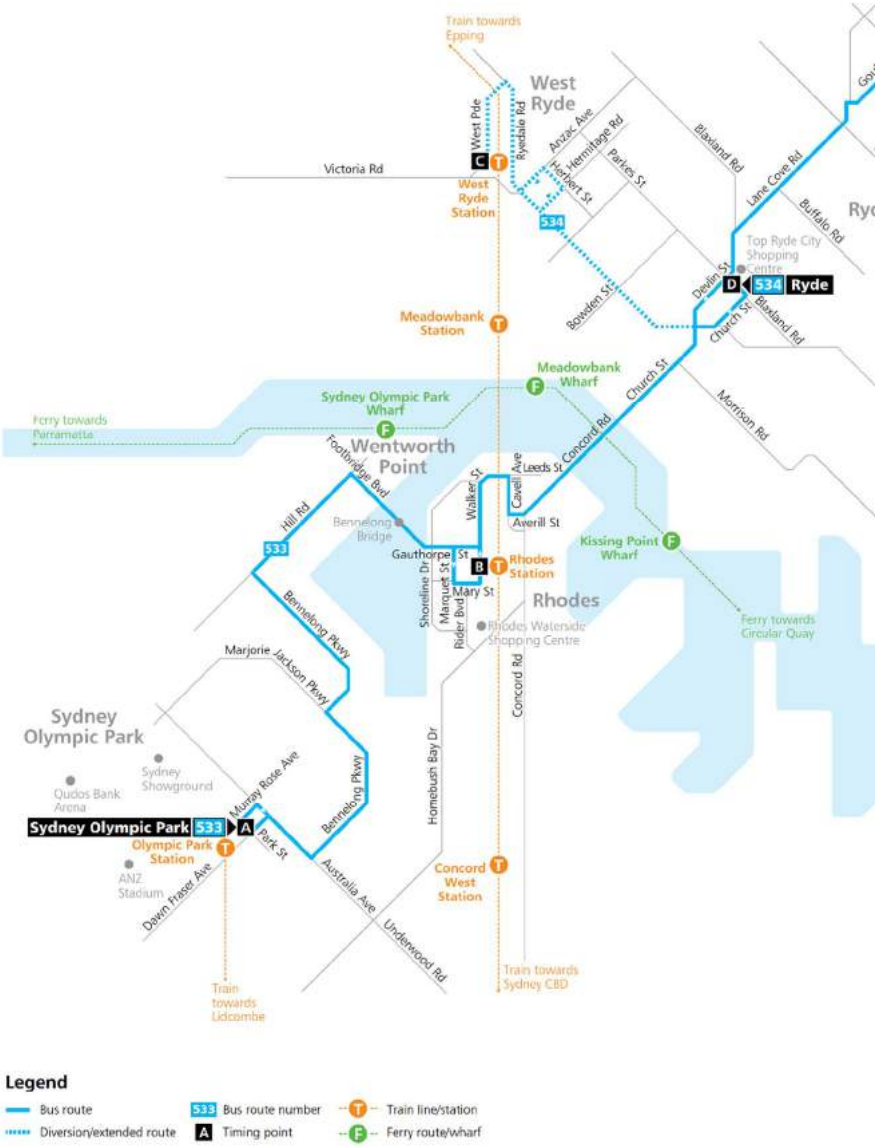
Source: Sydney Buses region guide for southern region (SMBSC 6) (Sydney Buses, extracted July 2015)

Figure 4.2 Existing bus network overview – Routes 525, 526, X25



Source: Hurstville, Roselands, Bankstown and Strathfield bus network map (Transport Buses, extracted July 2015)

Figure 4.3 Existing bus network overview – Route 450



Source: Olympic Park & Ryde to Chatswood network map (Sydney Buses, extracted June 2016)

Figure 4.4 Existing bus network overview – Route 533

Numerous bus stops support regular bus services to and from SOP, located on three key roads in the precinct and converging at Olympic Park rail station:

- Australia Avenue
- Dawn Fraser Avenue
- Edwin Flack Avenue.

All of the local bus stops under the control of the SOPA are accessible for people with mobility impairments, with paved access and a 150 mm upright kerb. The *Baseline Transport Strategy* identified that the busiest bus stops are located at:

- Olympic Park Station – Park Street
- Australia Avenue – between Figtree Drive and Herb Elliott Avenue
- Herb Elliott Avenue – near Showground Road.

A summary of existing bus services to and from SOP is provided in Table 4.2.

Table 4.2 Existing bus services to and from SOP

Factor | Source	2008 conditions	Existing conditions (2016)
Services	■ 401: Lidcombe to SOP Ferry Wharf ■ 450: Hurstville to SOP ■ 525: Burwood to Parramatta via SOP ■ 534: Chatswood to SOP	■ 401:Lidcombe to SOP ■ 450: Hurstville to SOP ■ 525: Burwood to Parramatta via SOP ■ X25: Strathfield to SOP ■ 526: Burwood to SOP Ferry Wharf ■ 533: Chatswood to SOP
Bus capacity (pax/bus)(1)	60	60
Peak frequency (buses/hour, one-way)	■ 401: 1–2 per hour ■ 450: 4 per hour ■ 525: 6 per hour ■ 534: 4 per hour ■ **Total: 15–16 per hour**	■ 401: 3 per hour ■ 450: 3–4 per hour ■ 525: 5–6 per hour ■ X25: 6 per hour ■ 526: 2 per hour ■ 533: 4 per hour ■ **Total: 23–25 per hour**
Line capacity (pax/hour)	**900–960 passengers/hour**	**1,380–1,500 passengers/hour**
Event services	Various event services – refer section 4.3.	

(1) Based on an indicative standard bus capacity of 60 passengers.
(2) Based on TfNSW bus timetable information (extracted July 2015).

Table 4.2 illustrates that:

- since the development of the *Baseline Transport Strategy* in 2008, bus services have significantly increased in terms of routes and frequency
- these service changes have increased hourly line capacity from around 960 passengers per hour to 1,500 passengers per hour.

Existing bus priority measures at SOP have been established primarily for events. Existing bus infrastructure supports the event bus terminals (Plaza and Aquatic) located on the northern and southern ends of Olympic Boulevard which operate for events at ANZ Stadium and the Sydney Showgrounds.

Key elements of existing bus infrastructure within and surrounding SOP are:

- The Mousehole: A bus priority roadway beneath Homebush Bay Drive which provides access to the southern end of the site
- Wilson Park Bus Roadway: A bus priority roadway adjacent to Wilson Park and along Newington Road which provides bus only access between Silverwater Road (at Clyde Street) and Holker Street, bypassing the heavily utilised Silverwater Road/Holker Street intersection
- Holker Street: Bus lanes in both directions between Hill Road and Newington Road
- Holker Street Busway: Bus lanes in both directions between Hill Road and Marjorie Jackson Parkway.

Based on publically available route information, the only sections of bus priority infrastructure currently used by regular services are the bus lanes on Holker Street.

4.1.3 Ferry

The existing F3 Parramatta River ferry route servicing SOP is illustrated in Figure 4.5.

Source: Sydney Ferries Network Map (Transport Sydney Ferries, extracted August 2015)

Figure 4.5 Existing ferry network overview

Ferry services are operated by Sydney Ferries from the Sydney Olympic Park Ferry Wharf which is located at the end of Hill Road. The ferry service directly links Sydney Olympic Park to Parramatta in the west and Milsons Point and Circular Quay in the east.

Since 2010, weekly ferry passengers using Sydney Olympic Park Wharf have increased from 2,430 passengers to 7,880 passengers in 2014. Journey to Work statistics (2011) indicate that no commuters use the ferry to access Sydney Olympic Park for work. This is likely due to the longer travel times on ferry when compared to other modes and the requirement to transfer to a connecting bus service (Route 526) to access the Town Centre.

A summary of existing ferry services to and from SOP is provided in Table 4.3, which illustrates that since the development of the *Baseline Transport Strategy* in 2008, ferry services have increased by around two per hour during peak periods.

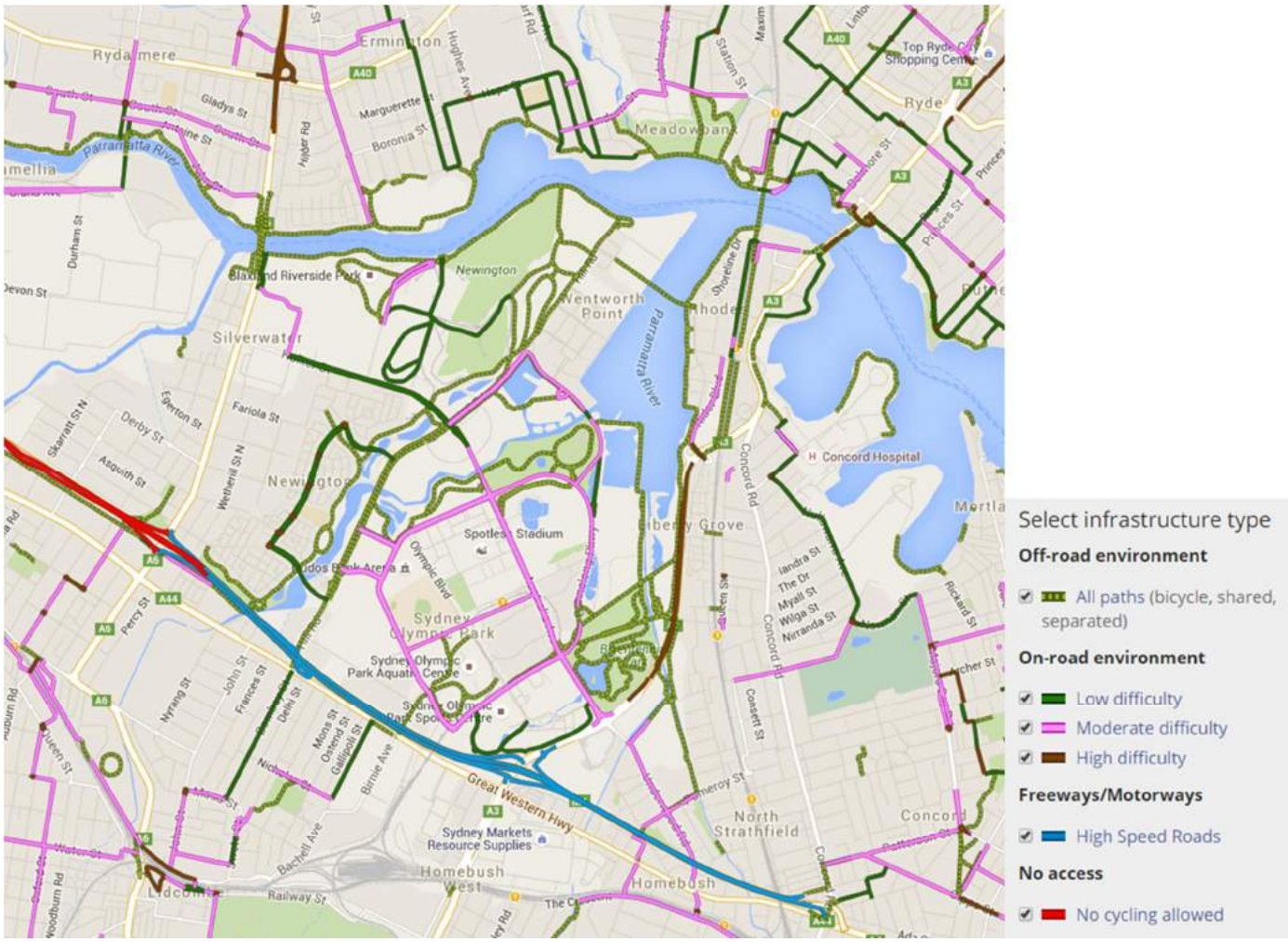
Table 4.3 Existing ferry services at Olympic Park Wharf

Factor | Source	2008 conditions	Existing conditions (2016)
Description	Olympic Park Ferry Wharf (northern end of Hill Road)	
AM peak frequency (ferries/hour)	3 to Circular Quay 1 from Circular Quay	4 to Circular Quay 3 from Circular Quay
PM peak frequency (ferries/hour)	3 to Circular Quay 3 from Circular Quay	3–4 to Circular Quay 3–4 from Circular Quay
Total peak services	**4–6 services/hour**	**6–8 services/hour**
Event services	Private charter services – refer section 4.3	

4.1.4 Walking and cycling

Walking and cycling in SOP is enabled by an extensive network of over 35km of pedestrian paths and cycleways, illustrated in Figure 4.6. The bicycle network is a combination of on-road bicycle lanes and off-road shared pathways which provide:

- internal connections between key attractions, activity centres, parklands, and adjacent residential communities
- high quality links to the regional cycleway network
- higher rates of bicycle parking provision when compared to the metropolitan average
- end of trip facilities in new developments as a result of *Baseline Master Plan* controls



Source: RMS Cycleway Finder V3 (RMS, June 2016)

Figure 4.6 Existing cycling network

There are approximately 16 km of on-road cycle lanes on the road network within and surrounding SOP. The bicycle lanes are located predominantly on collector roads, summarised in Table 4.4.

Table 4.4 Existing on-road bicycle lanes

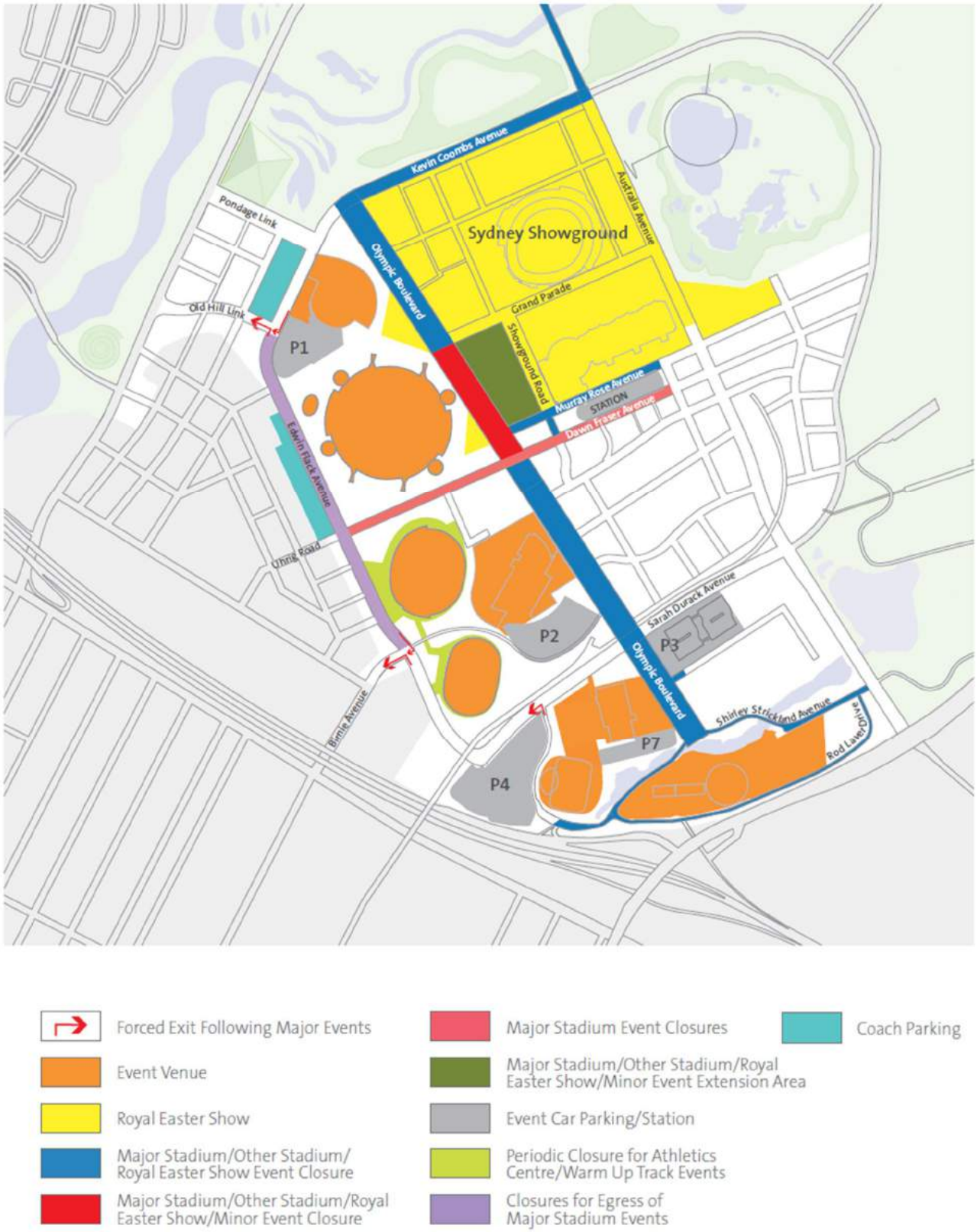
Road	From	To
Australia Avenue	Homebush Bay Drive	Kevin Coombs Avenue
Kevin Coombs Avenue	Australia Avenue	Pondage Link
Edwin Flack Avenue	Pondage Link	Sarah Durack Avenue
Sarah Durack Avenue	Edwin Flack Avenue	Australia Avenue
Pondage Link	Edwin Flack Avenue	Hill Road
Old Hill Link	Edwin Flack Avenue	Hill Road
Marjorie Jackson Parkway	Australia Avenue	Bennelong Parkway
Bennelong Parkway[1]	Australia Avenue	Marjorie Jackson Parkway
Holker Street	Hill Road	Newington Street
Avenue of Oceania	Hill Road	Newington Boulevard
John Ian Wing Parade	Hill Road	Newington Boulevard

Road	From	To
Newington Boulevard	Avenue of Oceania	John Ian Wing Parade

(1) Bennelong Parkway bicycle lane discontinuous in localised sections.

To complement the extensive existing walking and cycling networks, the *Baseline Transport Strategy* noted that there are around 140 bicycle parking spaces at key activity centres and parking facilities throughout SOP.

SOPA also promotes the use of sustainable modes through the implementation of road closures when medium and large scale events are staged at SOP. Olympic Boulevard and streets around Olympic Park Station have been designed to facilitate large pedestrian volumes during events through the provision of lay back kerbing to reduce trip hazards. Existing road closures which create pedestrianised areas for medium sized and major events are illustrated in Figure 4.7.



Source: Sydney Olympic Park Master Plan 2030 (SOPA, 2010)

Figure 4.7 *Baseline Master Plan* road closures for events

4.2 Future conditions

The *Baseline Transport Strategy* supporting the *Baseline Master Plan* defined an integrated future public and active transport network. A summary of the networks proposed by the *Baseline Transport Strategy* and this *Traffic and Transport Strategy (2016 Review)* are summarised in Table 4.5.

Table 4.5 Future public and active transport network overview

Mode	Relevant to:		Details
	Baseline Transport Strategy	*Traffic and Transport Strategy (2016 Review)*	
Heavy rail	✓	✓	▪ Increase train capacity (size) on T7 Olympic Line.
Rapid transit	✓	✓	▪ *Baseline Transport Strategy* included West Metro Line including Sydney Olympic Park station. ▪ *Traffic and Transport Strategy (2016 Review)* does not include rapid transit services in the 2030 timeframe. ▪ Provision of space for future rapid transit station and services beyond the 2030 timeframe is recommended.
Light rail	-	✓	▪ Light rail was not considered as a potential transport mode by the *Baseline Transport Strategy*. ▪ A light rail line between Parramatta and Strathfield via SOP is currently under investigation by TfNSW. Its inclusion is recommended by the *Traffic and Transport Strategy (2016 Review)*.
Bus	✓	✓	▪ Increase bus service coverage and capacity.
Ferry	✓	✓	▪ Continue ferry services to and from Sydney Olympic Park Ferry Wharf.
Walking and cycling	✓	✓	▪ Build upon and promote existing facilities to continue to grow mode share.

An overview of the public transport networks proposed by the *Baseline Transport Strategy* and this *Traffic and Transport Strategy (2016 Review)* are illustrated in Figure 4.8 and Figure 4.9 respectively.

The following sections provide details of the proposed components of the future public and active transport networks serving the SOP precinct. Features which have changed since the *Baseline Transport Strategy* was developed are also discussed in the following sections.

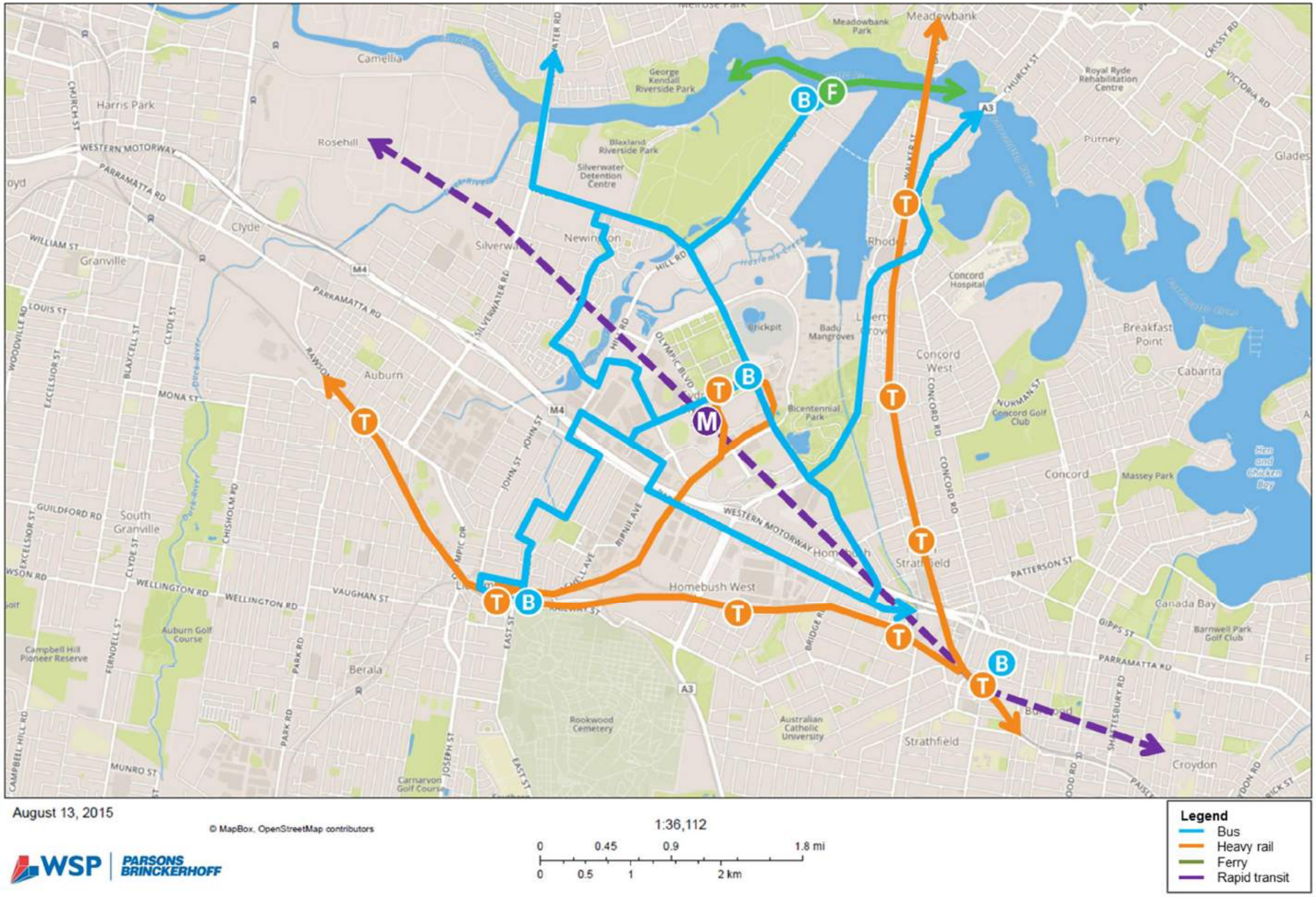


Figure 4.8 ***Baseline Transport Strategy*** **public transport network (2010)**

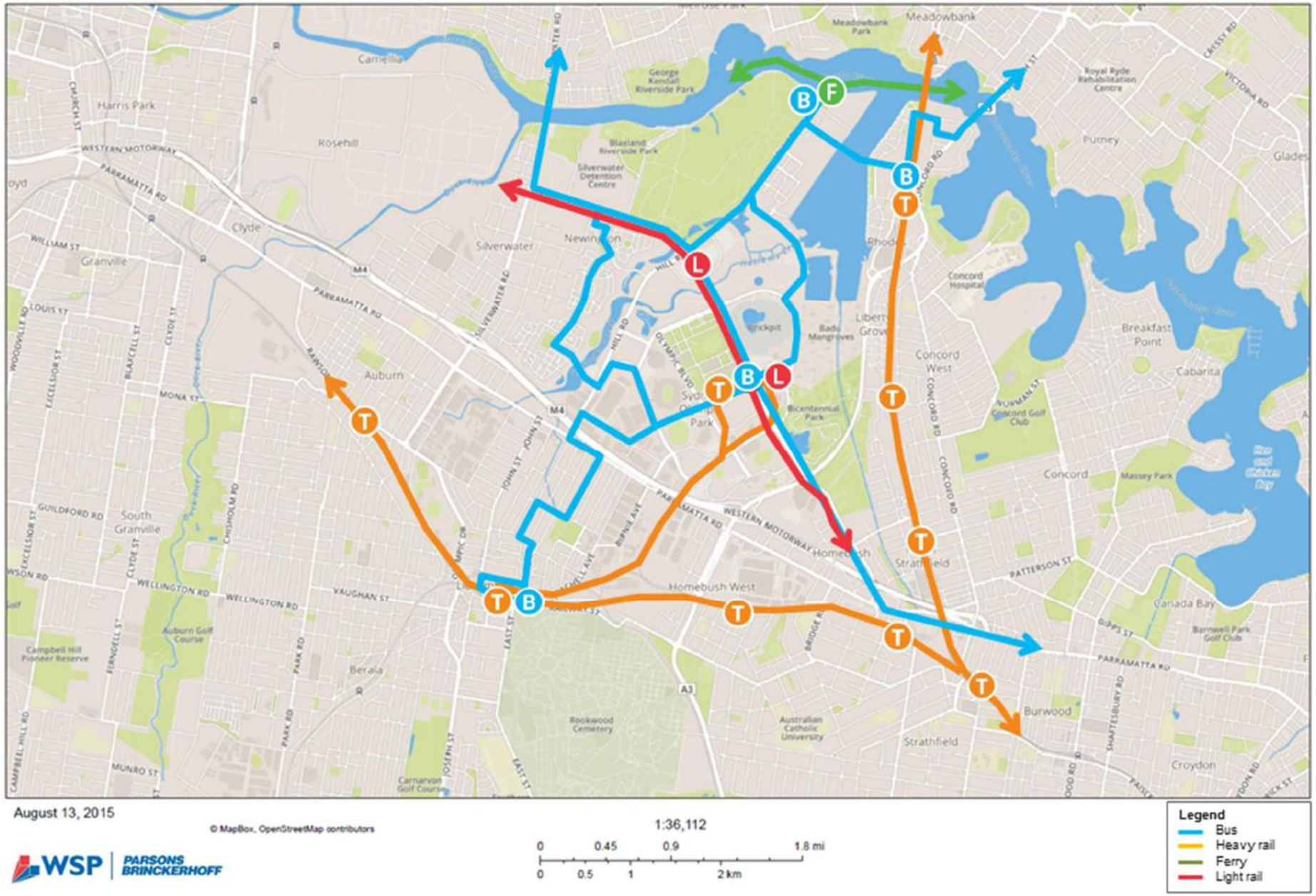


Figure 4.9 ***Traffic and Transport Strategy (2016 Review)*** **public transport network**

4.2.1 Heavy rail

The *Baseline Transport Strategy* identified a maximum service frequency and train capacity for Olympic Park station services. With existing heavy rail services having improved since this time, the maximum service frequency and capacities have been reviewed and updated, as shown in Table 4.6.

Table 4.6 Future heavy rail services at Olympic Park station

	Baseline Transport Strategy	*Traffic and Transport Strategy (2016 Review)*
Description	Olympic Sprint shuttle service between Lidcombe and Olympic Park	
Train configuration	8-car trains	
Train capacity (pax/train)	840	1,200
Peak frequency (trains/hour/direction)	6	
Indicative line capacity (pax/hour)	**5,040**	**7,200**
Event services	Direct from Central via Strathfield	

The *Baseline Transport Strategy* also identified indirect measures to increase rail mode share including:

- Improving the interchange experience at major connecting stations such as Strathfield and Lidcombe through:
  - improved provision of real time information in the station and on platforms
  - integrated ticketing between modes
  - increased intermodal frequencies (e.g. peak hour bus connections to and from stations).
- Increased knowledge and promotion of connections (paths and travel times) to local stations such as Concord West (15 minute walk) and Strathfield (10 minute bus journey).

Since the development of the *Baseline Transport Strategy* a number of these initiatives have been implemented. The *Baseline Transport Strategy* noted that discussions with the relevant government departments indicated that regular direct rail services from the T1 Western Line would be unachievable in the medium term. As a consequence, although Table 4.6 indicates that rail capacity between Lidcombe and Olympic Park stations could be increased, importantly direct services which would travel beyond Lidcombe would not be possible unless:

- Train paths became available on the T1 Western Line to allow at-grade movements to and from the Olympic Park Line, and/or;
- A grade-separated connection between the T1 Western Line and Olympic Park Line was constructed.

Current long term planning being conducted by TfNSW for the Western Rail Corridor includes options to provide direct rail connectivity for Sydney Olympic Park. This proposal would require design, allocation of funding and government approval.

This *Transport Strategy Review* recommends that:

- train capacities on the T7 Olympic Line will be progressively increased in response to increased patronage
- complementary strategies to encourage train travel to and from SOP will be adopted including:

- upgrades to Lidcombe's Olympic Sprint platform and its connectivity with T1 Western Line platforms (e.g. the replacement of existing stairs with escalators and the improvement of other station facilities and amenities)
- increased frequency of T1 Western Line services stopping at Lidcombe station to and from the west
- increased bus routes and frequencies between Strathfield and SOP
- encourage walking and cycling between Concord West/North Strathfield and SOP.

4.2.2 Rapid Transit

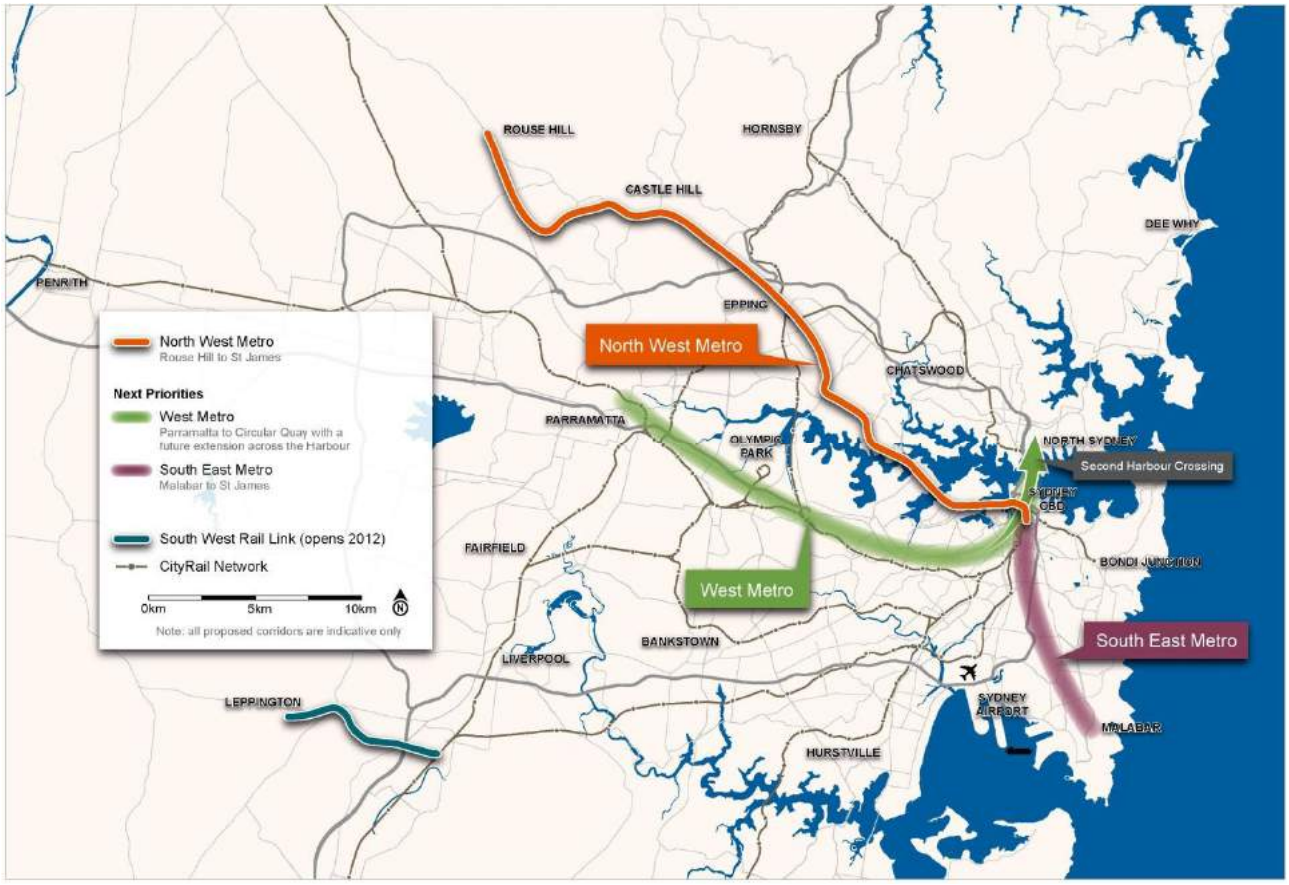
In November 2015, the Australian and New South Wales governments announced a joint federal and state government study *"Scoping study of rail needs for Western Sydney"*, including serving the proposed Western Sydney Airport and the Western Sydney Priority Growth and Land Release Areas. This study was also Western Sydney's population is set to increase from two million to three million over the next 20 years so this options plan will look at rail transport needs for the airport, as well as surrounding communities and employment lands. This options plan will consider rail as part of the broader transport network needed to support an airport and Western Sydney's growth. Sydney Olympic Park is located within Western Sydney in the context of this joint study.

The scoping study of rail needs for Western Sydney will include the following:

- Review existing plans for developing Western Sydney and a Western Sydney Airport, and the associated forecasts of population growth and aviation demand
- Review existing literature on the assessment of ground transport needs and solutions for Western Sydney and a Western Sydney Airport
- Review existing plans for expanding transport infrastructure to service Western Sydney
- Assess the role rail is likely to play in meeting the future ground transport needs of Western Sydney
- Review the evidence base of customer needs and preferences to determine the characteristics and features that a rail service for Western Sydney needs to be attractive to customers to deliver high levels of customer satisfaction
- Review and recommend the key policy settings to ensure successful integration of this rail service with Sydney's public transport network including Opal Card fares, service type and interchange requirements
- Identify and assess a range of rail service solutions to meet these needs, including different rail connections, travel speeds and train service types. The types of solutions to be considered will include, but not be limited to:
  - extending the existing South West Rail Link,
  - extending other elements of the metro rail network, and
  - developing a dedicated airport express service between a Western Sydney Airport and a key transport hub in the Sydney basin
- Conduct an initial assessment of the relative benefits and impacts of each option
- Consider funding and financing options, including options for the application of value-capture mechanisms
- Prepare a discussion paper summarising the above reviews and assessments and call for public submissions
- Consider the public submissions and prepare a report that summarises the scoping study findings and recommends next steps

This initiative also has the potential to free up line capacity on the heavily used T1 Western Line to achieve more services through the connecting station at Lidcombe in the future which will directly benefit Sydney Olympic Park.

Previously in 2008, the NSW State Government announced the Sydney Link and Metro Link programs. These programs, which have now been superseded, included a series of major transport projects including a possible future metro rail link to the west and to the south east of Sydney. The previously proposed Metro Link network is illustrated in Figure 4.10.



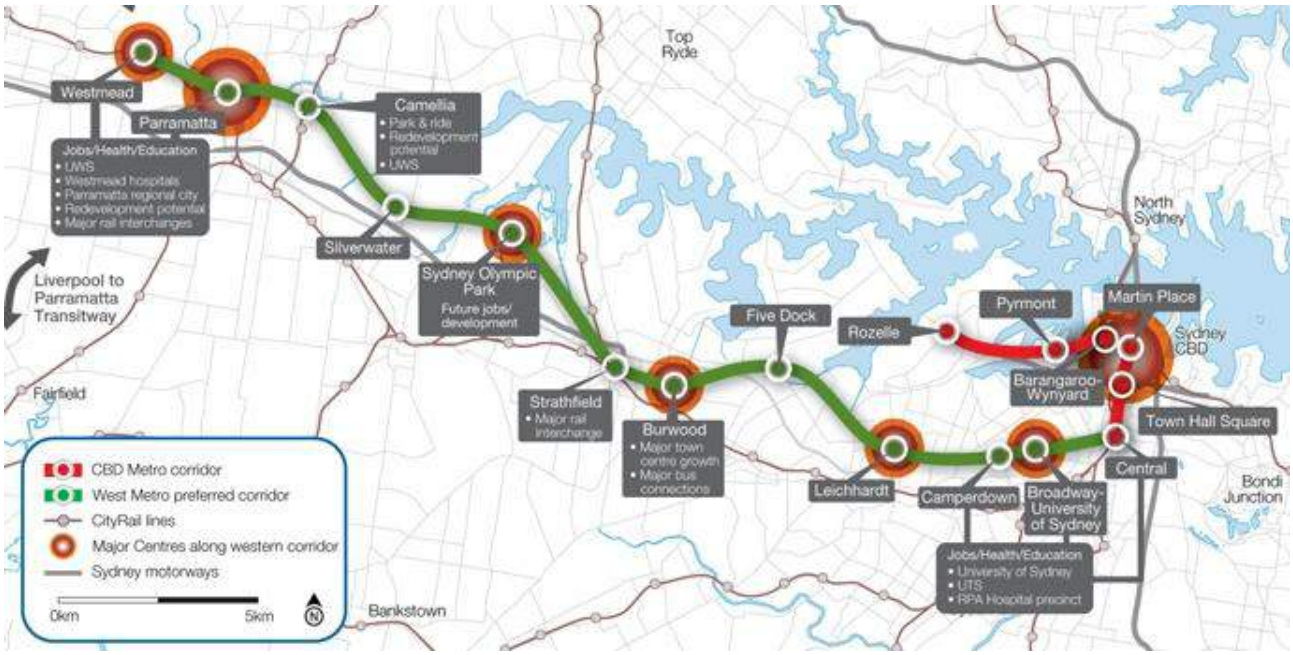
Source: NSW Ministry of Transport (2008)

Figure 4.10 Proposed Metro Link network (Now superseded by Sydney Metro)

Metro rail is a modern urban rail system which is:

- separate from the existing road and rail networks
- fast, frequent and can efficiently carry large numbers of people
- driverless for greater efficiency and flexibility
- a catalyst for growth in communities around new metro stations.

Of most relevance to SOP was the former West Metro proposal which would link Parramatta with the Sydney CBD via SOP. The preferred corridor for the former West Metro link is illustrated in Figure 4.11.



Source: http://www.railwaygazette.com/news/single-view/view/sydney-west-metro-route-announced.html

Figure 4.11 Previously proposed preferred West Metro alignment

The *Baseline Transport Strategy* acknowledged that the West Metro was unlikely to be built before 2017, when the first metro line (North West Metro) was scheduled for completion. The status of currently proposed metro rail projects in Sydney is illustrated in Figure 4.12:

- Sydney Metro Northwest is currently under construction
- Sydney Metro City and Southwest construction is estimated to start around 2017
- there are currently no plans for construction of a potential Sydney Metro West (previously proposed as West Metro). Any extension of the Sydney Metro network through Sydney Olympic Park would be subject to the findings of the Scoping study of rail needs for Western Sydney due in late 2016

Source: http://sydneymetro.info/project-overview1

Figure 4.12 Current Sydney Metro projects

SOPA recognised the importance of the previous West Metro proposal in supporting the development proposed by the *Baseline Master Plan*. This major public transport initiative would support the increase in public transport target mode share by providing a large volume of high-frequency public transport capacity to and from SOP, as illustrated in Table 4.7.

Table 4.7 Future rapid transit services to and from SOP

	Baseline Transport Strategy	*Traffic and Transport Strategy (2016 Review)*
Description	West Metro	Provision for a future SOP rapid transit corridor and station on the south-west corner of the Olympic Boulevard/Dawn Fraser Avenue intersection. This could be located on the following, previously considered potential future metro rail lines: ▪ Western Sydney Airport to Sydney CBD via Parramatta ▪ Hurstville–Macquarie Park Line.
Train capacity (pax/train)	1,350	No change to line capacities, but likely to be constructed after 2030 timeframe.
Peak frequency (trains/hour/direction)	20	
Indicative line capacity (pax/hour)	**27,000**	

This *Traffic and Transport Strategy (2016 Review)* recommends that:

- Potential (land use availability) for a future Sydney Olympic Park rapid transit station on the south-west corner of the Olympic Boulevard/Dawn Fraser Avenue intersection will be preserved. This station could be located on the following potential future rapid transit lines (illustrated in Figure 4.13):
  - Western Sydney Airport to Sydney CBD via Parramatta (currently under investigation)
  - Hurstville–Macquarie Park (not government policy)
- SOPA will work with TfNSW and the Australian government to safeguard a rapid transit station location and corridor and progress planning for future rapid transit services to and from SOP beyond the 2030 horizon.

In the absence of a rapid transit service through SOP by 2030, other public transport modes will be required to accommodate a larger volume of demand to achieve the targeted non-car mode shares.

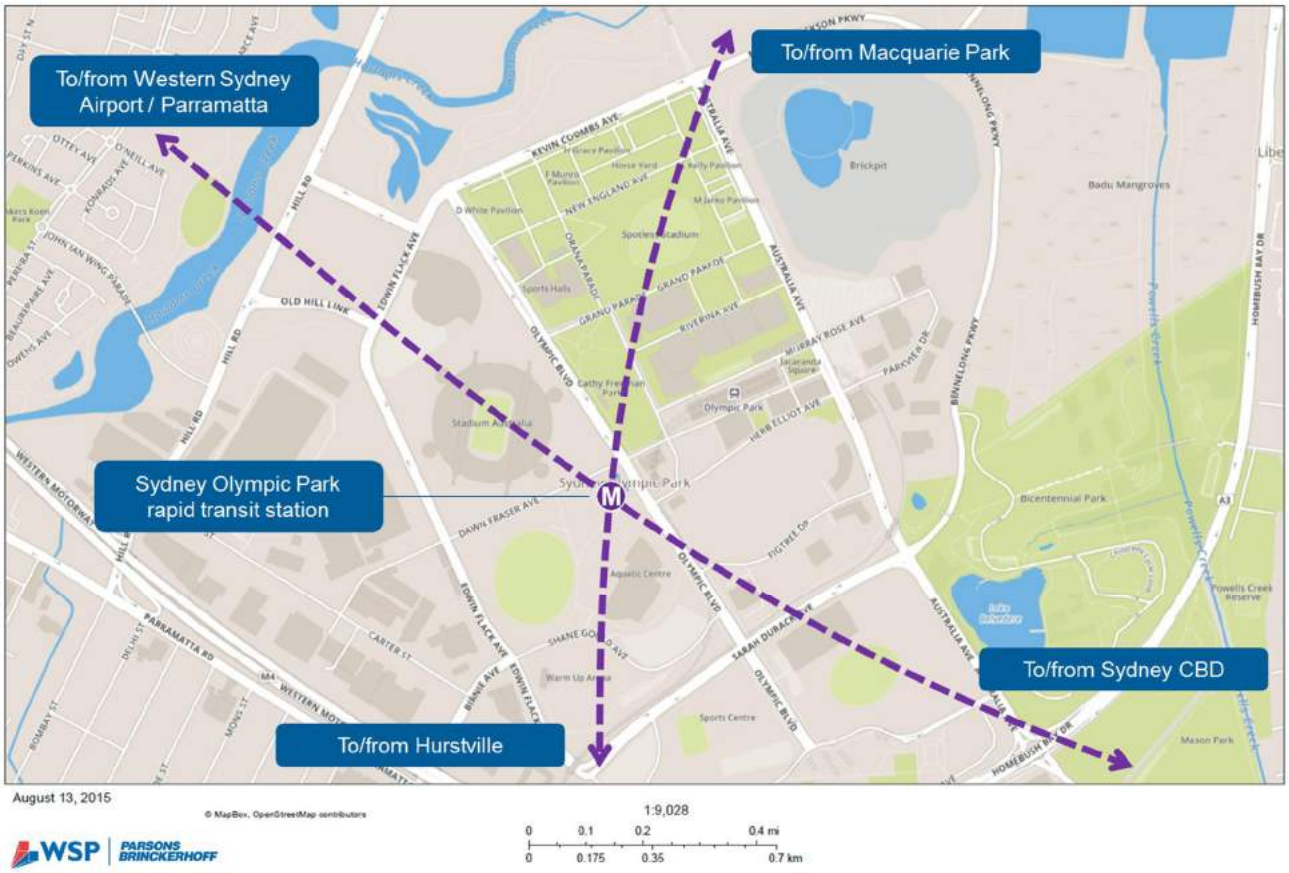


Figure 4.13 Potential future rapid transit services

4.2.3 Light rail

Light rail was not considered as a transport mode during the development of the *Baseline Transport Strategy*. However, since this time a light rail service between Parramatta and Strathfield has been confirmed as a project (refer to section 3.2):

- promoted by strategic plans and policies including the *Sydney CBD to Parramatta Strategic Transport Plan* (TfNSW, 2015), *A Plan for Growing Sydney* (DP&E, 2014), the *State Infrastructure Strategy* (Infrastructure NSW, 2014), and *Sydney's Light Rail Future* (Transport for NSW, 2012)
- currently in project development through specialist studies by TfNSW.

At the time of development of this *Traffic and Transport Strategy (2016 Review)*, TfNSW advised that:

- 'The Government has set aside $1 billion to deliver light rail for Parramatta with $19 million allocated for detailed planning in 2015/16'.
- 'It is anticipated that the preferred route between Parramatta and Strathfield would form the spine of a transport network connecting Greater Parramatta with key centres across Western Sydney'.

Consequently, to provide consistency with current Government plans and policies, the *Traffic and Transport Strategy (2016 Review)* includes light rail service provision to and from SOP, as indicated in Table 4.8.

Table 4.8 Future light rail services to and from SOP (indicative only)

	Baseline Transport Strategy	*Traffic and Transport Strategy (2016 Review)*
Description	-	Parramatta to Strathfield via SOP
Train capacity (pax/train)	-	300 (1)
Peak frequency (trains/hour/direction)	-	20 (1)
Indicative line capacity (pax/hour)	**-**	**6,000 (1)**
Event services	-	Subject to detailed project planning

(1) This information is generic for strategic planning purposes only as the fleet size and timetable are subject to detailed operations and commercial planning

Table 4.8 indicates that light rail could provide an indicative capacity of around 6,000 passengers per hour per direction based on a 3 minute service frequency, which is similar to the potential future heavy rail capacities proposed on the T7 Olympic Line.

The operation of light rail during events is still subject to detailed planning being undertaken by TfNSW. Light rail route option planning through Sydney Olympic Park will consider the impact of major events and be subject to minimal forced shutdowns or service modifications.

Although light rail would provide significant public transport capacity for travel to and from SOP, it is acknowledged that through passengers (e.g. travelling between Strathfield and Parramatta) would reduce available capacity for travel to and from SOP. This is dissimilar to the heavy rail line which provides capacity for trips to and from SOP only. The capacity and timetable for the system is subject to detailed light rail patronage analysis yet to be undertaken.

In addition, unlike the separate heavy rail line, light rail would generally be constructed within and/or interface with road corridors and intersections, reducing available traffic capacity and some turning movements. Figure 4.14 illustrates the most direct route for light rail through SOP (subject to further planning):

- Holker Street: Provides an external connection between SOP and Parramatta CBD
- Holker Busway: Provides a dedicated public transport entry/exit to and from SOP
- Australia Avenue: Provides a direct connection through SOP including the Central and Parkview precincts, where major future residential and retail development is proposed
- Underwood Road: Provides an external connection between SOP and Strathfield/Burwood.

The alignment shown in Figure 4.14 is reflective of the alignment shown in the *Sydney CBD to Parramatta Strategic Transport Plan* (see section 3.2.1).

Figure 4.14 Indicative future light rail line

This *Traffic and Transport Strategy (2016 Review)* recommends that:

- Light rail is included and provided for as part of the *Master Plan 2030 (2016 Review)*.
- A route between Parramatta CBD and Strathfield via Australia Avenue has been assumed as the preferred route as it is reflective of the alignment shown in the *Sydney CBD to Parramatta Strategic Transport Plan* and utilises existing entry and exit points to and from SOP.
- Where possible, *Master Plan 2030 (2016 Review)* will identify setbacks and easements for future light rail operations
- Light rail stop locations are to be coordinated with key destinations and transport nodes within the precinct

- The light rail alignment will be determined with consideration of high volume pedestrian movements to and from major venues
- Alternative routes and/or branches should be investigated, including potential routes which would help to connect SOP with its surrounding precincts (Carter Street, Wentworth Point and Rhodes) and/or minimise traffic impacts. However, these alternative routes are not government policy and are currently not part of the scope of the Parramatta Light Rail project.
- SOPA will work with TfNSW and other relevant government agencies to progress potential future light rail services to and from SOP to support the integrated land use and transport outcomes along the corridor.

4.2.4 Bus

The future bus network proposed by the *Baseline Transport Strategy* included:

- strategic bus corridors:
  - Parramatta to Burwood via SOP
  - Burwood to Macquarie
- cross-regional bus routes
- local buses.

The *Baseline Transport Strategy* noted that:

- The ability for bus services to operate on Strategic Bus Corridors with sufficient frequency, speed and reliability to attract high patronage from SOP users would depend largely on the level of bus priority implemented.
- Bus service contract reviews would provide an opportunity for SOPA to influence the provision of services to and from SOP. This was recommended to include:
  - rerouting the 525 service to operate between Burwood and Parramatta
  - improve local bus connections and service frequencies with the adjacent development areas of Carter Street, Newington and Wentworth Point.
  - separate bus services for Wentworth Point and Newington, via SOP, will be provided as the individual developments reach completion to provide more direct routes.
- Trunk bus services operating on a Strategic Bus Corridor through the site are likely to operate to a limited number of stops to maintain high speed and direct services. Due to this local, shuttle-type services will be investigated and implemented to connect SOP with surrounding areas.
- There would be a need to improve connections between the existing car parks and bus stops with offices and retail outlets in the Town Centre, and the Central and Parkview precincts. To achieve this an internal shuttle service was proposed to operate on the four main avenues and serve the four major car parks (P1, P3, P4 and P5). The service could possibly be funded through SOPA controlled parking revenue.
- A private shuttle bus service operates for employees of Commonwealth Bank which links the major public car parks during commuter peaks and operates as a shuttle to major retail outlets at Rhodes, the Direct Factory Outlets (DFO) and Arnott's (Strathfield) and to Strathfield station during lunch hours.

The *Baseline Transport Strategy* also provided recommendations relating to future bus infrastructure upgrades to improve service quality which included:

- The completion of a $135 million program to improve bus priority on Strategic Bus Corridors across Sydney by RMS.
- The completion of RMS' Public Transport Information and Priority System (PTIPS). PTIPS uses satellite technology to identify late running buses and communicates with the RMS' traffic management system to allocate traffic signal priority to late running buses.
- Traditional infrastructure solutions at key points of congestion:
  - dedicated bus lanes on approaches to congested intersections
  - dedicated bus 'queue jumps' (e.g. left turn only, buses excepted lanes)
  - bus head start signals ('B' signals)
  - conversion of general traffic lanes to 'transit' and 'no stopping' lanes.

In addition to general future bus infrastructure upgrades, the completion of the Bennelong Bridge across Homebush Bay now provides a bus, pedestrian, and cycle connection between Wentworth Point and Rhodes. This reduces the travel distance between these locations from around 8 km to less than 1 km, and enable local bus routes connecting SOP, Newington, Wentworth Point, and Rhodes.

The *Baseline Transport Strategy* also noted that there may be a need during the timeframe of the *Baseline Master Plan* (i.e. prior to 2030) for the following existing bus priority infrastructure established for events to be used by timetabled bus services:

- the Wilson Park Busway to/from the west
- the Mousehole to/from the south.

Section 4.1.2 summarises the improvements to bus services to and from SOP which have occurred since the development of the *Baseline Transport Strategy.* Recommendations which have been delivered include:

- generally increasing the frequency, routes, and network coverage of public bus services which provide connections to and from SOP
- the implementation of PTIPS.

This *Traffic and Transport Strategy (2016 Review)* recommends that the other fundamental features of the bus network proposed by the *Baseline Transport Strategy* are progressed in response to the further development of SOP. As illustrated in Figure 4.15, this would include:

- a new suburban bus route (and potential future Rapid bus route) between Parramatta and Strathfield via SOP, consistent with *Sydney's Bus Future* (see section 3.2.6)
- expansion of existing bus routes between SOP and Parramatta. *Sydney's Bus Future* cites 60 new services connecting these two key centres
- continuation of the suburban/cross-regional bus routes 533 between SOP and Ryde/Chatswood and 450 from Hurstville
- continuation and expansion of local bus routes connecting SOP with surrounding developments and centres including:
  - future precincts: Wentworth Point/Carter Street
  - existing residential areas: Newington/Rhodes
  - strategic centres: Strathfield/Burwood/Lidcombe

- consistent bus routes and bus stops not impacted by event road closures
- a potential internal shuttle service connecting the various centres and car parks throughout SOP. This service would be independently funded and operated (i.e. not a government service).

In relation to future bus infrastructure, this *Traffic and Transport Strategy (2016 Review)* also recommends that:

- traditional infrastructure solutions are implemented at key points of congestion
- the use of the Bennelong Bridge across Homebush Bay is leveraged to:
  - increase bus patronage to and from SOP
  - increase bus and active transport patronage to and from Wentworth Point and Newington, and consequently reduce the traffic impacts created on the road network within and surrounding SOP generated by through traffic
- Bennelong Parkway is now used by regular passenger bus services. Intersection access modifications will be made at Murray Rose Avenue to provide more direct bus access to the Olympic Park transport interchange to and from Wentworth Point
- a formal on-street bus interchange is investigated and developed in proximity of the existing heavy rail station to encourage bus (and multi-modal public transport) patronage, including:
  - accessible, modern, secure, and integrated transport infrastructure, including shelter, seating, and lighting
  - real-time travel and wayfinding information
  - bicycle parking facilities
  - be able to remain operational during major events in the precinct i.e. unaffected by event road closures.
- the potential future use of event infrastructure by regular bus services is considered if and when traffic congestion worsens at the key gateways that these bus services would otherwise use (i.e. to bypass the Homebush Bay Drive/Australia Avenue and Silverwater Road/Holker Street intersections, as illustrated in Figure 4.16).

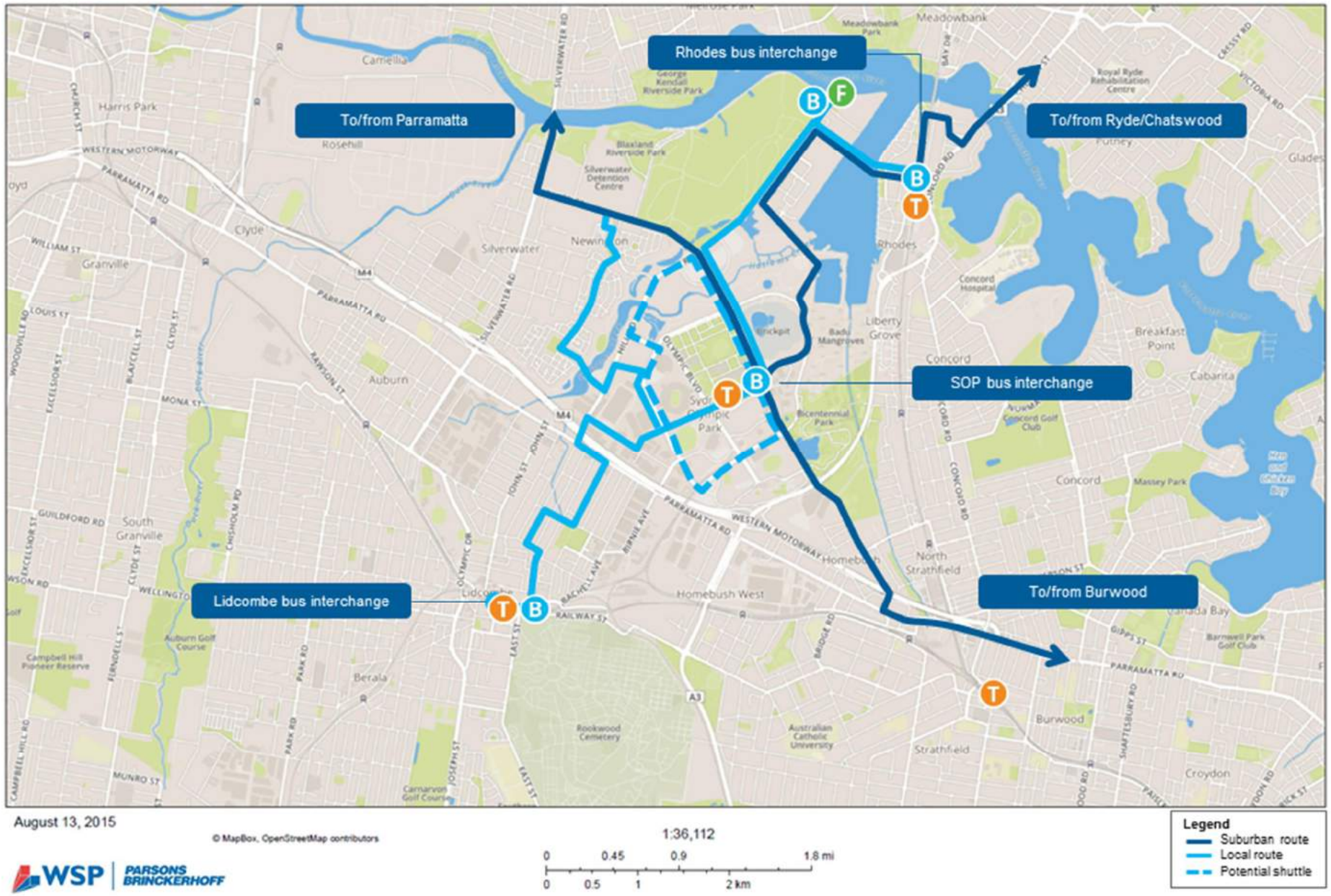


Figure 4.15 Proposed future bus network

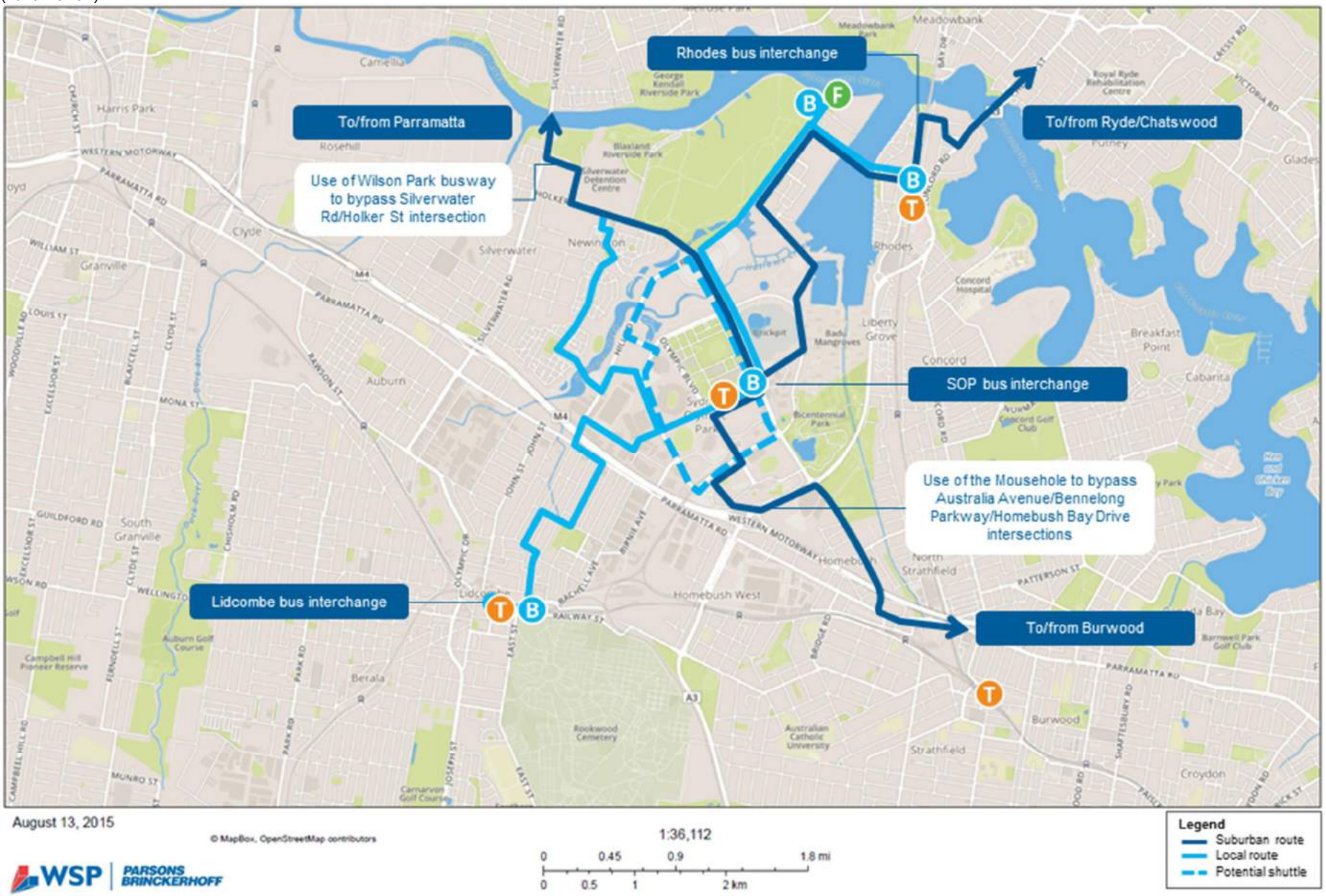


Figure 4.16 Proposed future bus network (Alternate options utilising event infrastructure)

4.2.5 Ferry

The *Baseline Transport Strategy* noted that:

- ferry services to the Sydney Olympic Park Ferry Wharf had been improved by extending services that previously terminated at nearby Meadowbank Wharf in response to development and activity on the Olympic Peninsula
- there could be potential scope to expand services to include stops at Darling Harbour
- charter ferry services provide transport to and from events via Sydney Olympic Park wharf
- Homebush Bay Bridge would create a link for public transport, walking, and cycling between Sydney Olympic Park wharf and Rhodes.

Since the development of the *Baseline Transport Strategy*:

- ferry services have been expanded to increase their frequency; Darling Harbour is also now an existing stop on the F3 Parramatta River service (see section 4.1.3)
- The replacement ferry wharf has been constructed through the Transport Access Program
- Bennelong Bridge across Homebush Bay completed in 2016 (see section 4.2.4).

This *Traffic and Transport Strategy (2016 Review)* recommends that further increases to ferry routes and frequencies to and from Sydney Olympic Park Wharf are considered as demand and patronage for these services grows.

4.2.6 Walking and cycling

The *Baseline Transport Strategy* recommended the following key infrastructure provisions for walking and cycling in the future, based on the Sydney Olympic Park Bicycle Strategy (SOPA, 2004):

- construct Homebush Bay Bridge, resulting in:
  - 20,000 future residents of Wentworth Point being within walking distance of Rhodes train station
  - existing and future residents and workers in Rhodes being within walking distance of Sydney Olympic Park ferry wharf
- maintain the grade separated link between the Parkview precinct and Bicentennial Park
- extend Haslam's Creek Bridge on Bennelong Parkway
- create an east-west link between the Central Sports Precinct in Sydney Olympic Park to North Lidcombe across Edwin Flack Avenue, the M4 Motorway and Parramatta Road utilising the old railway corridor
- develop links along Powell's Creek Corridor to Strathfield.

The *Baseline Transport Strategy* also provided general principles and guidelines to improve the quality and amenity of existing and future links, comprising:

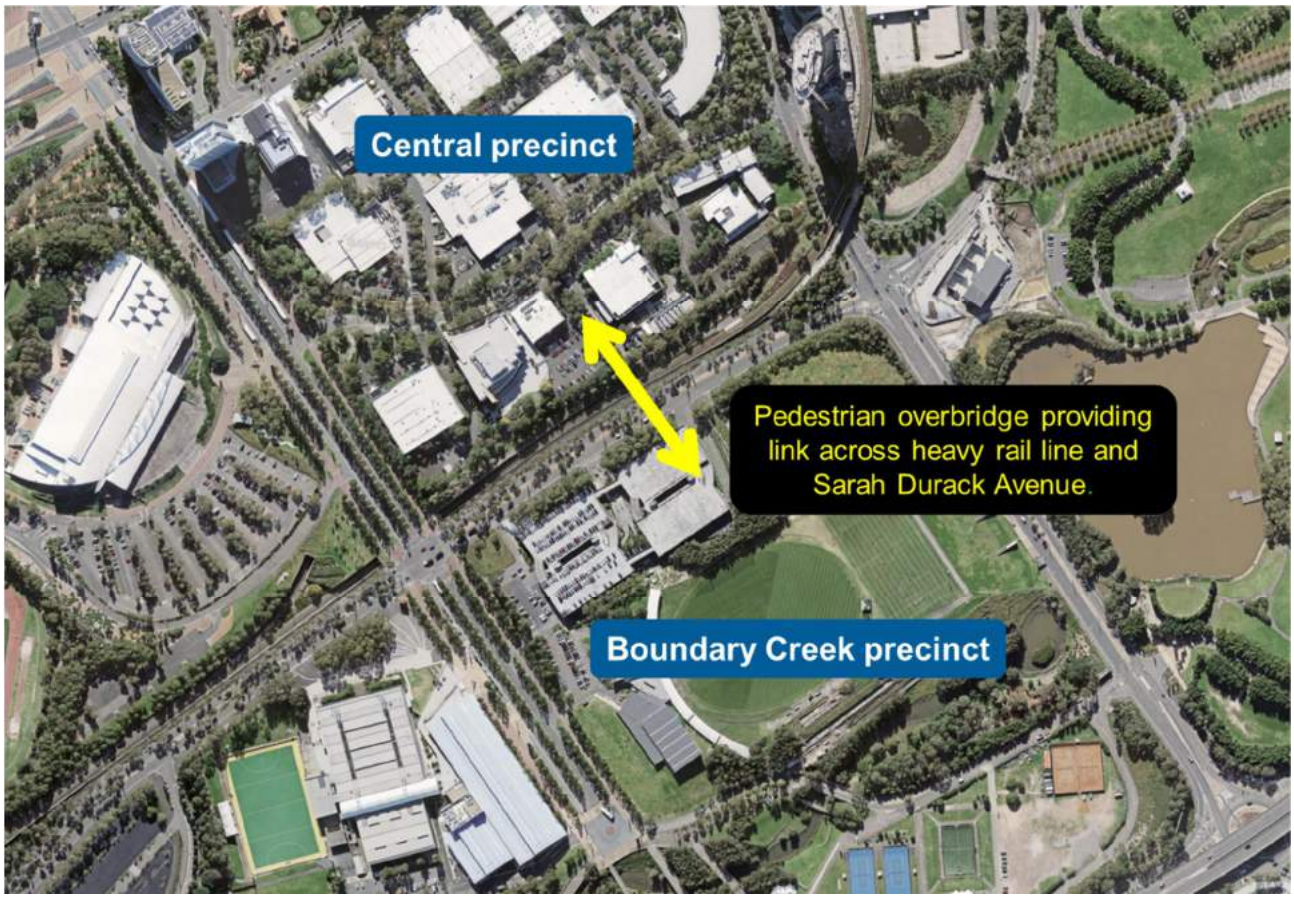
- reducing kerb radii on new streets to the desirable minimum required to reduce walking distances across streets and slow turning traffic
- minimising right-turn bays in medians to shorten pedestrian crossing distances
- prohibiting on-street parking on the main avenues to preserve on-road bicycle lanes

- adopting planning controls requiring businesses and developers to provide end of trip cycling facilities within their developments.

The *Baseline Transport Strategy* targeted a walking and cycling mode share of 8% by 2030 for commuting to and from SOP based on the above strategy measures. Achieving this target would be assisted by the increase in residential development proposed within SOP and surrounding areas. This would increase internally contained trips, increasing the population both living and working within the Olympic Peninsula. These relatively short-distance trips are much more likely to be undertaken through walking or cycling when compared to trips to and from areas outside of the Olympic Peninsula.

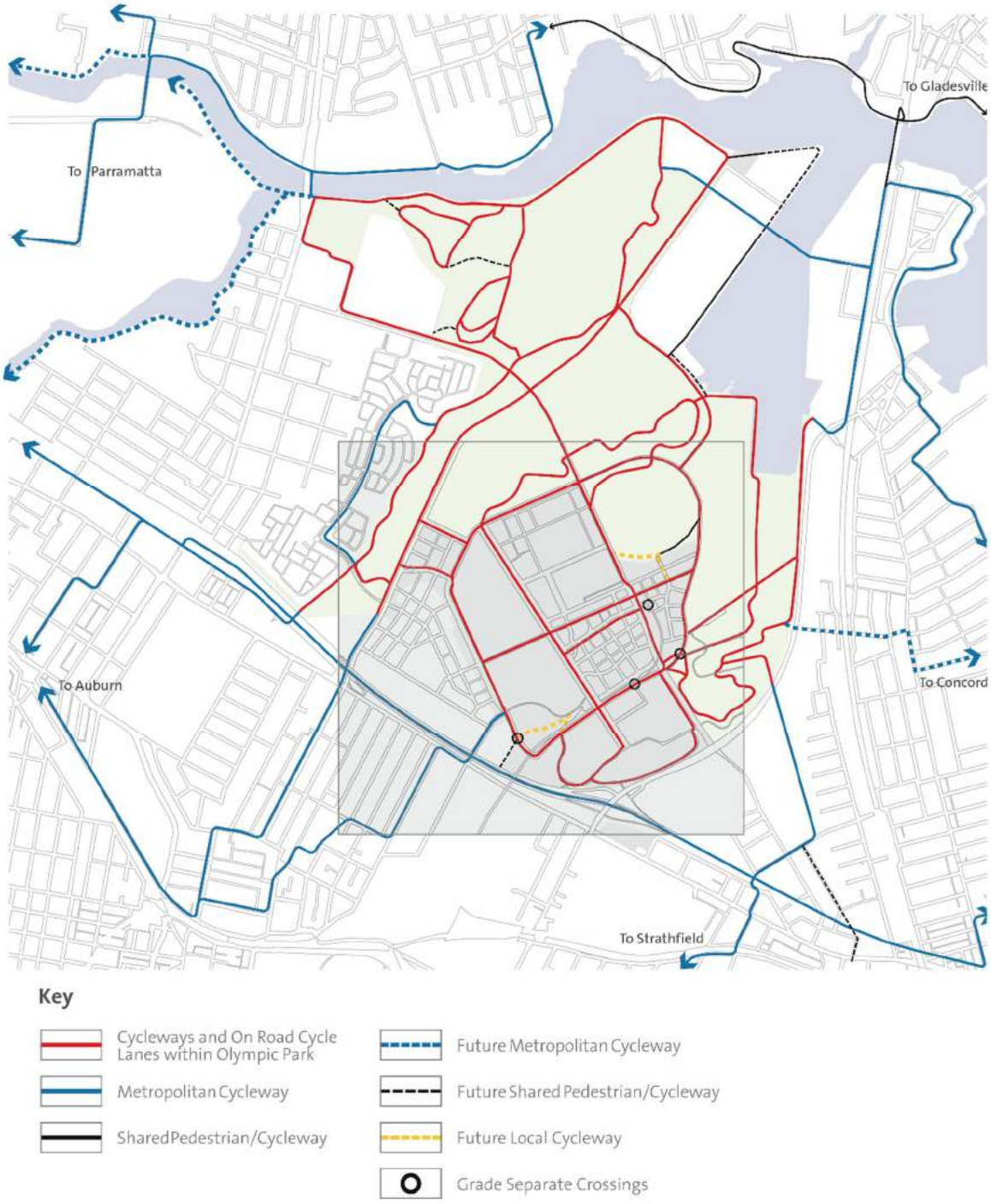
This *Traffic and Transport Strategy (2016 Review)* recommends that:

- the fundamental features of the walking and cycling networks (illustrated in Figure 4.20), and guidelines and principles proposed by the *Baseline Transport Strategy* are retained
- a new pedestrian railway underpass (currently under construction) will improve pedestrian and cycle connectivity from the Town Centre to Bicentennial Park and Concord West Station.
- a new pedestrian bridge providing a link across Sarah Durack Avenue and the heavy rail line between the Central precinct and Boundary Creek precinct (including the P3 car park) will be investigated, as illustrated in Figure 4.17. This new pedestrian link has the potential to reduce traffic entering the Central precinct by encouraging car drivers to park in the P3 car park and then walk to and from the precinct.
- Further connections and promotion of the commuter (regional) cycle network is undertaken including the new WestConnex cycleway and the potential to link across Duck River to Camellia and Parramatta in association with the Parramatta Light Rail project



Source: Parsons Brinckerhoff, based on SOPA aerial imagery

Figure 4.17 Proposed pedestrian bridge linking Central precinct and Boundary Creek precinct



Source: Sydney Olympic Park Master Plan 2030 (2016 Review) (SOPA, 2016)

Figure 4.18 *Master Plan 2030 (2016 Review)* future walking and cycling network

4.3 Event public transport

The *Baseline Transport Strategy* acknowledged that the provision of special public transport services for events has been one of the most successful legacies of the Sydney 2000 Olympic Games. The world class transport facilities built to support these services will continue to operate for the life of Master Plan 2030.

Where development pressures look likely to impact on event transport facilities, detailed examination of the alternatives will be undertaken before reducing the efficiency of event operations. Conversely, event infrastructure and operations will look to reduce the impact on the local community (businesses and residents) that has emerged in the past 10 years, particularly in the Town Centre.

4.3.1 Event rail operations

The key principles of event rail operations are:

- to satisfy demand for direct rail to the site during high, medium and low crowd days
- to move up to 36,000 people per hour during peak demand periods
- to deliver high capacity to events on both weeknights and weekends.

Special timetabled services to Olympic Park Station operate during major events. Event rail services operate in three modes:

- Major events: Where crowds are expected to exceed 60,000, 30 trains per hour could operate and move up to 36,000 people per hour. These trains can be integrated into the Sydney metropolitan rail system by connecting to principal stations (Strathfield, Central, Lidcombe, Granville, etc.)
- Medium events: Crowds of 20,000 to 60,000 would be served by operating approximately 12 trains per hour, providing a combination of integrated services and the Olympic Sprint shuttle services to Lidcombe
- Small events: When less than 20,000 people are expected, the Olympic Sprint shuttle service would operate to Lidcombe, providing a 12 minute round trip.

Passenger queuing systems are implemented at Olympic Park Station for medium and large events to facilitate safe and efficient loading, whilst maximising passenger comfort.

This *Traffic and Transport Strategy (2016 Review)* recommends that:

- Existing event rail operations are generally maintained and continued.
- The duration of the road closure on Dawn Fraser Avenue associated with station passenger loading is reduced to be consistent with those on Murray Rose Avenue, reducing the impact of existing event operations.

4.3.2 Event bus operations

The key principles of event bus operations are:

- to provide a reliable and continual base level of public transport for all forecast crowds
- to provide public transport access to areas not well serviced by rail for medium and large events
- to provide flexibility in increasing service delivery at relatively short notice
- to move between 8,000 and 12,000 people per event.

As illustrated in Figure 4.20, nine special event bus services operate for major events at SOP. These services utilise the existing bus priority infrastructure discussed in section 4.1.2, and operate from the Plaza and Aquatic Bus Terminals on Olympic Boulevard.

To successfully operate event bus services from the Aquatic Bus Terminal a number of strategic event road closures are required. To facilitate the development uplift proposed by the *Master Plan 2030 (2016 Review)* in the Central and Parkview Precincts, modifications to event bus operations and associated road closures require investigation to unlock local road capacity. To achieve this, it is recommended that all event bus operations are consolidated in an expanded Plaza Bus Terminal at the northern end of Olympic Boulevard. Initial investigations suggest that this is achievable in terms of design and operations. Stakeholder consultation and modification to event bus approach routes will be required to facilitate this change.

In 2003, integrated ticketing for large events at Sydney Olympic Park was introduced. Entry to selected major events includes the cost of return public transport to and from the venue. This scheme will be continued into the future and extended to all major events at SOP. This should be funded by the event or venue operator.

Source: Sydney Olympic Park Master Plan 2030 (2015 Review) (SOPA, 2016)

Figure 4.19 *Master Plan 2030 (2016 Review)* proposed road closures for events

Source: http://www.transportnsw.info/resources/documents/maps/sop-major-event-buses-map.pdf

Figure 4.20 Major event bus network

4.4 Future mode share targets

The *Baseline Transport Strategy* discussed the following non-car mode share targets identified by preceding studies in and around the Olympic Peninsula:

- *Sydney Olympic Park 2002 Master Plan*: 30% to 35%
- *Carter Street and Sydney Olympic Park Transport Mobility and Access Plan* (Maunsell, 2002): 35%.

The more recent *Carter Street Urban Activation Precinct Transport Impact Assessment* (Parsons Brinckerhoff, 2014) also adopted a non-car mode share of 35%. Although these studies nominated higher targets, the *Baseline Transport Strategy* adopted an initial non-car mode share of 25%. This represented a relatively conservative initial target based on:

- an existing (2001) journey to work mode share to and from SOP of 16%
- existing (2001) journey to work mode shares to and from other specialised centres of 20%
- consideration of achievable improvements to public transport services and infrastructure to and from SOP
- consideration of practical demand management measures to increase non-car modes.

In the long-term a stretch target of 40% was proposed by the *Baseline Transport Strategy* as a realistic long-term goal, achievable through:

- the introduction of metro rail (West Metro), providing a new, high capacity public transport mode to and from SOP
- a high level of commitment and investment from Government
- parking controls and the implementation of further demand management measures.

As shown in section 3.1.1, non-car mode shares for SOP (28%) and other strategic centres increased significantly between 2001 and 2011. However, continued growth in non-car mode shares would be required to enable the development yields proposed by the *Master Plan 2030 (2016 Review)*. Factors which would assist in managing the increased levels of demand include:

- Increased public transport patronage: Public transport patronage will continue to increase in response to infrastructure and service improvements such as the introduction of light rail, more direct and feeder bus services, improved heavy rail service patterns and connections, opal integrated ticketing and better interchange and bus stop facilities
- Limiting parking supply: Limiting parking supply through the reduction in the commercial office parking rate (in combination with increasing public transport provision) and increased road congestion on the regional road network will continue to reduce the appeal of car transport and increase the relative benefits of public transport use.
- Increased walking and cycling trips: This would be driven primarily by the increase in internally contained, short-distance trips within SOP. The recent opening of the Bennelong Bridge across Homebush Bay and the completion of the WestConnex commuter regional cycleway will both support the increase in cycling and walking trips
- Increased ‘internal containment’ of trips: This refers to the proportion of trips which start and end within SOP. The rate of 5% would increase due to the increasing population both living and working in SOP as well as the local services provided e.g. shops, schools, recreation. A higher rate of 10% is considered reasonable for future development supported by detailed regional traffic analysis

In summary, this Traffic and *Transport Strategy (2016 Review)* recommends that:

- an initial non-car mode share of 40% will be targeted, based on the existing mode share of 28% and continued development of strategies to promote non-car travel
- a long-term stretch target of 50–60% could be achievable if metro rail (or other high capacity transport modes/upgrades) is introduced within SOP.

4.5 Public and active transport: Traffic and Transport Strategy (2016 Review) summary

Table 4.9 summarises the key findings of the *Traffic and Transport Strategy (2016 Review)* relating to public and active transport. Figure 4.23 illustrates the key features of the proposed integrated public transport networks which would serve SOP.

Table 4.9 Public and active transport: *Traffic and Transport Strategy (2016 Review)* summary

Feature	Review findings/recommendations
Existing conditions	
Heavy rail	▪ Service changes between 2008 and 2015 have increased hourly line capacity from around 600 passengers per hour to 3,600 passengers per hour. Patronage also grew significantly
Bus	▪ Service changes between 2008 and 2015 have increased hourly line capacity from around 960 passengers per hour to 1,500 passengers per hour.
Ferry	▪ Between 2008 and 2015 ferry services have increased by around two per hour during peak periods and patronage also grew ▪ Ferry wharf has recently been upgraded
Walking and cycling	▪ Walking and cycling in SOP is enabled by an extensive network of over 35 km of pedestrian paths and cycleways.
Future conditions	
Heavy rail	▪ Train capacities on the T7 Olympic Line will be progressively increased in response to increased patronage. ▪ Complementary strategies to encourage train travel will be adopted including: ‣ upgrades to Lidcombe's Olympic Sprint platform and its connectivity with T1 Western Line platforms ‣ increased bus services and frequencies between Strathfield and SOP ‣ encourage walking and cycling between Concord West/North Strathfield and SOP.
Rapid transit	▪ Potential (land use availability) for a future rapid transit station on the south-west corner of the Olympic Boulevard / Dawn Fraser Avenue intersection will be preserved. This station could service two potential future rapid transit lines. ▪ SOPA will work with TfNSW and other relevant government agencies to progress potential future rapid transit services to and from SOP beyond the Master Plan 2030 timeframe.
Light rail	▪ Light rail is included and provided for as part of the *Master Plan 2030 (2016 Review)*. ▪ A route between Parramatta and Strathfield via Australia Avenue has been assumed, consistent with current planning for the Parramatta Light Rail ▪ Alternative routes and/or branches will be investigated, including potential routes which would help to connect SOP with its surrounding precincts and/or minimise traffic impacts.

Feature	Review findings/recommendations
Bus	■ The fundamental features of the bus network include: ▸ Opportunities for new and expanded suburban/cross-regional bus routes (potential future Rapid bus routes) ▸ continuation and expansion of local bus routes connecting SOP with surrounding developments and centres ▸ a potential internal shuttle service connecting the various centres and car parks within SOP. ■ The future bus infrastructure strategy includes: ▸ implementation of traditional infrastructure solutions at key points of congestion ▸ leveraging the benefits of the Bennelong Bridge across Homebush Bay ▸ a formal on-street bus interchange in proximity of the existing heavy rail station which is accessible during events ▸ consideration of the potential future use of event infrastructure by timetabled services.
Ferry	■ Increases to ferry routes and frequencies to and from Sydney Olympic Park wharf will be considered as demand and patronage for these services grows.
Walking and cycling	■ The fundamental features of the walking and cycling networks, and guidelines and principles proposed by the *Baseline Transport Strategy* will be retained.
Event public transport	
Event rail operations	■ Maintain existing event operations. ■ Reduce the duration of the road closure on Dawn Fraser Avenue associated with station passenger loading to be consistent with those on Murray Rose Avenue.
Event bus operations	■ Consolidate all event bus operations into an extended Plaza Bus Terminal.
Future mode share targets	
Recommended targets	■ An initial non-car mode share of 40% will be targeted, based on the existing mode share of 28% and continued development of strategies to promote non-car travel ■ A long-term stretch target of 60% could be achievable if rapid transit is introduced within SOP.

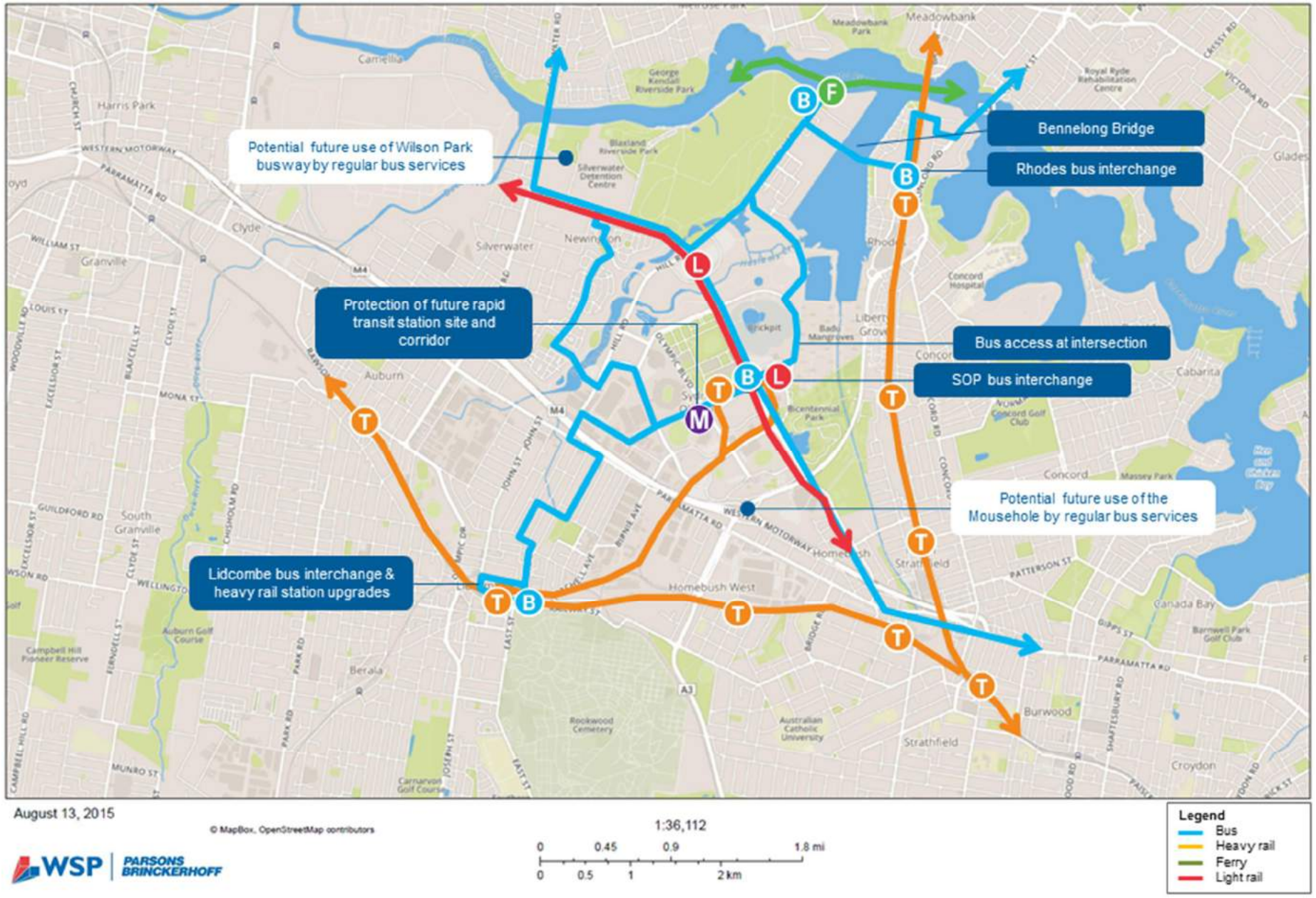


Figure 4.21 ***Traffic and Transport Strategy (2016 Review)*** **public transport network**

5. Traffic

5.1 Background

The *Baseline Transport Strategy* identified traffic generation as one of the major constraints to development at SOP. To assess the traffic impacts of the development proposed by the *Baseline Master Plan*, a traffic impact assessment was undertaken using the tools and models developed for previous traffic studies in the Homebush Bay Area for SOPA and Auburn Council.

Modelling undertaken preceding the *Baseline Transport Strategy* provided the basis for establishing the road capacity of the local area incorporating the four intersections which provide gateways to and from SOP:

- Australia Avenue/Homebush Bay Drive
- Birnie Avenue/Parramatta Road
- Hill Road/Parramatta Road
- Holker Street/Silverwater Road.

Additional traffic modelling and traffic impact assessments by consultants Masson Wilson Twiney (MWT) in 2006 and Sinclair Knight Merz (SKM) in 2007 produced similar findings in terms of traffic generation to the initial traffic modelling undertaken by Parsons Brinckerhoff. These analyses identified the maximum amount of commercial development achievable (approximately 250,000 m^2 GFA) at SOP based upon a journey to work non-car mode share of 25%.

Two levels of traffic modelling were undertaken as part of the *Baseline Transport Strategy*:

- regional traffic modelling using a Sydney-wide TransCAD traffic model
- development of a bespoke Homebush Bay Traffic Model to examine the local road network in greater detail, using the outputs of the regional traffic model
- sensitivity testing using the model framework was undertaken to examine the potential effects of network and land use changes.

The Homebush Bay Traffic Model was developed using a spreadsheet model developed in 2003 and used for the *Vision 2025* transport assessment as a basis. This methodology provided a consistent approach to traffic generation and distribution assumptions, and was informed by an extensive knowledge of the site's traffic patterns developed by Parsons Brinckerhoff through 15 years of planning for SOP.

The traffic analysis for this *Traffic and Transport Strategy (2016 Review)* has been undertaken with knowledge of a number of key projects and parallel road planning investigations being undertaken. These include but are not limited to:

- construction of WestConnex incorporating motorway widening and construction of new on and off-ramps at Hill Road and Homebush Bay Drive interchange
- opening of the Bennelong Bridge across Homebush Bay in June 2016 which now provides a more direct route for buses, cyclists and pedestrians with improved access to Rhodes station
- development of the *Olympic Peninsula Regional Transport Infrastructure Investigations,* a 10 year infrastructure plan by Roads and Maritime. This plan has focussed on the performance of key regional gateways and intersections within the network
- planning for the Parramatta Light Rail which is still in its route options development phase

- planning for adjacent developments such as Wentworth Point, Carter Street and Camellia and Parramatta Road which all share key access points to the precinct road network

In the absence of a complex and coordinated sub-regional mesoscopic traffic model which will be required for a number of the above projects, this analysis has focussed upon a local road network analysis.

5.2 Methodology

As part of this *Traffic and Transport Strategy (2016 Review)*, an updated traffic forecasting spreadsheet model and SIDRA intersection models have been developed on behalf of SOPA. These tools provide a framework to:

- create traffic forecasts for key roads within and surrounding SOP
- determine network performance at key intersections within the modelled area
- identify network upgrades required to achieve acceptable network performance.

The traffic modelling framework which has been developed follows the 5-stage process outlined below:

1. Site traffic generation calculations by precinct based on land use types, yield (see section 5.4.2), and assumptions regarding generation rates (see section 5.4.1).
2. Trip distribution between SOP precincts and external land uses based on traffic surveys of the existing road network and TfNSW models[2] for future year scenarios.
3. Mode share assumptions/estimates from TfNSW models[2] (see section 5.4.4) for trips to identify only motorised road based trips for the purposes of the traffic assessment.
4. Traffic assignment along key road network links between SOP precincts and external gateways. Background traffic is estimated based on the difference between site generation and observed traffic counts and TfNSW model[2] forecasts.
5. Assessment of key road infrastructure needs for peak period traffic conditions and determination of infrastructure requirements.

As noted above, steps 2, 3, and 4 of the traffic modelling framework require inputs from TfNSW strategic modelling to produce robust outputs. At the time of developing the *Traffic and Transport Strategy (2016 Review)* these inputs were not available. As a result, first-principles modelling has been undertaken (see section 5.5) to provide a strategic traffic analysis of the key traffic impacts of the *Master Plan 2030 (2016 Review)*, as well as future surrounding developments.

In addition, at the time of undertaking the *Traffic and Transport Strategy (2016 Review)*, Roads and Maritime (RMS) commissioned the *Olympic Peninsula Regional Transport Infrastructure Investigations,* a detailed traffic assessment of the wider Olympic Peninsula road network including regional gateways. Given the influence of planned strategic infrastructure and land use developments surrounding SOP, it is proposed that the traffic assessments for external roads on the boundary of the precinct will be assessed through this process.

[2] Appropriate strategic models were unavailable for the use in the traffic assessment of the *Transport Strategy Review* given the uncertainty relating to the large number of significant infrastructure and land developments planned within the vicinity of SOP.

SOPA will continue to work with TfNSW and RMS in the further development of integrated, collaborative traffic modelling to confirm the strategic analysis provided by this *Traffic and Transport Strategy (2016 Review)*. It is recommended that further, detailed planning work will include:

- The incorporation of TfNSW strategic model outputs (e.g. trip distribution, internal containment, mode choice, traffic assignment) into the 5-stage traffic modelling framework developed for SOPA.
- The collaborative development of an overarching, complementary road network strategy for the overall Olympic Peninsula, i.e.:
  - the identification/development of key upgrade requirements to the surrounding regional road network by RMS (including upgrades to the strategic 'gateway' intersections which provide access to and from the SOP precinct – see section 5.3.2)
  - identify if changes are required to planned upgrades to the SOP road network by SOPA, to integrate with and leverage the regional road network strategy.

The following sections present the local (SOP roads only) strategic traffic analysis which has been undertaken to identify the key traffic impacts and recommendations of the proposed *Master Plan 2030 (2016 Review)*.

5.3 Existing conditions

5.3.1 Existing road network

The SOP precinct and surrounding area road networks are described in Table 5.1 and illustrated in Figure 5.1 and Figure 5.2. The roads in this area are managed by the Sydney Olympic Park Authority (SOPA), Parramatta City Council, or Roads and Maritime Services.

Table 5.1 SOP precinct and surrounding road network summary

#	Road	Classification	Authority
Surrounding area			
1	M4 Motorway	Motorway	Roads and Maritime Services
2	Homebush Bay Drive	Arterial	
3	Silverwater Road		
4	Parramatta Road		
5	Hill Road (West)	Sub-arterial	Parramatta City Council (previously Auburn Council)
6	Holker Street		
7	Birnie Avenue	Collector	
8	Australia Avenue (South)		
9	Carter Street	Local	
10	Uhrig Road		
11	Hill Road (East)	Local (Parkway)	
12	Bennelong Parkway		
-	Other roads	Local	
SOP precinct			

#	Road	Classification	Authority
13	Australia Avenue (North)	Collector	Sydney Olympic Park Authority
14	Kevin Coombs Avenue		
15	Edwin Flack Avenue		
16	Sarah Durack Avenue		
17	Old Hill Link		
18	Pondage Link		
19	Olympic Boulevard	Local	
20	Dawn Fraser Avenue		
21	Marjorie Jackson Parkway	Local (Parkway)	
-	Other roads	Local	

Source: *Master Plan 2030 Baseline Transport Strategy*

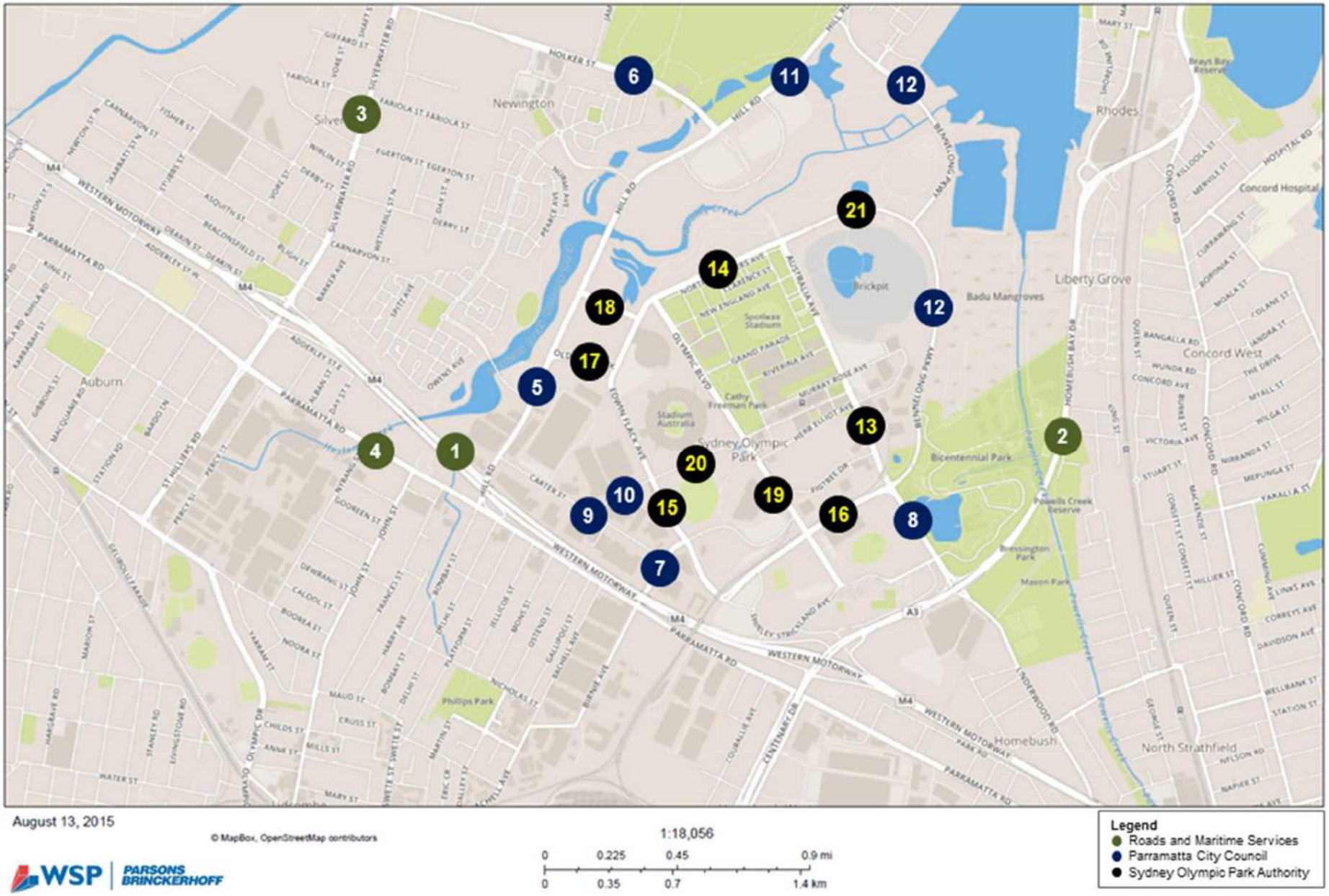


Figure 5.1 Existing road network ownership overview

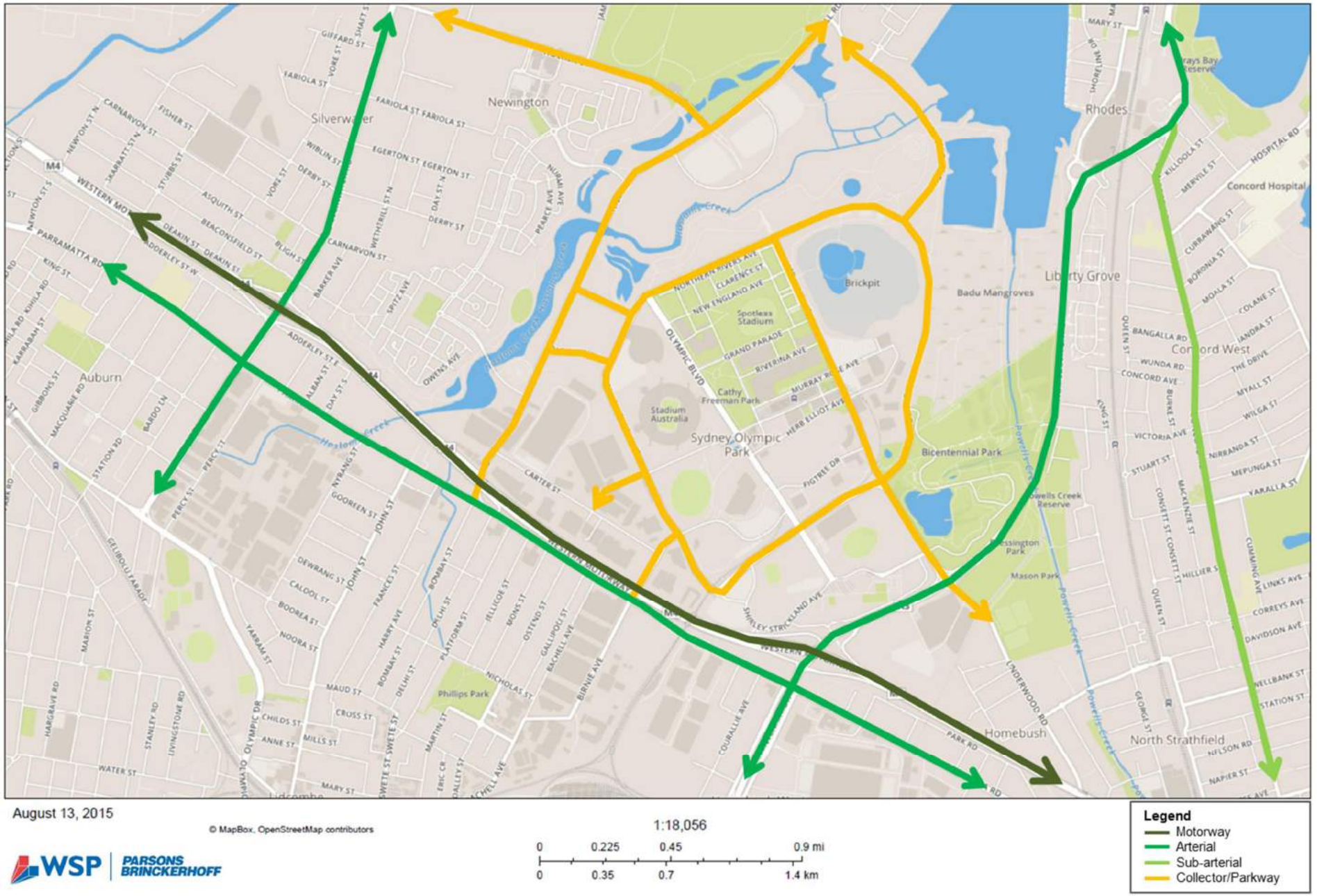


Figure 5.2 Existing road network hierarchy overview

5.3.2 Existing network capacity

Figure 5.3 illustrates the four strategic 'gateway' intersections which provide access between the arterial road network and the SOP precinct:

- South-east: Australia Avenue/Homebush Bay Drive
- South: Birnie Avenue/Parramatta Road
- South-west: Hill Road/Parramatta Road
- North-west: Holker Street/Silverwater Road.

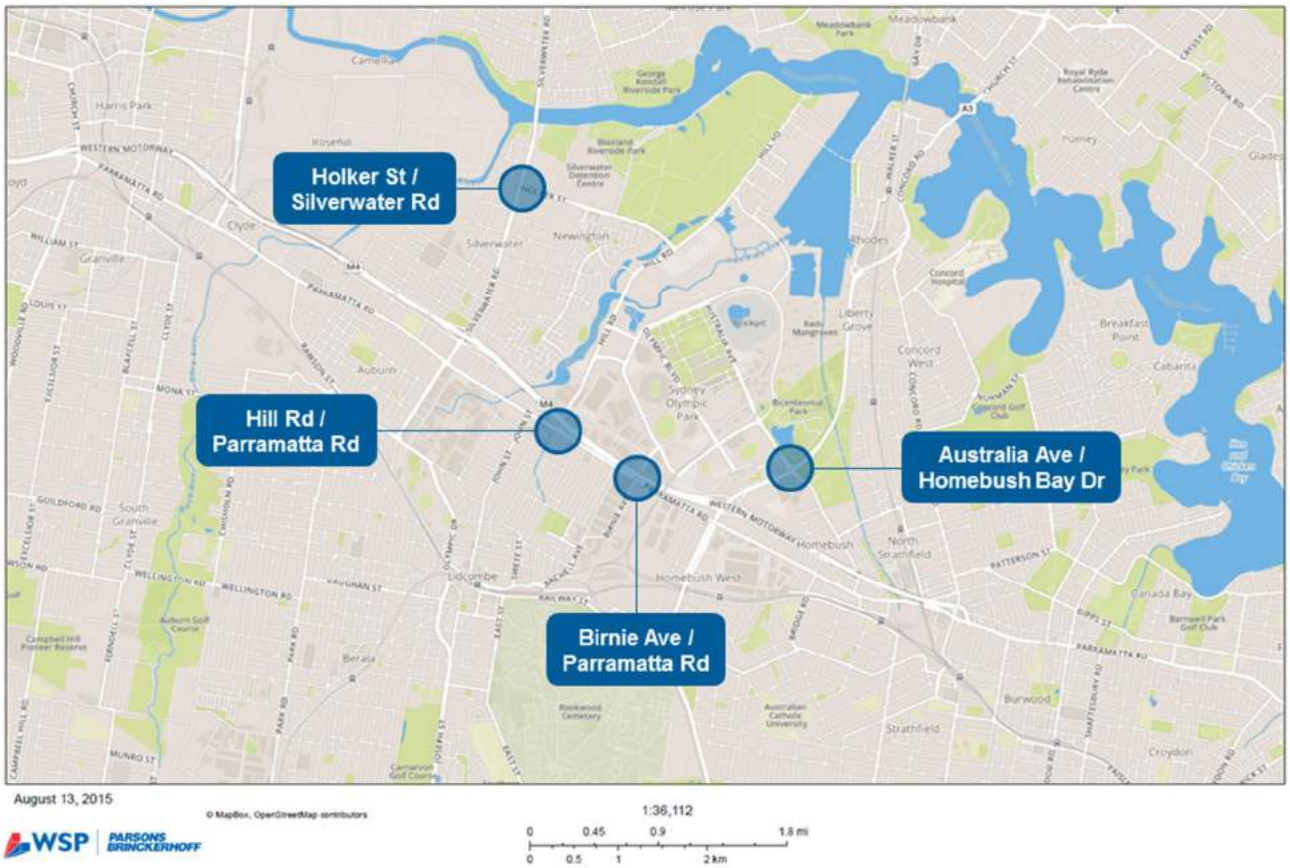


Figure 5.3 SOP precinct gateway intersections

The *Baseline Transport Strategy* indicated that:

- traffic demand under existing conditions was at about 90% of capacity during the morning and evening peak periods
- the overall capacity for vehicles through these gateways in the evening peak was estimated at the time to be around 3,000[3] vehicles per hour.

[3] Based on geometric provisions, signal operation plans and prevailing traffic demands at the time.

5.4 Modelling inputs and assumptions

5.4.1 Traffic generation

A summary of key assumptions relating to traffic generated by SOP is provided in Table 5.2.

Table 5.2 Traffic generation assumptions for SOP

Land use/factor	*Baseline Transport Strategy*	*Traffic and Transport Strategy (2016 Review)*
Commercial		
Employees (GFA/employee)	17 m^2/employee	17 m^2/employee
Traffic generation (AM peak hour)	1.66 vehicle trips/100 m^2 GFA	1.6 vehicle trips/100 m^2 GFA[1]
Traffic generation (PM peak hour)		1.2 vehicle trips/100 m^2 GFA[1]
Venues/Entertainment		
Traffic generation (peak hour)	Consistent with commercial	No change
Residential		
Dwellings (GFA/unit)	100 m^2/dwelling	80 m^2/dwelling
Residents (persons/dwelling)	2.2 residents/dwelling	2.2 residents/dwelling
Traffic generation (AM peak hour)	0.29 vehicle trips/dwelling	0.19 vehicle trips/dwelling[2]
Traffic generation (PM peak hour)		0.15 vehicle trips/dwelling[2]
Temporary accommodation		
Traffic generation (peak hour)	Assumes 20% of temporary accommodation GFA as 'commercial' for employee traffic generation purposes[3]	Assumes 20% of temporary accommodation GFA as 'commercial' for employee traffic generation purposes[3]
Retail		
Traffic generation (peak hour)	1.65 vehicle trips/100 m^2 GFA	3.7[5]/6.2[6] vehicle trips/100 m^2 GFA
Education		
Trip generation (peak hour)	Assumes 20% of education GFA as 'commercial' for employee traffic generation purposes; assumes students would generally travel via public transport and/or outside of peak periods, resulting in only relatively minor traffic generation.	No change.
Community facilities		
Traffic generation (peak hour)	-	Assumes 20% of community facilities GFA as 'commercial' for employee traffic generation purposes.

(1) Sydney average for office blocks (Guide to Traffic Generating Developments Update, RMS, August 2013)
(2) Sydney average for high density residential flat dwellings (Guide to Traffic Generating Developments Update, RMS, August 2013)
(3) This traffic generation represents temporary accommodation workers travelling in the peak hour
(4) Evening peak hour vehicle trips for casual accommodation (Guide to Traffic Generating Developments Update, RMS, 2002)
(5) Sydney average for shopping centres (Fridays; 30,000–40,000 m^2 GFA) (Guide to Traffic Generating Developments Update, RMS, August 2013)
(6) Sydney average for shopping centres (Fridays; 10,000–20,000 m^2 GFA) (Guide to Traffic Generating Developments Update, RMS, August 2013)

The *Baseline Transport Strategy* noted that commercial and retail developments generate substantially more peak hour trips per unit of area than residential. Based on the average residential dwelling size of 80 m^2 proposed by the *Master Plan 2030 (2016 Review) and* AM peak traffic generation of 0.19 vehicles trips per dwelling, residential development generates only 0.24 trips per 100 square metres compared with 1.2 to 1.6 for commercial and 3.7 for retail.

A summary of directional split assumptions used during the traffic modelling (consistent for both the *Baseline Transport Strategy* and the *Traffic and Transport Strategy 2016 Review)* is provided in Table 5.3.

Table 5.3 Traffic generation assumptions for SOP

Land use	AM peak		PM peak	
	Outbound	Inbound	Outbound	Inbound
Commercial/Education/Community	13%	87%	87%	13%
Residential/Temporary accommodation	78%	22%	40%	60%
Retail/Venues/Entertainment	50%	50%	50%	50%

Table 5.3 illustrates that:

- commercial land uses typically create predominantly inbound trips during AM peaks and outbound trips during PM peaks
- residential land uses typically create predominantly outbound trips during AM peaks and inbound trips during PM peaks
- retail land uses have been assumed to create an even split of inbound and outbound trips during weekday peak hours.

5.4.2 Sydney Olympic Park development yields

Summaries of land uses and resultant population and employment yields proposed by the *Baseline Master Plan* and *Master Plan 2030 (2016 Review)* are presented in Table 5.4 and Table 5.5. Full details are provided in section 2.

Table 5.4 Proposed land uses

Land use development	Development yield	
	Baseline Master Plan	*Master Plan 2030 (2016 Review)*
Residential	575,000 m^2	855,000 m^2
Commercial office	479,000 m^2	412,000 m^2
Venues (additions to existing)	130,000 m^2	110,000 m^2
Education	105,000 m^2	186,000 m^2
Temporary accommodation	81,000 m^2	192,000 m^2
Transport infrastructure	51,000 m^2	51,000 m^2
Retail	33,000 m^2	100,000 m^2
Community facilities	31,000 m^2	37,000 m^2
Entertainment	15,000 m^2	17,000 m^2
Total		
All land uses	**1,500,000 m^2**	**1,960,000 m^2**

Table 5.5 Proposed population and employment yields

Forecast	Development yield	
	Baseline Master Plan	*Master Plan 2030 (2016 Review)*
Residential (Residents)	14,000	23,500
Commercial/Education/Community facilities/temporary accommodation (Workers)	29,100	30,470
Venues/Retail/Entertainment (Workers)	2,400	3,530
Totals		
Residents	**14,000 residents**	**23,500 residents**
Workers	**31,500 workers**	**34,000 workers**

5.4.3 Mode share and vehicle occupancy

Table 5.6 summarises the non-car mode share targets (see section 4.4) and car occupancy rates assumed by the *Baseline Transport Strategy* and this *Traffic and Transport Strategy (2016 Review)*.

Table 5.6 Mode share and vehicle occupancy for SOP

Target	*Baseline Transport Strategy*	*Traffic and Transport Strategy (2016 Review)*
Non-car mode share (Initial)	25%	40%
Non-car mode share (Stretch)	40%	60%
Average car occupancy	1.2	

The *Baseline Transport Strategy* assumed that car occupancy would be 1.2 persons per vehicle for journey to work trips, reflecting limited opportunities for car sharing due to dispersed journey trip origins. No change to this assumption is proposed by this *Traffic and Transport Strategy (2016 Review)*.

5.4.4 Surrounding developments

Table 5.7 provides a summary of the future yields in surrounding developments. Further details are provided in section 3.3.

Table 5.7 Surrounding development future population and employment yields

Location/land use		*Baseline Master Plan*	*Master Plan 2030 (2016 Review)*
Wentworth Point	**Residential**	6,000 dwellings	9,500 dwellings
	Non-residential	3,000 m^2 retail 3,000 m^2 commercial	660 workers
Carter Street	**Residential**	-	6,400 dwellings
	Non-residential	800 m^2 retail 65,300 m^2 commercial	5,200 workers
Newington	**Residential**	3,200 dwellings	3,200 dwellings (Complete)
	Non-residential	4,000 m^2 retail 15,000 m^2 commercial	4,000 m^2 retail (Complete) 15,000 m^2 commercial
Total	**Residential**	**9,200 dwellings**	**19,100 dwellings**
	Non-residential	7,800 m^2 retail 83,300 m^2 commercial	**5,860 workers**

5.4.5 Regional traffic

Regional traffic is that which is not generated by land use within SOP but still uses surrounding major roads to pass through the area. Through traffic currently uses the road network within SOP to avoid congestion on surrounding roads, particularly:

- Birnie Avenue
- Edwin Flack Avenue
- Sarah Durack Avenue

- Australia Avenue
- Bennelong Parkway.

The *Baseline Transport Strategy* assumed that regional traffic demand would increase by 10% by 2030, although the level of through traffic could decrease as local activity increases and travel times through SOP are no longer advantageous.

On review, it is acknowledged that Bennelong Parkway continues to become increasingly utilised by traffic travelling between Wentworth Point and the regional road network. A combination of Sarah Durack Avenue, Edwin Flack Avenue, and Birnie Avenue also is used heavily by through traffic travelling between Homebush Bay Drive and Lidcombe.

It is recommended that assumptions regarding regional through traffic using the road network within SOP are reviewed considering the outputs of strategic traffic modelling undertaken for the area, when available.

5.4.6 Event and visitor traffic

Modelled trip generation rates include some visitor traffic to specific land use developments. The *Baseline Transport Strategy* assumed that:

- most medium and major (above 15,000 spectators) event related travel would not occur in the peak commuter periods
- a high level of traffic management would be required for major mid-week events
- restrictions on the use of event public parking may be required in the long term.

This *Traffic and Transport Strategy (2016 Review)* notes that the traffic generating impacts of the increased residential development proposed would include increased inbound traffic during weekday PM peak periods. Residential traffic would add to event traffic travelling to SOP for mid-week events.

For major events during the weekday PM peak, any traffic from the CBD or east of SOP would form part of the dominant westbound flow on the regional road network. It is only when they reach the gateways to SOP that patrons would travel in the opposite direction to workers leaving. As a result event patrons travelling to SOP would experience delays on the surrounding arterial road network before entering the SOP precinct local road network. The addition of new off ramps and on ramps at Hill road from the M4 Motorway will benefit event patrons particularly during the weekday PM peak. Within SOP, greater levels of travel demand management will be required for patrons travelling to SOP for major events staged on weekdays. Proposed improvements such as the introduction of light rail, consolidation of event bus services to the Plaza terminal and redirection of event bus services from the north away from Homebush Bay Drive will support this.

The management of event related traffic must also consider that development is planned in, and adjacent to, SOP on non-SOPA lands, and these are also likely to impact the arrival rate and travel times of mid-week patrons to major events. It is recommended that the locations and duration of event road closures be revised to impact fewer roads for shorter periods of time. This would ideally restrict the majority of road closures to Olympic Boulevard north of Herb Elliott Avenue, and Dawn Fraser Avenue between Showground Road and Edwin Flack Avenue for the majority of medium and major events. A reduced and consistent number of road closure time period classifications would assist in event operations awareness for local businesses and residents.

5.4.7 Freight

Changes in land use have been a significant feature of the *Baseline Master Plan*. The precinct has evolved from an area dominated by warehousing, freight and logistics and a light industrial based businesses to a vibrant mixed use precinct with high density residential development. The adjacent development areas such as Wentworth Point and Carter Street have experienced a more dramatic change. The future freight needs of the precinct are likely to be associated with retail land uses and event venue operations. The future business park uses in Carter Street will still require access for freight vehicles however they are likely to be smaller in size. The dominant logistics operation in Wentworth Point has recently ceased operation and is about to undergo a transformation into a residential development.

Provision for freight access has been accommodated in this *Traffic and Transport Strategy (2016 Review)* through the provision of a dedicated street within the Central precinct to support retail servicing within this street network. The existing local road network was also designed to accommodate large vehicles to service event venues and this has been maintained.

The improved connections to and from the M4 Motorway both on Hill Road and at the Homebush Bay Drive Interchange will also reduce the need for freight related vehicles to circulate through the local road network. The proposed reduction in extent and duration of event road closures proposed in this review will also assist in the movement of freight within the precinct.

5.4.8 Future network upgrades

Table 5.8 provides a summary of key public transport and road network upgrades assumed within the 2030 timeframe.

Table 5.8 Future network upgrade assumptions

Mode	Details
Heavy rail	■ Increase train capacity (size) on T7 Olympic Line. ■ Potential for direct connections to the T1 Western Line
Light rail	■ Construct light rail between Parramatta and Strathfield via SOP.
Bus	■ Opening of the Bennelong Bridge across Homebush Bay providing more direct bus services and connection to rail ■ Increase existing bus service coverage. ■ Increase existing bus service capacities/frequencies. ■ Increase existing bus service speeds (Rapid bus/priority measures/express services).
Ferry	■ Continue ferry services to and from Sydney Olympic Park Ferry Wharf.
Roads	■ Construct WestConnex, including: ‣ new connections at Hill Road and Homebush Bay Drive (to M4 Motorway) ‣ upgrades to existing connections at Silverwater Road and Homebush Bay Drive (to M4 eastbound, including a direct entry to the new M4 east tunnel). ■ Other road upgrades (see section 5.5) ‣ upgrades to roads surrounding the SOP precinct ‣ upgrades to roads within the SOP precinct.

5.5 Traffic forecasting and analysis

In this section, the capacity of the SOP precinct and immediately connected road network is discussed and related to future traffic demand estimates. It is difficult to identify a single value for capacity of a road network where traffic comes from many sources and traffic patterns vary substantially by time of day.

The *Baseline Transport Strategy* provided estimates of capacity in order to identify the limit of sustainable, traffic-generating developments in SOP for the *Baseline Master Plan*. This was quantified by developing estimates of the maximum amount of traffic able to leave the Olympic Peninsula area during the evening peak hour (referred to as 'evening peak trips out').

Traffic generated by SOP shares the road network with background traffic within and surrounding the SOP precinct. The 2003 *Traffic Assessment Study* concluded that as locally generated traffic increases, there will be less incentive for through traffic to use SOP roads, releasing more capacity for local traffic. This effect was taken into account by the *Baseline Transport Strategy* when estimating peak hour capacity.

This *Traffic and Transport Strategy (2016 Review)* provides:

- an analysis of the traffic-generating effects of the changes to land use development proposed by the *Master Plan 2030 (2016 Review)*
- recommendations regarding modifications to the road network upgrades proposed by the *Baseline Transport Strategy* in response to these changes.

5.5.1 Sydney Olympic Park

First-principles modelling has been undertaken to quantify the anticipated change to traffic generation as a result of the changes to land use development proposed by the *Master Plan 2030 (2016 Review).* A summary of this analysis is provided in Table 5.9.

Table 5.9 Estimated two-way AM peak hour traffic generation – Sydney Olympic Park

Land use	*Baseline Master Plan*		*Master Plan 2030 (2016 Review)*	
	Yield	Vehicles	Yield	Vehicles
Residential	6,350 dwellings	1,210	10,700 dwellings	1,330
Commercial	479,000 m^2	7,950	412,000 m^2	6,590
Venues	130,000 m^2	2,160	110,000 m^2	1,730
Education	105,000 m^2	340	186,000 m^2	600
Temp. accommodation	81,000 m^2	260	192,000 m^2	610
Retail (10,000–20,000 m^2)	33,000 m^2	550	-	-
Retail (30,000–40,000 m^2)	-	-	100,000 m^2	3,700
Community facilities	31,000 m^2	100	37,000 m^2	120
Entertainment	15,000 m^2	250	17,000 m^2	270
Total				
All land uses	1,500,000 m^2	**12,820**	1,960,000 m^2	**14,950**

For assumptions on generation rates refer to Table 5.2

Table 5.9 indicates that, based on the application of relevant set of assumptions for the yields proposed by the *Baseline Master Plan* and the *Master Plan 2030 (2016 Review)* shows that:

- the changes to land uses proposed by the *Master Plan 2030 (2016 Review)* would generate around 2,130 (17%) additional vehicles when compared to the *Baseline Master Plan*
- commercial and retail uses would generate the majority (around 69%) of AM peak hour traffic
- residential development would generate approximately 9% of total traffic under the *Master Plan 2030 (2016 Review)* scenario.

Further analysis has been undertaken to determine the effects of changes to proposed land uses (i.e. increased residential and reduced commercial development) on the directional generation of traffic. A summary of this analysis is provided in Table 5.10.

Table 5.10 Future AM peak hour traffic distribution – Sydney Olympic Park

Land use	*Baseline Transport Strategy*			*Traffic and Transport Strategy (2016 Review)*		
	Total vehicles	Inbound	Outbound	Total vehicles	Inbound	Outbound
Residential	1,210	270	940	1,330	290	1,040
Commercial	7,950	6,920	1,030	6,590	5,740	850
Venues	2,160	1,080	1,080	1,730	865	865
Education	340	290	50	600	520	80
Temp. accommodation	260	130	130	610	305	305
Retail	550	275	275	3,700	1,850	1,850
Community facilities	100	90	10	120	100	20
Entertainment	250	125	125	270	135	135
Total						
All land uses	**12,820**	**9,180**	**3,640**	**14,950**	**9,805**	**5,145**

Table 5.10 illustrates that the changes to land uses proposed by the *Master Plan 2030 (2016 Review),* when compared to the baseline, would:

- generate around 625 (7%) additional inbound vehicles
- generate around 1,505 (41%) additional outbound vehicles
- assist in further balancing inbound and outbound vehicles travelling to and from SOP.

Overall, the results indicate that the land uses proposed by the *Master Plan 2030 (2016 Review)* would increase AM peak hour traffic generation by approximately 17%, with the majority of the increase travelling in the opposite direction (outbound) to the dominant traffic flow (i.e. an increase in residents travelling outbound in the AM peak and inbound in the PM peak).

As a result, the additional traffic impacts due to the changes to land uses proposed by the *Master Plan 2030 (2016 Review)* are anticipated to be managed through the implementation of key regional and local road upgrades identified by this *Traffic and Transport Strategy (2016 Review)* and the projects identified through the *Olympic Peninsula Regional Transport Infrastructure Investigations* by RMS. The recent road upgrades associated with WestConnex will also contribute significantly to the improvement of regional road capacity of the precinct. The following sections provide an overview of these recommendations.

5.5.2 Surrounding developments and through traffic

As noted in section 5.4.5, the three key planned and ongoing developments surrounding SOP are:

- Wentworth Point (Primarily residential)
- Carter Street (mixed use development, predominantly residential and business park)
- Newington (residential – built out).

In addition to existing and future traffic generated by these developments, the road network within SOP is anticipated to remain a thoroughfare for a number of other 'through trips' or 'rat runners' in the absence of strategic interventions implemented by RMS. As noted in section 5.2, at the time of publication of the *Master Plan 2030 (2016 Review)*, information pertaining to strategic forecasts was not available to quantify this issue.

Wentworth Point

Wentworth Point has a planned growth of approximately 17,200 residents and 610 workers. This is a sixfold increase on the existing population estimated at 2,800 residents and 50 workers. Traffic surveys conducted in early 2015 on Bennelong Parkway and Hill Road (north of Holker Street) show that during the AM and PM peak hours the combined two-way volumes are between 2,500 and 3,000 vehicles per hour respectively. Assuming that three quarters travel to and from Wentworth Point then approximately 2,000 vehicles per hour two-way are generated from this precinct. This is higher than what would typically be estimated from a development of this size indicating:

- a relatively low existing public transport and mode share (estimated as around 13% by 2011 HTS data; the Bennelong Bridge across Homebush Bay, a new 'green' pedestrian, cycling and bus bridge to and from Rhodes opened in June 2016 and is expected to improve local trip generation, as discussed in section 4.2.4), and/or;
- a significant amount of construction traffic relating to the ongoing development of this site (potentially up to 1,000 vehicles during peak hour).

A full development scenario including an estimated 20,000 residents could generate up to approximately 7,000 vehicle trips during peak hours. With 90% of this traffic being residential generation, a significant outbound demand during the AM peak and inbound demand during the PM peak would exist. With the potential for up to 5,000 vehicles per hour in the peak direction from this development precinct, and as it is a contained development (without significant existing public transport and other travel demand management activities), its traffic impacts would create the need for significant upgrades to Hill Road and Bennelong Parkway.

However, following the opening of the Bennelong Bridge and assuming a similar public transport mode share as SOP, peak period directional demand would reduce to approximately 3,000 vehicles per hour[4]:

- 3,000 vehicles per hour would require a minimum of two lanes in each direction on Hill Road north of Bennelong Parkway to cater for this demand, with additional lanes at intersections.
- Hill Road would be the desired primary corridor for these development demands with all major directional distributions catered for. RMS is currently investigating this corridor and upgrade requirements (see section 5.5.3, section 5.5.4, and section 5.5.5):
  - East via Hill Road and M4 onramp (planned as part of WestConnex) or Parramatta Road
  - North via Holker Street and Silverwater Road

[4] The Wentworth Point TMAP forecasts 3,261 peak hour vehicle trips (two-way) following the completion of the Bennelong Bridge

- West via Holker Street or Parramatta Road
- South via Hill Road and Bombay Street.

Should congestion remain throughout the wider network, demand to use Bennelong Parkway will remain. In this case it is likely that upgrades to Bennelong Parkway as a result of the development of Wentworth Point will be necessary.

Carter Street

The Carter Street Priority Precinct is planned to convert a primarily industrial precinct into a mixed use development with over 13,440 residents and an additional 2,200 workers. Due to the nature of the current land use, a high reliance on private vehicles exists. The *Carter Street UAP Traffic Impact Assessment* (TIA) estimates that the development of the site will increase current traffic generation by 2,700 vehicles during commuter peak hours based on a 60% car driver mode share.

Intersections which the TIA highlighted as experiencing significant constraints in the future both with and without the development included:

- Hill Road/Carter Street
- Parramatta Road/Birnie Avenue
- Parramatta Road/Hill Road.

The priority precinct's close proximity to Parramatta Road and the M4 Motorway mean that both of these major roads are attractive as distributors of traffic demand. The Carter Street Priority Precinct provides recommendations similar to this Strategic Transport Assessment (see section 5.2) for area-wide, integrated strategic modelling to address arterial road network capacity issues and develop public transport initiatives.

Newington

Section 5.4.4 indicates that Newington is believed to be effectively fully developed. Consequently any further traffic impacts are considered to be contained within background and general future through traffic assumptions.

Through trips

An origin-destination traffic survey undertaken by SOPA in August 2015 indicated a significant amount of the traffic traversing the SOP precinct road network are through movements, unrelated to SOP land uses. This estimate is also reinforced by the analysis and findings of prior projects undertaken within the precinct. It is estimated that through movements primarily occur:

- between Homebush Bay Drive and Birnie Avenue via Sarah Durack Avenue (measured as 30% by the 2015 origin-destination surveys undertaken by SOPA)
- between Hill Road/Holker Street and Homebush Bay Drive via Bennelong Parkway (including traffic generated by the Wentworth Point development).

Strategic model outputs would provide insight and quantify the future potential for changes to existing through traffic patterns and demand. In the absence of these outputs it is generally anticipated that as local area developments occur (e.g. further development within SOP), the magnitude of through trip making reduces. This phenomenon would occur when the penalties (i.e. traffic increases and resultant increasing delays) for traversing the SOP road network exceed alternative routes.

Conclusions

As noted in section 5.2, to assess the impacts of all of the future development of SOP, surrounding developments, and through traffic, wider area integrated transport model outputs are required. Given the scale and locations of the developments, it is likely that relatively significant changes in travel behaviour will occur to, from, and within the Olympic Peninsula. Nevertheless, when considering the planned developments, the following conclusions are made;

- Wentworth Point is forecast to generate a significant volume of vehicles during peak hours. Given it is predominately a residential development, limited opportunities exist for trip containment and there will be a significant directional demand during commuter periods. Upgrades to Hill Road and Bennelong Parkway would be necessary to accommodate development traffic; a balance between supply (network capacity) and demand will be necessary to manage demands.
- Carter Street will create its most significant traffic impacts on Hill Road, Birnie Avenue, Parramatta Road and the M4 Motorway. As it is a mixed use development and smaller than Wentworth Point, its potential traffic impacts on and surrounding SOP will be less significant.
- Through traffic (including traffic generated by surrounding developments) is likely to continue to be a feature of demand on the SOP road network. However, it is anticipated that this demand may decrease proportionally over time to avoid the increase in traffic generated by SOP. Routes most susceptible to continuing through traffic in the future include Sarah Durack Avenue, Australia Avenue, Bennelong Parkway and Birnie Avenue.
- An area wide model of the Olympic Peninsula road network (and beyond) will provide greater clarity and quantification of anticipated future transport network performance. This modelling needs to consider the cumulative effects of all future developments and the demand impacts they are expected to create, in conjunction with upgrades to the future transport networks proposed to mitigate these impacts.

5.6 Future road upgrades

5.6.1 Overview

The *Baseline Transport Strategy* supporting *the Baseline Master Plan* nominated upgrades to the existing road network surrounding and within SOP. A summary of the short-term and long-term upgrades proposed by the *Baseline Transport Strategy* and this *Traffic and Transport Strategy (2016 Review)* are summarised in Table 5.11 and Table 5.12. Details of these upgrades are provided in sections 5.5.4 and 5.5.5.

Table 5.11 Future short-term road network upgrades

Location	Relevant to:		Details
	Baseline Transport Strategy	*Traffic and Transport Strategy (2016 Review)*	
Surrounding road network			
Silverwater Road/ Holker Street	✓	✓	▪ Priority 1 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
Parramatta Road/Hill Road/ Bombay Street	✓	✓	▪ Priority 1 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).

Location	Relevant to:		Details
	Baseline Transport Strategy	*Traffic and Transport Strategy (2016 Review)*	
Parramatta Road/ Birnie Avenue	✓	✓	▪ Priority 1 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
Carter Street/Hill Road	✓	✓	▪ Priority 2 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
Carter Street/Birnie Avenue	✓	✓	▪ Priority 3 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
Australia Avenue/ Homebush Bay Drive	✓	✓	▪ Priority 1 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
SOP precinct road network			
Hill Road/Holker Street	✓	✓	▪ Priority 1 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
Australia Avenue/ Kevin Coombs Avenue/ Marjorie Jackson Parkway	✓	✓	▪ Priority 3 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
Australia Avenue/ Murray Rose Avenue	✓	✓	▪ Signalise intersection. ▪ Provide right turn bays on Australia Avenue approaches.
Australia Avenue/ Herb Elliott Avenue/ Parkview Drive	✓	-	▪ Upgrade complete.
Australia Avenue/ Figtree Drive	✓	✓	▪ Do not signalise; upgrade in accordance with revised Central precinct road strategy (see section 5.5.6).
Australia Avenue/ Sarah Durack Avenue/ Bennelong Road	✓	✓	▪ Priority 1 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
Edwin Flack Avenue/ Uhrig Road/ Dawn Fraser Avenue	✓	✓	▪ Signalise intersection. ▪ Widen intersection. ▪ Provide right turn bays on all approaches.
Edwin Flack Avenue/ Birnie Avenue/ Shane Gould Avenue	✓	✓	▪ Priority 2 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
New Central precinct road network proposed by the *Master Plan Review*	-	✓	▪ Implement revised Central precinct road network strategy (see section 5.5.6) including: ‣ A new east-west access road between Herb Elliott Avenue and Figtree Drive. ‣ A new north-south street aligned with pedestrian bridge over Sarah Durack Avenue.

Location	Relevant to:		Details
	Baseline Transport Strategy	*Traffic and Transport Strategy (2016 Review)*	
Bennelong Parkway / Murray Rose Avenue	-	✓	▪ Signalise intersection. ▪ Widen intersection. ▪ Provide right turn bays on southbound and eastbound approaches.

Table 5.12 Future long-term road network upgrades

Location	Relevant to:		Details
	Transport Baseline Strategy	*Traffic and Transport Strategy (2016 Review)*	
Surrounding road network			
M4 Motorway widening	✓	✓	▪ Included in WestConnex projects. ▪ Funded and under construction ▪ Now considered **short term**
M4 Motorway / Hill Road east-facing ramps (eastbound on-ramp and westbound off-ramp)	✓	✓	▪ New eastbound on-ramp from Hill Road is included in WestConnex projects. ▪ New westbound off-ramp to Hill Road is included in WestConnex projects. ▪ Funded and under construction ▪ Now considered **short term**
Uhrig Road extension	✓	-	▪ Not recommended by *Transport Strategy Review*.
Use of the Mousehole by general traffic	✓	-	▪ Use by general traffic not recommended by *Transport Strategy Review*.
Homebush Bay Drive (A3) to Parramatta Road direct link	-	✓	▪ Recommended to reduce through traffic travelling through SOP precinct.

These nominated upgrades are expected to improve vehicle access by:

- expanding the existing network within SOP with new streets to increase connectivity and add capacity
- improving connections to the M4 Motorway through new eastbound on ramp and westbound off ramp at Hill Road; to improve access to and from the Sydney CBD, eastern suburbs and inner west; new G-turn Mr4 Motorway westbound at Homebush Bay Drive interchange
- improving connections to the major arterial roads
- improving connections to local roads in the Carter Street Priority Precinct
- upgrading the capacity of local intersections (e.g. new traffic signals)
- providing bus priority on routes into the site

- maintaining access at all times to local business and residences by providing convenient alternative routes when event road closures are in place.

5.6.2 Short-term road network upgrades

The *Baseline Transport Strategy* nominated short-term upgrades to the existing road network to increase traffic capacity to and from SOP. These road improvements were originally identified by the 2003 *Traffic Assessment Study* (Cardno, 2003):

- upgrades to the strategic intersections which provide access to and from the SOP precinct
- upgrades to intersections within the SOP precinct.

These intersection upgrades, in addition to reductions in through traffic, were estimated to increase the capacity of the road network to and from the SOP precinct from 3,000 vehicles by around 75% to 5,250 vehicles per hour. The recent upgrades to the access to the M4 Motorway and Hill Road widening will have increased this capacity even further. The peak hour road capacity of the regional road network is currently being investigated by RMS though region wide traffic modelling and was not available in time to be incorporated in this strategy.

Details of the proposed upgrades are provided in Table 5.13. The locations of recommended road upgrades are illustrated in Figure 5.4.

Table 5.13 Short-term intersection upgrades

#	Intersection	Proposed *Baseline Transport Strategy* upgrades	Status
Surrounding road network			
1	**Silverwater Road/ Holker Street**	▪ Prohibit right turn from Silverwater Road (northbound) into Holker Street by infilling the turning lane to create a median. ▪ Change Holker Street to three lanes westbound and one lane eastbound. ▪ Potential additional works: create a tidal flow arrangement on Holker Road with 2/2 and 1/3 east/west lane configurations.	RMS Priority 1 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
2	**Parramatta Road/ Hill Road/ Bombay Street**	▪ Ban right turn from Bombay Street (south approach). ▪ Alter Hill Road (north approach) to provide one left turn lane, one left and through lane and one right turn lane. ▪ Provide slip lane for Parramatta Road west approach left turn into Hill Road.	RMS Priority 1 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
3	**Parramatta Road/ Birnie Avenue**	▪ Birnie Avenue widened from two to three lanes northbound and from three to four lanes southbound. ▪ Ban right turn from Parramatta (eastbound) into Birnie Avenue South by closing turning lane. ▪ Elevate pedestrian/cycle path behind existing bridge piers.	RMS Priority 1 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
4	**Carter Street/ Hill Road**	▪ Signalise intersection. ▪ Add right turn bay from Hill Road northbound into Carter Street.	RMS Priority 2 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).

#	Intersection	Proposed *Baseline Transport Strategy* upgrades	Status
5	Carter Street/ Birnie Avenue	■ Extend concrete medians and line marking to enforce left in/left out only to Carter Street.	RMS Priority 3 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
6	Australia Avenue/ Homebush Bay Drive	■ Convert roundabout into two signalised intersections. ■ North intersection: ▸ Australia Avenue north approach – two through lanes + left turn slip lane (50 m upstream) ▸ Homebush Bay Drive west approach – one left turn slip lane (100 m upstream) + two right turn lanes ▸ Underwood Road south approach – two through lanes + one right turn lane (30 m long turn bay) ▸ Homebush Bay Drive east approach – one-way eastbound (two lanes). ■ South intersection: ▸ Australia Avenue north approach – one through lanes + two right turn lanes (right most right turn lane is only 30 m in length) ▸ Homebush Bay Drive west approach – one-way westbound (two lanes) ▸ Underwood Road south approach – two through lanes + left turn slip lane (50 m upstream) ▸ Homebush Bay Drive east approach – one left turn slip lane (50 m upstream) + two right turn lanes.	RMS Priority 1 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS).
SOP precinct local road network			
7	Hill Road/ Holker Street	■ Works required to open the Holker Street Busway to general traffic outside of events: ▸ signalise intersection ▸ lane configuration works: middle lane westbound on Hill Road and middle lane southbound on Holker Street changed to through only.	RMS Priority 1 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS). Opening Busway to general traffic **not recommended** due to conflicts with future bus and light rail services.
8	Australia Avenue/ Kevin Coombs Avenue/Marjorie Jackson Parkway	■ Works required to open the Holker Street Busway to general traffic outside of events: ▸ signalise intersection ▸ add right turn lane from Holker Street southbound into Kevin Coombs Avenue ▸ ban right turn from Marjorie Jackson Parkway westbound into Holker Street.	RMS Priority 3 intersection under investigation as part of *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS). Opening Busway to general traffic **not recommended** due to conflicts with future bus and light rail services.
9	Australia Avenue/ Murray Rose Avenue	■ Signalise intersection. ■ Provide two new right turning bays: Australia Avenue southbound into Murray Rose Avenue and Australia	Upgrade required.

#	Intersection	Proposed *Baseline Transport Strategy* upgrades	Status
		Avenue northbound into future extension of Murray Rose Avenue (Figure 5.5).	
10	**Australia Avenue/ Herb Elliott Avenue/ Parkview Drive**	■ Signalise intersection. ■ Provide two new right turning bays: Australia Avenue southbound into Herb Elliot Avenue and Australia Avenue northbound into Parkview Drive.	Upgrade complete.
11	**Australia Avenue/ Figtree Drive**	■ Signalise intersection. ■ Prohibit right turn from Australia Avenue southbound into Fig Tree Drive, enforced by extension of median. ■ Widen existing pavement on Figtree Drive. ■ Possible four-way intersection integrating access to development site 3 (Figure 5.6).	Upgrade required **but do not signalise**; signalise new east-west access road intersection with Australia Avenue between Herb Elliott Avenue and Figtree Drive in accordance with revised Central precinct road strategy (see section 5.5.5).
12	**Australia Avenue/ Sarah Durack Avenue/ Bennelong Road**	■ Provision of left turn slip lane from Bennelong Road to Australia Avenue. ■ Widen Sarah Durack Ave eastbound from two to three lanes at intersection with Australia Avenue. ■ Widen Australia Avenue southbound from three to four lanes at intersection with Sarah Durack Avenue/Bennelong Road.	Priority 1 intersection under investigation as part of Olympic Peninsula Regional Transport Infrastructure Investigations (RMS).
13	**Edwin Flack Avenue/ Uhrig Road/ Dawn Fraser Avenue**	■ Signalise intersection, allowing two lanes for each leg. ■ Potential additional works: add right turn bays for all legs of the intersection (Figure 5.7).	Upgrade required.
14	**Edwin Flack Avenue/ Birnie Avenue/ Shane Gould Avenue**	■ Signalise intersection. ■ Widen Shane Gould Avenue at intersection. ■ Add two new left turn lanes: Edwin Flack Avenue northbound into Birnie Avenue and Birnie Avenue eastbound into Edwin Flack Avenue. ■ Add new right turning bay from Edwin Flack Avenue northbound into Shane Gould Avenue. ■ Potential additional works: add two right turn bays: Edwin Flack Avenue southbound into Birnie Avenue and Shane Gould Avenue westbound into Edwin Flack Avenue	Signalisation and intersection widening upgrades generally complete, with the exception of the two new left turn lanes proposed. Priority 2 intersection under investigation as part of Olympic Peninsula Regional Transport Infrastructure Investigations (RMS).
15	**New Central precinct road network proposed by the *Master Plan Review***	■ Implement revised Central precinct road network strategy (see section 5.5.5) including: ▸ A new east-west access road between Herb Elliott Avenue and Figtree Drive. ▸ A new north-south street aligned with pedestrian bridge over Sarah Durack Avenue.	Upgrade required (not identified in *Baseline Transport Strategy*).
16	**Bennelong Parkway / Murray Rose Avenue**	■ Signalise intersection. ■ Widen Bennelong Parkway and Murray Rose Avenue at intersection. ■ Provide right-turning bays from Bennelong Parkway southbound to Murray Rose Avenue westbound, and from Murray Rose Avenue eastbound to Bennelong Parkway southbound.	Upgrade required (not identified in *Baseline Transport Strategy*).

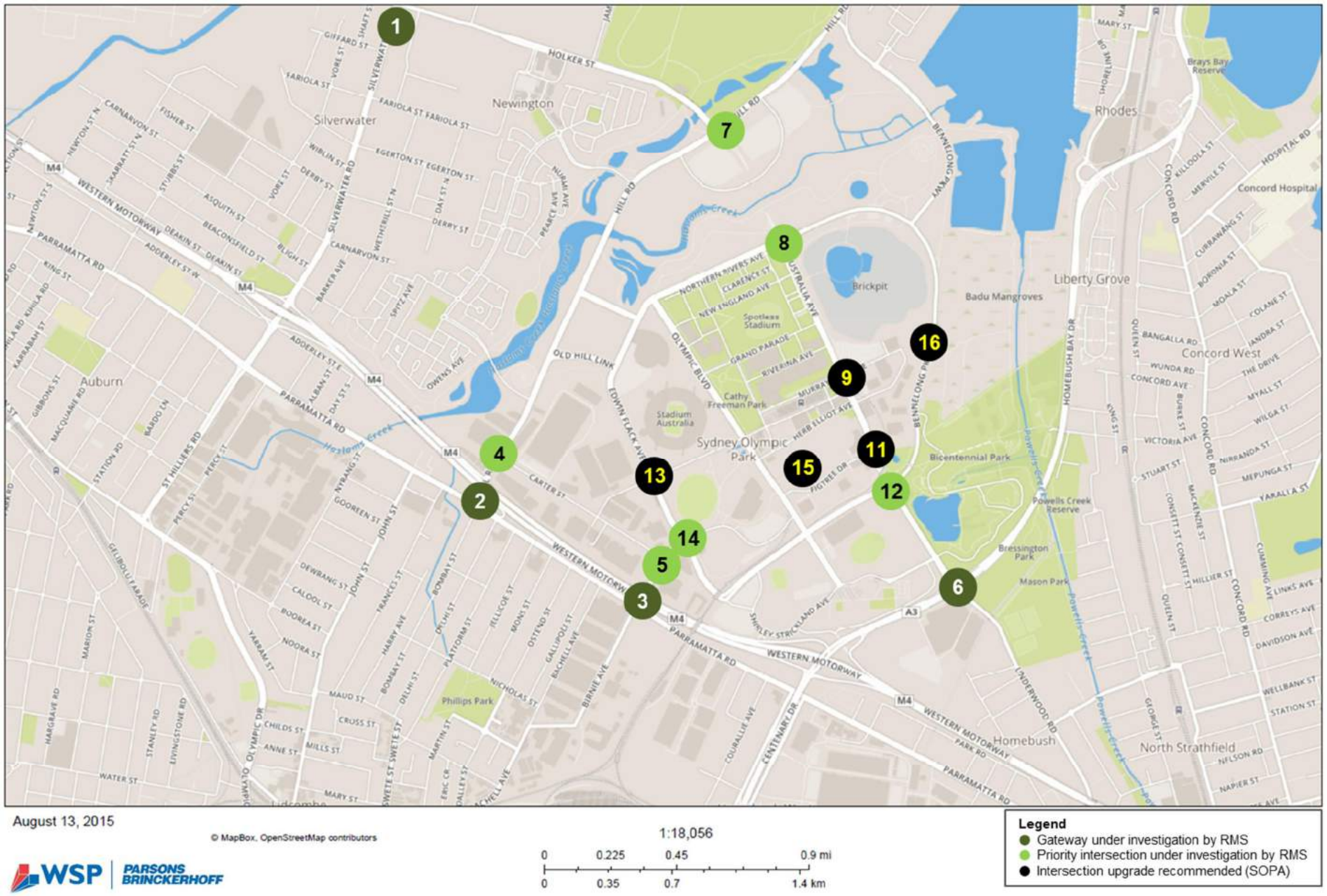


Figure 5.4 Recommended short-term road network upgrades

Many of the intersection locations where short-term upgrades were proposed by the *Baseline Transport Strategy* are now under investigation as part of the *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS). This investigation includes the four strategic gateway intersections, and other key intersections, which provide access to and from SOP. These investigations will determine the extent of upgrades required to satisfy the traffic demand generated by the future development of surrounding areas including Wentworth Point and Carter Street (see section 3.3), as well as SOP. Sketches of the previously nominated upgrades in these locations are provided in Appendix B of the *Baseline Transport Strategy*.

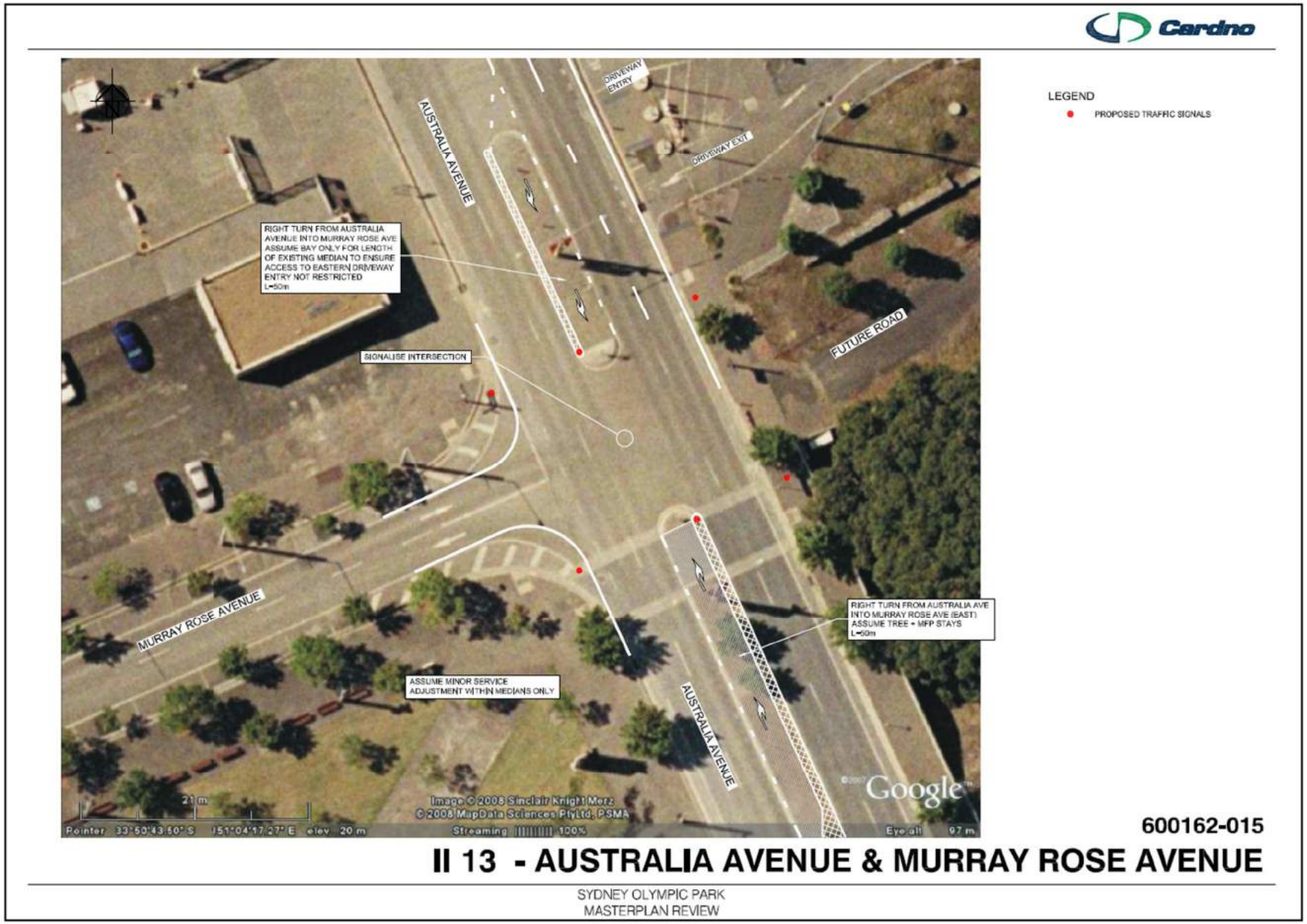
Table 5.13 indicates that there are three upgrades which were nominated by the *Baseline Transport Strategy* which have not yet been constructed, and are the responsibility of SOPA, namely:

- Australia Avenue/Murray Rose Avenue
- Australia Avenue/Figtree Drive
- Edwin Flack Avenue/Uhrig Road/Dawn Fraser Avenue.

The upgrades proposed by the *Baseline Transport Strategy* at these intersections are illustrated in Figure 5.5, Figure 5.6, and Figure 5.7. It is recommended that the signalisation and widening of Australia Avenue/Murray Rose Avenue and Edwin Flack Avenue/Uhrig Road/Dawn Fraser Avenue intersections are progressed.

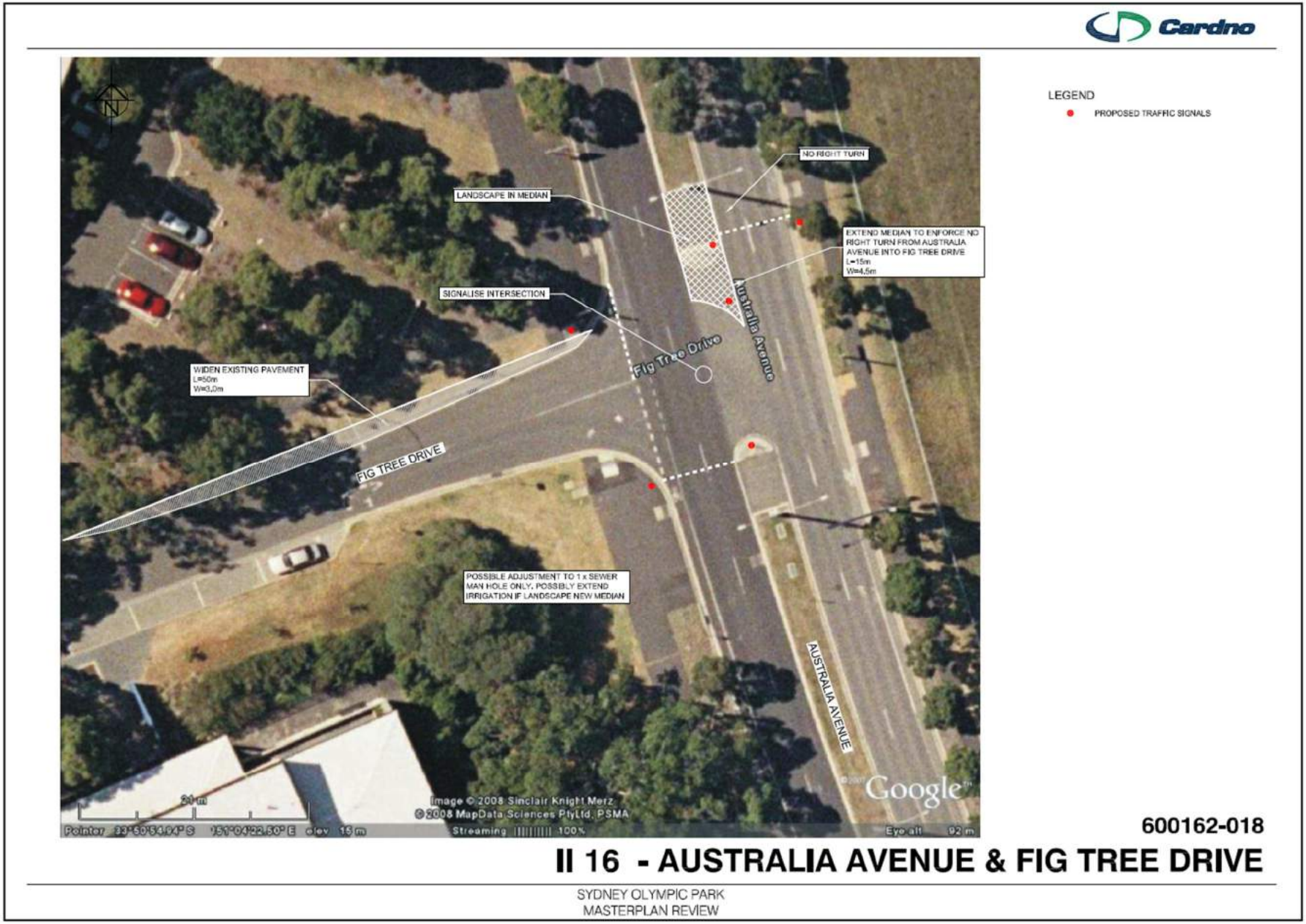
The upgrade to the intersection of Australia Avenue and Figtree Drive will be reviewed in line with the new Central precinct road strategy. It is recommended that the Figtree Drive intersection is not signalised, as a new signalised intersection on Australia Avenue with a new east-west access road is proposed to the north of Figtree Drive to provide primary traffic access to and from the precinct. Further details are provided in section 5.5.5.

These local road upgrades will also be reviewed in coordination with the Parramatta Light Rail project as the alignment is developed.



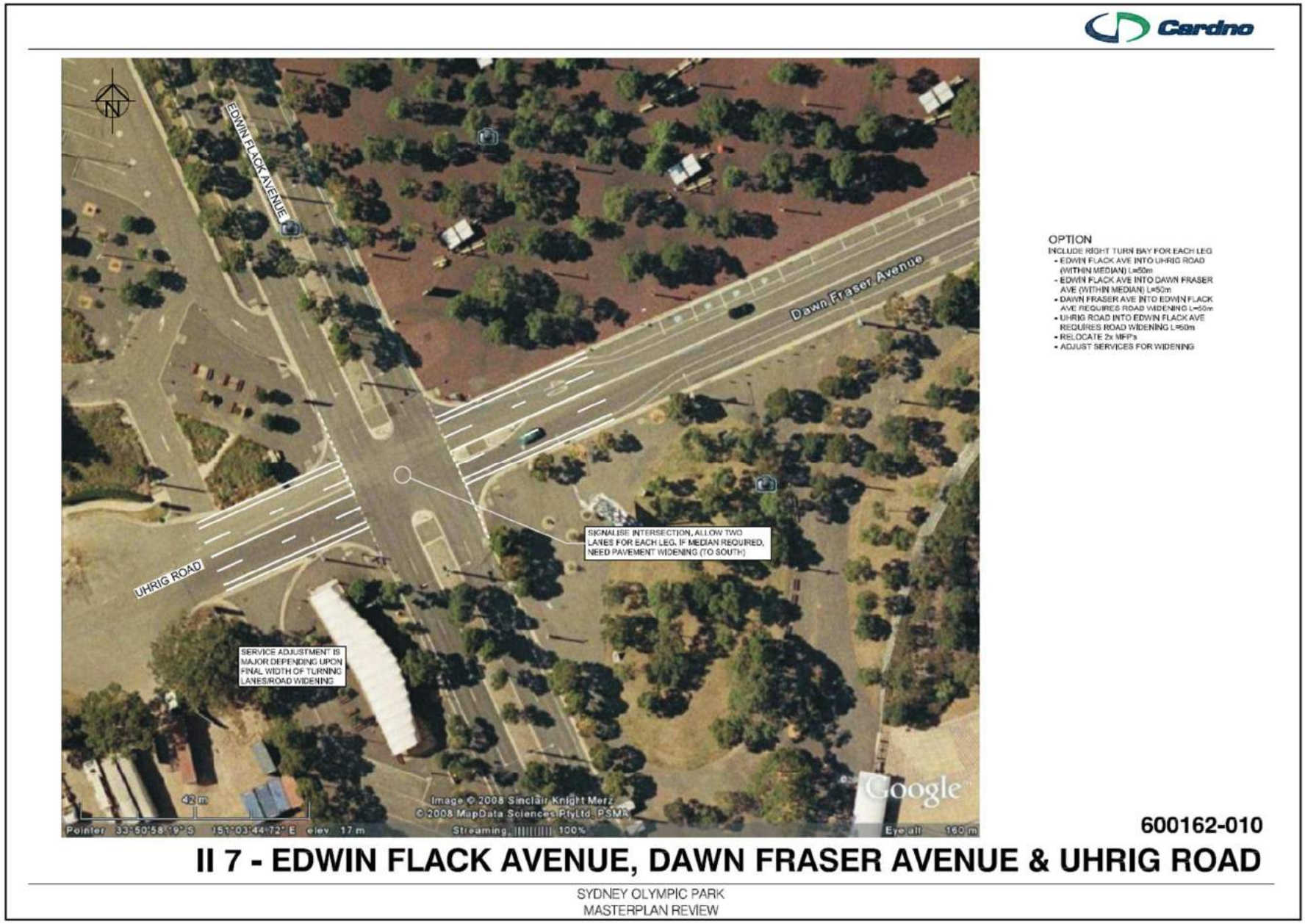
Source: *Master Plan 2030 Transport Strategy* (SOPA, 2010)

Figure 5.5 Australia Avenue/Murray Road Avenue intersection upgrade



Source: *Master Plan 2030 Transport Strategy* (SOPA, 2010)

Figure 5.6 Australia Avenue/Figtree Drive intersection upgrade



Source: *Master Plan 2030 Transport Strategy* (SOPA, 2010)

Figure 5.7 Edwin Flack Avenue/Dawn Fraser Avenue/Uhrig Road intersection upgrade

5.6.3 Long-term road network upgrades

The *Baseline Transport Strategy* nominated the following long-term upgrades to the road network to improve access to and from the Olympic Peninsula:

- upgrades to the capacity and accessibility of the M4 Motorway
- increasing the amount of strategic access points to and from the SOP precinct.

These upgrades, in addition to reductions in through traffic and the short-term upgrades, were estimated by the *Baseline Transport Strategy* to increase the capacity of the road network to and from the SOP precinct by a further 20%. Upgrades to the road network surrounding the SOP precinct are summarised in Table 5.14 and illustrated in Figure 5.8.

Table 5.14 Long-term road network upgrades

#	Upgrade	Proposed *Baseline Transport Strategy* upgrades	Status
Surrounding road network			
1	**M4 Motorway widening**	▪ Widening of M4 Motorway to three lanes east of Homebush Bay Drive. ▪ Estimated capacity increase of **400 vehicles per hour** due to reduction of traffic on Parramatta Road.	Included in WestConnex projects and now considered a **short term** upgrade.
2	**M4 Motorway/ Hill Road east-facing ramps (eastbound on-ramp and westbound off-ramp)**	▪ New ramps to Hill Road (eastbound on-ramp and westbound off-ramp) between M4 Motorway and Hill Road. ▪ Estimated capacity increase of **400 vehicles per hour** created by new point of access to and from M4 Motorway.	Eastbound on-ramp is included in WestConnex projects. Westbound off-ramp to Hill Road is included in WestConnex projects. Hill Road widening between M4 Motorway and Old Hill Link. Now considered a **short term** upgrade.
3	**Uhrig Road extension**	▪ Extend Uhrig Road to Parramatta Road. ▪ Estimated capacity increase of **300 vehicles per hour** created by new point of access to and from Parramatta Road.	**Not recommended** by Traffic and *Transport Strategy (2016 Review)*.
4	**Use of the Mousehole by general traffic**	▪ Use of the Mousehole by general traffic to access the M4 eastbound. ▪ Alternative to east-facing ramps at Hill Road. ▪ Estimated capacity increase of **400 vehicles per hour** created by new point of access to and from M4 Motorway.	**Not recommended** by *Traffic and Transport Strategy (2016 Review)*.
5	**Homebush Bay Drive to Parramatta Road direct link**	▪ Direct, two-way road connection between Homebush Bay Drive and Parramatta Road (east of Homebush Bay Drive).	Recommended to reduce through traffic travelling through SOP precinct.

Source: Master Plan 2030 Transport Strategy (2010)

This *Traffic and Transport Strategy (2016 Review)* recommends that:

- The M4 Motorway widening (1) and M4 Motorway ramps to Hill Road (2) would provide significant traffic capacity benefits to and from the Olympic Peninsula. These projects are included as part of the overall WestConnex project (see section 3.2.7). The eastbound on-ramp is scheduled to be delivered in the relatively short-term; the westbound off-ramp is not a currently committed project.
- The Uhrig Road extension upgrade (3) will not be pursued as a road connection. This project is unlikely to provide significant traffic capacity benefits due to existing capacity constraints on Parramatta Road. It would also introduce a new signalised intersection in close proximity to and in conflict with adjacent intersections. It may also significantly impact the amenity of the planned Carter Street town centre.
- The use of the Mousehole by general traffic (4) will not be pursued. This would impact event transport operations and limit the potential to use the Mousehole for regular bus service priority in the future (see section 4.2.4).
- A new road connection between Homebush Bay Drive and Parramatta Road (5) is recommended for investigation. This connection would improve network connectivity and provide an alternative route for traffic which currently travels through the SOP precinct.

In addition, the *Baseline Transport Strategy* identified a need for complementary upgrades to the capacity of the following arterial road intersections which provide key connections between SOP and other areas:

- Metroad 3 (now A3):
  - Centenary Drive/Arthur Street
  - Concord Road intersections at Rhodes (following full development of Rhodes Peninsula)
  - Devlin Street/Blaxland Road
- Metroad 6 (now A6):
  - Silverwater Road/Parramatta Road
  - Silverwater Road/Holker Street (further upgrades in addition to short term works discussed in section 5.5.3).

The *Baseline Transport Strategy* noted that Metroad 3 (now A3) and Metroad 6 (now A6) represent 50% of the access routes to the SOP precinct road network. It is recommended that future upgrades to these arterial roads are still likely to be required to provide the necessary traffic capacity to and from SOP.

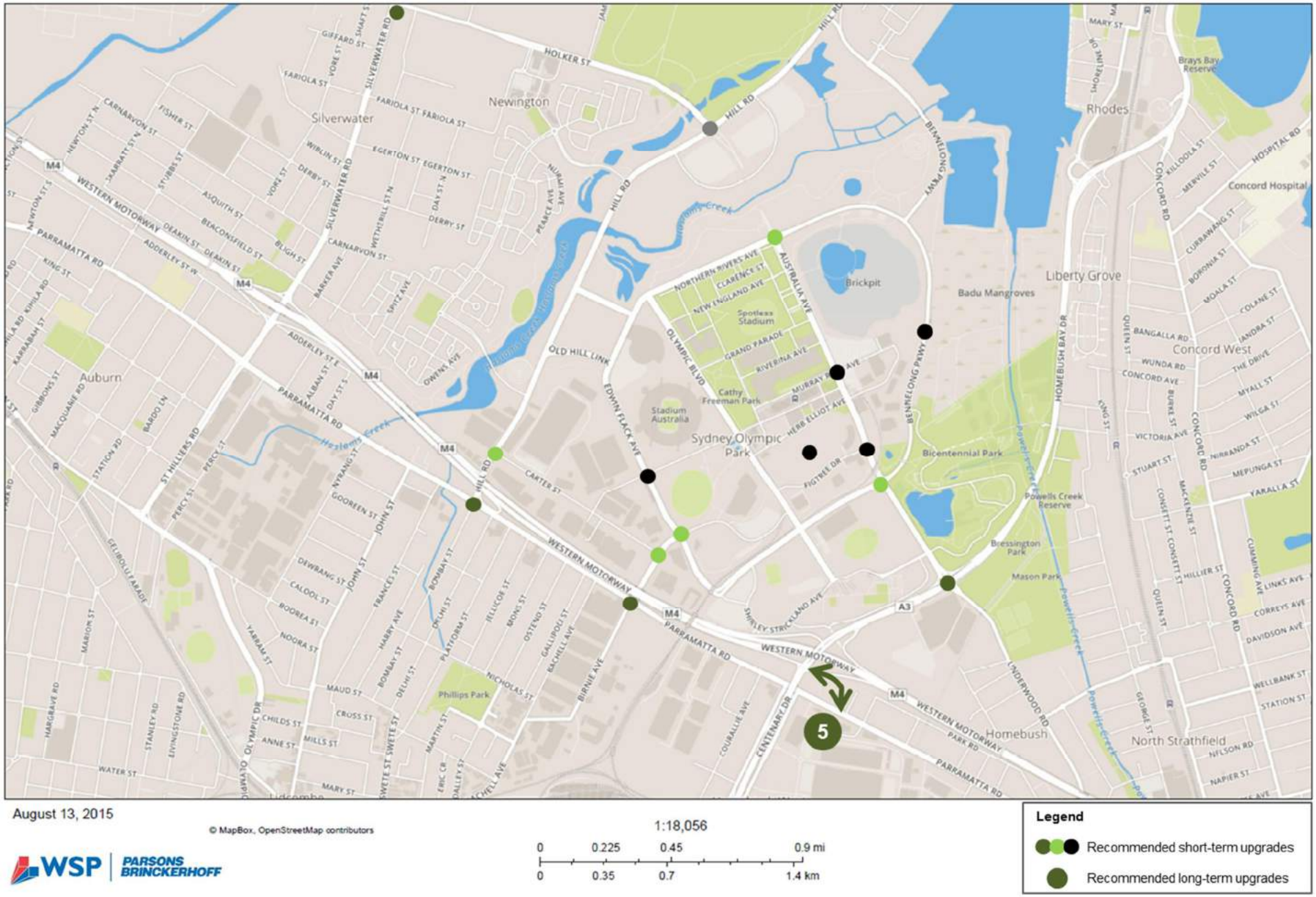


Figure 5.8 Proposed long-term road network upgrades

5.6.4 Future SOP precinct road network

The *Baseline Master Plan* included the development of the proposed SOP road network illustrated in Figure 5.9. The *Baseline Transport Strategy* noted that SKM undertook traffic microsimulation modelling to determine the capacity of the new road network in the Town Centre and Parkview precincts.

The SOP precinct road network was proposed to improve the permeability of the site for pedestrians, whilst also creating more efficient development sites. All of the new streets were proposed as local streets.

Figure 5.10 illustrates the key adjustments to the future SOP precinct road network proposed by the *Master Plan Review* which comprise:

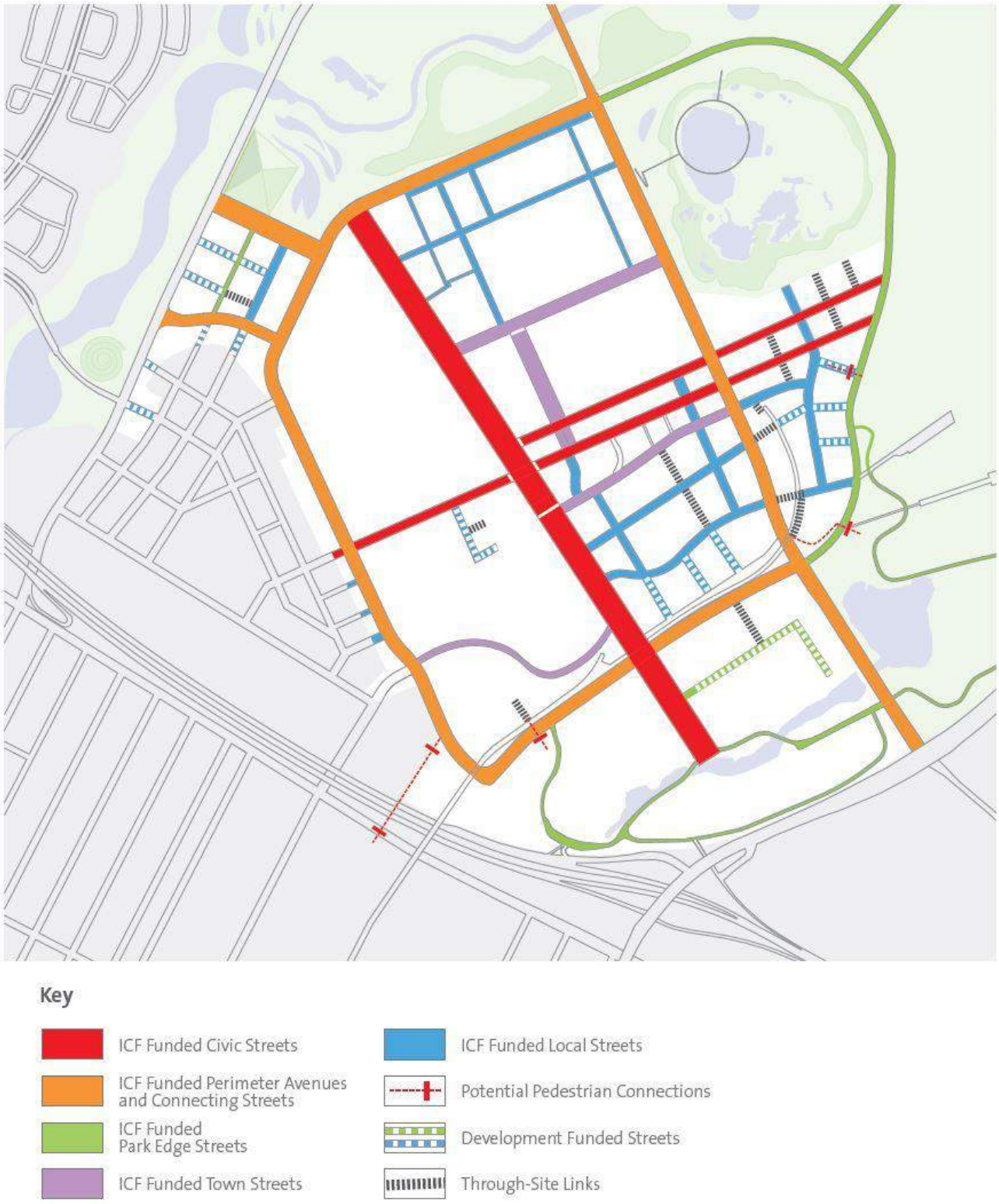
- a new east-west access street north of Figtree Drive, proposed as the primary service and parking access street to and from the Central precinct
- a new north-south street which would improve accessibility and permeability within the Central precinct, aligned with the proposed pedestrian bridge to and from the Boundary Creek precinct.

The new east-west access street would directly accommodate a large proportion of the car park and loading dock entry and exit points within the Central precinct, and as a result provide the primary point of vehicular access. This role would be reinforced through the implementation of a signalised intersection at its eastern end, enabling all movements to and from Australia Avenue. Focussing vehicular traffic on the new east-west access street would:

- Enable the *Baseline Master Plan* east-west street (immediately to the north of the new east-west access street) to fulfil a function as the primary active (pedestrian) street. Without the new east-west access street, both traffic movements and significant pedestrian activity would occur and conflict on this street, with potential safety, performance, and amenity impacts.
- Reduce non-residential traffic using Figtree Drive, protecting this road as a relatively quiet residential street.

During the early stages of development, prior to the construction of the new east-west street, it is proposed that Herb Elliott Avenue would provide the primary point of traffic access for the Central precinct to minimise traffic impacts on Figtree Drive. To achieve this, and generally promote the intended function of the road network within SOP, it is recommended that appropriate traffic management measures are implemented as development progresses (e.g. reduced posted speed limits, traffic calming devices, street scaping, etc.).

The new north-south street would provide the opportunity to further separate traffic and pedestrian movements. The new north-south street, aligned with the new pedestrian overbridge, would provide the primary street for pedestrian movements, while parallel north-south streets would be used to facilitate vehicular access and movements.



Source: Sydney Olympic Park Master Plan 2030 (SOPA, 2010)

Figure 5.9 *Baseline Master Plan* road network

Source: Sydney Olympic Park Master Plan 2030 (2016 Review) (SOPA, 2016)

Figure 5.10 *Master Plan 2030 (2016 Review)* road network

5.7 Traffic assessment results

The *Baseline Transport Strategy* stated that all of the short-term and long-term road upgrades nominated (with the exception of the Uhrig Road extension) and a non-car mode share stretch target of 40% would be required to provide the necessary capacity to accommodate forecast traffic demand.

Further strategic traffic modelling identified that as land uses change over time, the level of traffic generated may exceed the levels identified under full development due to:

- changes to proposed land uses
- current commercial and industrial land uses were approved under local planning schemes which allowed higher levels of parking provision than proposed under the *Baseline Master Plan*.

A target for commercial (479,000 m^2) and total development (1,500,000 m^2) was adopted for the *Baseline Master Plan* based on the assumption that:

- it could be supported through achieving the stretch journey to work non-car mode share of 40%
- an initial target of 250,000 m^2 of commercial development was used a trigger at which the future level of commercial development will be reassessed in direct relationship with the delivery of the new significant public transport mode and the capacity of the road network.

This *Traffic and Transport Strategy (2016 Review)* recommends that:

- the additional traffic impacts[5] of the changes to land uses proposed by the *Master Plan 2030 (2016 Review)* are anticipated to be generally manageable through the implementation of key initiatives identified by the *Baseline Transport Strategy*. Consequently the recommended upgrades to the impacted road networks are fundamentally unchanged.
- the following key adjustments to the future SOP precinct road network are adopted to facilitate the separation of pedestrian and vehicle movements within the Central precinct:
  - a new east-west access street north of Figtree Drive, proposed as the primary future vehicular access street for the precinct.
  - a new north-south street aligned with the proposed pedestrian bridge to and from the Boundary Creek precinct.
- it is likely that more significant upgrades (than those nominated in the *Baseline Transport Strategy*) to gateway intersections and other key intersections providing access to and from SOP will be required due to the increased development proposed in surrounding areas.
- SOPA will continue to contribute to RMS' investigations which will ultimately identify the upgrades required at intersections surrounding SOP.
- The introduction of the Parramatta Light Rail into the precinct will significantly alter parts of the local and regional road network. SOPA will work closely with TfNSW and RMS to achieve the most optimal design which minimise impacts and also addresses historical deficiencies in terms of capacity and operation when the light rail alignment is developed.

[5] Based on the assumptions and analysis presented in section 5.5.1.

5.8 Traffic assessment: Traffic and Transport Strategy (2016 Review) summary

Table 5.15 summarises the key findings of this *Traffic and Transport Strategy (2016 Review)* relating to traffic and the road network.

Table 5.15 Traffic assessment: *Traffic and Transport Strategy (2016 Review)* summary

Feature	Review findings/recommendations
Existing conditions	
Existing traffic demand	■ Existing traffic demand at the 'gateway' intersections to and from SOP is at capacity during morning and evening peak periods.
Future conditions	
Model inputs and assumptions	■ An initial non-car mode share target of 40% has been assumed. ■ Surrounding development yields and resulting traffic generation has changed significantly between the *Baseline Transport Strategy* and this *Traffic and Transport Strategy (2016 Review)*. It is recommended that assumptions regarding regional through traffic using the road network within SOP are reviewed considering the outputs of strategic traffic modelling undertaken for the area, when available.
Traffic generation	■ Residential development generates 0.24 trips per 100 square metres (based on an 80 m^2 dwelling size) compared with 1.2 to 1.6 for commercial and up to 3.7 for retail. ■ The changes to land uses proposed by the *Master Plan 2030 (2016 Review)* would (during the AM Peak): ▸ generate around 2,130 (17%) additional vehicles when compared to the baseline. ▸ generate around 625 (7%) additional inbound vehicles ▸ generate around 1,505 (41%) additional outbound vehicles ▸ assist in further balancing inbound and outbound vehicles travelling to and from SOP.
Network upgrades	■ The recommended upgrades to the impacted road networks are fundamentally unchanged. ■ Recommended short-term upgrades include: ▸ upgrades to the strategic intersections which provide access to and from the SOP precinct ▸ upgrades to intersections within the SOP precinct. ■ Many of the intersection locations where short-term upgrades were proposed by the *Baseline Transport Strategy* are now under investigation as part of the *Olympic Peninsula Regional Transport Infrastructure Investigations* (RMS). ■ Recommended long-term upgrades to the road network to improve access to and from the Olympic Peninsula include: ▸ upgrades to the capacity and accessibility of the M4 Motorway (now short term) ▸ increasing the amount of strategic access points to and from the SOP precinct ▸ future upgrades to connecting arterial roads.
SOP road network	■ The SOP precinct local road network was proposed to improve the permeability of the site for pedestrians, whilst also creating more efficient development sites. ■ The following key adjustments to the future SOP precinct local road network will be adopted to facilitate the separation of pedestrian and vehicle movements within the Central precinct: ▸ a new east-west access street north of Figtree Drive, proposed as the primary future freight vehicular access street for the precinct. ▸ a new north-south street aligned with the proposed pedestrian bridge to and from the Boundary Creek precinct.

Feature	Review findings/recommendations
Traffic assessment results	
Summary	■ The additional traffic impacts due to the changes to land uses proposed by the *Master Plan 2030 (2016 Review)* are anticipated to be managed through the implementation of key regional and local road upgrades identified by this *Traffic and Transport Strategy (2016 Review)* and the projects identified through the *Olympic Peninsula Regional Transport Infrastructure Investigations* by RMS. The recent road upgrades associated with WestConnex will also contribute significantly to the improvement of regional road capacity of the precinct. ■ It is likely that more significant upgrades (than those nominated in the *Baseline Transport Strategy*) to gateway intersections and other key intersections providing access to and from SOP will be required due to the increased development proposed in surrounding areas. ■ SOPA will continue to contribute to RMS' investigations which will ultimately identify the upgrades required at key intersections surrounding SOP. ■ SOPA will continue to contribute to TfNSW and RMS' investigations into light rail route options which will ultimately influence the upgrades required at key intersections in and surrounding SOP.

6. Parking

The 1995 *Master Plan Transport Strategy* for the redevelopment of Homebush Bay to host the 2000 Olympics established a maximum of 10,000 public parking spaces across SOP. These are now provided in a number of structured and at grade car parks. The limit was set primarily by the limited capacity of the surrounding arterial road network to accommodate departing vehicles.

Striking the right balance of car parking provision was an important feature of the *Baseline Transport Strategy*, which aimed to attract developers to the site whilst also balancing the amount of traffic generated by developments. With the planning approval and management of public parking in the control of SOPA, a suitable level of car parking was to be provided that would not impact the achievement of mode share targets or impact the viability of businesses and venues at SOP.

With the successful implementation of the first 5 years of Master Plan 2030 in terms of parking, and in the absence of a metropolitan wide strategy for parking, this *Traffic and Transport Strategy (2016 Review)* seeks to maintain the car parking strategies outlined in the *Baseline Transport Strategy*.

6.1 Existing public parking

Currently, there are a total of 11,200 public parking spaces at Sydney Olympic Park, excluding existing Parklands parking. This total is made up of the 10,420 spaces in the structured and surface car parks (i.e. P1, P2, P3, P4, P5, P6, P7, and P8) and the 780 spaces in on-street parks located around the Town Centre and on Olympic Boulevard.

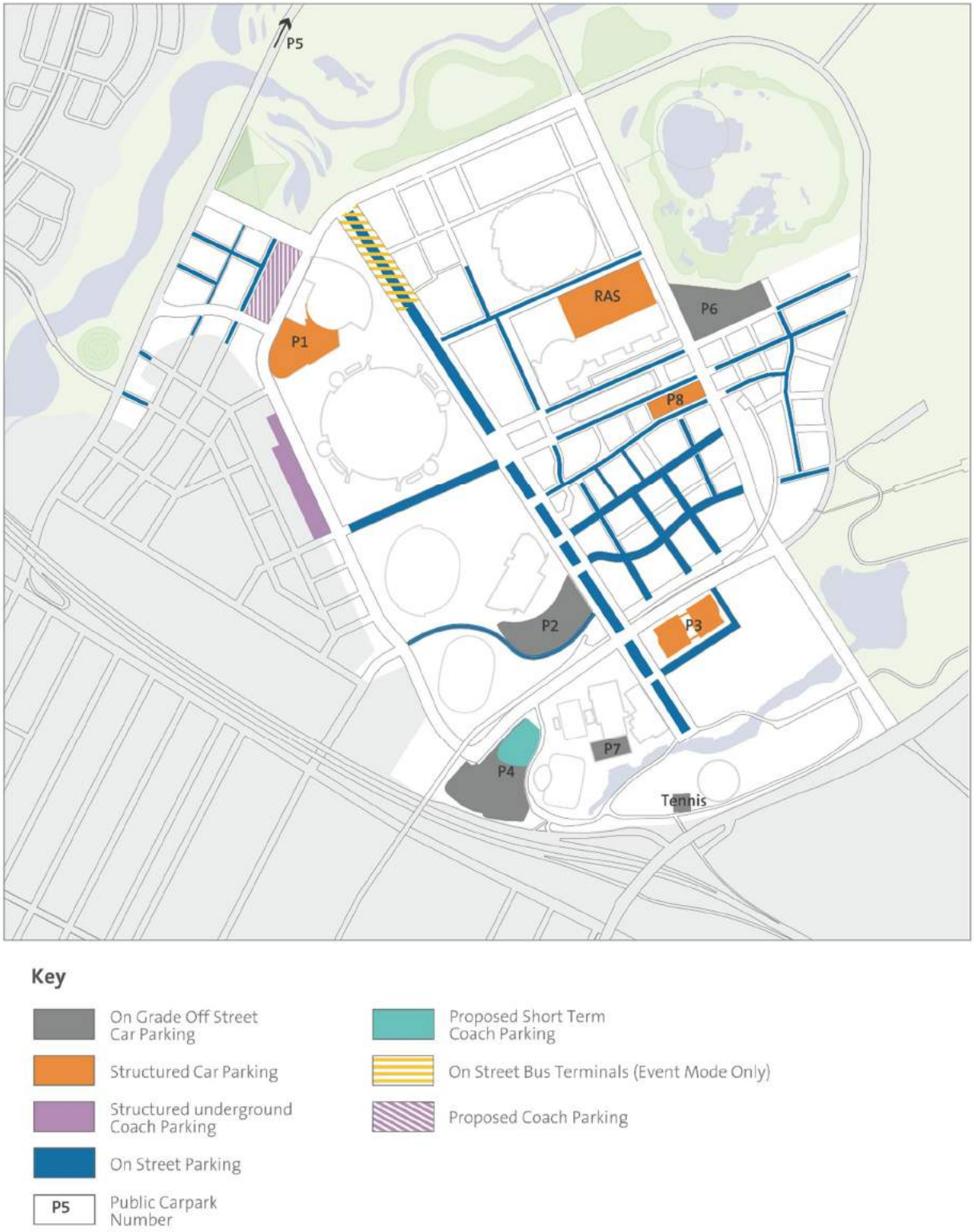
Table 6.1 summarises the capacity of off-street car parks. Existing car parking demand at SOP is below that of off-street parking capacity during morning and evening peak periods.

Figure 6.1 illustrates the approach routes to major car parks. Figure 6.2 shows the overall location of all public parking proposed under the *Master Plan 2030 (2016 Review)*.

Table 6.1 Existing off-street public car parking supply

Car park	Capacity	Venue	Main approach route
P1	3,320	ANZ Stadium, Qudos Bank Arena, Sydney Showground	Hill Road/Edwin Flack Avenue
P2	570	SOP Aquatic Centre, SOP Athletic Centre	Birnie Avenue/Australia Avenue
P3	1,490	SOP Aquatic Centre, SOP Sports Centre, Tennis Centre	Australia Avenue
P4	980	SOP Hockey Centre, SOP Sports Centre	Birnie Avenue/Australia Avenue
P5	2,520	ANZ Stadium, Sydney Showground	Holker Street/Hill Road
P6	1,070	Sydney Showground	Australia Avenue
P7	260	SOP Hockey Centre, SOP Sports Centre, Tennis Centre	Olympic Boulevard/Australia Avenue
P8	210	ANZ Stadium, Sydney Showground	Australia Avenue
Total	**10,420**	-	-

Figure 6.1 Approach routes to major car parks



Source: Sydney Olympic Park Master Plan 2030 (2016 Review) (SOPA, 2016)

Figure 6.2 *Master Plan 2030 (2016 Review)* future car and coach parking

6.2 Private parking provision rates

Under the *Baseline Master Plan*, all new private development was required to provide car parking in accord with the parking rates outlined in Table 6.2. This *Traffic and Transport Strategy (2016 Review)* supports the continued application of these rates until the next review is undertaken.

Table 6.2 Schedule of maximum car and bicycle parking requirements

Land use	Type	Rate
Education[1]	Schools and tertiary facilities	1 car space/2 staff
	Bicycles (Visitors)	1 bicycle space/100 fulltime students
Child Care	Staff	1 car space/2 staff
	Visitors/Set down	1 car space/4 children + suitable drop-off
Residential	1/2/3/4 bedrooms	1/1.2/1.5/2 car spaces/dwelling
	Visitors	0.2 car spaces/dwelling
	Bicycles (Dwellings)	1 bicycle space/3 dwellings
	Bicycles (Visitors)	1 bicycle space/12 dwellings
Aged Housing	Occupants	2 car spaces/3 dwellings
	Visitors	1 car space/5 dwellings
Commercial	Workers	1 car space/80 m^2 GFA[2]
	Bicycles (Workers)	1 bicycle space/200 m^2 GFA
	Bicycles (Visitors)	1 bicycle space/750 m^2 GFA
Retail	Supermarkets	4 car spaces/100 m^2 GFA
	Local Retail	1 car space/50 m^2 GFA
	Themed Retail	1 car space/30 m^2 GFA
Recreational facilities	Visitors (Sports participation)	3 car spaces/100 m^2 GFA
Leisure	Visitors (Cinema)	1 car space/30 m^2 GFA
	Visitors (Art gallery)	1 car space/200 m^2 GFA
Hotel	Staff	1 car space/2 staff
	Accommodation	1 car space/apartment
Hospital	Staff	1 car space/2 staff
	Visitors	1 car space/4 beds
Place of Worship	Visitors	1 car space/30 m^2 GFA
Club	Staff	1 car space/2 staff
	Visitors	1 car space/50 m^2 GFA
Professional Consulting rooms	Staff	1 car space/2 staff
	Visitors	1 space/professional
Restaurant	Staff and visitors	1 space/50 m^2 GFA
Mixed use	Varies	Specify rate as per individual land uses

Land use	Type	Rate
Venue additions	Varies	Rate subject to specific parking needs study

(1) No specific car parking provision for students – assumes use of public parking facilities.
(2) 1 space/80 m^2 GFA proposed in longer term for commercial development - see section 6.4.

6.3 Short term demand for public car parking

The short term demand for public car parking spaces at SOP is expected to include the following:

- current corporate tenants and students who utilise public car park spaces through the monthly parking permit scheme. This parking largely takes place in the P6 and P3 car parks
- in addition to the parking permit scheme, the average daily occupancy of the public car parks by casual users for minor week-day events is up to 2,200 spaces, in P1 and P3 car parks.

6.4 Long term demand for public car parking

The other component of demand for public car parking is generated by development under the *Baseline Master Plan*. In terms of public parking demand, the *Baseline Transport Strategy* assumed that the new commercial, retail, and education land uses would generate significant demand. It was also envisaged that residential developments would accommodate the majority of their parking requirements in private car parks. The key difference in the demand drivers outlined in the *Baseline Transport Strategy* and revised in the *Transport Strategy Review* are the increases in retail, residential, and temporary accommodation land uses.

Table 6.3 below sets out in detail the forecast future demand for private car parking generated by each proposed land use at estimated rates for the *Baseline Master Plan* and *Master Plan 2030 (2016 Review)*.

Table 6.3 Future demand for private car parking by land use

Land use	Rate applied	*Baseline Master Plan*		*Master Plan 2030 (2016 Review)*	
		GFA (m^2)	Spaces generated	GFA (m^2)	Spaces generated
Commercial	1 space/80 m^2 (1)	479,000	5,990	412,000	5,150
Retail	1 space/50 m^2	33,000	660	100,000	2,000
Education	1 space/55 m^2	105,000(2)	290	186,000	510
Residential	1.09 spaces/ dwelling(3)	575,000 (6,350 dwellings)	6,920	855,000 (10,690 dwellings)	11,650
Temporary accommodation	0.4 spaces/ dwelling(4)	81,000 (2,025 rooms)	810	192,000 (4,800 rooms)	1,920
Total	-	-	**14,670**	-	**21,230**
Total less residential	-	-	7,750	-	9,580

(1) New rate applied to longer term i.e. *Master Plan 2030 (2016 Review)*
(2) Assumes that 15% of total education GFA is treated as office commercial, consistent with the *Baseline Transport Strategy*.
(3) Assumption consistent with *Baseline Transport Strategy*.
(4) Assumption consistent with *Baseline Transport Strategy*.

Analysis outlined in Table 6.3 estimates that parking demand generated from the *Master Plan 2030 (2016 Review)* equates to a total of 21,230 spaces across all land uses. This represents an increase of 6,560 additional car parking spaces when compared to the *Baseline Master Plan*. As a result of the *Master Plan 2030 (2016 Review)*:

- Demand generated by commercial development would be reduced by 840 spaces
- Retail floor space would generate demand for an additional 1,340 spaces.
- Residential development would generate demand for an additional 4,730 spaces
- When removing residential parking demand, other land uses generate less spaces (1,830 spaces) than the *Baseline Master Plan*

The analysis indicates that the *Master Plan 2030 (2016 Review)* would create a significant increase in parking demand within SOP when compared to the *Baseline Master Plan*. A large proportion of this demand would be generated by residential development which could not be accommodated by existing public car parks or on street. Consequently it is recommended that the parking provisions for this land use type are monitored and reviewed as development progresses. Further consideration of the separation of parking spaces and dwellings during the sale of residential units will be considered in the future, in line with current market trends for lower car ownership. Together these measures could achieve a significant drop in the provision of parking whilst also supporting more sustainable travel.

As outlined in the *Baseline Transport Strategy*, it is envisaged that on-street spaces would be utilised by local retail, community uses, and casual visitors to the Sydney Olympic Park.

Future parking rates for commercial and residential development will be informed by market trends and competing centres in the absence of a metropolitan parking strategy. It is noted that future reductions in parking provisions would need to be linked to and supported by major public transport improvements to provide practical, alternative non-car travel modes, as discussed in section 4. The planning principles behind Transit Orientated Development acknowledge the role of public parking in providing people with transport choices. By maintaining office commercial development within the Central Precinct in close proximity to Olympic Park Station and the proposed Transport Interchange, a balanced approach to public transport and public parking provision can achieve sustainable transport outcomes in the Town Centre.

6.5 Key parking considerations

A key consideration in terms of future public parking numbers for SOP identified in the *Baseline Transport Strategy* was the ‘changeover’ ability of the site to move from everyday activities to event mode. The *Baseline Transport Strategy* did not provide a precise figure as to what would comprise a suitable ‘changeover’ car parking capacity, as it would vary depending on the timing, type and location of event involved. A best estimate was in the order of 2,500 public spaces which will provide a buffer for any changeover period.

The *Baseline Transport Strategy* identified a range of management strategies that could be implemented to assist in the efficient utilisation of the existing public car parks to accommodate both the *Baseline Master Plan* and event needs. These included pricing strategies aimed at imposing penalties/high costs on parkers who wish to stay during major event times, ‘corporate tenant’ parking management plans, and the provision of relevant access clauses in new developer agreements, where relevant. This approach is recommended to be maintained by this *Traffic and Transport Strategy (2016 Review)*.

The future capacity of the regional road network will limit the operational use of potential parking spaces at SOP. The *Baseline Transport Strategy* indicated that the long term peak hour capacity for the precinct would be approximately 6,300 vehicles per hour. This capacity is yet to be determined by RMS through regional traffic modelling for the *Traffic and Transport Strategy (2016 Review).* However, the amount of car based worker trips will be heavily influenced by the availability of parking and associated public transport service

levels. The total estimated provision of parking under *Master Plan 2030 (2016 Review)* for workers (commercial, education) is restricted to 5,660 spaces. This analysis demonstrates the interrelationship between traffic demand and parking, highlighting the need for SOPA to maintain close control of the parking supply over time.

The increase in retail floorspace proposed by the *Master Plan 2030 (2016 Review)* represents the most significant generation of additional parking attracting people in to the precinct during commuter and event periods (as opposed to residential parking generating trips away from the precinct in the AM peak). The increase in retail floorspace is estimated to increase parking demand by an additional 1,340 spaces. The majority of this retail floorspace is likely to be in the Central Precinct; the impact of the overall increase in parking needs further detailed consideration on its road network impacts through wider Olympic Peninsula road network modelling.

6.6 Car parking strategy

The *Baseline Transport Strategy* provided a balanced approach to support the existing operations of major venues and tenants whilst also providing for emerging land uses and new developments. This *Traffic and Transport Strategy (2016 Review)* considers that these approaches remain relevant. The car parking strategy is broken down into four categories, each with a set of key elements:

- Parking principles:
  - cap public parking at 10,000 spaces not including the existing Parklands, Sydney Showground, and on-street components
  - provide total event parking in structured parking, keeping to the 10,000 space cap
  - manage parking provision to promote alternative forms of transport
  - review the need for additional public parking capacity on a regular basis as new development proposals are identified
  - manage and redistribute existing public car parking supply to meet new land use requirements effectively.
- Parking management:
  - implement a range of management strategies to ensure a more efficient utilisation of existing public car parking assets including pricing strategies, ‘Private in Public Parking’, tenant management, and location strategies
  - implement the potential for the dual use of private commercial parking spaces to provide additional public parking capacity for major events on weekday evenings and weekends through the *Master Plan 2030 (2016 Review)* and individual site-based commercial agreements
  - ensure event car and coach parking facilities are utilised during non-event periods
  - use enhancements in technology to improve methods of payment, enforcement and turnover of parking supply
  - continue to use variable message signs to manage access routes to car parking during events
  - separate event public transport access routes from those used for accessing public car parks where possible
  - continue the requirement for pre-paid parking for major events.
- Off-street parking:
  - locate car parks underground where possible

- design and locate car park entries away from main streets to minimize visual impact and improve street capacity
- retain the existing off street public car parking facilities of P1, P2, P3, P4, P5, P6, P7, and P8
- construct new basement public car parking in the Town Centre to serve the 'day-to-day' needs of the Town Centre and that of Sydney Showground exhibitions.

- On-street parking:
  - provide on-street parking to serve community and local retail uses, as well as the 'day to day' needs, of the site around the Town Centre and each precinct
  - manage the on-street parking for residents in the Parkview, Central, and Haslams precincts through a residential parking scheme
  - retaining the quantity of public parking at SOP at 10,000 spaces as required under venue leases, but removing the existing Parklands, Sydney Showground and on-street components from the total public parking supply calculation.

In addition, this *Traffic and Transport Strategy (2016 Review)* recommends that car sharing schemes and facilities are promoted and facilitated within SOP. This would include the provision of dedicated car-sharing spaces in proximity of residential land uses, which could be located either on-street, or within basement car parks of larger developments. The facilitation of car sharing schemes within SOP would assist in reducing car ownership, and supporting the reduced car parking provisions discussed in section 6.4.

6.7 Coach parking

The provision of coach parking is a vital component of any event or venue transport strategy. It supports the travel needs of groups who travel from outside of the metropolitan area. SOP, through its Olympic legacy, currently provides coach parking facilities incorporating world's best practice design that support the site's sporting and entertainment venues.

Coach parking capacity has reduced since the development of the *Baseline Transport Strategy* due to the removal of coach parking Pod A. Existing event coach parking demand at SOP remains below that of the reduced off-street coach parking capacity for the majority of events. The existing provision of structured public coach parking is outlined in Table 6.4.

Table 6.4 Existing structured coach parking areas

Coach parking area	Capacity	Venue	Access route
Pod B	61	ANZ Stadium, Qudos Bank Arena, Sydney Showground, SOP Aquatic Centre, SOP Athletic Centre	Uhrig Road
Pod C	71	ANZ Stadium, Qudos Bank Arena, Sydney Showground	Hill Road
SOP Sports Centre	8	SOP Aquatic Centre, SOP Sports Centre, Tennis Centre	Australia Avenue
Total	140	-	-

6.7.1 Future coach parking areas

The coach parking strategy outlined in the *Baseline Transport Strategy* maintained 100 structured coach parking spaces, which can be further supplemented with on-street coach parking as warranted by peak event demands. With the focus of development under the *Master Plan Review* being in the Central, Parkview and

Stadia precincts, this *Traffic and Transport Strategy (2016 Review)* plans to maintain off-street coach parking in existing locations at Pod B and Pod C. The key components of the coach parking strategy for the *Master Plan 2030 (2016 Review)* are as follows:

- coach parking Pod B (61 spaces) would remain, incorporated into the future redevelopment of the site with expanded basement coach parking. This has the potential to provide direct connection to the stadium via a road underpass
- coach parking Pod C (71 spaces) would initially remain, and be incorporated into the future redevelopment of the Haslams precinct with potential additional capacity
- coach parking in the SOP Sports Centre (eight spaces) on the corner of Olympic Boulevard and Sarah Durack Avenue may be removed to make way for development. These spaces would not be replaced
- total structured coach parking spaces would then be 132 spaces
- on-street coach parking for daily use adjacent to venues such as the SOP Aquatic and Sport Centres would be maintained
- on-street coach parking locations which conflict with land use strategies outlined in the *Master Plan Review* would be removed.

6.8 Parking: Traffic and Transport Strategy (2016 Review) summary

Table 6.5 summarises the key findings of this *Traffic and Transport Strategy (2016 Review)* relating to parking.

Table 6.5 Parking: *Traffic and Transport Strategy (2016 Review)* summary

Feature	Review findings/recommendations
Existing conditions	
Existing car parking demand	▪ Existing car parking demand at SOP is below off-street parking capacity during morning and evening peak periods. ▪ Existing event car parking demand at SOP remains below that of off-street parking capacity.
Existing coach parking demand	▪ Coach parking capacity has reduced since 2008 with the removal of coach parking Pod A. ▪ Existing event coach parking demand at SOP remains below that of the reduced off-street coach parking capacity for the majority of events.
Future conditions	

Feature	Review findings/recommendations
Car parking generation	■ The parking rates developed for the *Baseline Transport Strategy* remain valid for this *Traffic and Transport Strategy (2016 Review).* ■ The changes to land uses proposed by the *Master Plan 2030 (2016 Review)* (compared to the *Baseline Master Plan*) would: ▸ generate 6,560 additional parking spaces ▸ generate 1,340 additional retail parking spaces ▸ generate 4,730 additional residential parking spaces ▸ reduction in commercial parking supply by 840 spaces ■ Parking provisions for residential development will be monitored and reviewed as development progresses. Consideration of a lower residential parking rate in the future could achieve a significant drop in the provision of parking whilst also supporting more sustainable travel. ■ The separation of parking spaces and dwellings during the sale of residential units will be considered in the future, in line with current market trends for lower car ownership. ■ Future parking rates for commercial and residential development will be informed by market trends and competing centres in the absence of a metropolitan parking strategy. ■ Future reductions in parking provisions would need to be linked to and supported by major public transport improvements to provide practical, alternative non-car travel modes.
Future coach parking	■ Coach Parking Pod B (61 spaces) would initially remain and expand in the future as basement parking in association with development ■ Coach Parking Pod C (71 spaces) would initially remain and expand in the future in association with development of the Haslams precinct ■ Existing off-street coach parking assets provide the ability to accommodate the majority of event demands, whilst also being located away from the precincts which will be the focus for development under the *Master Plan 2030 (2016 Review).* ■ Coach parking in the SOP Sports Centre (eight spaces) on the corner of Olympic Boulevard and Sarah Durack Avenue may be removed to make way for development. These spaces would not be replaced. ■ Total future structured coach parking would provide 132 spaces.

7. Travel demand management

Travel demand management measures will be important to achieve the target of private vehicle trips to be generated by the proposed *Master Plan 2030 (2016 Review)* development. Travel demand management was first identified as a measure in the *2002 Master Plan*. It was subsequently reinforced as a transport measure in the *Baseline Transport Strategy*. Budget allocations for a workplace travel plan officer to assist in delivering travel demand management programs were incorporated into the *Sydney Olympic Park Infrastructure Contributions Plan 2030*.

This Traffic and *Transport Strategy (2016 Review)* calls for a longer term view of travel behaviour and, in particular, requires consideration of principles of transport sustainability. All of Sydney's regional and sub-regional centres will come under increased pressure from car travel. Local and State governments recognise this and are adopting a range of policies to encourage increased use of public transport through parking levies, controls on parking supply and investment in public transport projects. TfNSW has recently created a dedicated travel demand management team in its Freight, Strategy and Planning division. SOPA working with TfNSW and the local business association will be important stakeholders in maximising the outcomes of local travel demand management measures.

Continued growth in non-car mode shares would be required to enable the development yields proposed by the *Master Plan 2030 (2016 Review),* as discussed in section 4. Factors which would assist in managing the increased levels of demand include:

- Increased 'internal containment' of trips. This refers to the proportion of trips which start and end within SOP. This would increase due to the increasing population both living and working in SOP.
- Increased walking and cycling trips. This would be driven primarily by the increase in internally contained, short-distance trips within SOP.
- Increased public transport patronage. Public transport patronage will continue to increase in response to infrastructure and service improvements.
- Limiting parking supply. Limiting parking supply (in combination with increasing public transport provision) and increasing road congestion will continue to reduce the appeal of car transport and increase the relative benefits of public transport use.

Overall, it is recommended that SOPA collaborate with the Travel Demand Management team at TfNSW to continue to develop and apply targeted, local demand management policies and initiatives.

7.1 Workplace travel demand management

The *Baseline Transport Strategy* identified a need for all businesses to develop and implement Workplace Travel Plans, and recommended that a position be created for a Workplace Travel Plan Project Officer. Budget was subsequently allocated for an implementation plan. Such implementation plans will incorporate specific and measurable goals regarding vehicles used per worker, and ways in which flexible work arrangements can be encouraged. In the time since the *Baseline Transport Strategy* was developed, no Workplace Travel Plan Project Officer has been appointed but despite this there has been a significant positive change in commuter travel behaviour. This has been due to the lobbying efforts of both SOPA and the local business association.

Workplace Travel Plans are likely to grow in importance for centres located outside the Sydney and Parramatta CBDs. A workplace travel plan pilot program has been ongoing in the Macquarie Park precinct (Macquarie Connect) in recent times however its level of success is unknown. TfNSW will be the key government agency in supporting SOPA to achieve the local changes required.

The key outcomes which workplace travel planning can achieve were outlined in the *Baseline Transport Strategy* and remain valid:

- travel plans will directly assist SOPA in achieving their sustainability objectives
- travels plans will maximise the accessibility of SOP by all modes and maximise the use of all available transport services and infrastructure
- there is a need to continually address and enhance the perception of SOP as an accessible location for business amongst developers
- SOPA has a clear opportunity through the Development Application (DA) process to encourage and assist incoming developers and tenants develop and implement meaningful travel plans that support staff as they relocate to SOP from other workplaces
- to further promote a mode shift and offer ongoing support to business, SOPA will consider establishing a Transport Management Association (TMA) like Macquarie Connect
- It is strongly recommended that SOPA develops and implements its own travel plan thereby providing a key example within SOP of travel plan implementation and demonstrating the organization's own commitment to its vision and mission goals.

7.2 Transit oriented development

Land uses with high densities of either workers or residents will be located close to Olympic Park station, future light rail stops and major bus stops. Attention will be given to a high level of pedestrian access between transport nodes and surrounding buildings. In the Town Centre, this has already achieved with the establishment of an eastern entrance to the rail station.

The *Baseline Transport Strategy* acknowledged the benefits and principles of Transit Orientated Development (TOD) in the land use proposals developed. Commercial office development has been located within walking distance of the railway station and is supported by high quality pedestrian facilities.

This *Traffic and Transport Strategy (2016 Review)* recommends the location of light rail and bus stops along major spines, such as Australia Avenue and Dawn Fraser Avenue, to maximise service to the largest potential passenger catchments and adjacent development precincts.

7.3 Car parking policy

Higher use of non-car transport modes will only be attained with a right combination of public transport service provision and a controlled parking supply. Private parking rates have been developed which yield less private parking than adjacent local government areas such as Auburn and Canada Bay but are in line with other new development areas such as Macquarie Park and Rhodes.

This *Traffic and Transport Strategy (2016 Review)* recommends that the ongoing review of parking supply by SOPA be undertaken in line with:

- improvements in public transport service provision
- increasing traffic volumes on the regional and local road networks
- developments in travel demand policy by TfNSW.

7.4 Funding

The *Baseline Transport Strategy* developed contribution plans have previously been enacted (*Sydney Olympic Park Infrastructure Contributions Framework 2030*) to ensure that contributions from developers are applied to the transport demand management measures outlined in this section. Sufficient funding will be dedicated to the various projects and measures to ensure that they are implemented as development occurs in order to properly offer travel choice and influence travel behaviour. The current Infrastructure Contributions Framework (ICF) provides for a range of traffic and transport related initiatives, including:

- upgrades to 12 existing streets and construction of 13 new streets in the Town Centre
- improvements to 15 local intersections both within and at the peripheries of the Town Centre, e.g. widening, signalisation
- establishment of precinct shuttle service

In addition to the above initiatives, proposed amendments to the ICF will also provide for:

- construction of 5 additional streets in the Central Precinct
- construction of 2 additional pedestrian bridges
- consolidation of Event Bus terminals into a single location
- improvements to Lidcombe Station to improve commuter amenity

While it is intended that a Special Infrastructure Contribution Levy be established to provide for the costs of regional traffic and transport upgrades across the entire Olympic Corridor, a new 'satisfactory arrangements' clause is proposed in the SEPP (State Significant Precincts) 2005 as an interim measure to ensure that provision for traffic and transport infrastructure is considered in development assessments.

7.5 Self-containment

A key component of the *Master Plan 2030 (2016 Review)* is the increase in residential dwellings on site. This facilitates the establishment of live-work opportunities (self-containment) within SOP. In turn this has the potential to reduce the number and length of local trips undertaken by private vehicle.

The *Baseline Transport Strategy* traffic assessment assumed the maximum rate of self-containment to be 5% of workforce trips. The strategic traffic assessment for this *Traffic and Transport Strategy (2016 Review)* effectively adopts the same assumption, although this is considered to be conservative, and representative of a worst-case scenario. In comparison, travel self-containment rates of up to 14% have been achieved in Western Sydney low density residential developments (Harrington Park) (Yigitcanlar et al, 2005).

As noted in section 5.2, strategic traffic modelling outputs are required to provide quantitative estimates of future internal containment. In the context of SOP there are two key internal containment elements:

- residents both living and working directly within SOP
- residents living and working in the wider Olympic Peninsula. For example, residents of Wentworth Point working in SOP.

Developing accurate estimates of these factors is critical as the level of internal containment directly influences the volume of traffic entering and exiting the Olympic Peninsula via the gateway and other key intersections. In turn these forecasts will inform and dictate road network upgrade requirements and strategies at these key locations. Consequently, as discussed in section 5, it is recommended that SOPA continue to contribute to RMS' investigations which will ultimately identify the road network upgrades required at key intersections within and surrounding SOP.

7.6 Travel Demand Management – Traffic and Transport Strategy (2016 Review) summary

Table 7.1 summarises the key findings of this *Traffic and Transport Strategy (2016 Review)* relating to travel demand management.

Table 7.1 Travel demand management: *Transport Strategy Review* summary

Feature	Review findings/recommendations
Workplace travel demand management	■ The key outcomes which workplace travel planning can achieve were outlined in the *Baseline Transport Strategy* and remain valid.
Transit oriented development	■ The *Baseline Transport Strategy* acknowledged the benefits and principles of Transit Orientated Development in the land use proposals developed. ■ The location of light rail and bus stops along major spines, such as Australia Avenue and Dawn Fraser Avenue, is recommended to maximise service to the largest potential passenger catchments and adjacent development precincts.
Car parking policy	■ The ongoing review of parking supply by SOPA will be undertaken in line with: ▸ improvements in public transport service provision ▸ increasing traffic volumes on the regional and local road networks ▸ developments in travel demand policy by TfNSW.
Funding	■ Sufficient funding will be dedicated to the various projects and measures to ensure that they are implemented to properly offer travel choice and influence travel behaviour. ■ Review of the allocation of parking revenue will also be considered by SOPA to channel funds to local public transport projects. ■ NSW Department of Planning and Environment is setting up a Special Infrastructure Contribution levy for the Olympic Peninsula to recoup costs of regional road upgrades
Self-containment	■ The *Baseline Transport Strategy* traffic assessment assumed the maximum rate of self-containment to be 5%. ■ This *Traffic and Transport Strategy (2016 Review)* effectively adopts the same assumption, although this is considered to be a low estimate, and representative of a worst-case scenario. This should be further investigated to establish a higher rate of 10% containment over time ■ Strategic traffic modelling outputs are required to provide quantitative estimates of future internal containment. These will inform and dictate road network upgrade requirements and strategies at these key locations. ■ SOPA will continue to contribute to RMS' investigations which will ultimately identify the road network upgrades required at key intersections within and surrounding SOP.

8. Conclusion

Sydney Olympic Park will continue to evolve and improve as a key centre in Western Sydney. This *Traffic and Transport Strategy (2016 Review)* has identified a target journey to work non-car mode share of 40%, which can be achieved through high capacity public transport infrastructure and service upgrades, regional road upgrades, the implementation of workplace travel plans, and careful control of the supply of parking.

The future development of a potential rapid transit line passing through Sydney Olympic Park (currently under investigation jointly between the federal and state governments) would provide the opportunity to further realise higher development potentials in a sustainable way beyond 2030, creating potential for a higher journey to work non-car mode share target of around 60%.

Increased emphasis on retail land uses as well as residential, education, and venue expansion will provide opportunities to control traffic generation and increase the use of public transport. This can be achieved through the generation of trips in the reverse peak direction, and during non-commuter peaks. The development of additional dwellings on site could encourage a greater proportion of people living and working at Sydney Olympic Park and increase internal trip containment from the 5% of trips modelled as part of this analysis to a higher rate of around 10% as experienced in other parts of Sydney and Australia. Proposed changes to land use and density will generate an additional 2130 vph during the AM peak. It is anticipated this can be accommodated through planned improvements to existing local street network, regional upgrades and reductions in through traffic.

Public transport can be increased through the introduction of increased rail and bus frequencies as well as the introduction of light rail, which is likely to commence operation around 2025 to meet demand from developments in planning.

The capacity of regional road upgrades to accommodate the *Master Plan 2030 (2016 Review)* yields is greater than the previous Master Planning for the site through the improvements associated with WestConnex. Traffic generation levels travelling to the precinct will also be less due to the reduction in levels of commercial office development (the highest generator of traffic). The construction of new ramps to the M4 Motorway at Homebush Bay Drive and Hill Road, as well as the widening of Hill Road from the M4 Motorway to Old Hill Link will be the first of a number of regional road projects required to improve access for Sydney Olympic Park and will effectively create a second major gateway into SOP and the Olympic Peninsula.

The amounts of car and coach parking provided on site will be maintained to meet long term venue agreements, ensuring efficient transport management during events. Parking supply will be controlled to balance the needs of development and venues, the need to increase the ridership of public transport to meet mode share targets, and the management of traffic on the local and regional road networks.

Medium and large sized events will be supported through enhanced levels of public transport service provision, and preferably staged outside the peak commuter travel periods to and from Sydney Olympic Park.