



Rhodes Precinct

Department of Planning Industry and Environment

Traffic and Transport Report

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Rhodes Traffic and Transport Report

Rhodes

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Executive summary

Department of Planning, Industry and Environment (DPIE) is working with the City of Canada Bay to prepare a Place Strategy for Rhodes. The area was nominated as a Planned Precinct in 2015.

This report identifies the transport initiatives recommended to support the proposal for Rhodes.

Existing transport network constraints

The following constraints have been identified following an assessment of the existing transport network:

- A congested arterial road network (Concord Road) that will continue to be a key bus and freight corridor.
- A congested rail network with train loads close to capacity at Rhodes Station during peak hours and more passengers expected from Wentworth Point as new development becomes occupied.
- A constrained local road network with a lack of bus priority opportunities.
- Restricted access to the Parramatta River foreshore which inhibits walking and cycling opportunities.
- Major transport infrastructure (railway line and Concord Road) that act as barriers to east-west movements for walking and cycling within Rhodes and surrounding suburbs.

Proposed future land uses and development capacity

The Place Strategy, which has land uses and development capacity allocated across different Character Areas, aims to increase the density and mix of uses that will attract and generate travel demand to, from and within Rhodes. The potential number of dwellings, population and jobs by Character Area are shown in Table ES.1.

Of the additional population proposed within the precinct, all residents are located within 800 metres of the Rhodes Station and the proposed ferry wharf (approximately 10 minutes walking distance) and within 400 metres of a bus route.

Table ES.1: Potential Ultimate number of dwellings and population

Character Area	Number of dwellings	Population (based on 2.4 people per dwelling)	Non-residential GFA (Gross Floor Area)	Employment (No. Jobs)
Station Gateway West	701	1,682	10,082	370
Station Gateway East	1,500	3,600	11,084	310
Cavell Avenue Precinct	1,134	2,722	7,302	260
Leeds Street Precinct	903	2,167	4,632	210
Precinct Total	4,238	10,171	33,100	1,150

Evaluation of road network

Traffic demand on the Concord Road corridor is expected to be above its capacity into the future. Due to the capacity constraint of the network, the deterioration would be largely reflected in the form of more unreleased traffic i.e. vehicles unable to enter the modelled network area rather than substantial differences in the road network performance such as change in the level of service at the intersections or mid-blocks.

For the purpose of modelling the transport impacts, the adopted approach has been to focus on quantum of development that can be accommodated within the road network in the near term so that scenarios and their impacts can be compared against existing road network.

Traffic modelling has been undertaken to determine the impacts of proposed road network improvements at key intersections in the Rhodes Precinct and on the Concord Road / Church Street / Devlin Street corridor between Victoria Road and Rider Boulevard.

The assessment included a business as usual 'Do Minimum' scenario and a Project Case scenario assuming up to 70% development in the Precinct (i.e. trips generated by approximately 3,000 dwellings and 1,100 jobs) and road network improvements. The results indicate that the Project Case has similar traffic outcomes to the Do Minimum scenario, indicating that approximately 3,000 dwellings can be accommodated on the upgraded road network without adversely impacting the Concord Road corridor.

Key findings of the assessment for 30% reduction from full development trips and the business as usual DoMin scenario include:

- Additional 150m eastbound lane on Averill Street on approach to Concord Road
- Potential extension of Averill through to Blaxland Road (subject to further investigation)
- New street connecting Cavell Avenue and Blaxland Road west of Cropley Street
- Localised kerbside parking bans on Leeds Street and Cavell Avenue

When compared with the Do Minimum scenario, travel times along the corridor under the R3 Project Case indicates very similar results in both peaks.

Future transport network

The proposed future land use and transport network aims to support the forecast increase in travel demand as a result of the rezoning proposal for Rhodes. Overall, with full development, it is expected up to an additional 3,000-3,500 person trips in the peak hour in the Rhodes. The proposed transport network to support this additional demand is recommended to include the following:

- A street hierarchy that is based on the movement and place framework. Concord Road will continue to be the key north-south movement corridor through the precinct for general traffic, freight and buses. Activated frontages in some parts of Mary Street, Blaxland Road and Leeds Street will become 'Places for People' (refer to **Section 4.3.1**).
- New and upgraded walking links have been identified where high pedestrian activity will be located and to provide new connections and improved permeability (refer to **Section 5.2.1**).
- Proposed strategic cycling links have been identified based on providing connectivity with regional cycling links and closing missing gaps in the network. These new cycling links improve connectivity through Rhodes to existing links to the north-east, north-west, west and south (refer to **Section 5.2.2**).
- Improved bus services capitalising on the new Bennelong Bridge, improving frequencies and span of hours of key routes, local bus network redesign and improving the quality of interchange at Rhodes Station (refer to **Section 5.2.3**).
- Improvements to ferry access as a result of new ferry wharf at Rhodes (refer to **Section 5.2.3**).
- Increased rail capacity through timetable adjustments (and Sydney Metro line introductions), extension and widening of the platforms and potential future quadruplication of the Northern Line through Rhodes and north over the Parramatta River rail bridge (refer to **Section 5.2.3**).

Overall key findings

- The primary focus for Rhodes will be to reduce car driver demand, increasing the mode share of active and public transport and implementing policies that reinforce this mode shift to sustainable transport options.
- If government investment in transport unlocks more capacity than anticipated in this plan, the transport and land use plan could be revised to take advantage of the additional network opportunities.
- An integrated package of works consisting of infrastructure, service and policy measures will need to be implemented to service population growth for Rhodes which will require key stakeholder agencies to agree on the scale and timing of development and the infrastructure required to support it.

- Based on transport modelling, with the support of the proposed infrastructure, approximately 3,000 dwellings and 1,100 jobs (70% of full proposed development) can be supported on the transport network at a functional level of service. This would be achieved through a combination of transport network improvements and travel demand management measures. The modelled travel times and intersection LoS comparisons indicate that the proposed road network upgrades through Rhodes, in conjunction with already committed works on Devlin Street would largely offset the impacts of additional traffic generated by the proposed development.
- As for the Project Case with full development (beyond 3,000 dwellings), the current committed transport infrastructure would not be able to support additional trips, including background traffic growth. The network requires a later reassessment with consideration of the below:
 - **Related major public transport infrastructure:** With the constraints on the existing road network, there will be a greater emphasis on the rail network to provide a larger share of the transport capacity requirements to drive the mode shift away from private vehicles to public transport. This may include the potential quadruplication of the Northern Line to provide the opportunity for more train services. A high-level analysis of the rail demand suggests that equivalent of at least one additional southbound rail service would be required in the one-hour morning peak to meet demand resulting from the Rhodes development. In practice, the additional demand will be spread over several arriving trains as train services do not start from Rhodes station and not empty. The proposed Sydney Metro West can also contribute to higher public transport ridership in Rhodes and potentially alleviate pressure on the Northern Line.
 - **Significant travel pattern changes in the area:** The trip rates and mode share figures in this report are based on pre-pandemic travel behaviour. During the pandemic period, many employees work from home and this is expected to be carried to the post-pandemic period in some form. If the changes in travel behaviour become permanent, the total number of trips from both background growth and from this development would be lower thus reducing or eliminating the need for large scale network improvements under the full development model.

1. Introduction

1.1 Background

The Department of Planning Industry and Environment (DPIE) is working with the City of Canada Bay and Transport for NSW to prepare a Place Strategy for the Rhodes Precinct. The Precinct comprises land on the Rhodes East (bounded by the Parramatta River, Mary Street and the Main North Railway Line) and Station Gateway West (bounded by Walker Street, Gauthorpe Street, Marquet Street and Mary Street) as shown in **Figure 1.1**.

In 2015, Rhodes was nominated by the City of Canada Bay as a potential area for urban renewal. Since then, DPIE has been working with Council to progress the planning for Rhodes. DPIE has commissioned Jacobs Group (Australia) Pty Ltd to undertake the transport investigation for this study. The study has been used to assess and investigate the impacts an additional population of 10,224 across Rhodes, as identified in the Place Strategy for 2036. This study attempts to identify the impacts of this population growth on the surrounding transportation network and proposes mitigation measures that will facilitate this growth and supportive transportation infrastructure measures required.

1.2 Purpose of this report

This report comprises a high-level traffic and transport strategy for the development of Rhodes to accommodate additional population and jobs growth. It is intended that this report be used to guide to decision-making on future transport investment for Rhodes, to ensure unique and variable transport requirements are satisfied.

This report identifies the transport initiatives recommended to support the proposal for Rhodes. The approach of this report is to explain the policy and planning context, describe the existing and future travel tasks, evaluate the performance of the transport network, and document the recommended transport network enhancements.

This report attempts to ensure a coordinated and efficient approach to land use planning, sustainable management and transport infrastructure investment that responds to growth targets within the Eastern District.

1.3 Scope and limitations

As is normal in such studies, the scope of this work entails a number of limitations. The main limitations include:

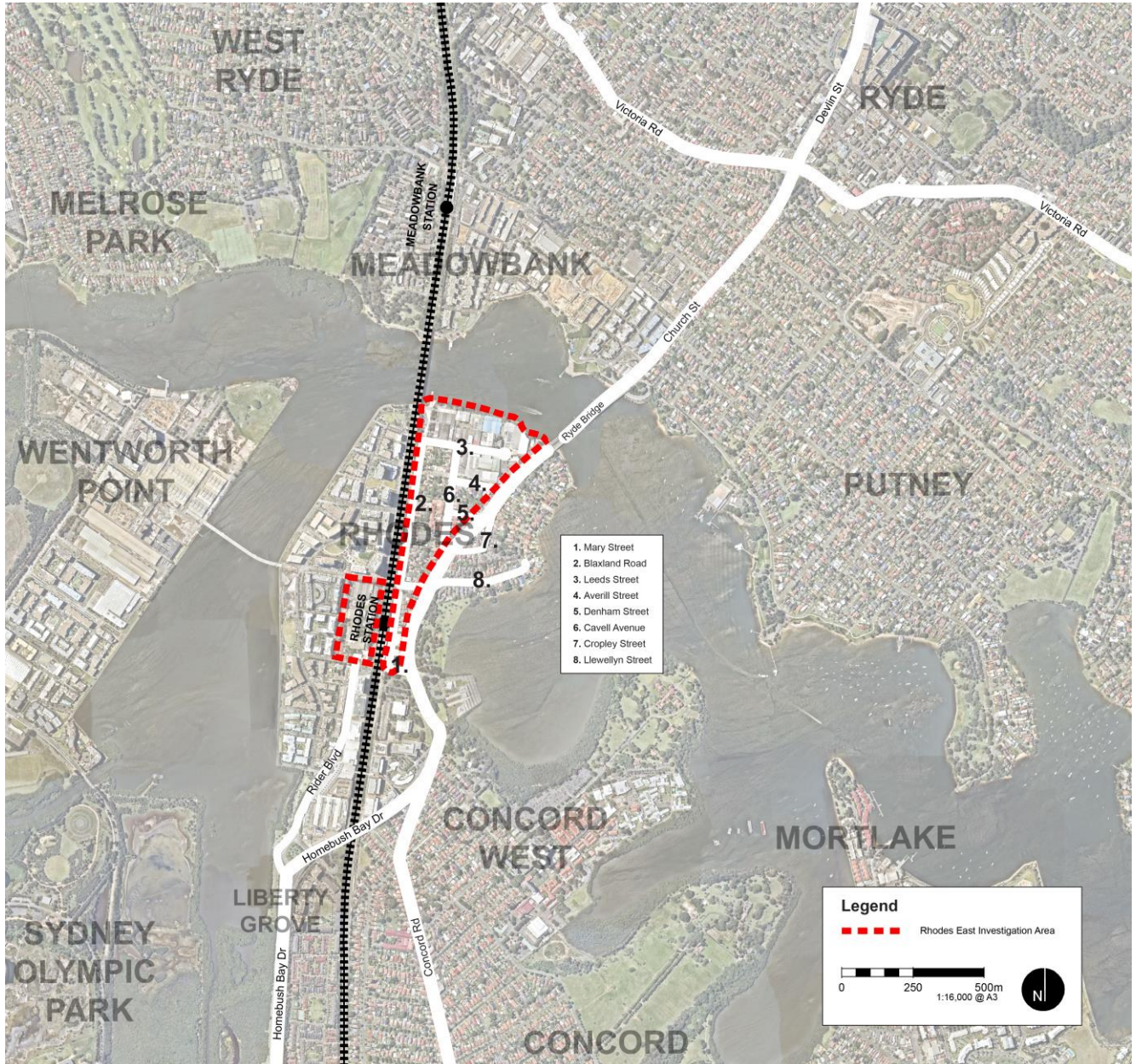
- The lack of sufficient zone and network detail of the Sydney Strategic Travel Model (STM) to generate robust traffic flows and turn movement growth for key intersections within the study area.
- Limited surety in the approval and delivery of other proposed public transport projects (i.e. quadruplication of the Northern Line and proposed extension of Parramatta Light Rail to Wentworth Point and Olympic Park (PLR2) and their impacts on the T9 Northern Line, in particular Rhodes Station.
- Proposed road network upgrades will require detailed concept designs to be developed using accurate topographical surveys, further engineering investigation, consultation and detailed environmental assessment.

1.4 Report structure

The remainder of this report is structured as follows:

- **Section 2** summarises the policy, planning and travel context including relevant goals and actions from NSW and local policy documents, and the existing travel task.
- **Section 3** describes the Place Strategy objectives for Rhodes and outlines the transport planning framework used to determine the various transport functions.
- **Section 4** evaluates the performance of the proposed transport network.

- Section 5** details the future transport task and describes the proposed transport network including new and upgraded walking and cycling links; improvements to bus, light rail, ferry and heavy rail; and improvements to road infrastructure. Travel demand measures including travel plans and parking are also discussed.



Source: Jacobs, 2018

Figure 1.1 : Rhodes Precinct Area

2. Policy, planning and travel context

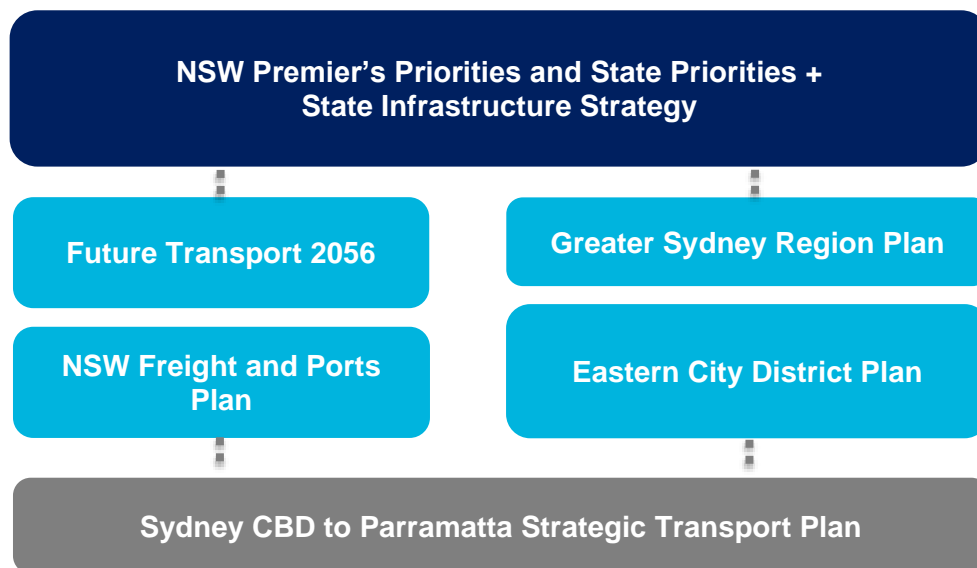
This section documents the policy and planning context that has informed the transport planning outcomes detailed in this report and highlights the key visions, objectives and strategies relevant to Rhodes. Existing travel characteristics are summarised, and existing transport issues described to highlight the constraints that will need to be considered.

2.1 Strategic planning context

NSW Government objectives related to transport and land use planning are detailed in several policies and planning documents including:

- *Greater Sydney Region Plan, A Metropolis of Three Cities* (NSW Department of Planning and Environment, 2018)
- *Eastern City District Plan* (NSW Department of Planning and Environment, 2018)
- *Future Transport 2056* (Transport for NSW, 2018)
- *State infrastructure Strategy* (Infrastructure NSW, 2018)
- *NSW Freight and Ports Plan* (NSW Government, 2018)
- *Sydney CBD to Parramatta Strategic Transport Plan* (TfNSW 2015)

The relationship between these policies and planning documents is shown in Figure 2.1 and their relevance to Rhodes is described below.



Source: Jacobs, 2018

Figure 2.1 : The relationship between NSW Government policies and planning documents

2.1.1 The Greater Sydney Region Plan, A Metropolis of Three Cities

The Greater Sydney Region Plan, A Metropolis of Three Cities is built on a vision of three cities where most residents live within 30 minutes by public or active transport of their jobs, education and health facilities, services and great places.

Rhodes has been identified as both a Strategic Centre within the Eastern City as well as a commercial office precinct and health and education precinct due to its proximity to Concord Hospital.

Priorities for Rhodes include:

- Working with council to provide capacity for additional mixed-use development in Rhodes including offices, retail, services and housing.
- Supporting health-related land uses and infrastructure around Concord Hospital.
- Working with council to improve walking and cycling connections between Rhodes train station and Concord Hospital.

The Plan also establishes a new shared vision for Greater Parramatta to the Olympic Peninsula (GPOP), which is adjacent to Rhodes, with key connections to Wentworth Point and Sydney Olympic Park.

2.1.2 Future Transport 2056

Future Transport 2056 is the strategy that provides plans and initiatives for the next 40 years of how people will live, work and move across the state. A key component of the strategy is the Greater Sydney Services and Infrastructure Plan which shows Rhodes as located on a key city-shaping corridor, the T9 Northern Rail Line. This location provided Rhodes to access to both Parramatta CBD and the Harbour City within 30 minutes by public transport.

In addition to this existing train line, Rhodes is also part of a long-term vision to provide a potential mass transit corridor between Macquarie Park and Kogarah, with Rhodes being a primary interchange location with the T9 Northern Line along this corridor.

Rhodes is also situated along the shared rail and freight corridor that includes the T9 Northern Line (that serves freight trips to Newcastle via Hornsby) and the A3 road corridor, which serves road freight from Hurstville through to the Northern Beaches.

2.1.3 NSW State Infrastructure Strategy 2018-2038

The NSW State Infrastructure Strategy 2018–2038 builds on the NSW Government's major long-term infrastructure planning over the last seven years. The strategy sets out the government's priorities for the next 20 years, and combined with the Future Transport Strategy 2056, the Greater Sydney Region Plan and the Regional Development Framework, brings together infrastructure investment and land-use planning for our cities and regions. Over the last seven years, NSW has invested and delivered to reduce its infrastructure backlog, creating a pipeline of future investment in major projects. The NSW State Infrastructure Strategy 2018–2038 sets out the NSW Government's infrastructure vision for the state over the next 20 years, across all sectors.

As part of the vision for connecting people and places, the NSW State Infrastructure Strategy, Infrastructure NSW will investigate within the next 10 years improved train links to provide smart rail technology and Advanced Train Control System to provide safer and more efficient train services on key lines including the T9 Northern Line.

2.1.4 NSW Freight and Ports Strategy

As a supporting plan to Future Transport 2056, this Plan is central to the NSW Government's long-term vision for transport in NSW. It aligns with the NSW Government's statewide land use and infrastructure plans – the NSW Regional Plans, Greater Sydney Commission District Plans and the State Infrastructure Strategy. The

Strategy includes over 70 initiatives to be delivered by 2023 – ranging from infrastructure investment to trials of new technologies.

Concord Road is identified as a primary freight route, which links major regions throughout the Sydney metropolitan area to strategically important ports, airports, industrial areas, freight terminals, intermodal terminals and hubs.

The Main North Railway Line is also part of a significant freight route which travels alongside the study area. The Main North Railway Line through Rhodes is part of Australia's busiest rail line, the east coast rail network, servicing Melbourne, Brisbane and Sydney.

2.1.5 Sydney CBD to Parramatta Strategic Transport Plan

The *Sydney CBD to Parramatta Strategic Transport Plan* is a transport plan that aims to improve the way people move along and around one of Sydney's most important and busiest areas, the corridor between Sydney CBD and Parramatta. The plan identifies future transport requirements and interventions at the regional, intermediate and local level by detailing a range of short, medium and long-term initiatives.

The plan sets the strategic framework for how transport can be improved in the corridor, and incorporates the following initiatives that are relevant to Rhodes:

- The Greater Parramatta to the Olympic Peninsula Priority Growth Area, which includes Wentworth Point.
- Parramatta River ferry initiatives, including a new wharf at Rhodes.
- The Bennelong Bridge to provide access between Rhodes and Wentworth Point.

The plan also identifies that trips less than five kilometres make up 85 per cent of all trips that start and finish in the corridor, which have the potential to be undertaken by walking or cycling.

2.2 District and local context

The Greater Sydney Commission's (GSC) District Plan for the Eastern District and City of Canada Bay's planning documents provide additional context at the district and local level and are described below.

2.2.1 Greater Sydney Commission Eastern City District Plan

The GSC was established to bring best practice to Greater Sydney by integrating land use, transport and infrastructure planning and collaborating with state agencies, and local and Commonwealth Governments. The Eastern City District Plans provide the link between *The Greater Sydney Regional Plan* and councils' Local Environment Plans. The goal of the District Plans is to have well-coordinated, integrated and effective planning for land use, transport and infrastructure. The District Plans set out the opportunities, priorities and actions and provide the means by which *The Greater Sydney Regional Plan* can be actioned at a local level.

Situated in the Eastern City District, Rhodes is recognised as a strategic location of metropolitan and district significance. The NSW Department of Planning, Industry and Environment and City of Canada Bay Council have been working collaboratively on the Rhodes Planned Precinct to maintain jobs in the area, and to provide new homes, shops, cafes and foreshore access. Key actions for Rhodes are centred around productivity and include:

- Protect capacity for job targets and a diverse mix of uses to strengthen and reinforce the economic role of the centre
- Protect employment generating capacity at Rhodes Business Park
- Improve links to the GOP area
- Enhance links with the Concord health precinct
- Promote place making initiatives to improve the quality of public spaces
- Develop opportunities to provide sustainable utility infrastructure
- Create a connected walking and cycling network within the precinct to regional links and where possible along river foreshores

2.2.2 City of Canada Bay plans and policies

The *Rhodes West Draft Master Plan* (City of Canada Bay 2009) established Rhodes as a major area for development and growth in the Canada Bay local government area (LGA), projecting at the time that 47 per cent of future growth would occur within the Rhodes area. Early community concerns focused on the lack of adequate community facilities, proposing reductions less than the areas full development potential.

The *Canada Bay Local Planning Strategy* (City of Canada Bay 2010) identified that there would be intra-centre competition between the Rhodes, Macquarie Park, Parramatta and Burwood strategic centres in attracting future investment and higher order employment. To support future growth and meet ideal employment scenarios the strategy focused on the following key actions:

- Retaining key industry sites and solidifying the Rhodes precinct as a key service industry location.
- Intensifying employment within Rhodes in combination with the provision of transport infrastructure.
- Ensuring and retaining shop frontages in all new developments, and establishing active vibrant public domains, along with improving the urban design and design quality of building development.

The *Rhodes Peninsula Place Plan* (City of Canada Bay 2012) was put forth as a place-making document to give the community input into establishing the desired social and community place-focused outcomes for the Rhodes Peninsula. The plan acknowledges the following:

- That infrastructure provision will need to keep up with population growth and demand.
- The need for a well maintained and accessible public domain.

- Community desire for the Rhodes Peninsula to be more active and vibrant.

The *Canada Bay Local Environmental Plan* (City of Canada Bay 2013) contains zoning amendments, increased building heights and floor space ratio controls to allow for greater capacity of residential dwellings around the Rhodes train station precinct and Rhodes Peninsula.

Local Strategic Planning Statement (City of Canada Bay March 2020) positioned Rhodes Planned Precinct as mixed-use community close to jobs and public transport. Its Infrastructure & Collaboration identifies the priority that work towards best-practice planning and infrastructure provision for Rhodes Planned Precinct, creating a model for sustainable, high quality development.

- New social and cultural infrastructure, including a new primary school, affordable housing and open space/recreation facilities, are required to support the anticipated population of 10,000 new residents.
- Development will also place substantial pressure on existing transport infrastructure, which is already at capacity. In particular Concord Road and the north-south rail line will need upgrading and a new ferry wharf is required to support an increase in journeys taken by public transport.
- Council is committed to ensuring that Rhodes is an exemplar development through encouraging active and public transport and the implementation of Travel Demand Management (TDM) measures

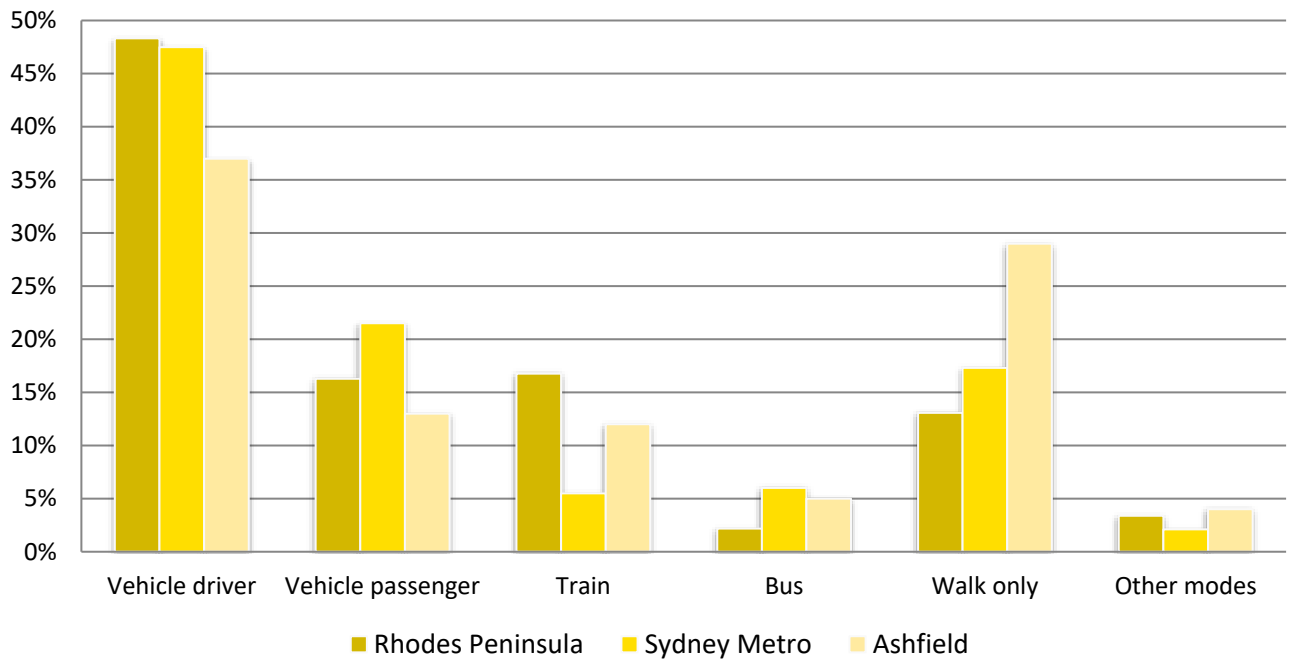
2.3 Existing travel characteristics

2.3.1 Modes of travel

Existing modes of travel used for all trips to and from Rhodes are shown in Figure 2.2. Private vehicles account for 65 per cent of trips, 17 per cent of trips are made by train, 13 per cent of trips are made by walking, two per cent are made by bus, and three per cent are made by other modes.

Comparatively, across the Sydney metropolitan area, approximately 69 per cent of trips are made by private vehicle. Trips made by train account for six per cent of trips across Sydney, which is significantly lower than Rhodes, and six per cent are made by bus, which is higher than Rhodes. Walk only trips account for 18 per cent of trips across Sydney, compared to only 13 per cent in Rhodes.

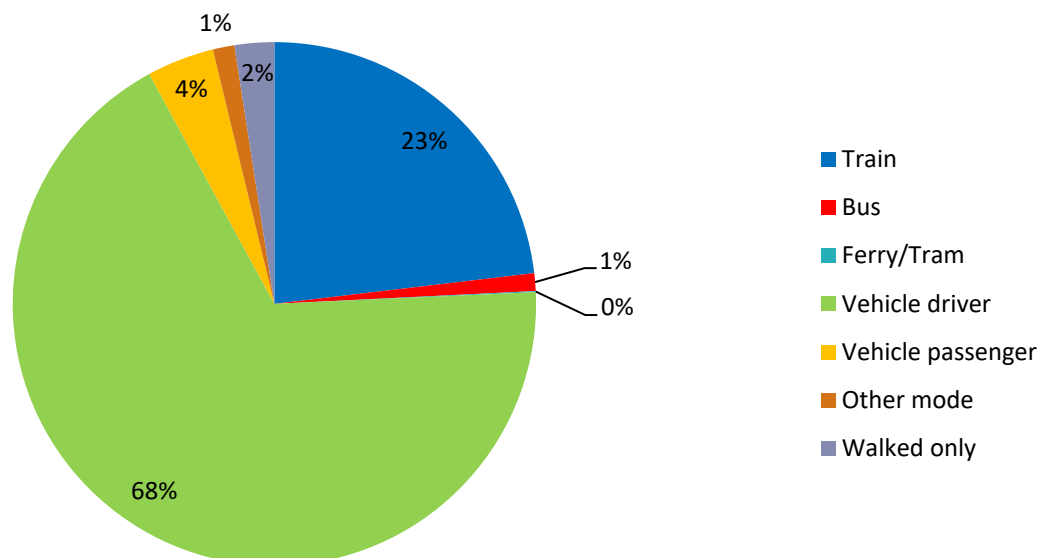
The former Ashfield Local Government Area (LGA), now in the Inner West Council, has been used as a travel comparison or benchmark for Rhodes given its high-quality rail access and similar demographic characteristics, with a high professional workforce. The rail mode share for Ashfield is similar to Rhodes at 12 per cent of all trips. However, walk only trips in Ashfield are significantly higher at 29 per cent. The high share of walk trips also translates to a lower overall private vehicle mode share in Ashfield of 50 per cent.



Source: Bureau of Transport Statistics, Household Travel Survey, 2015

Figure 2.2 : Existing modes of travel to and from Rhodes and a comparison with the Sydney Region and Ashfield LGA

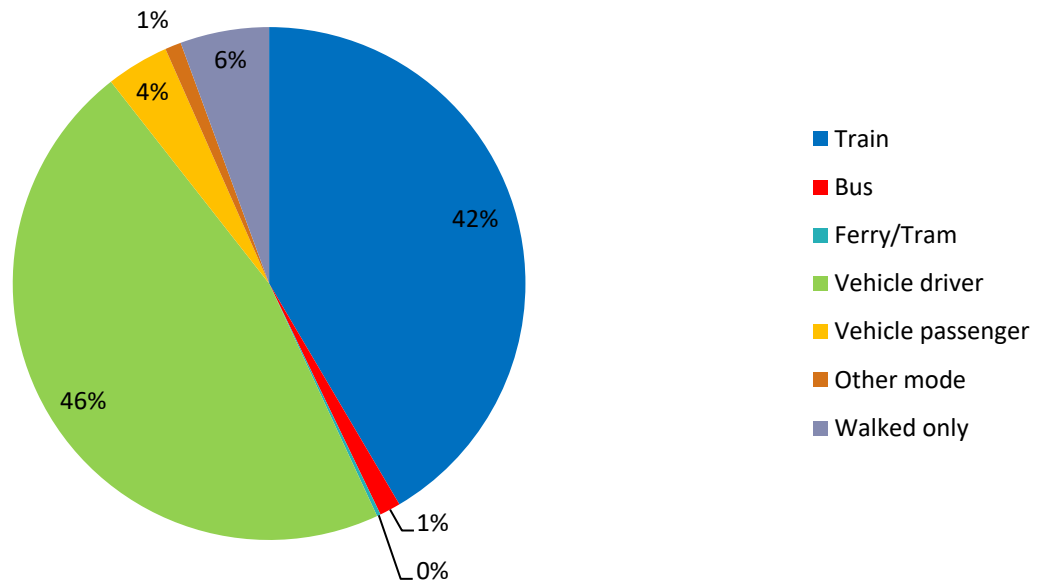
Existing modes of travel for trips to work in Rhodes are shown in Figure 2.3. Private vehicles account for 72 per cent of trips, 23 per cent of trips are made by train, two per cent of trips are walk only, and one per cent of trips are made by bus.



Source: Australian Bureau of Statistics, 2011

Figure 2.3 : Existing mode of travel for trips to Rhodes for work

Existing modes of travel for trips to work from Rhodes are shown in Figure 2.4. Private vehicles account for 50 per cent of trips, 42 per cent of trips are made by train, six per cent of trips are walk only, and one per cent of trips are made by bus.

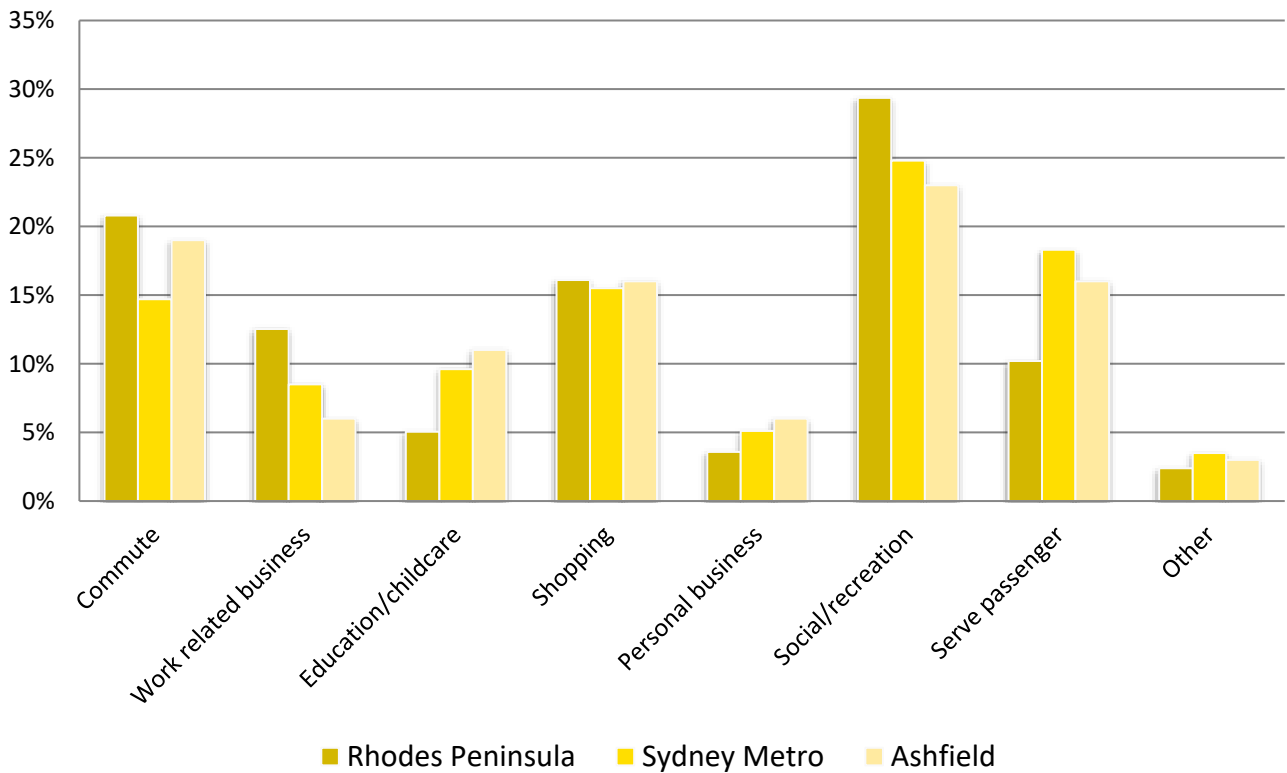


Source: Australian Bureau of Statistics, 2011

Figure 2.4 : Existing mode of travel for trips from Rhodes for work

2.3.2 Trip purpose

Trip purposes for residents in Rhodes are shown in Figure 2.5. Rhodes has a higher than average portion of commuter trips at 21 per cent, compared to 15 per cent for Sydney and 19 per cent for Ashfield. Social / recreation trips are also high (29 per cent) and trips serving passengers are low (10 per cent). This may reflect the younger population of Rhodes (median age 28 – Sydney and Ashfield 36 and 35 respectively) with less children being dropped off at school by residents (average children per family 1.4 – Sydney and Ashfield 1.9 and 1.6 respectively) (ABS 2011). The high proportion of social / recreation trips combined with the low walking mode share previously identified suggests that many people are undertaking these types of trips by private vehicle.

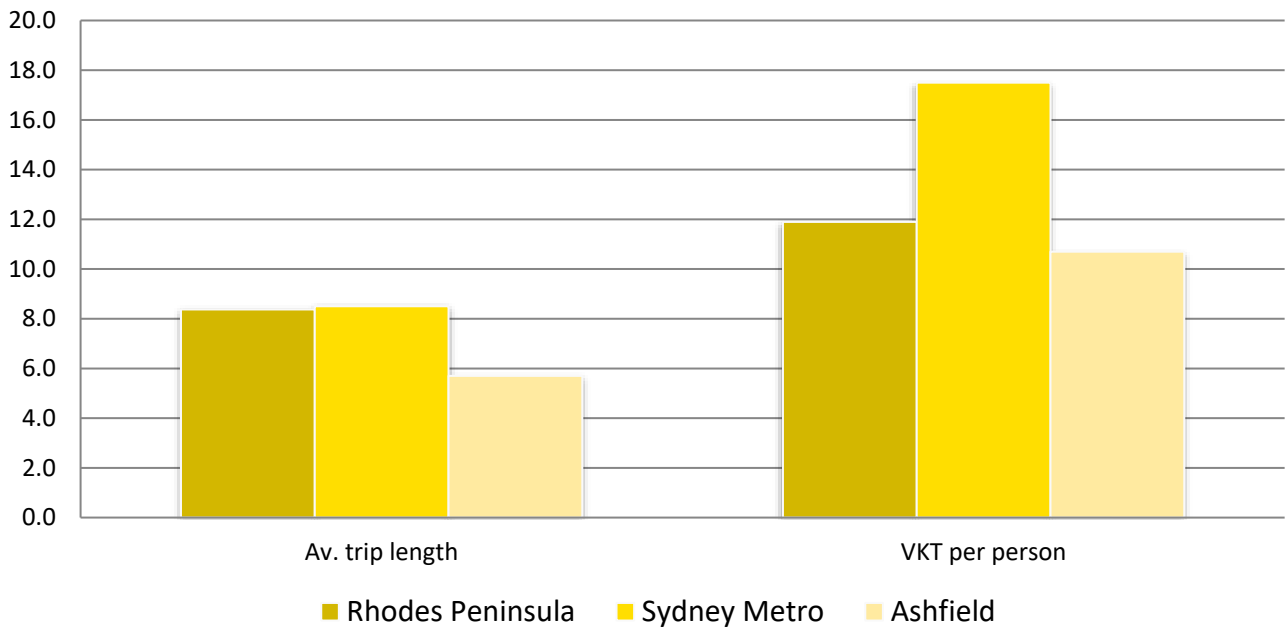


Source: Bureau of Transport Statistics, Household Travel Survey, 2015

Figure 2.5 : Trip purpose for Rhodes and a comparison with the Sydney metropolitan area and Ashfield LGA

2.3.3 Trip distance and number of trips per person

The average trip distance per person in Rhodes is shown in Figure 2.6. The average trip length is 8.4 kilometres which is roughly equivalent to the Sydney average, with Ashfield averaging 5.7 kilometres. This difference is likely to be related to the very low walking mode share in Rhodes compared to Ashfield. Rhodes residents travel further on average to access services and employment, either by car or train. The vehicle kilometres travelled (VKT) per person of 11.9 kilometres is more aligned with Ashfield (10.7 kilometres), than the Sydney average (17.5 kilometres).

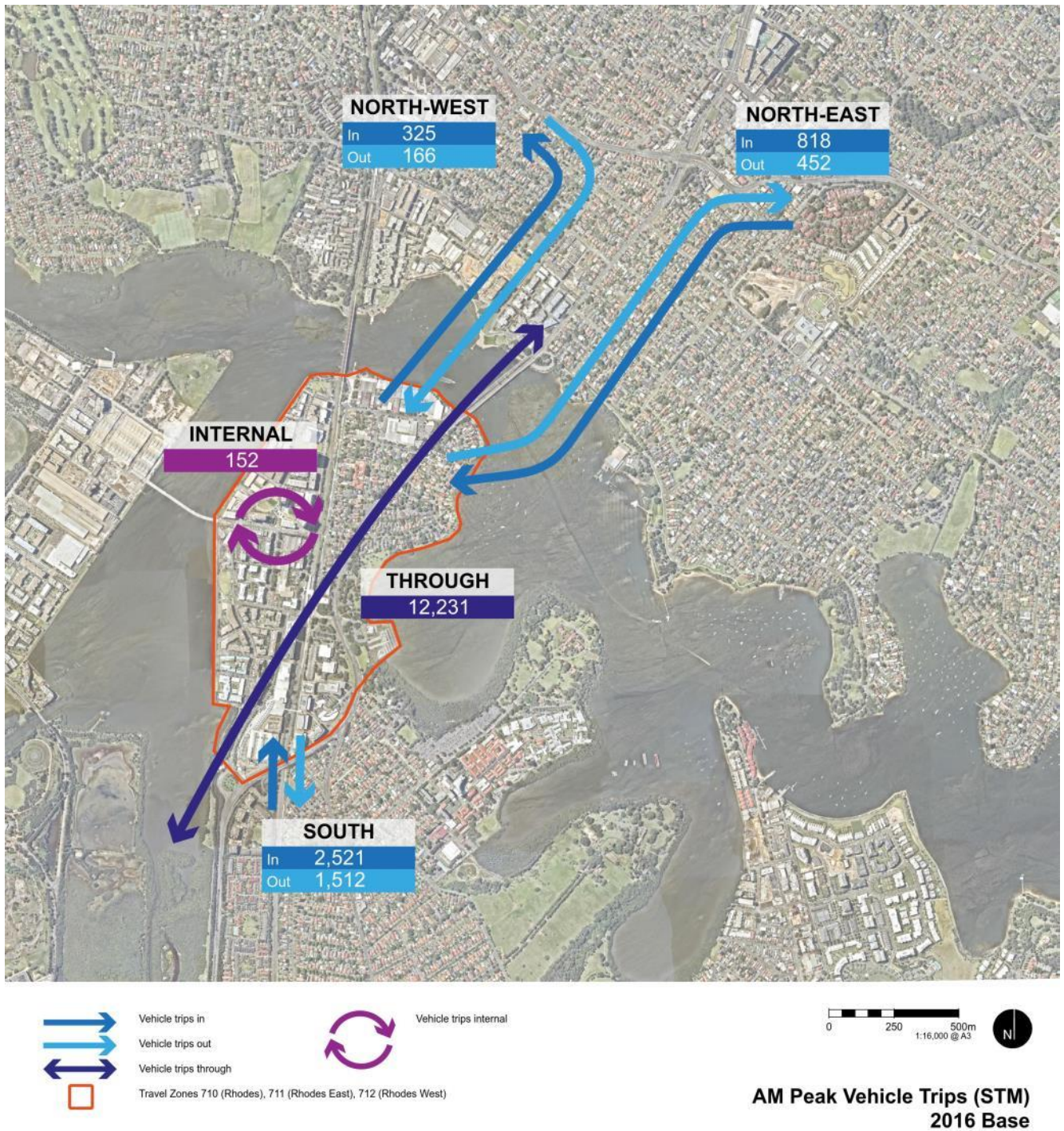


Source: Bureau of Transport Statistics, Household Travel Survey, 2015

Figure 2.6 : Average trip distance and VKT per person in Rhodes and a comparison with the Sydney metropolitan area and Ashfield LGA

2.3.4 Spatial distribution of trips

The spatial distribution of motorised vehicle trips to, through and within Rhodes during the two-hour weekday morning peak period (7.00 am to 9.00 am) is shown in Figure 2.7. There are more vehicle trips entering Rhodes than departing in all three directions, indicating Rhodes is more of a destination than a trip origin in the morning peak period. The majority of vehicle trips into and out of Rhodes are from the south via Homebush Bay Drive or Concord Road. Given Homebush Bay Drive and Concord Road are major arterial roads providing inter-regional links, the majority of trips (12,000) pass through Rhodes without stopping. There are very few internal vehicle trips (less than 200).



Source: Sydney Strategic Travel Model, 2016

Figure 2.7 : Spatial distribution of trips to, through and within Rhodes suburb

2.4 Existing transport network constraints

Based on an assessment of the existing transport network, the following constraints have been identified:

- A congested arterial road network (Concord Road) that will continue to be a key bus and freight corridor.
- A congested rail network with train loads approaching capacity at Rhodes Station during peak hours and more passengers expected from Wentworth Point as new development becomes occupied.
- A constrained local road network with a lack of bus priority opportunities.
- Restricted access to the Parramatta River foreshore which inhibits walking and cycling opportunities.
- Major transport infrastructure (railway line and Concord Road) that act as barriers to east-west movements for walking and cycling within Rhodes, and to Rhodes West and surrounding suburbs.

A summary of existing transport network constraints and opportunities is shown in Figure 2.8.

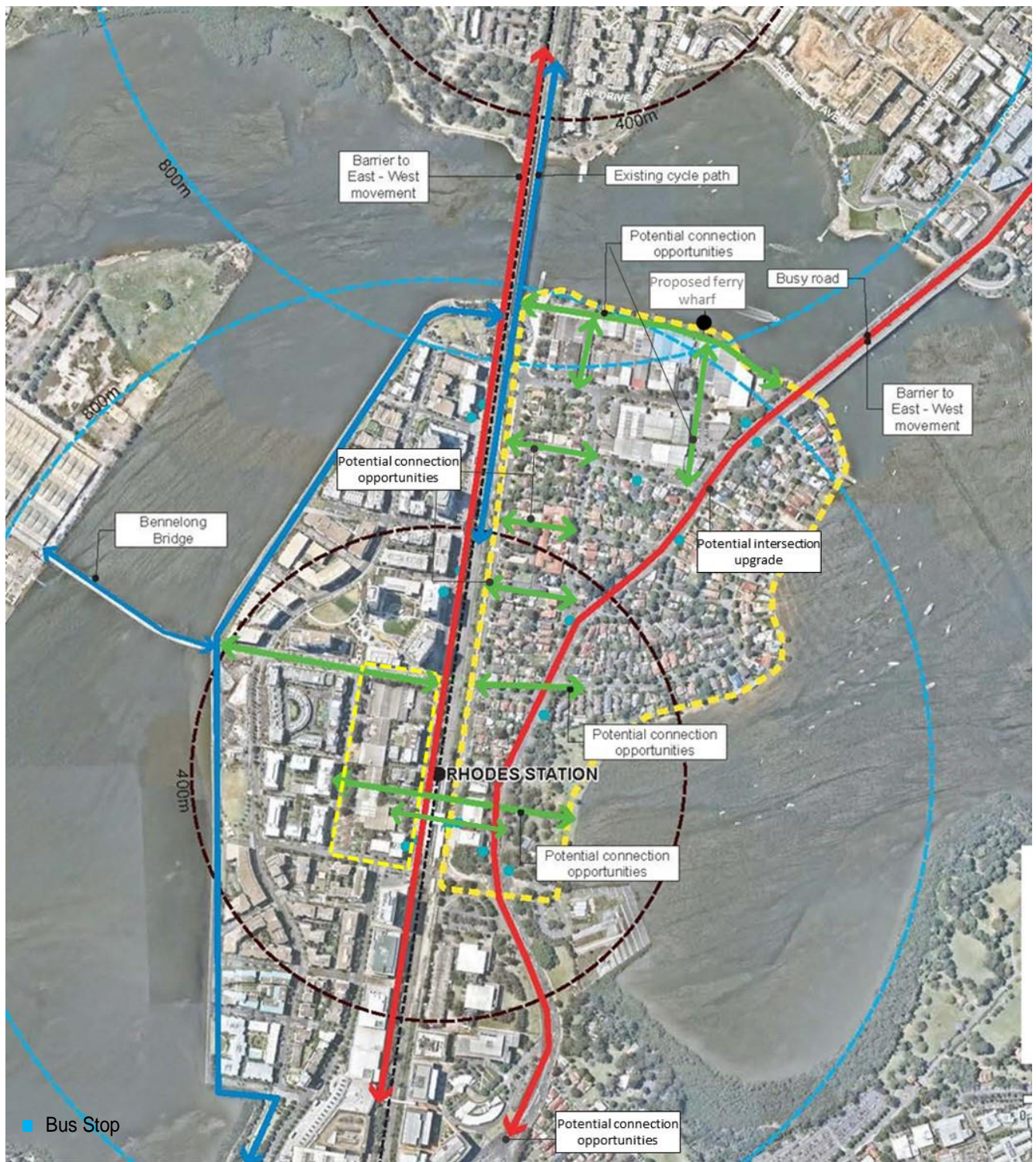


Figure 2.8 : Existing transport network constraints and opportunities

3. Place Strategy objectives and planning framework

Defining the transport planning vision and objectives for Rhodes will ensure that planning and investment in the transport network will result in positive outcomes, address the areas of highest priority, and cater for increased future transport demands resulting from the proposal. These are described in this section.

3.1 Vision, objectives and principles

3.1.1 Vision

The Rhodes Place Strategy includes the following overarching vision for the precinct:

In 2036, Rhodes will be a sustainable, thriving, people-focused place that respects heritage and is supported by a forward-thinking transport strategy and meaningful connections to the water. The way buildings relate to the street and the rich amenity of Rhodes will encourage residents and visitors to walk further, stay longer, enjoy and take pride in the community identity of this place.

In order to support this vision and respond to the constraints outlined in **Section 2.4**, four key transport objectives for Rhodes have been developed.

- 1) Create a local street network that is designed for people first and vehicles second.
- 2) Prioritise active and public transport, and demand management measures to support sustainable travel behaviour and encourage reduced car use.
- 3) Provide a diversity of land uses with walkable access to a variety of services and facilities to discourage unnecessary car trips.
- 4) Establish the Rhodes peninsula as part of Sydney's connected network of jobs and recreation taking advantage of its central location within the Olympic Peninsula.

3.1.2 Planning principles

Based on the vision and objectives identified, planning principles were used to inform option development and ultimately the transport outcomes for Rhodes. These principles and how they relate to the objectives are detailed in Table 3.1.

Table 3.1 : Transport planning objectives and principles

Objectives	Principles
1. Create a local street network that is designed for people first and vehicles second.	<ul style="list-style-type: none"> • Plan transport networks and land uses to influence the location, timing, scale and density of development. • Implement a road planning framework for the Rhodes study area that recognises the movement and access requirements across the road network. • Provide improved permeability of connections by removing barriers to local movement by sustainable modes. • Facilitate appropriate provision for freight and local delivery access within the area.
2. Prioritise active and public transport, and demand management measures to support sustainable travel behaviour and encourage reduced car use.	<ul style="list-style-type: none"> • Support public transport and walking and cycling to grow the proportion of travel by these modes. • Provide safe and direct access to support key desire lines and to major trip generators within and outside the precinct. • Leverage off new infrastructure such as the Bennelong Bridge to provide new services and infrastructure to maximise benefits. • Provide a policy framework that supports sustainable travel behaviour (such as parking rates, behavioural programs, travel plans). • Improve efficiency by sharing the road space more effectively among all modes of road based transport.
3. Provide a diversity of land uses to provide residents with walkable access to a variety of services and facilities and discourage unnecessary car trips.	<ul style="list-style-type: none"> • Plan transport networks and land uses to influence the location, timing, scale and density of development.
4. Establish the Rhodes peninsula as part of Sydney's connected network of jobs and recreation taking advantage of its central location within the Olympic Peninsula.	<ul style="list-style-type: none"> • Improve the efficiency of the transport network through increasing passenger and freight efficiency, project prioritisation and making existing infrastructure more efficient. • Consider the broader regional needs of the Greater Parramatta to Olympic Peninsula and the Global Economic Corridor when proposing public transport improvements. • Consider the role of regional freight moving through the precinct.

3.1.3 Potential measures

Ultimately, the Rhodes precinct will be measured on how it achieves the vision and objectives. From a transport perspective there are a number of approaches for measuring outcomes. Some potential options and their relationship to the objectives are outlined in Table 3.2.

Table 3.2 : Objectives and potential measures

Objectives	Potential measures
1. Create a local street network that is designed for people first and vehicles second.	<ul style="list-style-type: none"> • Number of barriers or opportunities that influence movement. • Mode share for public transport, walking and cycling. • Level of Service for pedestrians and bicycles. • Average walking distance to public transport.
2. Prioritise active and public transport, and demand management measures to support sustainable travel behaviour and encourage reduced car use.	<ul style="list-style-type: none"> • Mode share for public transport, walking and cycling. • Level of Service for pedestrians and bicycles. • Average walking distance to public transport. • Transfer times/distances for customers interchanging modes. • Number and type of parking spaces provided. • Change in duration of peak periods and off-peak load factors. • Mode shift. • Number of developments with Travel Plans.
3. Provide a diversity of land uses to provide residents with walkable access to a variety of services and facilities and discourage unnecessary car trips.	<ul style="list-style-type: none"> • Accessibility to a range of travel options and local services. • Proportion of contained trips.
4. Establish the Rhodes peninsula as part of Sydney's connected network of jobs and recreation taking advantage of its central location within the Olympic Peninsula.	<ul style="list-style-type: none"> • Mode share for public transport, walking and cycling. • Travel time reliability for people and goods. • Proportion of through-traffic and freight vehicles. • Travel times to key centres.

3.2 Strategic road planning framework

The framework defines the future function of the street network on the basis of land use and transport objectives and desired outcomes for Rhodes. The roads within and around Rhodes provide two primary functions for transport customers:

- Movement – the ability to travel between places.
- Place – the ability to access origins and destinations of travel.

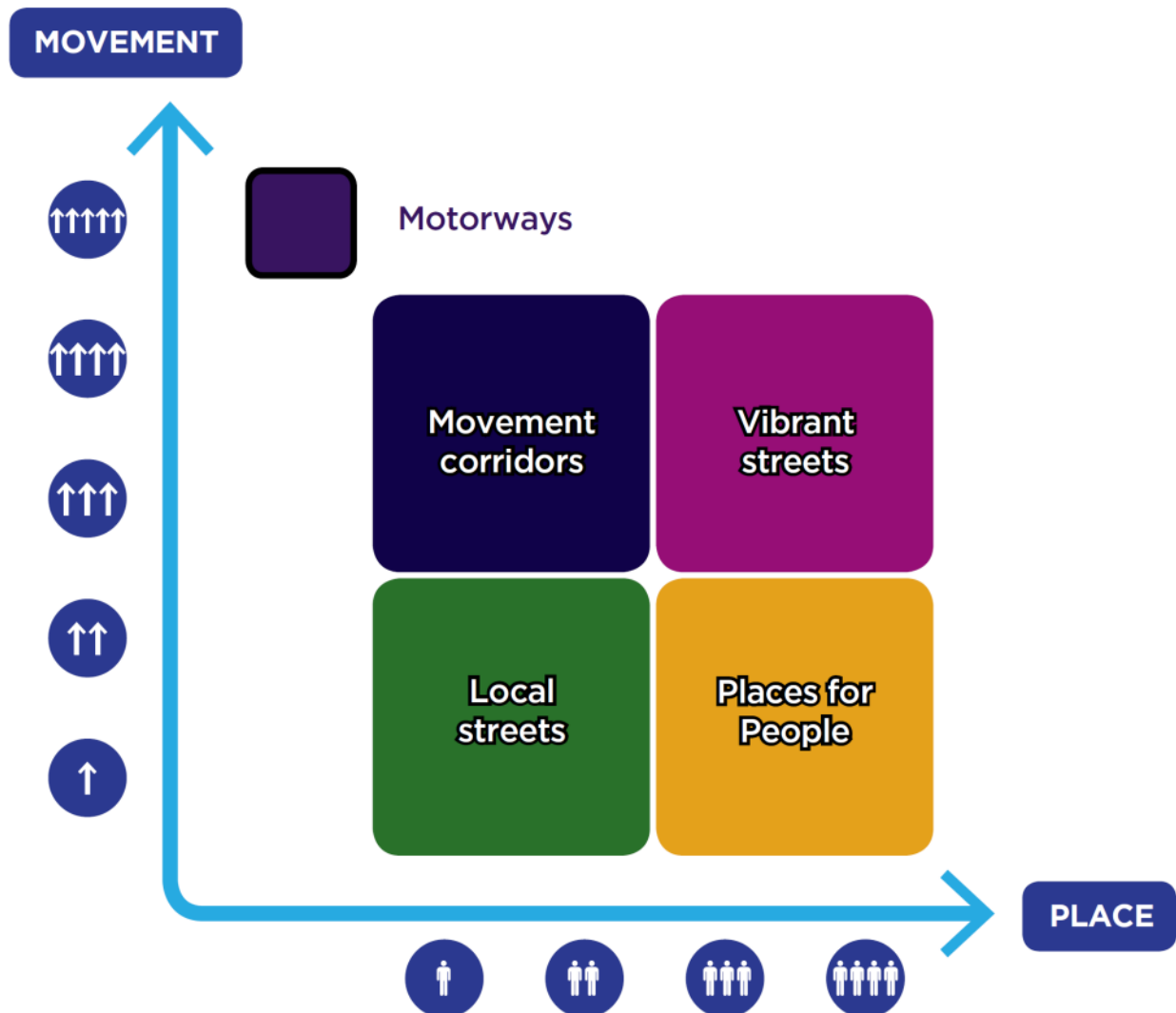
An understanding of the two functions of a street is vital when the two functions are competing, such as through increased movement requirements or improved place amenity. The movement and place function of a street informs planning for the level of access across each of the transport modes. The street network consists of a mixture of different road types serving different functions within the transport network. These are shown in Figure 3.1.



Source: TfNSW, 2016

Figure 3.1 : Movement and place hierarchy

The matrix in Figure 3.2 shows how different street types are categorised in terms of their movement and place function.



Source: TfNSW, 2016

Figure 3.2 : Movement and place framework

3.3 Overview of strategic transport modelling approach

Transport modelling has been undertaken as part of the overall transport evaluation to support the planning for Rhodes. Transport modelling has been used to inform the understanding of future travel demand, travel patterns and performance of the road network with consideration of:

- Existing land uses, population and employment in the Sydney Greater Metropolitan Area
- Future land use changes
- Future proposed, planned and committed transport infrastructure and services

The Sydney Strategic Travel Model (STM) has been used to identify the number of trips (travel demand) and what origins and destinations people will travel to, from and within (trip distribution) for all purposes of travel. The STM is used for projecting travel patterns under different land use, transport and pricing scenarios. It can be used to test alternative settlement, employment and transport policies, to identify likely future capacity constraints, or to determine potential usage levels of proposed new transport infrastructure or services.

4. Transport network evaluation

This section examines the transport network impacts on Rhodes and its surrounding road network from predicted growth derived from the land use scenario identified in Place Strategy. In doing so, it identifies from a high-level strategic perspective the network impacts of the proposed population growth.

4.1 Proposed master plan

The Rhodes precinct, which forms the basis of the proposed transport network presented in this report, is shown in Figure 4.1. The Rhodes Precinct Place Strategy aims to increase the density and mix of uses that will attract and generate travel demand to, from and within Rhodes.

Four Character Areas have been identified in the Place Strategy and are described below.

- **Station Gateway West** – The Station Gateway West character area adjoins the western side of Rhodes Station. Established residential apartments are located to the south and west including the recently completed Town Square, with newer residential apartments and Central Park to the north. The area is a rectangular parcel of land approximately 3 hectares in area, oriented north–south. The site is bordered by Mary Street to the south, Walker Street to the east, Gauthorpe Street to the north and Marquet Street to the west. Connections further south and north are available along Rider Boulevard and Walker Street, and a pedestrian right-of-way, Annie Leggett Promenade, provides an additional mid-block pedestrian connection west to Rhodes Foreshore Park.
- **Station Gateway East** – this area is bound by Blaxland Avenue to the west and south, Concord Road to the east and a proposed new road to the north. Current uses include a park, retail development, business centre and low-rise dwellings. The character area serves as an important place for connections within the Rhodes strategic centre, including connections to the station, Mcllwaine Park and Concord Hospital to the south east. Considerations that have informed proposed controls include maintaining solar access to Mcllwaine Park and ensuring separation and variation for towers both within the character area and in the adjacent Station.
- **Cavell Avenue** – The Cavell Avenue character area is bound by Blaxland Avenue to the west, Leeds Street to the north, Concord Road to the east and a new road to be created end of Cavell Avenue. The area is currently a mixture of low-density dwellings, community uses such as a church and community centre, and industrial uses in the block bound by Cavell Avenue, Leeds Street, Concord Road and Averill Street. There are some heritage items in the character area. The proposed high–low development model provides tools for a sympathetic interface with these items. The future of Cavell Avenue will largely consist of community and residential uses. The area will provide an opportunity for high-amenity, medium-density housing with good access to public transport, jobs and services offered in the broader Rhodes strategic centre. The proposed future scale of the character area is medium density, offering a range of housing typologies including strata and Torrens title dwellings to promote housing diversity and a more human-scale from other areas in the precinct. New roads and pedestrian connections are proposed throughout the character area to create a permeable road network. A new primary school will be provided in the Cavell Avenue character area for up to 1,000 students.
- **Leeds Street** – This area is bound by Blaxland Avenue to the west, the foreshore to the north, Concord Road to the east and Leeds Street to the south. Leeds Street is currently zoned IN1 General Industrial. The renewal of Leeds Street will enable the delivery of a foreshore park and continuation of a foreshore pedestrian and cycle path. These new pedestrian and cycle paths will provide important local connections and also contribute to the Green Grid outlined in the Eastern City District Plan. Other opportunities in Leeds Street include a new ferry wharf opposite the foreshore park and new pedestrian connections to the foreshore and ferry from Leeds Street. New connections are proposed to be activated with ground floor destination retail and other active uses. Benchmark for fine grain will bring a human-scale to development in this location and its interface with the foreshore. A new primary school is proposed to the south of the character area. Limiting overshadowing of the new school site has been a consideration in development of proposed controls. Views to the precinct when arriving via the road and rail bridge have also informed the master plan.

The land uses and scale of development are based on analysis undertaken by Roberts Day. The proposed number of new dwellings, population and new jobs by Character Area are shown in Table 4.1 and Figure 4.1.

Table 4.1 : Potential number of dwellings and jobs

Character Area	Number of Dwellings	Population (based on 2.4 people per dwelling)	Non-residential GFA (Gross Floor Area)	Employment (no. jobs)	Non-residential Development Program
Station Gateway W	701	1,682	10,082	370	mixed use
Station Gateway E	1,500	3,600	11,084	310	Aged Care, mixed use, and office
Cavell Avenue	1,134	2,722	7,302	260	mixed use
Leeds Street	903	2,167	4,632	210	mixed use
Precinct Total	4,238	10,171	33,100	1,150	

Note: mix-use comprises Retail/café/restaurant



Source: RobertsDay, 2020

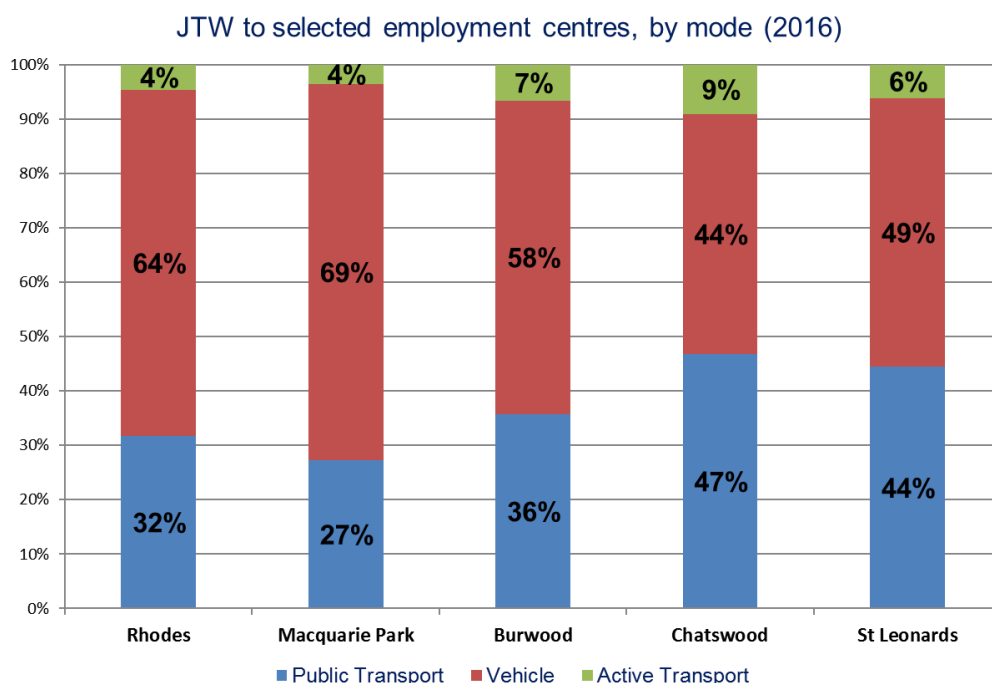
Figure 4.1 : Rhodes Draft Place Strategy

4.2 Future travel demand

4.2.1 Mode share

In order to support higher population and employment numbers within Rhodes, planning for additional transport capacity has been focussed largely on public and active transport, particularly on increasing public transport mode share by increasing the proportion of trips travelling to and from Rhodes by rail. To encourage increase in public transport mode share, target mode shares indicative of a more public transport-focussed centre has been adopted for Rhodes, based on observed mode shares in other centres as shown in Figure 4.2.

Consultation with government agencies determined that public transport mode shares comparable to Chatswood would be an appropriate target for Rhodes and 44% private vehicle mode share is assumed for commuting purpose, particularly for residential and office. Mode shares for other land use are slightly adjusted based on their travel pattern. A summary of the existing and target mode shares for Rhodes is shown in Table 4.2.



Source: Australian Bureau of Statistics, 2016

Figure 4.2 : Mode share for comparable employment centres

Table 4.2 : Interim mode share targets for Rhodes

Mode	Existing Mode share	To		From	
		Future Office	Future Mix used	Future residential	Future Age care
Private vehicle	64%	44%	30%	44%	40%
Rail	31%	30%	30%	30%	30%
Bus & Ferry	1%	5%	10%	5%	10%
Others	4%	21%	30%	21%	20%

Note: Others include active transport and work from home trip

Mixed use/retail will predominately serve local residents hence the higher walking mode share

4.2.2 Trip generation

The trip generation rates have been calculated using the overall personal trip rate in Table 4.3 and applying local modal split assumptions shown in Table 4.2 to estimate the vehicle generation rates.

A breakdown of the estimated total number of trips generated by the Rhodes precinct is listed in Table 4.4. Using person trip rates and expected mode shares, a total of 1,073 vehicle/h (AM peak) and 1,177 vehicle/h (PM peak) trips using car occupancy assumption for residential of 1.2 passengers per vehicle and 1.5 for other land uses is estimated.

Table 4.3: Person Trip Rates

Vehicle Trip Rate	Unit	AM			PM		
		Rate	IN	OUT	Rate	IN	OUT
Residential	Dwelling	0.6	20%	80%	0.59	80%	20%
Mix use	100 m ²	2.86	50%	50%	5.97	50%	50%
Aged Care	100 m ²	0.84	60%	40%	0.96	40%	60%
Office	100 m ²	2.89	80%	20%	1.59	20%	80%

Note: Car space is estimated at 1 space per 100 m²

Table 4.4: Peak Hour Vehicle Trips (School trips excluded)

Character Area	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Leeds Street	50	170	220	179	61	240
Cavell Avenue	51	201	252	198	51	249
Station Gateway East	97	286	383	295	107	403
Station Gateway West	62	156	218	188	97	285
Total	261	812	1,073	860	317	1,177

4.2.3 Rail implications of future travel demand

Continued growth in travel is expected in and around Rhodes regardless of the Rhodes development. With a congested road and rail network, it is likely that more rail services will be required to stop at Rhodes station. However, the capacity of the station is limited due to the following factors:

- Shared downstream track capacity on the Western Line
- Train length limitations for platforms on the Northern Line
- Shared track with freight and intercity trains
- Platform and concourse capacity at Rhodes

Line capacity

As indicated in Table 4.4 there would be an additional 1,000-1,200 passengers travelling in the peak direction from Rhodes in the morning peak hour, based on the proposed number of additional dwellings over the whole Rhodes peninsula. This would require the equivalent of at least one additional train per hour to serve the forecast increase in train passengers travelling in the peak direction (southbound in the morning peak) assuming capacity of 1,200 passenger per train (at 135 per cent loading). However, this demand would be spread over several arriving trains as services do not start from Rhodes station and therefore trains would not be empty.

This of course does not take into account the available train capacity of services approaching Rhodes station. Current capacity on the T9 Northern line is limited to the existing total of 8 eight-car trains per hour for the peak two hours and 4 eight-car trains per hour in the off-peak. Changes to the existing operation of the line would be needed to provide additional carriages or services that could accommodate any growth in rail passengers at Rhodes.

Platform capacity

In addition to the line limitations for existing services on the T9 Northern Line, analysis undertaken by Transport for NSW in 2019 also indicates that there are existing capacity limitations for both the platform and station concourse to accommodate a substantial increase in passenger volumes through Rhodes station. Key capacity limitations in the AM Peak at this station include:

- Station concourse operating at Level of Service C;
- Stairs from station concourse to Platform 1 operating at Level of Service D;
- Platform 1 operating at Level of Service D, with a narrow northern end to the platform, and passengers required to travel to either end of the platform to find available carriage capacity;
- Platform 2 unloading to station concourse operating at Level of Service C (Level of Service D in PM Peak), with stair width insufficient to allow passengers to exit the platform within a 2-minute period; and
- Stairs from Walker St to the station concourse are operating at a Level of Service E, with pulses of passengers disembarking buses to travel up the stairs to the concourse and platforms.

These observations indicate that during peak periods, Rhodes Station has insufficient capacity for existing train passenger demand (noting that this analysis was undertaken after the additional two trains were added to stop at Rhodes in late 2018) and that under future forecast demands, these conditions will worsen without further upgrades to the platform and concourse.

4.2.4 Key findings of future travel demand analysis

Key finding #1 – Walking needs to be a focus

The existing walking mode share in Rhodes is very low (only 13 per cent). Making Rhodes East a walkable neighbourhood with multiple destinations and services within walking distance is critical.

Key finding #2 – Public transport will need to play a major role

Rail is already carrying a moderate share (17 per cent of all trips) and this will need to increase. Buses have the potential to carry more than the current two per cent of trips, particularly with improvements connecting to Wentworth Point and Sydney Olympic Park via the Bennelong Bridge.

Key finding #3 – Car trips need to be managed downwards

The road network through Rhodes is already congested and more cars in the area is not a desirable outcome to achieve the project vision. The ability to achieve the mode share for car trips will be a factor of demand management (e.g. parking policies) and the success of shifting or shaping behaviour. Providing people with realistic options to walk for short trips, particularly social / recreation and weekend trips, will be a significant influence on the success of the mode share targets. This is not just about the transport network, but also the walkability of the urban form and the mix of land uses within walking distance.

The mode share targets for Rhodes are shown in Table 4.2. In order to ensure consistency and that conflicting policies are not pursued; it is recommended these targets are also adopted for Rhodes West.

4.3 Road network evaluation

Evaluation of proposed road improvement measures to accommodate the proposed land use and population was undertaken using traffic modelling. These measures have been identified and developed in consultation with DPIE, TfNSW and the City of Canada Bay.

4.3.1 Proposed street hierarchy

The proposed street hierarchy for the broader Rhodes Precinct using the movement and place framework discussed in **Section 3.2** is shown in Figure 4.3. The identified local streets support local access in the Rhodes Precinct. Other streets and their function are also shown.

Movement corridors

Concord Road will continue to be the key north-south movement corridor through the precinct for general traffic, road freight and bus transport. The significant volume of traffic, key road freight and bus transport function, and lack of alternative crossings of Parramatta River between Silverwater Road and Victoria Road, means that opportunities to downgrade the movement function are scarce. That said, opportunities to improve crossings for pedestrians and cyclists and the building frontages need to be pursued.

Places for People

Rider Boulevard is an existing 'Place for People' that provides an activated north-south frontage connecting south from Rhodes Station to the Rhodes Shopping Centre. The boulevard is characterised by:

- A diversity of active ground floor uses.
- Time restricted on-street parking.
- Generous footpath provision with outdoor seating in some locations.
- An urban plaza on the corner of Mary Street / Rider Boulevard.
- A mixture of marked and signalised pedestrian crossings.
- Cycling lanes.
- 50 kilometres per hour speed limit. This speed limit is not ideal for a 'Place for People' and a 40 kilometres per hour speed limit should be considered.

Mary Street east of the station will become a 'Place for People' between Marquet Street and Concord Road, providing the activated east-west spine connecting a diversity of uses through the station precinct, both sides of the station.

Blaxland Road between Mary Street and Llewellyn Street will be formalised as a 'Place for People' providing an activated frontage connecting into east-west links across the rail line at the station. There will be a new bus interchange and cycleway adjacent to the train station in Walker Street.



- Movement corridor
- Places for people
- Local streets

Note: Averill Street extension subject to further investigation

Figure 4.3 : Proposed street hierarchy for the broader Rhodes Precinct

4.3.2 Assessed intersections

Traffic modelling was undertaken at two geographical levels:

- Concord Road / Church Street / Devlin Street corridor between Victoria Road, Ryde and Rider Boulevard, Rhodes.
- Rhodes Investigation Area.

These intersections are shown in Figure 4.4 and listed in Table 4.5.



Figure 4.4 : Intersections assessed as part of road network evaluation

Table 4.5 : Intersections assessed as part of road network evaluation

Concord Road / Church Street / Devlin Street corridor			Rhodes Investigation Area		
No.	Intersection	Intersection control	No.	Intersection	Intersection control
1	Concord Road / Averill Street	Signalised	1	Leeds Street / Blaxland Road	Signalised
2	Concord Road / Llewellyn Street	Signalised	2	Leeds Street / Cavell Avenue	Priority controlled
3	Concord Road / Mary Street	Signalised	3	Cavell Avenue / Averill Street	Priority controlled
4	Concord Road / Homebush Bay Drive	Signalised	4	Blaxland Road / New Averill Street extension*	Priority controlled

Note: Blaxland Road / New Averill Street extension subject to further investigation

4.3.3 Modelled scenarios

Analysis of the traffic impacts of the proposed Rhodes Precinct and associated land use changes has been undertaken on the basis of the following scenarios:

4.3.4 Do Minimum Scenario

Land use and development

The Do Minimum scenario includes the following land use assumptions:

- No Rhodes Precinct development
 - Background traffic growth associated with movements through Rhodes based on forecast traffic volumes provided from Sydney Strategic Travel Model (STM) in 2016. These background growth forecasts correspond to 9% growth for the morning and evening peak from 2016 to 2026.

Road network improvements

The Do Minimum scenario includes the following road network improvements:

- Widening of Devlin Street northbound near Victoria Road
- Removal of the southbound bus lane on Devlin Street beneath Victoria Road, as committed by TfNSW under the Pinch Points program.

The Project Case includes the following road network improvements:

- Widening of Devlin Street northbound between Victoria Road and removal of the southbound bus lane on Devlin Street beneath Victoria Road as committed by TfNSW under the Pinch Points program (as per Do Minimum)
- Lengthening of right turn bay on Concord Road into Averill Street by 50m
- Additional 150m eastbound lane on Averill Street on approach to Concord Road
- Extension of Averill Street through to Blaxland Road (subject to further investigation)
- New street connecting Cavell Avenue and Blaxland Road west of Cropley Street
- Localised kerbside parking bans on Leeds Street and Cavell Avenue

Figure 4.6 shows the above improvements.

Sensitivity test results

The Project Case sensitivity test concluded with a 30% reduction of full development trips (R3 Project Case), where the volume of unreleased vehicle traffic is comparable to the Do Minimum scenario (within approximately 100 vehicles) (refer Table 4.6)

Based on the assessment, 70% of the full development capacity (i.e., 3,000 dwellings and 1,100 jobs), with proposed mitigation schemes, would result in no significant worsening over the Do Minimum scenario. Accordingly, 2026 R3 Project Case is adopted for further road network performance analysis in the following sections.

Table 4.6 : 2026 Total Unreleased Vehicle Summary

2026 Scenarios	DoMin	R0	R1	R2	R3
AM (6:00-10:00)	72	225	193	121	162
PM (3:00-7:00)	790	1728	1375	1204	899

4.3.5 Network performance

Intersection performance analysis criteria

The performance of a road network is largely dependent on the operating performance of its intersections, which form critical capacity control points.

Road based Level of Service (LoS) is a qualitative measure describing operational conditions within a traffic stream and their perception by drivers and / or passengers. This measure is used in planning design and operation of roads. It also provides a basis for determining the number of lanes to be provided on the road network. The road operational conditions in terms of LoS criteria are classified into six categories as shown in Table 4.7.

Table 4.7 : Level of Service (LoS) criteria for intersections

LoS	Average delay per vehicle (seconds / vehicle)	Traffic signals and roundabouts	Give way and stop signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity, and accident study required
E	57 to 70	At capacity, at signals, incidents will cause delays. Roundabouts require other control mode	At capacity, requires other control mode
F	Over 70	Extra capacity required	Extreme delay, traffic signal or other major treatment required

Source: Roads and Traffic Authority, 2002

Assessment of intersection performance

The micro-simulation modelled intersection results are shown in Figure 4.5 to Figure 4.8.

The key findings from this comparison include:

- For the Concord Road corridor, all intersections perform at similar LoS in both peaks, with a number of intersections south of Ryde Bridge improving in the evening peak under the Project Case
- For intersections internal to the Precinct, all intersections improve under the Project Case due to the proposed upgrades.

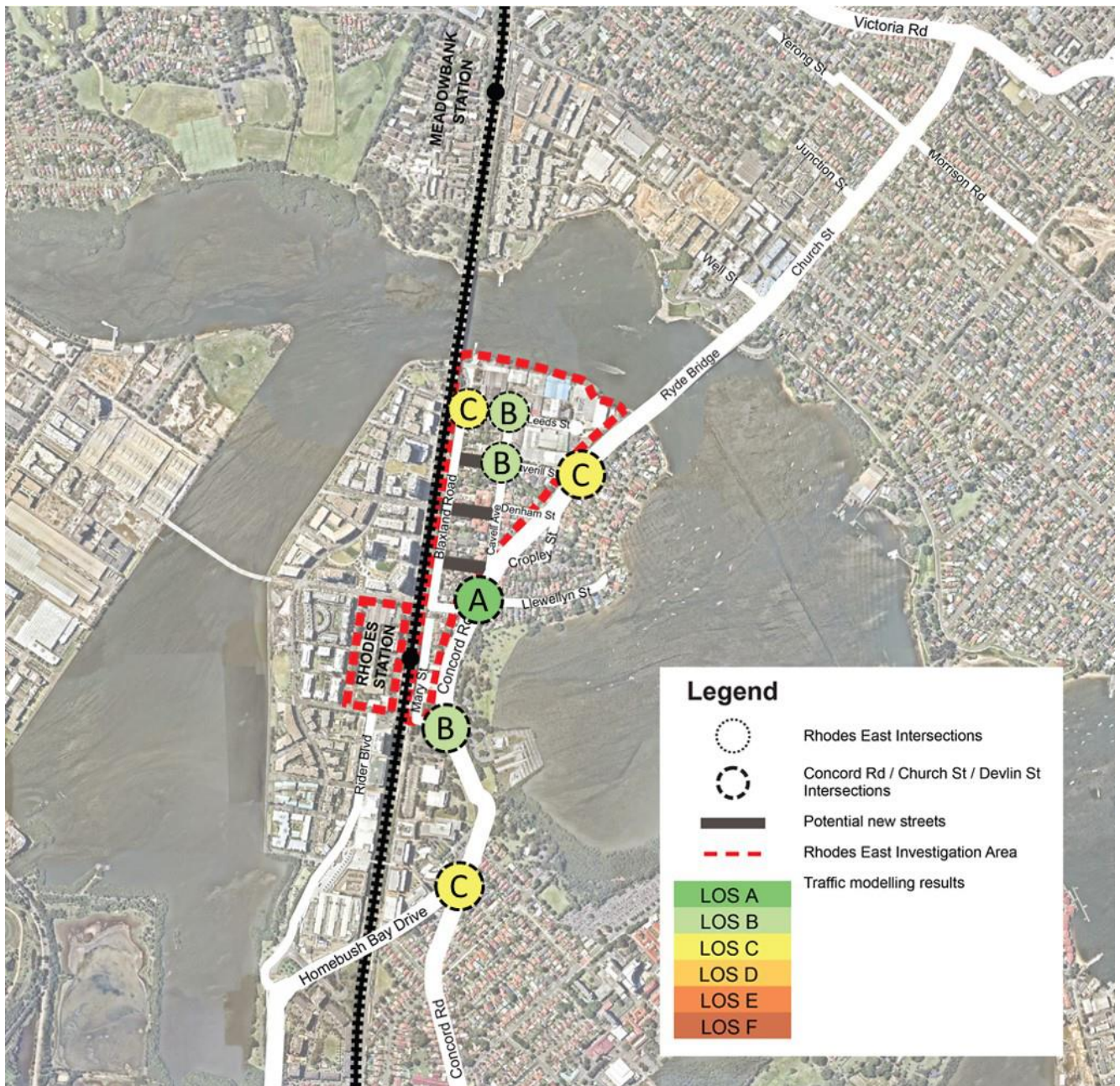


Figure 4.5 : Intersection performance, Do Minimum, morning peak

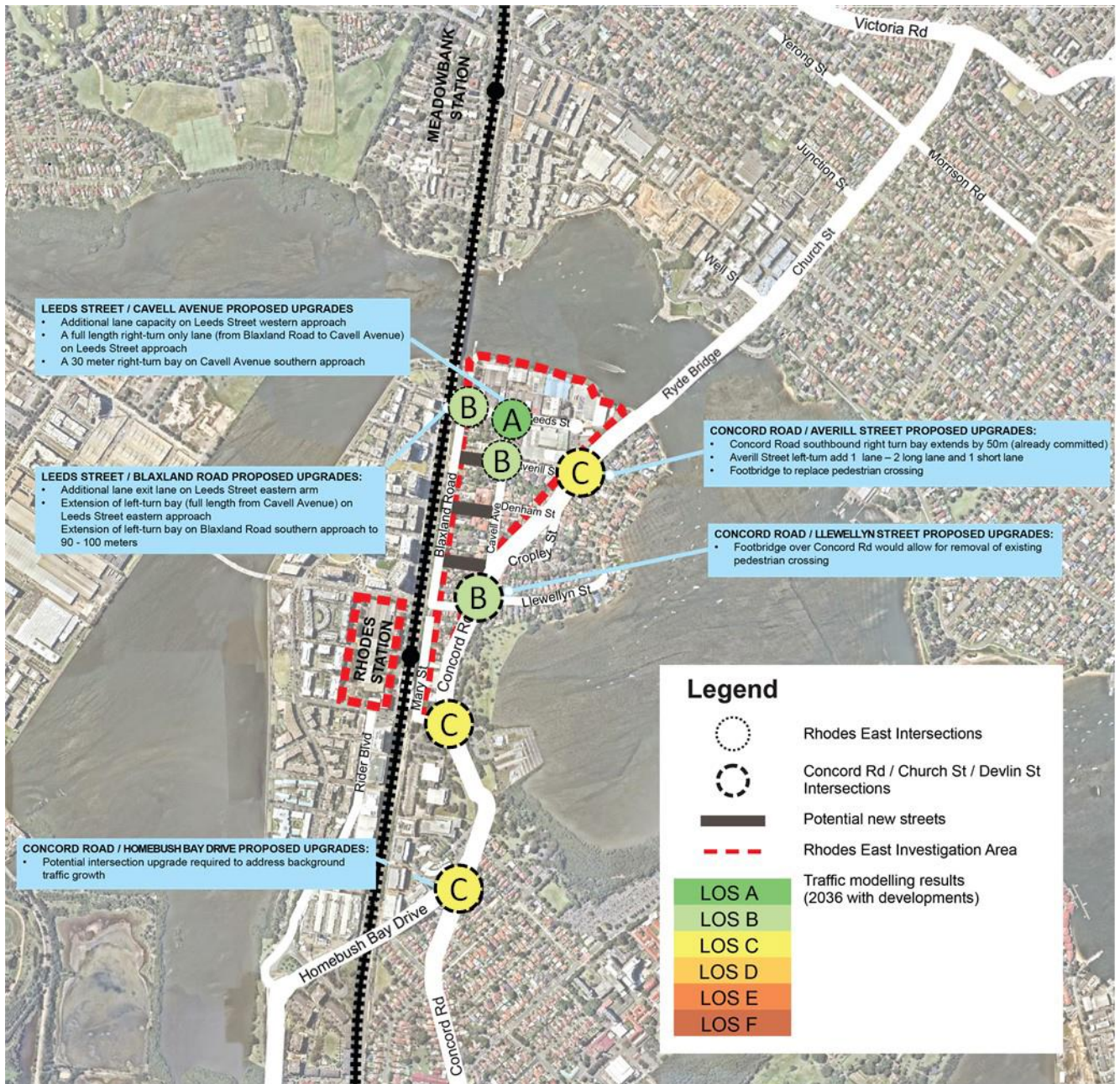


Figure 4.6 : Intersection performance with development in Rhodes, morning peak, with mitigation

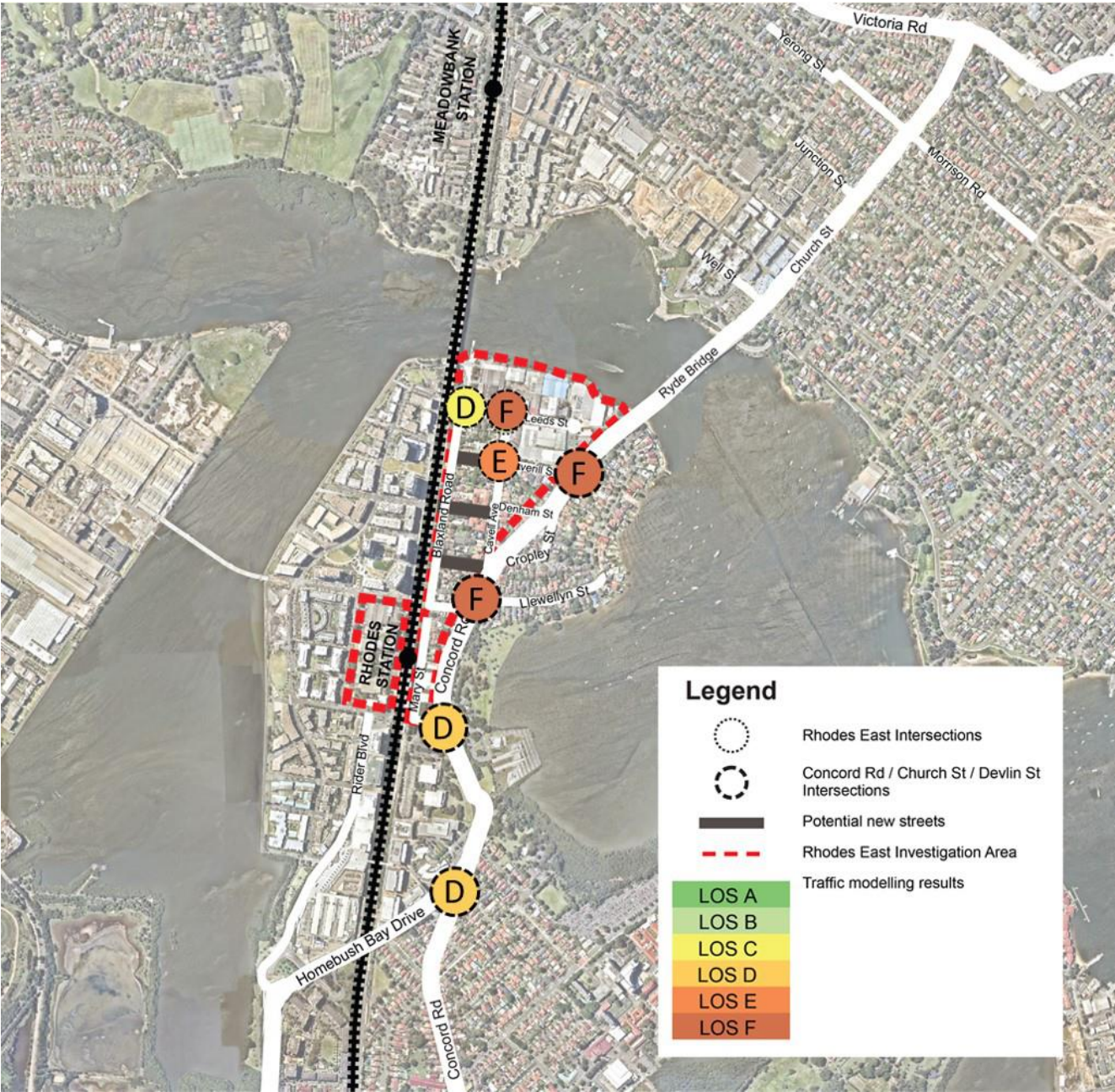


Figure 4.7 : Intersection performance, Do Minimum, evening peak

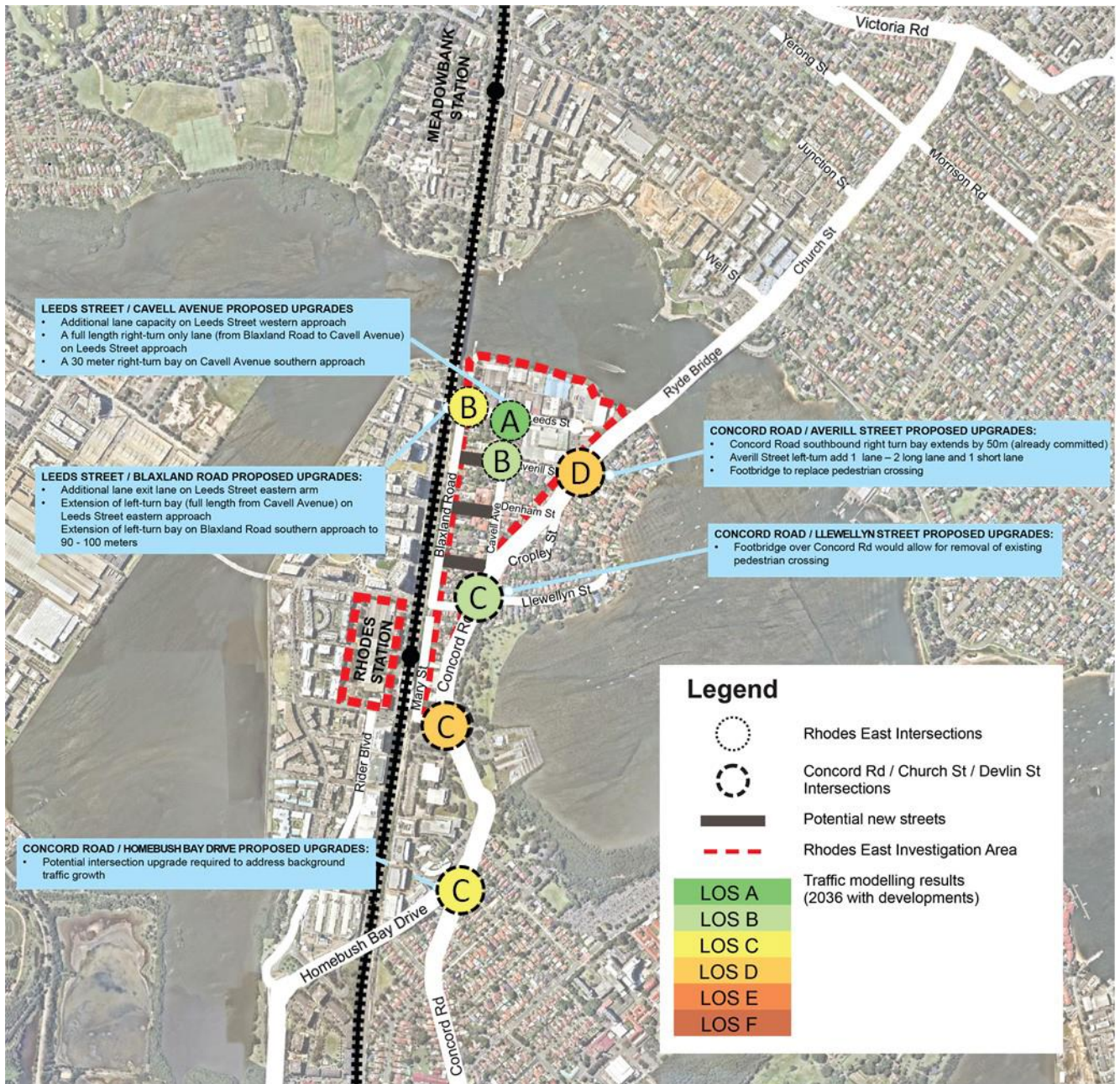


Figure 4.8 : Intersection performance, with development in Rhodes, evening peak, with mitigation

Assessment of corridor travel times

Maintaining travel times along the key arterial route of Homebush Bay Drive, Concord Road and Church Street is critical to minimising the impacts of the proposed Rhodes Precinct on existing travel through the area. To assess the impacts that increased traffic generation associated with the precinct would have on existing travel through Rhodes, modelled travel times for general traffic during the morning and evening peak period have been compared.

Cumulative travel time graphs for this corridor under the various scenarios are shown in Figure 4.9 to Figure 4.12.

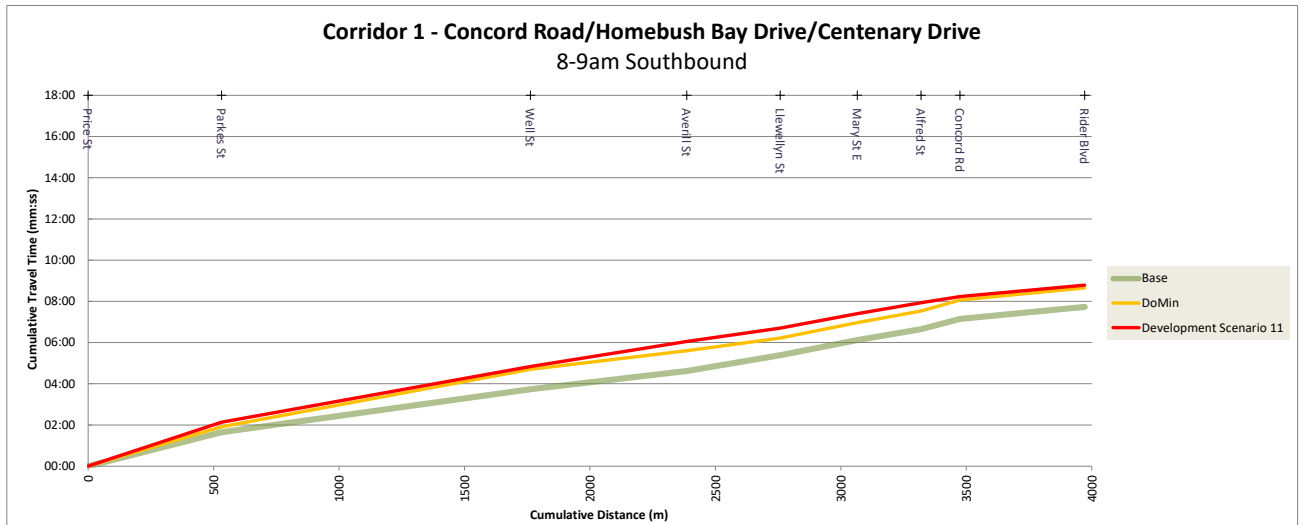


Figure 4.9: Morning peak southbound travel time comparison

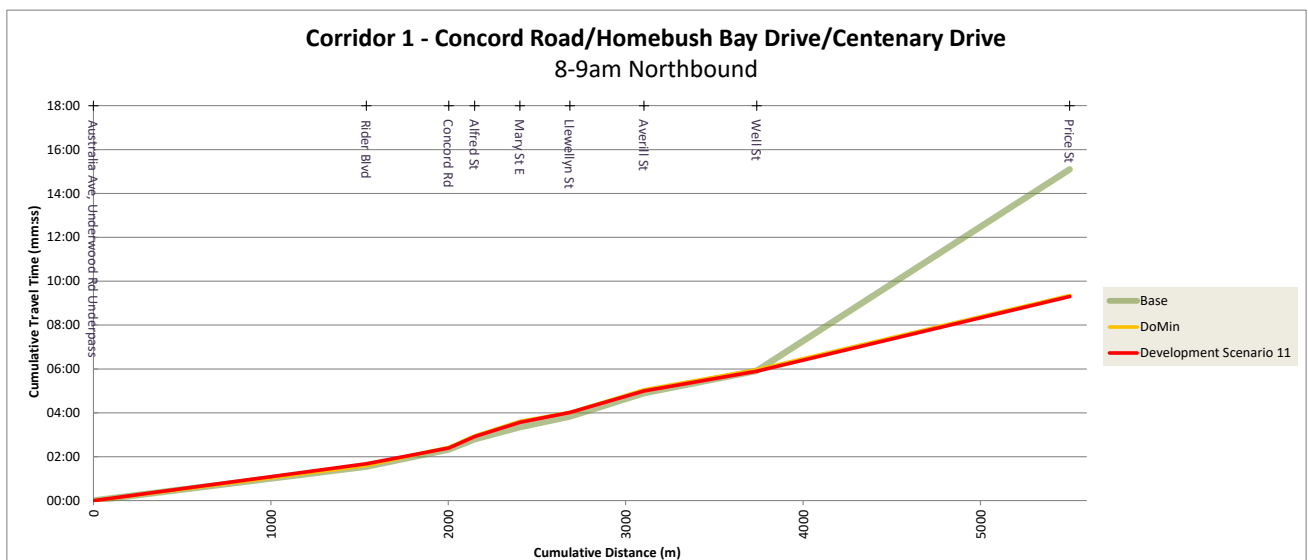


Figure 4.10: Morning peak northbound travel time comparison

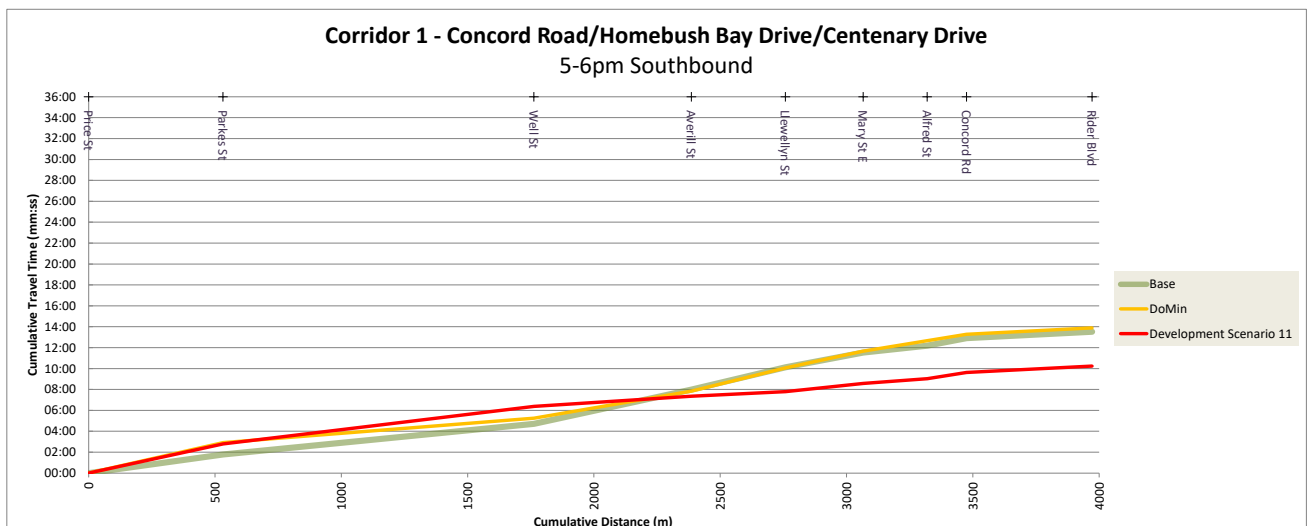


Figure 4.11: Evening peak southbound travel time comparison

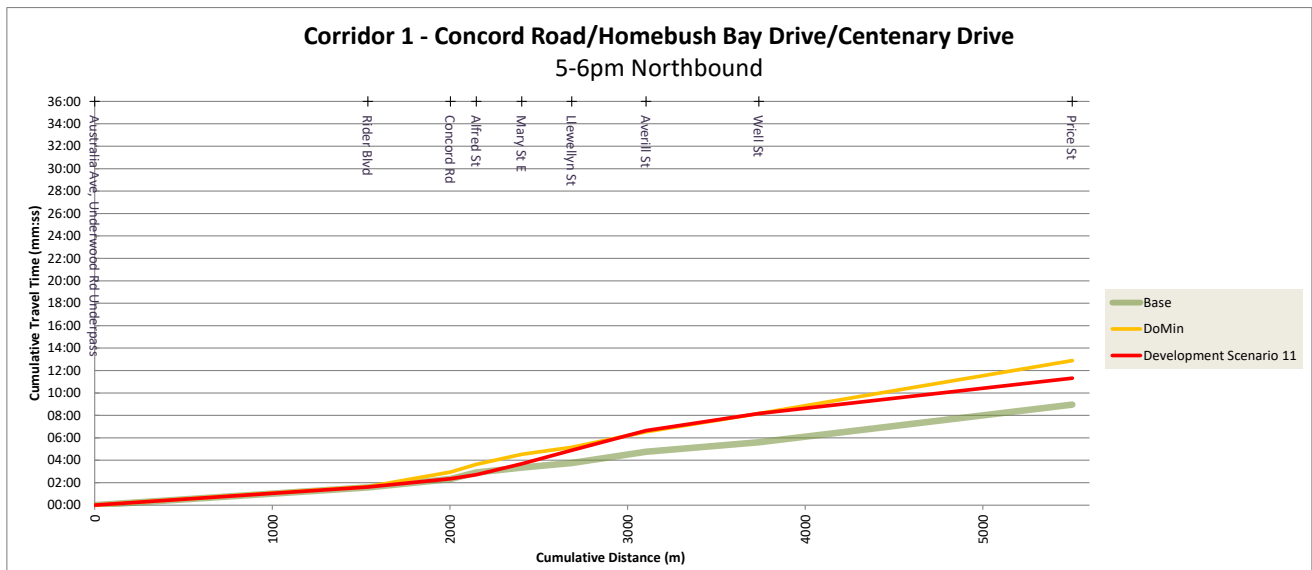


Figure 4.12: Evening peak northbound travel time comparison

Analysis of the modelled travel times for the Homebush Bay Drive and Concord Road corridor indicates forecast background growth will generally increase travel time along the corridor. Under the Project Case (R3), with the proposed network upgrades, travel times along the corridor will be similar to the Do Minimum scenario.

As a result of the Devlin Street/Blaxland Road upgrade proposed by TfNSW, travel times in the northbound direction improves north of Well Street where a fourth lane is to be provided, improving travel speeds under the Do Minimum scenario. The upgrade at Concord Road / Averill Street would assist in mitigating the impacts of additional traffic growth associated with both background growth and the proposed development within Rhodes. When compared with the Do Minimum scenario, travel times along the corridor under the R3 Project Case indicates similar results in both peaks.

Overall, the modelled travel times and intersection LoS comparisons indicate that the proposed road network upgrades through Rhodes, in conjunction with already committed works on Devlin Street, would largely offset the impacts of additional traffic generated by the proposed development.

Future Network Evaluation Recommendation

As for the Project Case with full development (beyond 3,000 dwellings), the current committed transport infrastructure would not be able to support additional trips. The network requires a later reassessment with consideration of the below:

- Significant travel pattern changes in the area: The trip rates and mode share figures in this report are based on pre-pandemic travel behaviour. During the pandemic period, many employees work from home and this is expected to be carried to the post-pandemic period in some form. If the changes in travel behaviour become permanent, the total number of trips from both background growth and from this development would be lower thus reducing or eliminating the need for larger scale network improvements under the full development model.
- Related major public transport infrastructure: With the constraints on the existing road network, there will be a greater emphasis on the rail network to provide a larger share of the transport capacity requirements to drive the mode shift away from private vehicles to public transport. This may include the potential quadruplication of the T9 Northern Line to provide the opportunity for more train services. A high-level analysis of the rail demand suggests that equivalent of at least one additional southbound rail service would be required in the one-hour morning peak to meet demand resulting from the Rhodes development. The Sydney Metro City and South-West, Sydney Metro West, and the proposed Parramatta Light Rail extension (PLR 2) to Wentworth Point and Sydney Olympic Park would also contribute to changing directions of travel on the Northern Line.

5. Proposed transport network

The proposed transport network responds to the transport planning objectives, identified constraints and future land uses and travel demand. TfNSW and the City of Canada Bay will need to work collaboratively to monitor and review the performance of this transport system to ensure it is able to accommodate future travel demand.

5.1 Process of development

The development of individual strategies and measures for Rhodes has evolved through an ongoing process based on close consultation with DPIE and key stakeholders (TfNSW and City of Canada Bay). The first step of this process involved identifying and analysing transport-associated issues in the Rhodes Investigation Area. This was based upon a review of the existing transport and land use conditions that will influence the future development of Rhodes within the study context.

The second step of the process was the preparation of a preferred Place Strategy and accompanying population growth scenario to create a favourable environment towards future growth in Rhodes to meet District Plan targets.

Finally, the preferred Place Strategy was tested to ascertain the cumulative and regional traffic and transport impacts associated with future land-based demands likely to be imposed on Rhodes. This process provided an opportunity to identify strategies and measures required to support future traffic and transport growth in Rhodes. The specific strategies and measures are detailed in the sub-sections below relating to the five key themes:

- Walking and cycling.
- Bus, light rail and heavy rail.
- Road network.
- Travel demand management.
- Parking.

5.2 Walking and cycling

Planning for walking and cycling has been developed using a strategic network approach, based on the identification of key local and regional desire lines, links, connections and activity areas, as well as street functions determined using the movement and place framework. This approach is focussed on improving connectivity and permeability in the existing walking and cycling network by upgrading existing links and creating links and connections. Earlier realisation of walking and cycling infrastructure will be important to achieve a mode shift away from private vehicles. The proposed future walking and cycling network is shown in Figure 5.1.

The walking and cycling links described below take advantage of new streets and pedestrian connections proposed in the Place Strategy, which will support greater levels of walking and cycling by improving access, permeability and intersection densities.

5.2.1 Walking

New and upgraded walking links have been identified where high pedestrian activity will be located and to provide new connections and improved permeability.

New walking links are proposed as part of the precinct to improve connections through Rhodes:

- Upgraded walking links are proposed on Blaxland Road and Leeds Street.
- The crossing of the railway line at Rhodes Station has been identified to be extended, with a new connection proposed east from Blaxland Road to Concord Road to improve access. This will connect McIlwaine Park and the Station Gateway West precinct via Rhodes Station.

- A foreshore walking link between the John Whitton rail bridge/Ryde Bridge (Concord Road) is also proposed, providing access to the foreshore at the northern end of the peninsula, as well as to the proposed ferry wharf.
- New east-west roads and a pedestrian link between Blaxland Road and Cavell Avenue aligned with Averill Street (subject to further investigation)

Appropriate pedestrian facilities and road treatments will be necessary to provide safe and high-quality walking links as outlined above. This will be determined at a later stage following more detailed assessment and design.

5.2.2 Cycling

Proposed strategic cycling links have been identified based on providing connectivity with regional cycling links and closing missing gaps in the network. These new cycling links improve connectivity through Rhodes to existing links to the north-east, north-west, west and south, including:

- The Blaxland Road cycleway is proposed to be upgraded to a separate cycleway to provide a commuter street for local and regional connections;
- New links on Leeds street between the railway line and Concord Road (subject to further investigation)
- New links are proposed along Cavell Avenue and Llewellyn Street east, which connects Leeds Street and Blaxland Road (subject to further investigation);
- On Concord Road south of Llewellyn Street, connecting to a new link on Mary Street (Mary Street part subjects to further investigation); and
- Upgrades to the cycleway on Walker St to connect to Gauthorpe St cycleway are also under investigation.

Appropriate cycling facilities such as separated cycleways, shared paths or on-road lanes and stencils will be necessary to provide safe and high-quality links as outlined above. This will be determined at a later stage following more detailed assessment design. In addition, on-street bicycle parking should be provided at key locations such as Rhodes Station, and off-street bicycle parking rates should be increased for developments, closer to requirements under the City of Sydney Local Environment Plan. Specific requirements for end of trip facilities should also be developed. More detail on the approach to off-street bicycle parking and end of trip facilities rates is provided in **Section 5.3.3**.

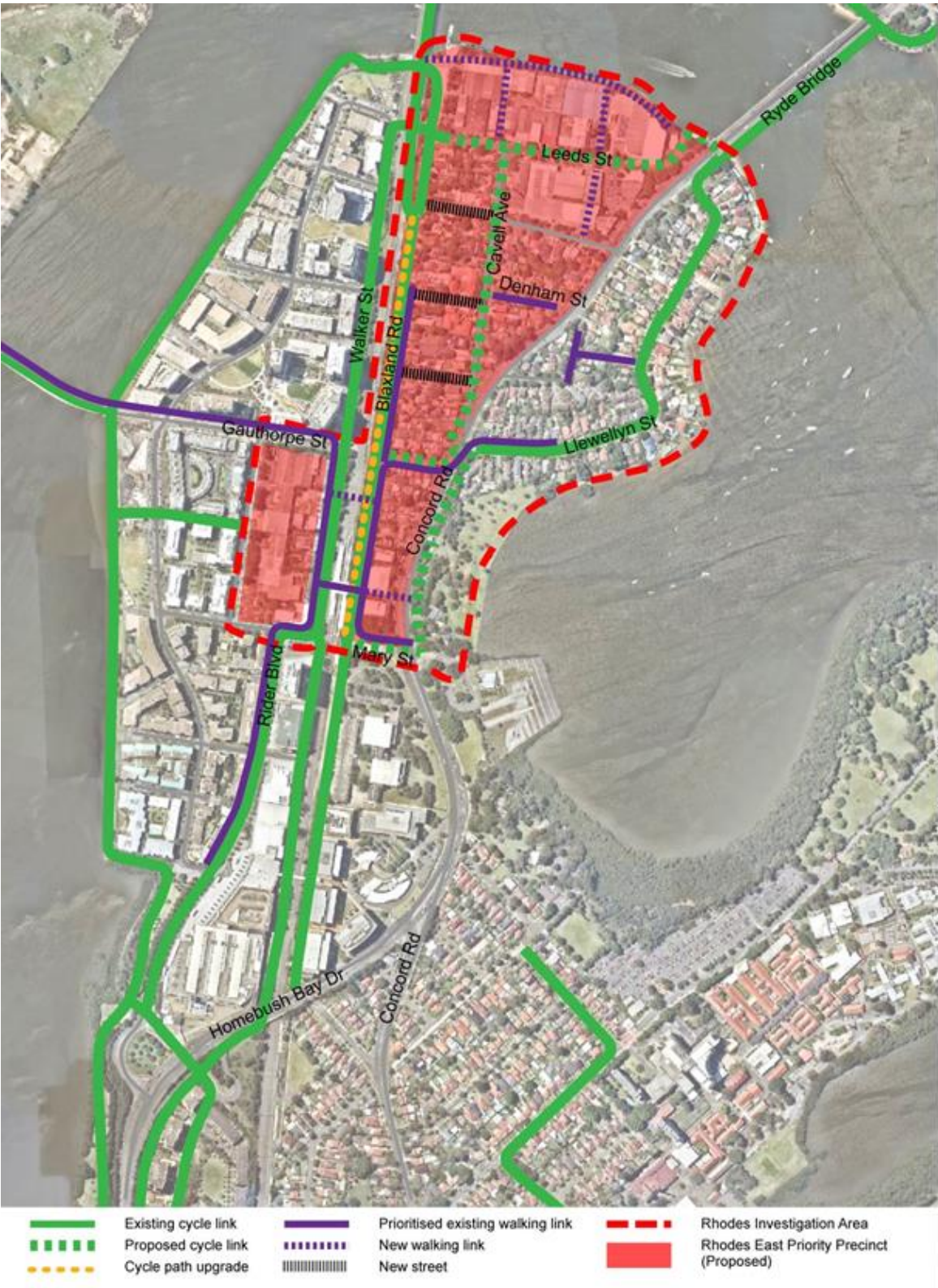


Figure 5.1 : Proposed future walking and cycling network

5.2.3 Bus, ferry and heavy rail improvements

Bus

The bus network supporting Rhodes is likely to serve a local function, with rail being the dominant mode of public transport given the extent of the travel task and on-road congestion. The bus network will continue to focus on providing connections to destinations not well connected to Rhodes by rail and providing feeder services to rail.

Opportunities for better bus connections have been enhanced by the completion of the Bennelong Bridge in May 2016. This bridge provides a bus and active transport only connection between Rhodes and Wentworth Point.

Bennelong Bridge services

Routes 526 and 533 provide connections from Rhodes to Wentworth Point and Sydney Olympic Park via the Bennelong Bridge. The 533 continues north to Ryde and Chatswood, whilst the 526 connects to Sydney Olympic Park ferry wharf and south to Strathfield and Burwood. Both services will play a key role as feeder services for Wentworth Point residents requiring access to Rhodes Station, as well as providing connections to other employment centres such as Sydney Olympic Park and Ryde, and to local destinations such as Rhodes Shopping Centre.

As development increases in Rhodes, Wentworth Point and Sydney Olympic Park these connections will increase in importance. This will not only be for residents to the west of the bridge wanting to access Rhodes Station, but also for people travelling between both sides for a variety of purposes such as Rhodes residents working in Sydney Olympic Park. Community shuttle bus services such as Baylink help to provide the connectivity across Homebush Bay.

Other services

The 410(formerly M41) will continue to be the core service on Concord Road providing connections from Rhodes to Ryde, Macquarie Park and Concord.

The local routes 458 also operate north-south via Rider Boulevard / Walker Street and Concord Road. The route is a frequent service connecting to Ryde and Burwood / Strathfield. It provides important local connections to Concord Hospital and Rhodes Shopping Centre.

Proposals

Some of the other key opportunities for buses in Rhodes include:

- Increase frequencies and span of hours of services using the Bennelong Bridge to connect to Wentworth Point and Sydney Olympic Park. This could include consideration of converting the 533 to an all-day, seven day a week service.
- Consider local bus network redesign opportunities to improve legibility and quality of service for customers.
- Improved bus stop facilities and walking access to stops on Concord Road, including better connectivity to Rhodes Station for customers, which would need to be coordinated with TfNSW and the City of Canada Bay.
- Improving interchange facilities at Rhodes Station on the eastern and western side including high quality shelters and seating for waiting customers.
- Improved connections to be investigated between Rhodes, Wentworth Point and the Sydney Metro West Station at Olympic Park.

Ferry

The NSW Government is delivering a new ferry wharf at Rhodes as part of the Transport Access Program. Community consultation on the proposed wharf and ferry interchange at Rhodes was carried out in 2015. The new ferry wharf at Rhodes is proposed to be built on the eastern side of the John Whitton Rail Bridge, nearer Concord Rd. This will create an opportunity to integrate the wharf into the Rhodes plans.

The current proposed location is in the Leeds Street precinct. The Leeds Street precinct has been designed to reflect this ferry wharf location with a new pedestrian link providing a visual and physical connection from Leeds Street. The proposed foreshore promenade will provide ferry users with access to the broader Rhodes Peninsula and Rhodes Station.

Rail

The following options are suggested to address the need for increased rail capacity:

- The shutdown of the Epping to Chatswood Rail Link for the integration of Sydney Metro North West freed up capacity of the T1 Western Line and allowed for the operation of 8 8-car trains during the peak two hours. This arrangement can be continued with the Sydney Metro North West already in operation.
- Sydney Metro City & Southwest timetable adjustments to cater for increased capacity via additional services and less crowded services at Rhodes (with Northern Line customers diverting on to the Metro at Epping, prior to reaching Rhodes).
- Potential Quadruplication of the Northern Line through Rhodes and north over the Parramatta River rail bridge, allowing more services to stop at Rhodes Station.
- Mass transit –providing improved public transport service to Rhodes and future Sydney Metro West at North Strathfield.
- Proposed extension of Parramatta Light Rail (PLR 2) to Wentworth Point and Sydney Olympic Park would increase accessibility to Parramatta CBD and Olympic Park train and metro station and is expected to reduce passenger demand at Rhodes station from Wentworth Point.

In addition to these measures to increase line capacity, further capacity at Rhodes Station itself would need to be provided to maintain an acceptable Level of Service for passengers at the platform and transiting through the station. Additional station upgrade measures that could be considered include:

- Additional stairs to the platforms
- Widening of platform one
- New northern concourse with additional stairs to the platforms and concourse space.

5.2.4 Road network

The road network will continue to be an integral part of the transport network in the study area, with Concord Road the major north-south arterial road. The road network also facilitates access for walking, cycling and buses to, from and within Rhodes. The road network will mainly serve subregional and regional travel demand for a range of trip purposes.

The Place Strategy proposes new streets to provide improved permeability for all users to promote walking, cycling, bus, train and ferry use, as well as potentially redirecting traffic away from the Leeds Street precinct which has been identified for a lower traffic volume and speed environment.

This includes the following one-block connections between Cavell Avenue and Blaxland Road (indicative):

- Extension of Averill Street from Cavell Avenue to Blaxland Road
- Extension of Denham Street from Cavell Avenue to Blaxland Road (slightly staggered)
- Extension of Cropley Street from Cavell Avenue to Blaxland Road (slightly staggered)

Smaller, more compact blocks encourage a diversity of small, medium and large developments across the study area, and a finer grain street network in the study area will have an important role in improving accessibility for pedestrians and cyclists to move within the study area, as well as for motorists to access the arterial road network.

Potential intersection improvements would facilitate access to the study area and provide safe crossing points for pedestrians and cyclists, as well as bus priority measures where required. The exact configuration of new or modified intersections will be determined through more detailed traffic modelling and is described in **Section 4**.

5.3 Travel demand management

Travel demand management involves managing the transport task through:

- Reducing dependence on private vehicles for some trips.
- Rescheduling trips outside of peak periods.
- Encouraging people to better organise their travel so they make more efficient trips resulting in fewer and shorter trips.

Policy and design initiatives that aim to manage travel demand and optimise existing and planned transport infrastructure and services will assist in meeting the future travel task. Three key strategies to manage travel demand in Rhodes are described below.

5.3.1 Transport Management Associations

Transport Management Associations (TMAs) are non-profit, member-controlled organisations that provide transportation services in a particular area, such as a commercial centre, large shopping mall, medical centre or industrial park. They are generally public-private partnerships, consisting primarily of area businesses with local government support.

TMAs can provide a variety of services that encourage more efficient use of transportation and parking resources:

- Access management
- Commuter trip reduction and telework support
- Commuter financial incentives
- Flexitime support
- Freight transport management

- Guaranteed ride home services
- Marketing and promotion
- Shared parking coordination and parking management
- Shuttle services
- Public transport improvements
- Transport access guides
- Wayfinding and multi-modal navigation tools.

TMA stakeholders typically include regional and local government agencies, public transport providers, chambers of commerce or other business organisations, businesses, facility managers (such as a mall or medical centre), employees, nearby residents and customers.

TMA should support a variety of transportation services, travel options and incentives, including planning efforts to create more pedestrian- and public transport-friendly land use, and parking brokerage services to help businesses share and trade their parking resources. Programs tend to be most effective when they improve consumers' travel choices and provide incentives to use alternatives to driving when possible.

TMA should work to develop and maintain cooperation between transportation agencies, public transport service providers, businesses, employees and residents who are affected by their programs.

A TMA has been successful in Macquarie Park, for example, where funding is jointly provided for private businesses and government. Should a TMA be deemed a possible option, it is suggested this is applied to the whole of Rhodes, not just Rhodes. Success will be dictated by influencing the behaviour of future residents and businesses, but also changing existing behaviours.

5.3.2 Travel plans

The success of the mode share targets outlined in Table 4.2 will be dictated by how they are implemented and how their achievements are measured. One approach for doing this can be through travel plans. A travel plan is a package of site-specific measures implemented to promote and maximise the use of more sustainable modes of travel (City of Sydney 2015). Generally, travel plans are undertaken by developers as part of the development application process. For example, the City of Sydney includes requirements in their Development Control Plan (DCP) around when a travel plan is required. Councils can also actively encourage existing developments to prepare and promote a travel plan. Travel plans include the following essential elements:

- Site audit and data collection – much of the data in this report provides a useful starting point to understand existing behaviour in Rhodes.
- Objectives and targets – this could include the mode share targets included in **Section 1**. The target may need to be tailored to be more specific to the particular land use being proposed on the site.
- Actions – linked to objectives and targets such as those included in **Section 3.1**.
- Promotion and marketing strategy – this involve determining customer needs and preferences, creating appropriate products, providing useful information to customer, and promoting their use as public knowledge and attitudes have a major effect on travel behaviour.
- Commitment of resources – in the case of Rhodes, one approach could be for council and / or developers to provide funding to support the employment of personnel to implement and manage the travel plan. In other cases, TMAs have played this role at a whole-of-precinct level.
- A monitoring and review process – regular reviews need to be implemented (a TMA could play this role) and tangible incentives need to be included. One approach for this could be to link targets to infrastructure funded by developers e.g. if developments do not meet the targets of the travel plan within a certain timeframe using 'soft' measures, developers may need to provide the cost for infrastructure items.
- Governance support – this can be linked to a TMA or similar. The point is that there needs to be high level support and active involvement from the government and private interests involved.

5.3.3 Parking

Off-street parking rates

Car parking controls can be used as a policy tool to manage travel demand and dependence on private vehicles. The approach to recommending parking rates for Rhodes has been based on accessibility to public transport services and an improved active transport network. Reduced parking rates will help to alleviate traffic congestion by encouraging other modes (train, bus, cycle and walk) during peak periods and outside of peak periods reduced parking provision will support a less car-centric culture with a lower car ownership. Parking rates for each development type is outlined in Table 5.1.

Table 5.1 : Proposed maximum parking rates by development type

Land Use	Maximum Rate
Residential	0.1 spaces per studio dwelling
	0.3 spaces per 1 bedroom dwelling
	0.7 spaces per 2 bedroom dwelling
	1 space per 3 or more bedroom dwelling
	1 visitor parking per 20 dwellings
Commercial	1 space per 150m ² GFA
Retail	1 space per 100m ² GFA
Cafes and Restaurants	1 space per 150m ² GFA or for every 6 seats (whichever is lesser)
Industrial	1 space per 150m ² GFA

Car sharing rates have been developed using the parking rates outlined above. Car share schemes are generally more successful in higher density areas with limited off-street parking availability and high quality public transport. Rates for car sharing spaces in new developments are based on the City of Sydney Development Control Plan (DCP) 2012.

Additionally, controls permitting reduced car parking provision where car share spaces are provided are proposed based on the Leichhardt DCP 2013. Tiered rates would allow car share spaces to be provided in lieu of car parking spaces, determined by the number of car share spaces to be provided.

City of Sydney and Leichhardt DCPs have been used in the development of car share rates as these are considered applicable to the future vision of the precinct. A more detailed local assessment will be required to validate or refine the proposed rates, as well as detailed investigation of car share rates for non-residential developments.

Rates for development type are outlined in Table 5.2.

Table 5.2 : Proposed car share rates by development

Residential car share rate	Car share rate to reduce car parking provision
Maximum one per 40 dwellings	One in lieu of three parking spaces

The bicycle parking approach has been developed to complement the approach to vehicle parking. A uniform rate has been developed based on rates within the City of Sydney DCP 2012 which are considered best practice in the Sydney context. End-of-trip facilities for non-residential developments and on-street bicycle parking are also included in the bicycle parking approach. As cycling infrastructure is proposed across the precinct and bicycle usage is encouraged across the precinct, one single set of minimum rates is considered appropriate.

The proposed rates are outlined below in Table 5.3. End-of-trip facility rates are outlined in Table 5.4. The recommended rates are based on City of Sydney as they are generally higher than those required under the existing City of Canada Bay development control plan. Parking spaces should be designed to comply with relevant Australian Standards. Note that these rates are intended for new developments and do not cover public area bicycle parking spaces at rail station, ferry wharf, playground or school, which also should be encouraged.

Table 5.3 : Proposed minimum bicycle parking rates

Category	Residential		Commercial		Retail		Industrial	
	Resident	Visitor	Employee	Visitor	Employee	Visitor	Employee	Visitor
All precincts	one per dwelling	one per ten dwellings	one per 150m ² GFA	one per 400m ² GFA	one per 250m ² GFA	two + one per 100m ² when over 100m ² GFA	one per ten employees	Nil

* City of Sydney DCP 2012

Table 5.4 : Proposed end-of-trip facilities for non-residential developments

Category	Personal lockers	Showers and Change Cubicles
All precincts	One per bicycle space	1 for up to 10 spaces 2 for 11-20 spaces 1 for every 10 spaces after

* City of Sydney DCP 2012

Unbundling and decoupling

Unbundled parking is parking that is separated from the cost or rent of a dwelling or building. This is not only more equitable but can also reduce the total amount of parking required for the building. For buildings with unbundled parking, a parking rate reduction of 20 per cent is proposed.

Decoupled parking is parking that is spatially separated from the building to which the parking services. It is also generally unbundled from the sale or rental of an apartment or building. The benefits of decoupled parking are significant, enabling transition to a low car dependant future. Decoupled parking has the potential to deliver the significant and mutually reinforcing benefits of parking. The shift towards lower car ownership rates and emergence of the autonomous vehicle will reduce the need for parking and investment in underground parking. In particular, parking stations/basement parking may lose value as vehicles may no longer need to be parked or housed at origin or destination locations.

To achieve this:

- Parking should be spatially decoupled from buildings where possible.
- Sites should be identified for decoupled parking to reduce the need for on-site, underground parking.
- Decoupled parking should be built above ground and managed flexibly as the corridor transitions towards low car ownership and use.

For buildings with decoupled, unbundled parking, a parking rate reduction of 40 per cent on maximum parking rates is proposed. Decoupled parking could be transitioned to other uses when the demand for parking is no longer required, including where new public transport infrastructure is delivered and parking rates for the precinct are reduced to a more accessible parking classification.

On-street parking

Parking in Rhodes West features a mixture of time restrictions and some unrestricted parking. This provides parking for visitors to the area and discourages resident car ownership. A similar policy should be adopted for Rhodes East to complement the off-street parking approach. The amount of unrestricted on-street parking should be limited as far as possible to ensure space is allocated efficiently and long term free parking is avoided. Time limited parking could be considered on a 24/7 basis to discourage residents from parking on-street overnight. An 85 per cent occupancy rate has been put forward as a good target to aim for when designing pricing of restricted on-street parking. This aims to ensure adequate turnover of spaces, particularly around retail uses (Shoup 2005). On-street parking will be a critical component of the urban fabric of Rhodes and should be designed to support the vision for the street, and in particular the walking mode share target.

5.4 Action plan

A summary of actions to implement the transport initiatives recommended to support the proposal for Rhodes is presented in Table 5.5. The following actions and strategies have been developed in consultation with DPIE, TfNSW and City of Canada Bay. The majority of the infrastructure upgrades and other initiatives will need to be implemented to support the development of the first 3,000 dwellings, coordinated with development over time. Beyond the 3,000 dwelling threshold, major public transport catalysts will need to be investigated, such as the quadruplication of the Northern Line, together with a shift to active and public transport options.

The action plan has been developed for the traffic and transport study in order to provide key stakeholders with a framework whereby transport/policy related issues and corresponding actions may be carried out in an integrated and coordinated approach to achieve the objectives set out in this report.

Table 5.5 : Summary of actions to implement proposed transport initiatives

ID	Item description	Purpose
Road network improvement measures		
1	Upgrade of Concord Road / Averill Street: <ul style="list-style-type: none"> Extend the Concord Road southbound right turn bay by 50 metres towards Ryde Bridge. Widen Averill Street to provide two exit lanes. Provide additional left-turn capacity on Averill Street – one full length lane and two short lanes. Convert the current signalised pedestrian into a staged crossing on the Concord Road southern approach. 	<ul style="list-style-type: none"> Increases capacity of intersection and reduces delays for traffic
2	Extension of Averill Street from Cavell Avenue to Blaxland Road	<ul style="list-style-type: none"> Improves connectivity for all road users Supports the redirection of traffic away from the Leeds Street precinct which has been identified for a lower traffic volume and speed environment
3	Extension of Denham Street from Cavell Avenue to Blaxland Road (slightly staggered)	<ul style="list-style-type: none"> Improves connectivity for all road users Supports the redirection of traffic away from the Leeds Street precinct which has been identified for a lower traffic volume and speed environment
4	Extension of Cropley Street from Cavell Avenue to Blaxland Road (slightly staggered)	<ul style="list-style-type: none"> Improves connectivity for all road users Supports the redirection of traffic away from the Leeds Street precinct which has been identified for a lower traffic volume and speed environment

ID	Item description	Purpose
5	Investigate options to upgrade the intersection of Concord Road and Homebush Bay Drive	<ul style="list-style-type: none"> Improve travel times northbound and southbound along Homebush Bay Drive and Concord Road for local and regional trips
Walking improvement measures		
6	Upgrade walking link on Blaxland Road / Mary Street	<ul style="list-style-type: none"> Improves pedestrian safety and connectivity Supports mode shift towards increased walking trips
7	Upgrade walking link on Leeds Street	<ul style="list-style-type: none"> Improves pedestrian safety and connectivity Supports mode shift towards increased walking trips
8	Upgrade walking link across Blaxland Rd and Concord Rd at Rhodes Station	<ul style="list-style-type: none"> Improves pedestrian safety and connectivity Supports mode shift towards increased walking trips
9	Provide new walking link across railway line at the proposed new northern station concourse	<ul style="list-style-type: none"> Improves pedestrian safety and connectivity Supports mode shift towards increased walking trips
10	Provide new walking link on new road connection between Blaxland Road and Denham Street (subject to further investigation)	<ul style="list-style-type: none"> Improves pedestrian safety and connectivity Supports mode shift towards increased walking trips
11	Provide new foreshore walking link between the John Whitton rail bridge and Ryde Bridge (Concord Road)	<ul style="list-style-type: none"> Improves pedestrian safety and connectivity Supports mode shift towards increased walking trips
Cycling improvement measures		
12	Provide new cycling link on Cavell Avenue	<ul style="list-style-type: none"> Improves cyclist safety and connectivity Supports mode shift towards increased cycling trips
13	Provide new cycling link on Llewellyn Street	<ul style="list-style-type: none"> Improves cyclist safety and connectivity Supports mode shift towards increased cycling trips
14	Provide new cycling link on Concord Road south of Llewellyn Street	<ul style="list-style-type: none"> Improves cyclist safety and connectivity Supports mode shift towards increased cycling trips
15	Upgrade existing shared path on Blaxland Road to a separated cycleway and pedestrian path	<ul style="list-style-type: none"> Improves pedestrian and cyclist safety and connectivity Supports mode shift towards increased cycling trips
16	Upgrade Walker Street to improve the connection of the cycleway south of Rhodes Station to the cycleway on Gauthorpe Street	<ul style="list-style-type: none"> Improves pedestrian and cyclist safety and connectivity Supports mode shift towards increased cycling trips
17	Provide additional cycle facilities on Walker Street to connect the cycleway at the station to cycle path on Gauthorpe St.	<ul style="list-style-type: none"> Improves pedestrian and cyclist safety and connectivity Supports mode shift towards increased cycling trips

ID	Item description	Purpose
Bus improvement measures		
18	Increase frequencies and span of hours of services using the Bennelong Bridge	<ul style="list-style-type: none"> Improves bus service quality Supports mode shift towards increased public transport trips
19	Improve frequency and span of hours on the M41	<ul style="list-style-type: none"> Improves bus service quality Supports mode shift towards increased public transport trips
20	Local bus network redesign	<ul style="list-style-type: none"> Improves bus service quality Supports mode shift towards increased public transport trips
21	Improve bus stop facilities and walking access to stops on Concord Road	<ul style="list-style-type: none"> Supports mode shift towards increased public transport trips
22	Improve interchange facilities at Rhodes Station including high quality shelters and seating for waiting customers	<ul style="list-style-type: none"> Supports mode shift towards increased public transport trips
23	Investigate new or altered bus services connecting the Sydney Metro at Sydney Olympic Park to Rhodes via Bennelong Bridge	<ul style="list-style-type: none"> Improves accessibility to and from Rhodes Supports mode shift towards increased public transport trips
Ferry improvement measures		
24	Deliver a new ferry wharf at Rhodes as part of the Transport Access Program	<ul style="list-style-type: none"> Supports mode shift towards increased public transport trips
Rail improvement measures		
25	Rhodes Station upgrades	<ul style="list-style-type: none"> Provide additional stairs at the existing concourse Widen Platform 1 New station concourse
26	Sydney Metro City & Southwest timetable adjustments	<ul style="list-style-type: none"> Provides increased capacity for Northern Line services at Rhodes Supports mode shift towards increased public transport trips
27	Quadruplication of the Northern Line through Rhodes and north over the Parramatta River rail bridge	<ul style="list-style-type: none"> Provides increased capacity for Northern Line services at Rhodes Supports mode shift towards increased public transport trips
28	SydneyMetro West	<ul style="list-style-type: none"> Encourages Wentworth Point residents towards Olympic Park Supports mode shift towards increased public transport trips
29	Parramatta Light Rail extension (PLR 2)	<ul style="list-style-type: none"> Encourages Wentworth Point residents towards Parramatta and future Olympic Park metro station Supports mode shift towards increased public transport trips

ID	Item description	Purpose
Travel demand management measures		
30	Create a Transport Management Association for Rhodes	<ul style="list-style-type: none"> Supports mode shift away from private vehicles to public and active transport
31	Implement travel plans as part of developments	<ul style="list-style-type: none"> Supports mode shift away from private vehicles to public and active transport
32	Implement maximum parking rates	<ul style="list-style-type: none"> Supports mode shift away from private vehicles to public and active transport
33	Implement car share rates	<ul style="list-style-type: none"> Supports mode shift away from private vehicles to public and active transport
34	Implement minimum bicycle parking rates	<ul style="list-style-type: none"> Supports mode shift away from private vehicles to public and active transport
35	Investigate parking unbundling and decoupling	<ul style="list-style-type: none"> Supports mode shift away from private vehicles to public and active transport
36	Review on-street parking	<ul style="list-style-type: none"> Supports mode shift away from private vehicles to public and active transport