

CAMELLIA-ROSEHILL PLACE STRATEGY

Traffic and Transport Technical Implementation Report

22 JULY 2022

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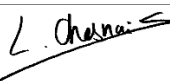
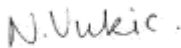
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DEPARTMENT OF PLANNING AND ENVIRONMENT CAMELLIA-ROSEHILL PLACE STRATEGY

Technical Implementation Report

Traffic and Transport

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EXECUTIVE SUMMARY

The Camellia-Rosehill Precinct (the Precinct) is currently on the cusp of substantial change with the introduction of Stage 1 of the Parramatta Light Rail, which will provide a new direct connection to the Parramatta CBD. This presents an opportunity for Camellia-Rosehill to become a vibrant precinct with the potential for creating jobs, housing, entertainment and open space along the Parramatta River.

The Camellia-Rosehill Place Strategy (the Strategy) proposes a 20-year vision for future land use for the Precinct as well as supporting mobility outcomes that are to be considered in the transport provisions. The vision for the Strategy is as follows:

Camellia-Rosehill has an important strategic role as an industry and employment hub within the Greater Parramatta and Olympic Peninsula (GPOP) Economic Corridor. By 2041, the precinct will be enhanced with service and circular economy industries and new recreational and entertainment facilities, all enabled by better transport access via light rail, active transport and road connections.

A well-designed town centre next to the light rail stop will be the focus of community activity.

New homes will be close to public transport supported by new quality public spaces including public open spaces, public facilities high quality street infrastructure, and walking and cycling paths.

Key environmental features such as Parramatta River, Duck River and their wetlands will be protected and enhanced. Camellia's rich heritage will be preserved, celebrated and promoted.

Country and culture will be valued and respected with the renewal guided by Aboriginal people.

The precinct will set a new standard for environmental sustainability with embedded renewable energy networks, integrated remediation and water management strategies, circular economy industries and a commitment to achieve net zero by 2040.

Recycled water will be connected to all residences, businesses and public spaces and will support the integrated network of green infrastructure.

Camellia will be a showcase of recovery and restoration – a place of economic prosperity but also a place where people love to live, work and enjoy

The Department of Planning and Environment (DPE) has engaged a range of technical services to determine opportunities and challenges at the site. These

technical studies including this Traffic and Transport Technical Implementation Report has informed the development of the Strategy and Master Plan for the precinct.

The Place Strategy and Master Plan is being prepared for the whole Precinct and draws on the substantial body of previous investigations, including ongoing collaboration with industry, the community and state agencies.

An Enquiry by Design (EbD) process was undertaken to inform the preparation of the Place Strategy. The EbD was an interactive process which explored a number of Master Plan options for Camellia-Rosehill which could deliver the vision for the precinct and resulted in a draft Master Plan which was the subject of public consultation as part of the Camellia-Rosehill Directions Paper. The draft Master Plan was further refined following exhibition of the Directions Paper and consideration of the submission received.

The draft place strategy was publicly exhibited on 17 December 2021 until 4 March 2022. The draft master plan was further refined following exhibition of the draft place strategy and consideration of the submissions received. Refer to the Department of Planning and Environment's finalisation report for further information.

This Traffic and Transport Technical Implementation Report is driven by the mobility planning and integration principles outlined in strategic planning strategies relevant to NSW and the Central River City.

The transport initiatives in this report have been developed with the following guiding principles:

- Providing the right mix of homes, jobs and recreation within close proximity to enable shorter trips made by walking cycling and public transport
- Safer and more reliable road connections to and from the M4 and State road network are critical to enable the continual operation of existing and future industrial and employment uses
- Focused investment in improved public transport routes to, from and through the precinct, such as the new Parramatta Light Rail and local bus services
- Maximise connectivity offered by the Parramatta Light Rail stop in the design and layout of the town centre
- Safe and high-quality street environment within the precinct to encourage people to walk and ride bicycles, as well as enable great place outcomes
- Appropriate provision and location of parking and urban freight access to enable vibrant places and encourage sustainable travel choices.

The Camellia-Rosehill Place Strategy Traffic and Transport Technical Implementation Report outlines the assessment and validation of 17 transport initiatives to enable the desired land use and economic outcomes (shown in Figure i-1-1), against the transport vision and mobility outcomes for the Camellia-Rosehill Precinct. From a transport perspective, the Master Plan proposes:

- An active transport network that is well-connected to existing shared paths in all directions through bridges over the Parramatta River and Duck River
- Integration of active transport links with the foreshore through waterfront activation
- Safe separation of high pedestrian activity areas such as the town centre from freight and heavy vehicle movements generated by industrial areas
- A bus network that supports the Parramatta Light Rail services by providing additional public transport connectivity to the town centre and employment areas
- Integration of the potential Parramatta Light Rail Stage 2
- High-quality heavy vehicle accesses to the Precinct to enable freight movements to metropolitan Sydney, rural NSW and the rest of Australia
- Safe separation of general traffic movements from freight and heavy vehicles
- A road network that is well-connected to major road corridors in all directions through new Precinct access points, including bridges over the Parramatta River and Duck River.

This document provides a high-level, desktop analysis of the Master Plan and the potential implications for the multimodal transport network in and around the Precinct. The proposed solutions and upgrades tested in this analysis were developed using existing information and future transport projections in the area, combined with firsthand principles and key outputs from the Sydney Strategic Travel Model.

While no strategic modelling or detailed microscopic modelling has yet been performed for this Master Plan, outputs from the Strategic Travel Model have been incorporated into the preliminary analysis of future Precinct trip generation and distribution. These assumptions will be provided to TfNSW to inform the undertaking of a traffic modelling study to determine future trip distribution and network performance indicators.

As such, the next steps to support the Place Strategy include the development of a detailed traffic and transport study in conjunction with different levels of traffic modelling. The study will further assess the proposed network upgrades necessary to support the Precinct, supported by more comprehensive traffic modelling and intersection analysis. The detailed transport modelling may refine or add to the

scope of the road and transport infrastructure needed to support the development of the Camellia-Rosehill Precinct.

CAMELLIA-ROSEHILL PLACE STRATEGY – TRAFFIC AND TRANSPORT TECHNICAL IMPLEMENTATION REPORT

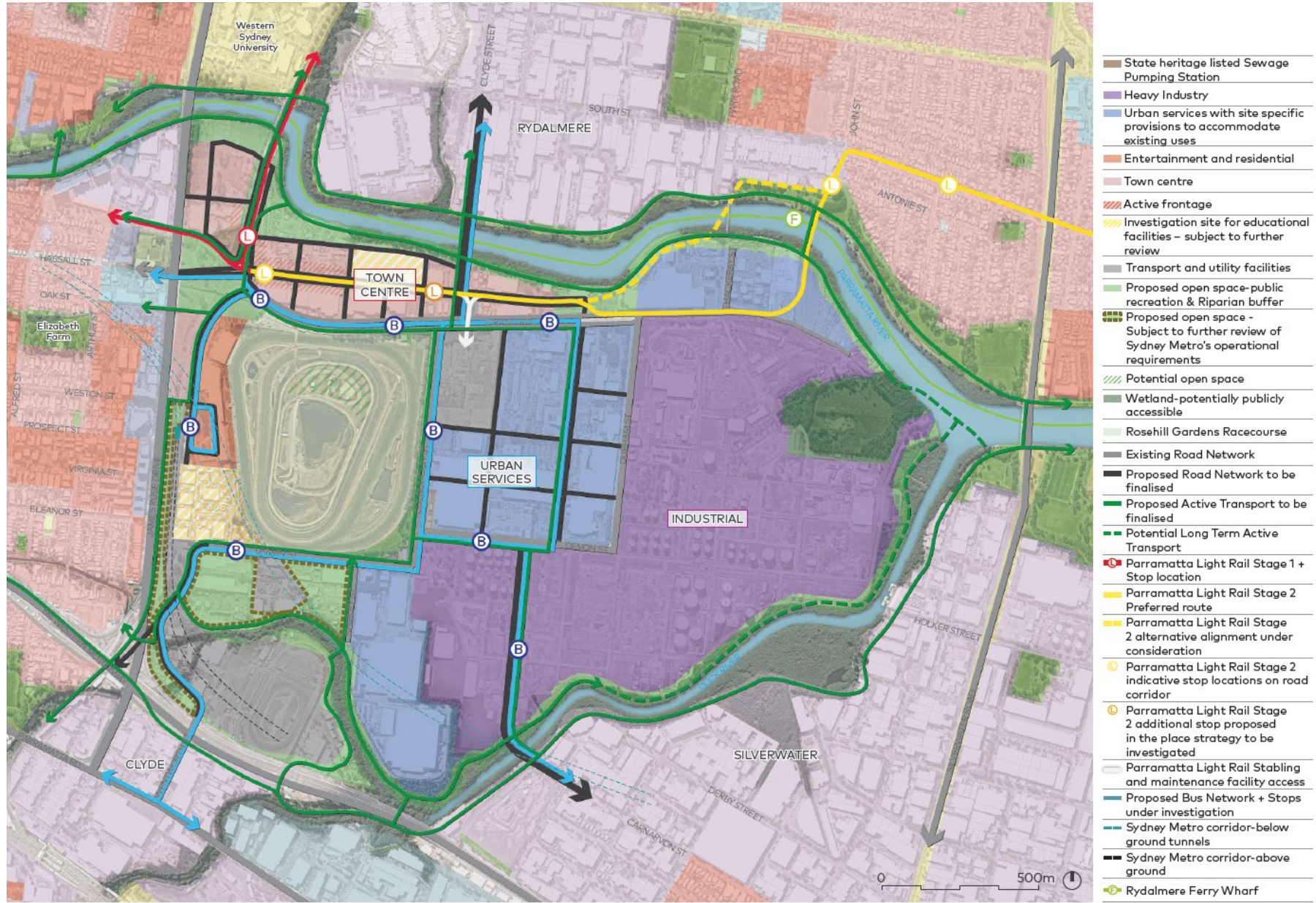


Figure i-1-1 Summary of preferred scenario

INTRODUCTION

The Camellia-Rosehill Precinct (the Precinct) is identified as a priority growth area, supporting the Parramatta CBD in *A Plan for Growing Sydney* and the *Greater Sydney Region Plan*.

The NSW Department of Planning and Environment (DPE) is leading the master planning process of the Camellia-Rosehill Place Strategy (the Strategy). The Strategy provides a 20-year land use vision for the Precinct, recognising its strategic attributes, and guiding future land use and infrastructure investment decisions that are to be delivered with the support of State and Local Government agencies.

The Strategy will be given statutory weight through a Ministerial 9.1 Direction and may inform a future rezoning proposal (if required), development of a site specific Development Control Plan, a local contribution plan and state infrastructure contributions framework.

Arcadis Australia Pacific (Arcadis) has been engaged by DPE to prepare a series of traffic and transport studies, including a Traffic and Transport Technical Implementation Report (the Report) to support the Strategy.

This Camellia-Rosehill Place Strategy Traffic and Transport Technical Implementation Report assesses and validates 17 transport initiatives identified in the preferred scenario, against the transport vision and mobility outcomes for the Camellia-Rosehill Precinct.

1.1 Vision

The Camellia-Rosehill Place Strategy vision is as follows:

Camellia-Rosehill has an important strategic role as an industry and employment hub within the Greater Parramatta and Olympic Peninsula (GPOP) Economic Corridor. By 2041, the precinct will be enhanced with service and circular economy industries and new recreational and entertainment facilities, all enabled by better transport access via light rail, active transport and road connections.

A well-designed town centre next to the light rail stop will be the focus of community activity.

A new urban services precinct and retention of heavy industrial land will ensure Camellia-Rosehill fulfills its potential to be an employment powerhouse.

New homes and jobs will be close to public transport supported by new quality public spaces including public open spaces, public facilities high quality street infrastructure, and walking and cycling paths.

Key environmental features such as Parramatta River, Duck River and their wetlands will be protected and enhanced. Camellia's rich heritage will be preserved, celebrated and promoted.

Country and culture will be valued and respected with the renewal guided by Aboriginal people.

The precinct will be net zero ready and set a new standard for environmental sustainability with embedded renewable energy networks, integrated remediation and water management strategies, and circular economy industries.

Recycled water will be connected to all residences, businesses and public spaces and will support the integrated network of green infrastructure.

Camellia will be a showcase of recovery and restoration – a place of economic prosperity but also a place where people love to live, work and enjoy.

1.2 Project background

The Camellia Rosehill Precinct (~321ha) plays a strategic role in the Greater Parramatta and the Olympic Peninsula (GPOP). Camellia was identified by the NSW Government as a priority growth area in 2014, resulting in precinct wide Land Use and Infrastructure Strategy in 2015 and subsequently development of a Town Centre Master Plan in 2018. Work on the Town Centre was paused pending outcomes of Greater Sydney's 2019 Draft Place-based Infrastructure Compact (PIC) Pilot which aimed to ensure infrastructure delivery was matched with growth across the 26 precincts in the GPOP corridor. The PIC recommended that Camellia be retained for urban service and industrial land, however, should the Government seek to progress a town centre (in the form of the 2018 plan or a modified form), before any rezoning a number of issues had to be resolved. It was determined that a coordinated and strategic approach was required, and a Place Strategy be prepared for the whole Precinct, drawing on previous work and including ongoing collaboration with industry, the community and state agencies.

1.3 Project process

An Enquiry by Design (EbD) process was undertaken to inform the preparation of the Place Strategy. The EbD was an interactive process which explored a number of Master Plan options for Camellia-Rosehill which could deliver the vision for the precinct and resulted in a draft Master Plan which was the subject of public

consultation as part of the Camellia-Rosehill Directions Paper. The draft Master Plan was further refined following exhibition of the Directions Paper and consideration of the submission received.

The EbD process enabled key stakeholders to collaborate on the development of a vision for the Strategy. It also provided opportunities for integration and testing of ideas through a number of workshops and direct engagement with consultant teams and Government stakeholders, including but not limited to:

- DPE
- Transport for NSW (TfNSW)
- City of Parramatta Council
- Cumberland Council
- Government Architect NSW
- Sydney Olympic Park Authority
- Sydney Water.

The draft place strategy was publicly exhibited on 17 December 2021 until 4 March 2022. The draft master plan was further refined following exhibition of the draft place strategy and consideration of the submissions received. Refer to the Department of Planning and Environment's finalisation report for further information.

1.4 The Camellia-Rosehill Master Plan

The Master Plan is shown in Figure i -1-1 and forms the basis of the Place Strategy.

Key features of the Master Plan include:

- Provision for approximately 10,000 dwellings within a Town Centre serviced by light rail
- Provision for approximately 15,400 jobs
- A new primary school and primary and secondary high school
- District and regional open space facilities
- Introduction of a new entertainment precinct and an urban services area
- Initiatives to Care for Country and continued protection of heritage listed sites
- Retention of the existing state heritage sewerage pumping station (SPS) 067 within the town centre

- Measures to mitigate land use conflicts and risks including buffers and setbacks from existing fuel pipelines and between the existing sewerage pumping station and future surrounding residential uses
- Access to the Parramatta River, Duck River and Duck Creek foreshores and potentially the wetland
- New transport infrastructure including a local road network, potential bus services, additional connections into and out of the precinct, and opportunities to integrate Parramatta Light Rail Stage 2
- An extensive active transport network
- A comprehensive remediation strategy
- A sustainability strategy and integrated water cycle management strategy.

1.5 Strategic planning context

This section outlines the planning and transport frameworks that the Camellia-Rosehill Precinct has been developed under. The traffic and transport components align with the directions and objectives set out in strategic plans and policies of the Greater Sydney Region, regional priorities and local planning policies to align with stakeholder and community expectations.

CAMELLIA-ROSEHILL PLACE STRATEGY – TRAFFIC AND TRANSPORT TECHNICAL IMPLEMENTATION REPORT

Table 1-1 Planning context

Level	Direction setting	Land use planning	Transport planning	Implications on the Traffic and Transport Technical Implementation Report
NSW	<ul style="list-style-type: none"> • Future Transport 2056 Strategy • NSW Government Premier's Priorities • NSW State Infrastructure Strategy • Net Zero Plan Stage 1:2020-2030 • Greater Sydney Services and Infrastructure Plan • State Infrastructure Strategy 		<ul style="list-style-type: none"> • Greater Sydney Services and Infrastructure Plan • NSW Freight and Ports Plan 2018-2023 • Road Safety Plan 2021 • Parramatta Road Urban Transformation Strategy 2016 • Parramatta Road Corridor Urban Transformation – Planning and Design Guidelines 	<ul style="list-style-type: none"> • Committed freight corridors are reflected • Committed Sydney Metro West facilities and catchments are reflected • Committed short-, medium-, and long-term network upgrades are reflected • Aspirational transit targets
Region	<ul style="list-style-type: none"> • A Metropolis of Three Cities 	<ul style="list-style-type: none"> • Central City District Plan • Greater Parramatta to Olympic Peninsula Place-based Infrastructure Compact 		<ul style="list-style-type: none"> • Incorporating an understanding of the Camellia-Rosehill Precinct's strategic significance within the Central City and GOPP corridor into the development of transport initiatives • Delivery of Parramatta River and Duck River green grid priorities • Consideration of costs of traffic and transport solutions to support the town centre
Local	<ul style="list-style-type: none"> • Community Strategic Plan 2018-2038 – City of Parramatta • Economic Development Plan 2017-2021 	<ul style="list-style-type: none"> • Local Strategic Planning Statement 	<ul style="list-style-type: none"> • Integrated Transport Plan for Parramatta CBD • Parramatta Bike Plan 2017 • Parramatta Ways Walking Strategy • Disability Inclusion Action Plan – City of Parramatta • Socially Sustainable Parramatta Framework 	<ul style="list-style-type: none"> • Committed and potential active transport infrastructure is reflected • Connectivity with the wider active transport network • Light rail is integrated into the internal street network to enable permeable access
Precinct		<ul style="list-style-type: none"> • Draft Camellia Land Use and Infrastructure Strategy in 2015 • Draft Camellia Master Plan 2018 		<ul style="list-style-type: none"> • Review and integration of previous work with Precinct planning

Level	Direction setting	Land use planning	Transport planning	Implications on the Traffic and Transport Technical Implementation Report
Street	<ul style="list-style-type: none"> • Practitioner’s Guide to Movement and Place • Sydney Green Grid West Central District Spatial Framework and Project Opportunities • Walking Space Guide • Cycleway Design Toolbox • Freight and Servicing Last Mile Toolkit • Bus Priority Infrastructure Planning Toolbox 	Better Streets		<ul style="list-style-type: none"> • Proposed internal road network classification • Integration of the proposed active transport links with the green grid opportunities

1.6 Report structure

The remainder of this report is structured as follows:

- **Section 2 Movement and Place** – Provides an overview of mobility objectives and principles to guide the Strategy, and provides context for an understanding Movement and Place in the Precinct
- **Section 3 Issues and opportunities** – Provides a problem statement supported by a summary of identified issues and opportunities
- **Section 4 Option development** – Reviews the Master Plan against the relevant context and provides the reasoning for recommended measures
- **Section 5 Transport assessment and validation** – Conducts an assessment and validation of the transport initiatives
- **Section 6 Cost estimation and delivery plan** – Outlines recommended provisions suitable for inclusion in a Delivery Plan and provides preliminary cost estimates for the proposed infrastructure
- **Section 7 Conclusions and next steps**

MOVEMENT AND PLACE

The development of a great precinct needs to effectively balance the creation of vibrant places where people can live, work and thrive, with efficient and reliable movement between these places. To support this, the Movement and Place framework aims to enable a collaborative practice and achieve a well-designed built environment of public spaces and mobility networks. Developed by the Government Architect NSW in conjunction with TfNSW, this six-step process is targeted at successful, amiable places, connecting mobility users, and creating healthy environments. The six steps of the Movement and Place co-design process is highlighted in Figure 2-1.

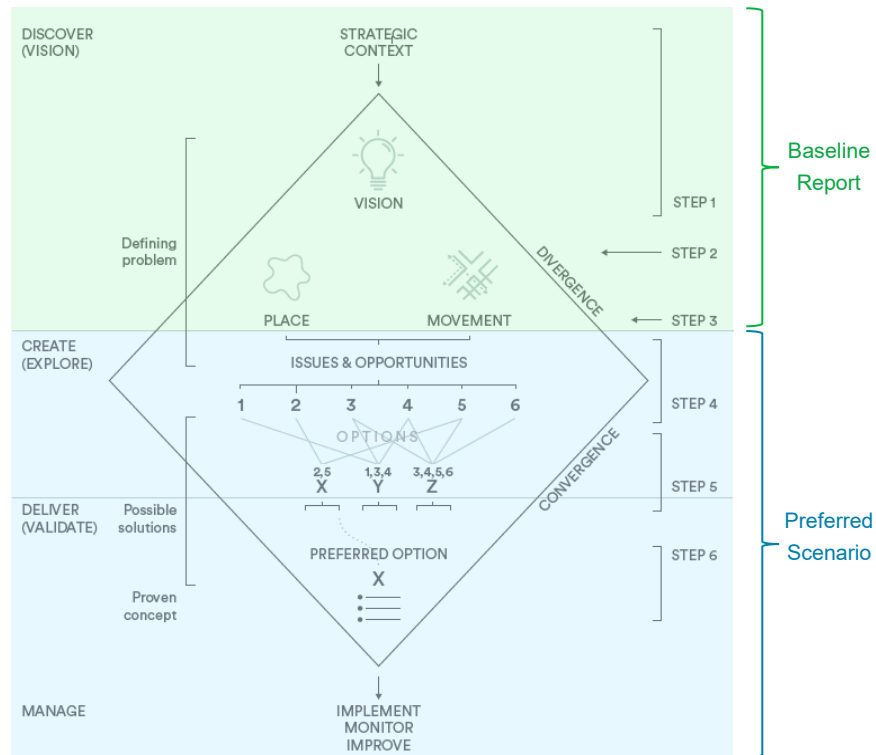


Figure 2-1 Movement and Place process

Source: Practitioner's Guide to Movement and Place, Government Architect NSW

2.1 Guiding principles

The development of a Place Strategy and a supporting Traffic and Transport Technical Implementation Report for the Camellia-Rosehill Precinct aims to be driven by crucial mobility planning and integration principles. These guiding principles cascade from strategic planning frameworks and progressed through to the co-design process of the project.

These principles include:

- Delivering on the outcomes and objectives of State and local government planning frameworks
- Integrating transport with proposed land uses, existing water features and surrounding areas
- Enabling sustainable mode shift to active transport and public transport
- Improved accessibility and connectivity within and beyond the Precinct
- Managing mobility conflicts across different modes, and in particular between heavy vehicle movements and other road users
- Distribution of better-quality accesses to the peripheries of the Precinct.

2.2 Mobility objectives

To ensure multimodal mobility and a high-level of accessibility as the Precinct develops, the following outcomes will be critical for its success:

- Integrated transport and land use outcomes with a diverse mix of uses to create jobs closer to homes, new urban services area and retention of industrial lands
- Future residential development within Camellia will be well serviced by a combination of regional and enhanced bus connectivity within and beyond the Precinct
- Ensuring the layout and design of local street network enables good movement and place outcomes.
- Active and public transport infrastructure through Camellia will complete the missing link across GOP including public access to and along the foreshore.
- Regional road network to support jobs and productivity.
- Encourage sustainable travel choice through integrated parking policies and supply of parking to ensure good place outcomes.

2.3 Understanding place

The *Movement and Place Practitioners Guide* (GANSW, 2020) provides a framework to understand places within the Camellia-Rosehill Precinct. The Guide offers three lenses in defining places – physical form, meaning, and activity – which combine to create place intensity.

Situated on Dharug country, Camellia-Rosehill as a precinct is surrounded by the Parramatta River, Duck River and Duck Creek, and bounded by James Ruse Drive to the west. With an absence of connections over the river, the Precinct currently functions as a peninsula.

Land zoning within the Precinct is primarily industrial, and home to businesses focused on manufacturing and fuel. Viva Energy fuel storage and distribution terminal is a major business located in the east.

The Rosehill Gardens Racecourse is located to the western end of the Precinct and serves as an important entertainment venue within Western Sydney, attracting high numbers of visitors during special events with around 25 race meetings a year. Between major race events, the Racecourse serves as a function space that is rented out by organisations and individuals for conferences, exhibitions, trade shows, celebrations, and weddings. The land adjacent to the Racecourse is zoned for business development, consisting of relatively smaller lot sizes when compared with the rest of the Precinct. Currently there are no areas within the Camellia-Rosehill Precinct zoned for residential land uses, and subsequently few community-serving businesses or facilities.

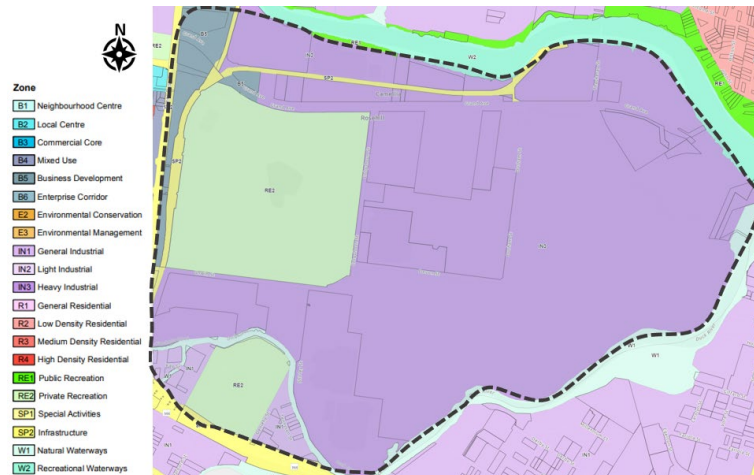


Figure 2-2 Current land use zones in Camellia-Rosehill

East of the racecourse, the Precinct consists of various industrial land use types. While mangroves grow along the foreshore and provide an opportunity for development into a recreational trail, the physical form, historically built for movement of heavy freight, currently does not contribute value to place outside of economic drivers. Similarly, the industrial nature of the area does not enable the Precinct to contribute significant meaning to the local people and communities of the surrounding area. As a result, almost all activity within the Precinct is currently contributed by industrial businesses. While the place value within the Precinct is currently limited, there are significant opportunities to transform this through physical connections with existing places in the surrounding area, and the development of a new community-serving and recreational landscape through the Place Strategy.

Located only 1.6 kilometres from the Parramatta CBD, this large lot of industrial land plays a significant strategic role in GOP Economic Corridor and has the potential to leverage upon the growth of Sydney’s developing Central River City to evolve into a vibrant hub that is well-connected into nearby places of value. However, the connection between the Precinct and the Parramatta CBD is currently limited by James Ruse Drive, which serves high daily traffic demand and forms a barrier to east-west movements. With the completion of the Parramatta Light Rail and new Camellia light rail stop, the area will become well-connected to employment and residential areas in both the Parramatta CBD and the growing Health and Education Precinct in Westmead to the west through public transport.



Figure 2-3 Camellia-Rosehill Precinct Study Area

Due to a lack of connections over the Parramatta and Duck Rivers, the Precinct is disconnected from places of value around the borders of the Precinct. North of the river, the Rydalmere Bike Path is an active transport leisure route that leads to the Rydalmere Wharf and nearby parks, sports fields and reserves that provide recreational value to residents and visitors. Improving access to these recreational spaces would provide local character and meaning, enhancing the quality of leisure and recreational areas available to existing employees of the industrial precinct.

While two river crossings currently exist for pedestrians over Parramatta River, the Precinct would benefit from additional and higher quality crossings. A pedestrian bridge extending north of Thackeray Street provides the single river crossing within the Precinct, however no lifts or bicycle access ramps are available to enable people with differing mobility needs to access the staircase. West of the Precinct, the James Ruse Drive shared path is located alongside a six-lane road, where a circuitous route involving a crossing of James Ruse Drive and the use of an underpass is required in order to access recreational spaces from the Precinct.

2.4 Understanding movement

A review of the existing connections across and in vicinity of Camellia-Rosehill was undertaken to provide an understanding of the current and prospective transport network users across all modes of the transport network. The review of the baseline conditions enables the projection of current travel and freight patterns in the region for the Master Plan evaluation, providing an overview of the current issues and opportunities in and around the study area borders.

The Precinct is currently accessed primarily via Grand Avenue, which serves as the most direct road to access the majority of the Precinct and connects to James Ruse Drive, which serves as part of the outer ring road around the Parramatta CBD area. A secondary access is available using a more circuitous route via Unwin Street and Wentworth Street to the south, which provides an additional connection to Parramatta Road.

Figure 2-4 is a schematic of the current and future committed transport links connecting Camellia to the broader transport network. The future committed transport links shown include Stage 1 of the Parramatta Light Rail (planned opening 2023) and the Sydney Metro West Stage 1 (planned opening 2030).

Parramatta Light Rail Stage 2 has now been committed for planning, utilities and geotechnical investigations. Work on the Environmental Impact Statement is progressing. The proposed routes of Stage 2 are shown, which would extend the Light Rail network to Ermington and Sydney Olympic Park. There are two options currently under consideration for the alignment of the Parramatta Light Rail Stage 2. Both routes run through the Precinct.

Sydney Metro West planned with Clyde stabling and maintenance facility and major ancillary facilities are located on the former speedway and adjacent industrial land. The maintenance facility connects to the mainline tunnels via a section of above-ground track, a dive structure and tunnel portal. The nearest metro station will be located at Parramatta CBD, accessible via the light rail. The NSW Government decided not to proceed with a station at Camellia due to identified environmental constraints.

This schematic highlights the central role the planned Camellia light rail stop will play, as it will provide the highest-quality public transport connection in the Precinct and connect with the Parramatta Station transport interchange. This would improve access for potential Camellia-Rosehill residents to jobs and services in the Parramatta CBD and Westmead, whilst also improving public transport access for workers commuting into the Precinct from the rest of Sydney.

However, the Precinct currently lacks alternative public transport options, with no direct connection to nearby Sydney Olympic Park, Auburn or Ermington local centres, and only limited bus services available on the western edge of the Precinct. The bus network would need to be expanded to run through the Precinct to support any densification of land use, taking advantage of the connections provided by the Camellia light rail stop. This section also highlights how Parramatta River and Duck River are limiting access options to the Precinct for all transport modes.

CAMELLIA-ROSEHILL PLACE STRATEGY – TRAFFIC AND TRANSPORT TECHNICAL IMPLEMENTATION REPORT

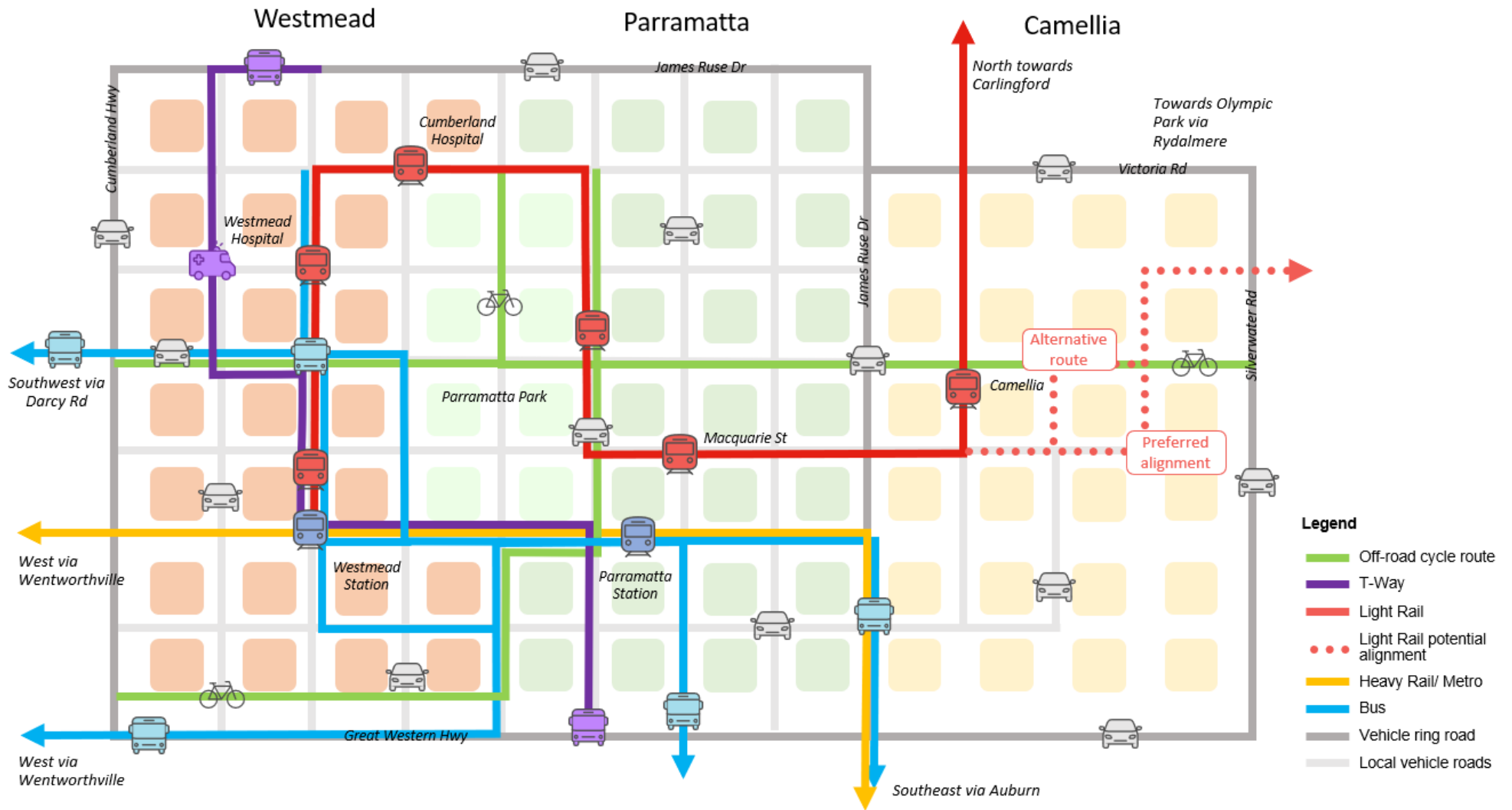


Figure 2-4 Camellia and surrounding transport network service density map

2.4.1 Active transport

There is currently a very limited active transport network due to the industrial nature of the Camellia-Rosehill Precinct. With no dedicated cycling infrastructure and limited provision of footpaths, private vehicles are currently the preferred mode of travel within the Precinct. Furthermore, the absence of high quality and direct crossings over James Ruse Drive, Parramatta River and Duck River also means there are long distances between pedestrian and cyclist crossing opportunities over these physical barriers, making active transport trips undesirable.

2.4.2 Public transport

2.4.2.1 Current network

While the demand for public transport will increase through the course of developing various new land use types proposed by the Place Strategy, there is currently a lack of demand for public transport connectivity in the Camellia-Rosehill Precinct, contributed by the existing car dependent heavy industrial employment land use types. Consequently, the public transport network is currently limited to just two bus lines:

- Route M92 runs along James Ruse Drive and Parramatta Road. Services run every 10 minutes in both directions during peak periods and every 15 to 20 minutes outside peak periods and during weekends, running between Parramatta and Sutherland via Lidcombe and Bankstown
- Route 535 replaced the Carlingford Railway Line in 2020, running from Parramatta and stopping at the former railway stations between Camellia and Carlingford. Services run every 15 minutes in both directions during peak periods and every 20-30 minutes outside peak periods and during weekends.

An extensive bus network connects Parramatta to suburbs around the Precinct, as shown in Figure 2-5. Pedestrian access to these bus stops is limited due to the long walking distances and physical barriers created by Parramatta River and Duck River.

Currently, no bus services enter the Precinct itself. Parramatta River and Duck River form physical barriers that limit connections from the Precinct to the north, east and southern directions. These would need to be overcome with new bridges for the Precinct to be fully integrated into the wider public transport network. The location of these bridges should include the consideration of optimising new public transport links towards critical centres such as Sydney Olympic Park, Rhodes, and Epping.

The former Carlingford Railway Line ran parallel to James Ruse Drive, with stations at Rosehill and Camellia serving the Precinct, connecting to Carlingford and Clyde (with passengers interchanging at Clyde to access the wider Sydney Trains

network). However, services on this line were infrequent and underutilised, with less than 200 passengers using either of these stations per day in July 2015. This line closed in January 2020 to enable the construction of Stage 1 of the Parramatta Light Rail.

Demand for public transport is expected to be higher when events are held at Rosehill Racecourse, with complimentary race shuttle buses to Rosehill Racecourse typically being run during periods of high activity. Passengers are advised to take a bus on either route M92 or 535 from the Parramatta Station bus interchange.

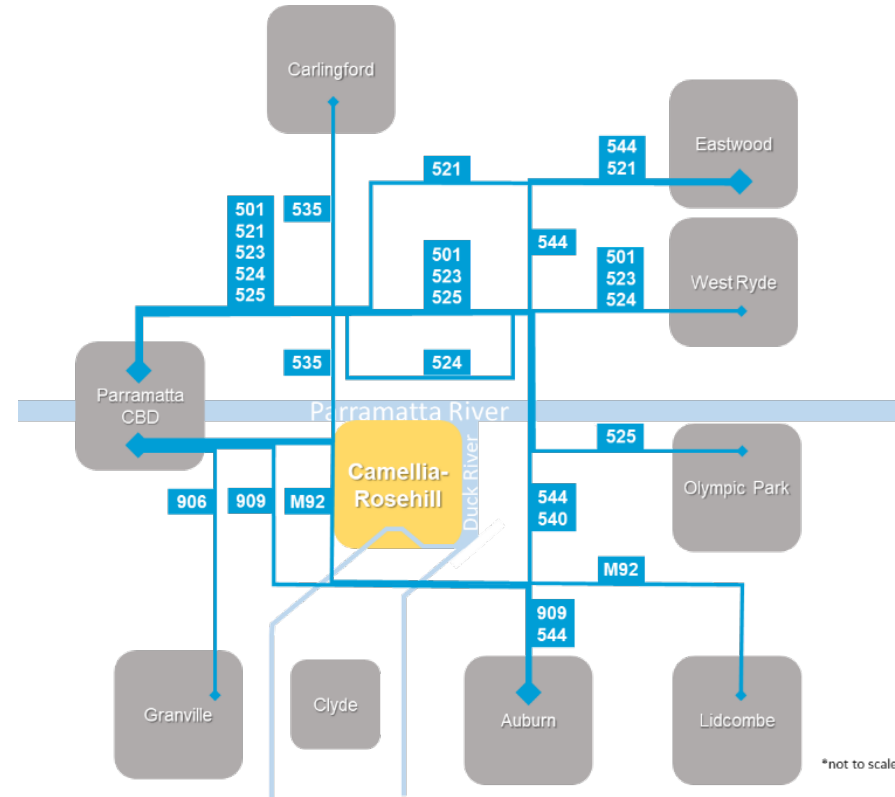


Figure 2-5 Existing local bus network around the Precinct Existing local bus network around the Precinct

2.4.2.2 Committed public transport projects

Parramatta Light Rail Stage 1

Stage 1 of the Parramatta Light Rail will operate between Westmead and Carlingford, through the Parramatta CBD and sections of the former Carlingford Railway Line. Figure 2-6 shows the proposed route and stops of Stage 1. The line is currently under construction and due to open in 2023.

The new light rail includes a stop at Camellia (at the former Camellia Railway Station), providing the Precinct with a new direct public transport link to both the Parramatta CBD and Westmead Health Precinct. The light rail station will serve the proposed Camellia town centre and mixed-use development.

This project includes a new elevated crossing over James Ruse Drive, providing a grade-separated crossing for both light rail vehicles and a new active transport link over the busy road. North of Camellia, the Parramatta River Bridge is being refurbished to accommodate the new light rail and also provide a new active transport link, linking up with the Parramatta River Cycleway and continuing to Carlingford. A stabling and maintenance facility is being established east of Rosehill Racecourse.

The Parramatta Light Rail Stage 1 is expected to be completed by 2023, and has the potential to dramatically improve connectivity and permeability between Camellia, Parramatta, and Carlingford.

Parramatta Light Rail Stage 2

The NSW government has committed toward planning and development works for the second stage of the Parramatta Light Rail, which would extend the light rail line as shown in Figure 2-6. The commitment of Parramatta Light Rail Stage 2 is critical to servicing the proposed dwelling and job densities in the Camellia-Rosehill Precinct. The extension will add a new branch to Melrose Park, crossing the Parramatta River via a new bridge and connecting with Sydney Olympic Park. The following two route options for the Camellia/Rydalmere section are currently being under investigation:

- Preferred alignment – through Camellia, following Grand Avenue before crossing Parramatta River to connect with South Street in Rydalmere
- Alternative route under consideration – through Camellia, following Grand Avenue until Durham Street, then continuing along the foreshore before crossing Parramatta River to connect with South Street in Rydalmere.

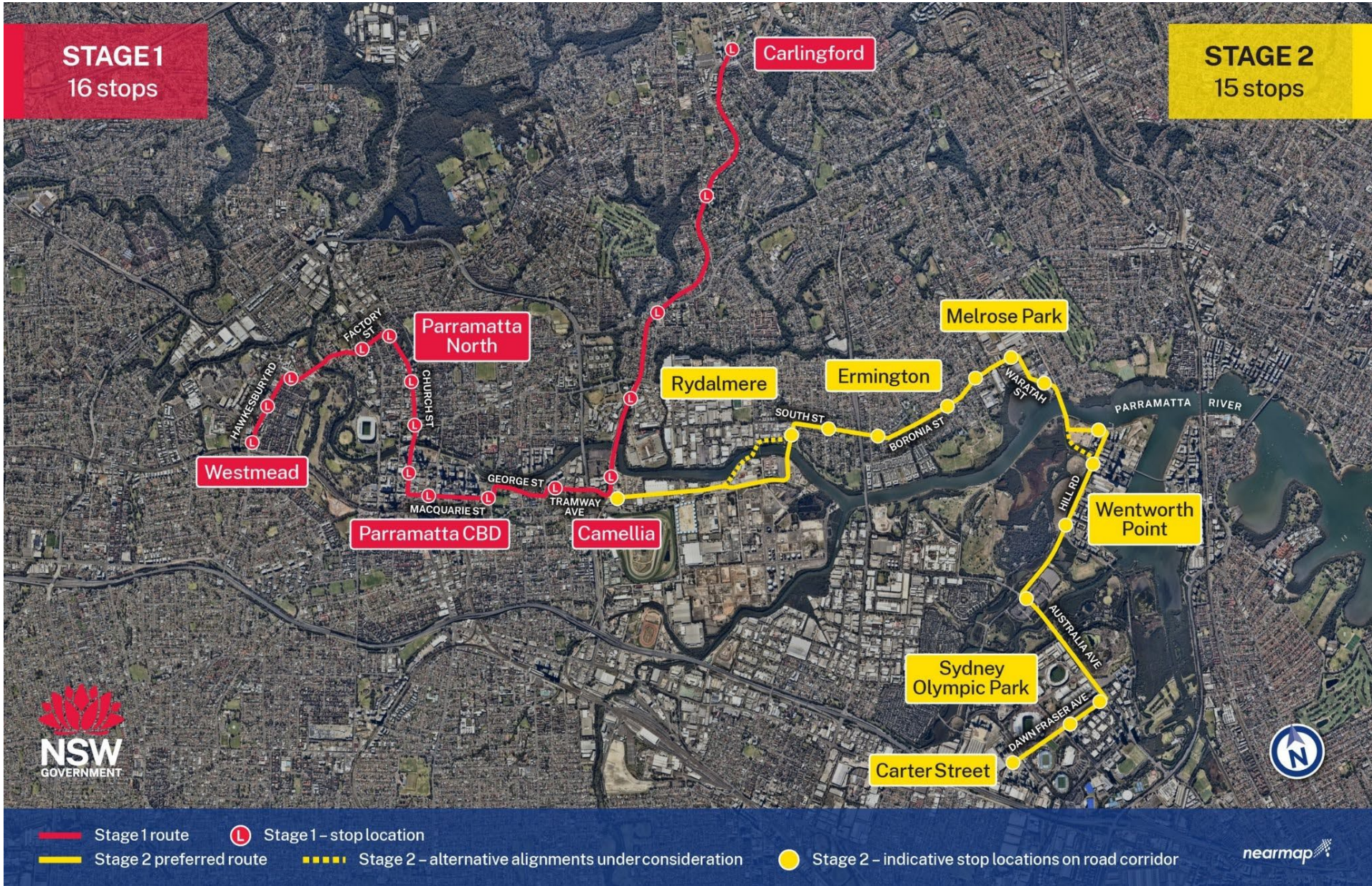


Figure 2-6 Proposed Light Rail route
Source: Transport for NSW

Sydney Metro West Stage 1

Stage 1 of the Sydney Metro West will run between Westmead and the Sydney CBD, connecting Parramatta to Hunter Street metro stations with a travel time of 20 minutes. Figure 2-7 indicates the proposed route and stops of Stage 1. The line is currently under construction and due to open in 2030.

While the NSW Government has stated there will be no metro station within the Camellia-Rosehill Precinct, the new metro station at Parramatta would be located near the Parramatta light rail stop, providing convenient transport interchange between the two modes. This would further enhance public transport links for the Precinct via light rail, enabling quicker journeys to Sydney Olympic Park and the Sydney CBD. A stabling and maintenance facility will be established at the former Valvoline Raceway and adjacent industrial land.



Figure 2-7 Sydney Metro West Stage 1 route map

Source: Transport for NSW

Sydney Metro West – Clyde stabling and maintenance facility

The Clyde stabling and maintenance facility (MSF) site is planned to the southwest end of the Camellia-Rosehill Precinct, bounded by Unwin Street, James Ruse Drive, and the M4 Motorway. The facility will include a dive site for the metro line expanding to the north of the site, adjacent to Prospect Street. The proposed realignment of Unwin Street to join Wentworth Street is currently under planning by Sydney Metro, and will likely provide access to the MSF site. Figure 2-8 highlights the location of the MSF site.

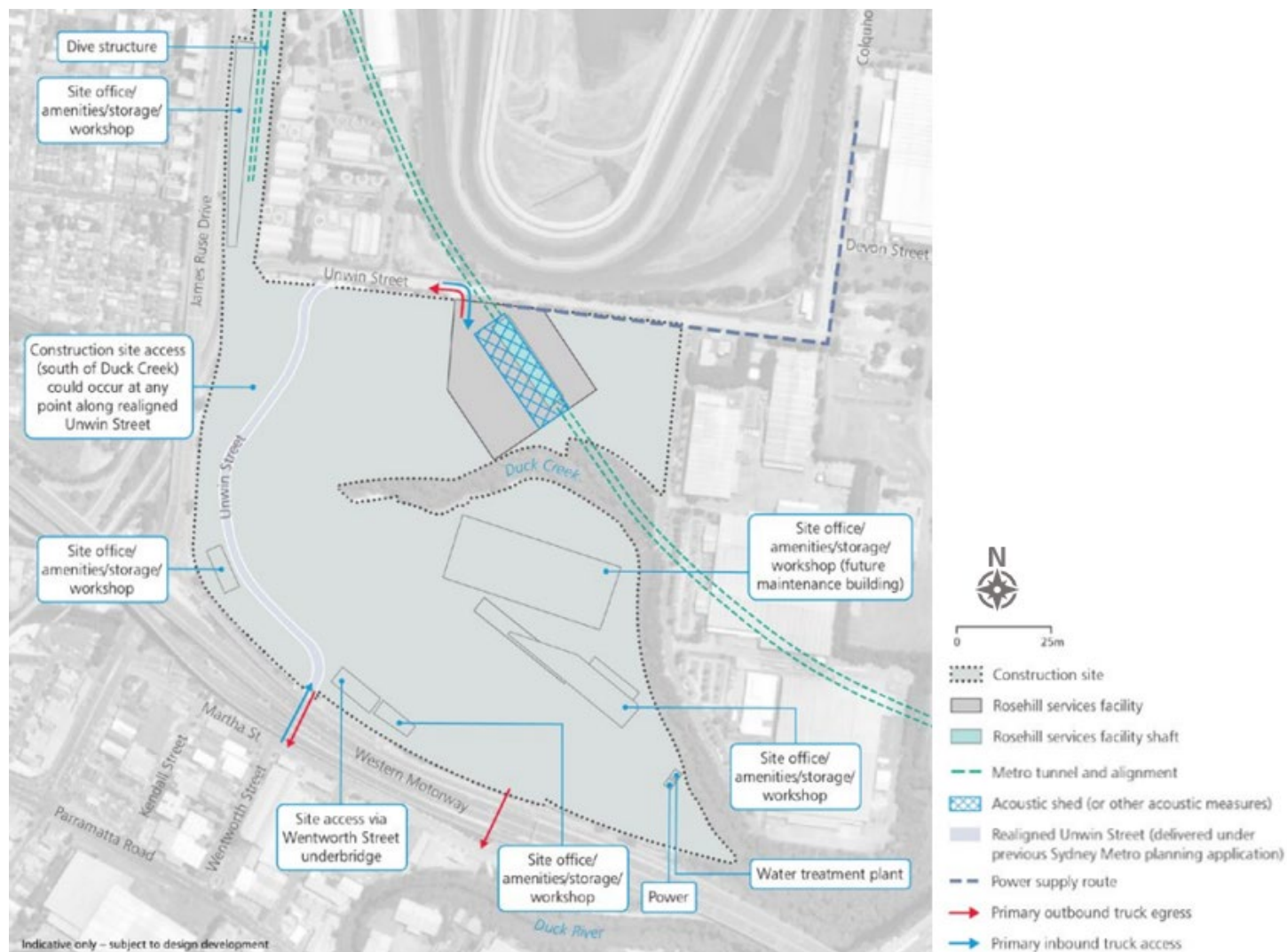


Figure 2-8 Clyde stabling and maintenance facility construction site

Source: Sydney Metro West EIS Technical Paper 6 – Landscape and visual amenity

2.4.3 Freight

The surrounding road network also carries key freight routes as shown in Figure 2-9, with the M4 Motorway designated as a primary freight route, whilst James Ruse Drive and Silverwater Road are secondary freight routes. The Precinct's connectivity with the freight network has made it historically attractive for industrial land uses.



Figure 2-9 Surrounding freight routes

Source: Camellia Transport and Traffic Assessment, WSP 2018

2.4.3.1 Parramatta freight patterns

The Parramatta Statistical Area houses a variety of diverse land uses. Along with Camellia-Rosehill, the industrial areas in Silverwater and Rydalmere supply metropolitan Sydney, rural NSW, and the rest of Australia with five main commodities in order of freight volumes:

1. Consumer goods
2. Fuel
3. Construction goods
4. Waste
5. Construction material.

Figure 2-10 highlights the destination of those commodities from Parramatta outwards.

A significant proportion of the Parramatta area's exports have a destination within the Greater Sydney region, through supplies of fuel, construction materials, and consumer goods. Areas in regional NSW, including the Central Coast and the Illawarra and Shoalhaven areas to the south, are supplied with manufactures and consumer goods from Parramatta, and significant fuel exports also have a destination to the south.

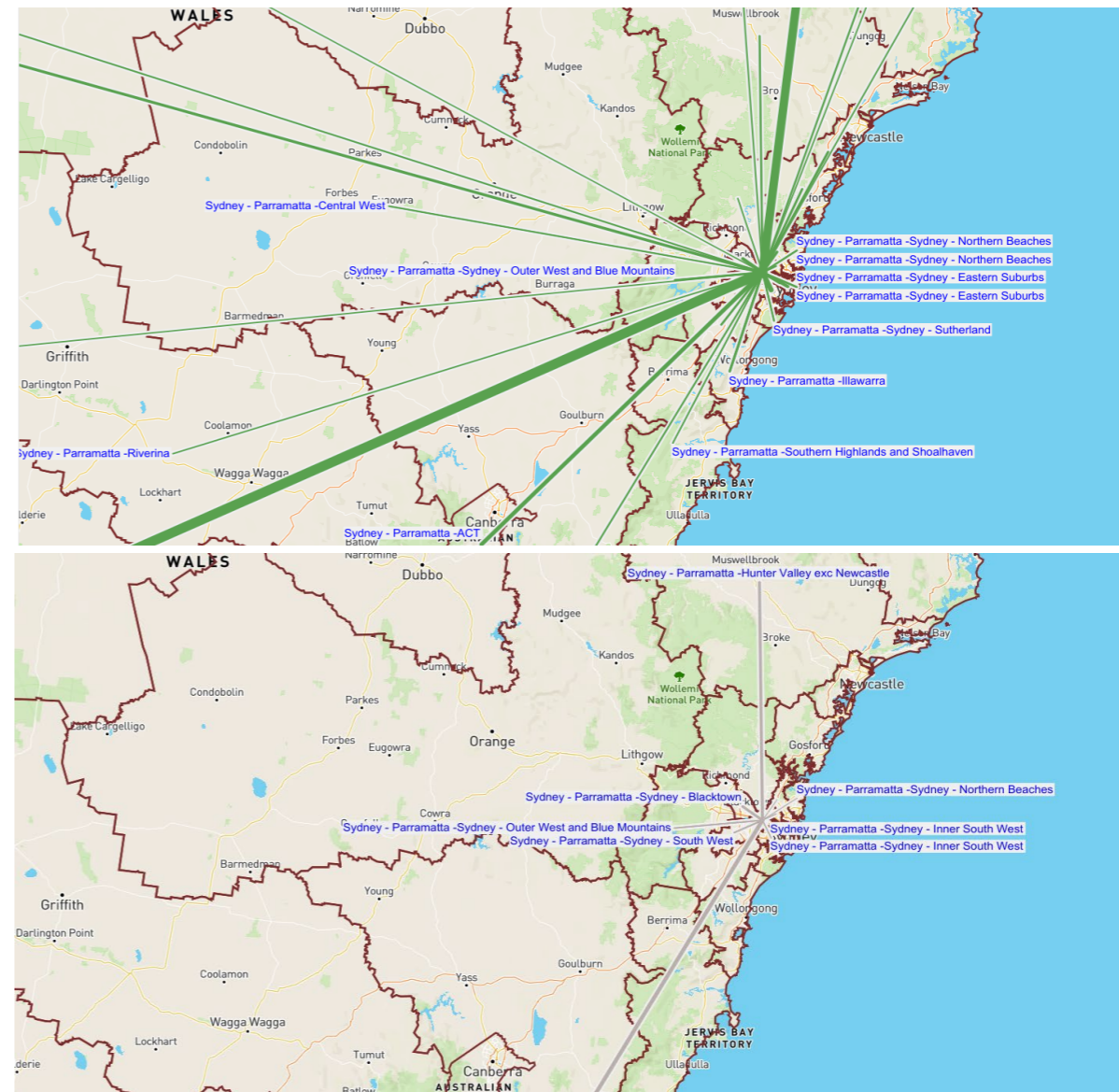
Interstate exports comprise primarily of consumer goods and manufactures, significant proportions of which travel to the nearby states of Victoria, Queensland, and the Australian Capital Territory. While comparatively less in volume, these export classes also make long journeys to South Australia and Western Australia.

Waste generated by the Parramatta region is primarily exported to the Capital Region, with some additional destinations in metropolitan Sydney and the Blue Mountains area.

2.4.3.2 Camellia-Rosehill snapshot

Figure 2-11 and Figure 2-12 graphs show traffic counts taken on Grand Avenue and Wentworth Street in February 2016. The average daily traffic count of those entering or exiting the Precinct was around 19,300 per weekday, of which around 25 per cent (approximately 5,300) were heavy vehicles.

Weekday heavy vehicle movements show a reasonably flat peak between 10am to 3pm, however, movements were observed throughout the 24 hours indicating that some businesses operate overnight. This includes the Viva Energy fuel import, storage and distribution terminal, as shown in Figure 2-12 graphs fuel tanker movements occur through the day and night. A total of around 500 fuel tankers per weekday access this fuel terminal.



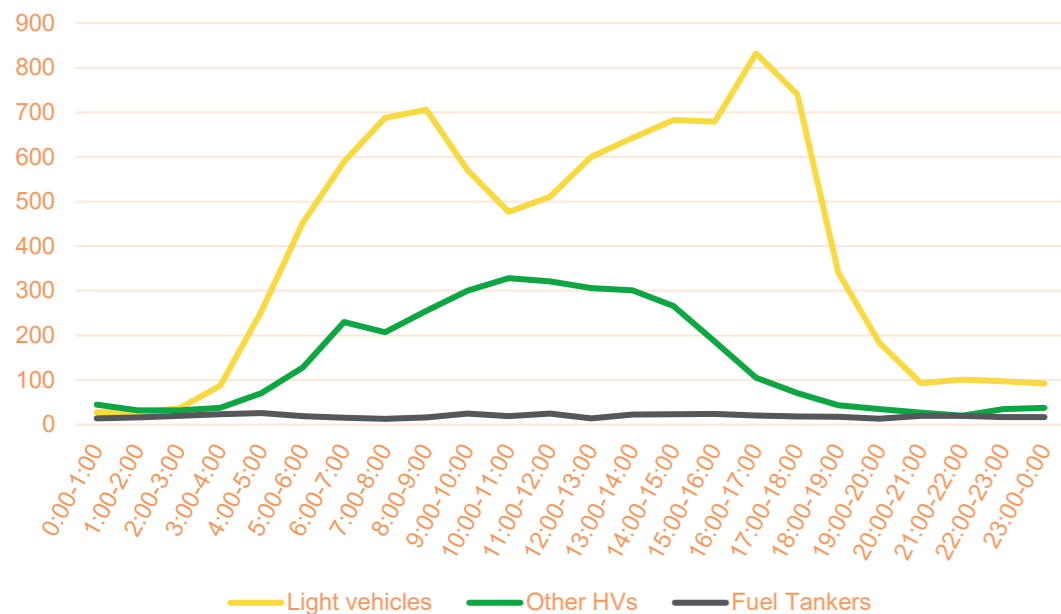
Ran.	Commodity Group	Annual freight volumes in kilotonnes (kt)
1	Manufactures	3,329.975
2	Fuel	3,160.000
3	Construction Materials	1,048.480
4	Waste	274.000
5	Metro Containers	160.000

The five origin maps highlight the destinations of the above highlighted commodities. For fuel, Central Coast and Illawarra regions are the most significant attractors, with almost 300 kt of fuel each in 2021. For consumer goods, Parramatta exports the most out to Victoria, with almost 500 kt.

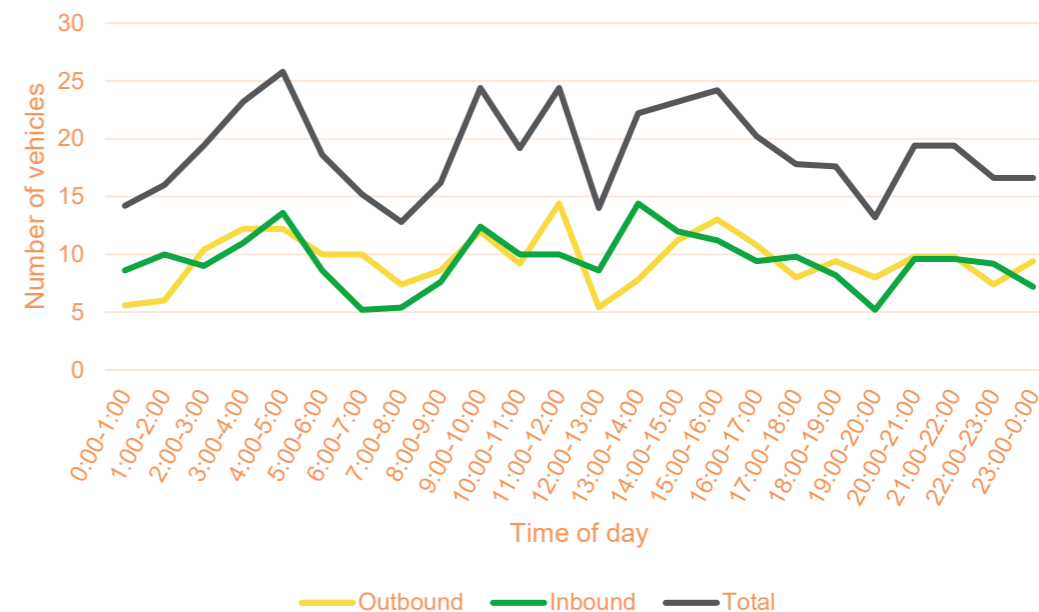
Figure 2-10 Commodities out of Parramatta
 Top Left: Fuel, Top Right: Consumer Goods, Middle Left: Construction Material, Middle Right: Waste, Bottom: Manufactures

Source: Transport Performance and Analytics, Transport for NSW

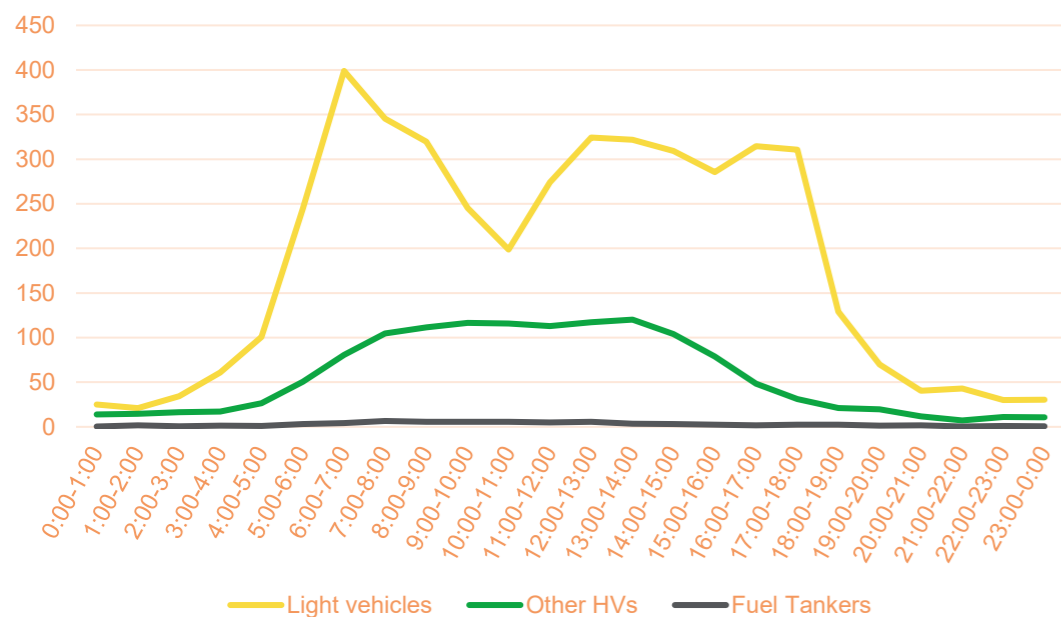
Grand Avenue
Weekday Traffic Counts



Grand Avenue
Weekday Fuel Tanker Counts



Wentworth Street
Weekday Traffic Counts



Wentworth Street
Weekday Fuel Tanker Counts

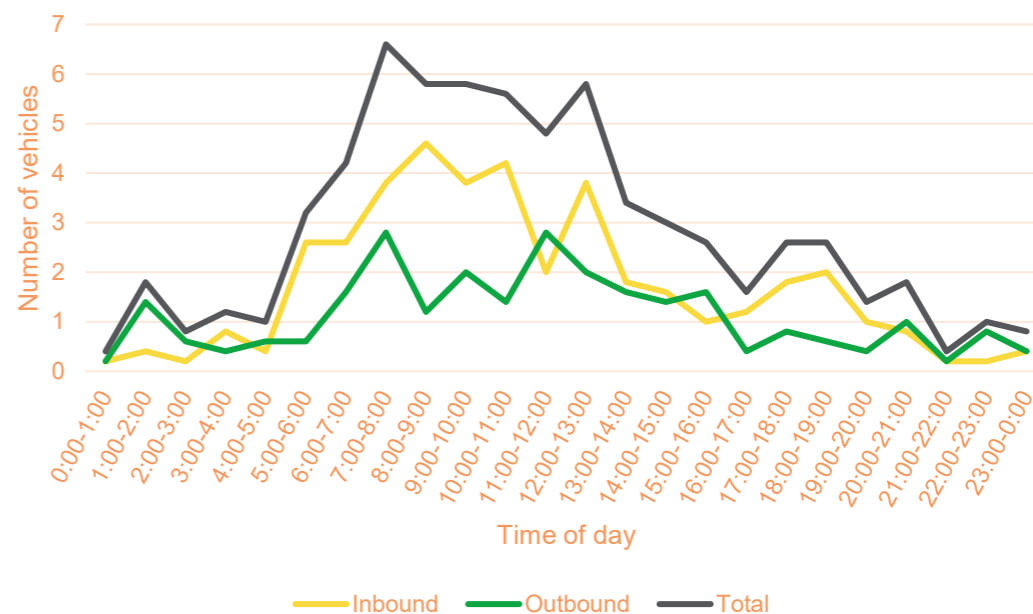


Figure 2-11 Traffic volumes on weekdays per hour at precinct access points
Source: Matrix Traffic and Transport Data, 9 to 15 February 2016 survey

Figure 2-12 Fuel tanker volumes on weekdays per hour at precinct access points
Source: Matrix Traffic and Transport Data, 9 to 15 February 2016 survey

2.4.4 General traffic

The Precinct is located on the corner of James Ruse Drive and the M4 Motorway/ Parramatta Road, providing it with good access to the broader Sydney arterial and motorway road network. Travel patterns in the Camellia-Rosehill Precinct are currently dominated by private vehicle usage. Public and active transport networks are limited due to the current industrial and low-density land uses resulting in low demand for these transport provisions.

As indicated in Figure 2-14, road access into the Precinct is currently limited to just two points:

- Via Grand Avenue onto James Ruse Drive
- Via Unwin Street, Kay Street and Wentworth Street onto Parramatta Road. This route is height restricted at 4.6 metres.

Direct access into the Rosehill Gardens Racecourse car park is also possible from James Ruse Drive. Deniehy Street provides access to a small, isolated section of light industry east of Valvoline Raceway.

These two access points are located near the Precinct's western edge, severely limiting movement to the north, east and southern directions. This is primarily due to the Precinct's location on the banks of the Parramatta and Duck Rivers, meaning any new connections would need to include new bridges over these waterways.

Figure 2-13 shows traffic volume counts of vehicles entering or exiting the Precinct at the two access points averages at around 19,300 per weekday. Two-thirds of this traffic uses Grand Avenue, with the remaining using Wentworth Street to access the Precinct. Traffic during the weekends is less than half of average weekday traffic.

A capacity assessment was carried out for key road links around the Precinct, the results of which are shown in Table 2-1 and Table 2-2. The assessment indicates that the demand observed on James Ruse Drive, Victoria Road, Parramatta Road, and Silverwater Road are expected to exceed the design capacity in at least one of the peak hours, which would result in poor intersection performance and long delays for vehicles travelling on these roads. An increase in turning volumes into the Precinct as a result of land use changes may potentially exacerbate existing traffic performance issues.

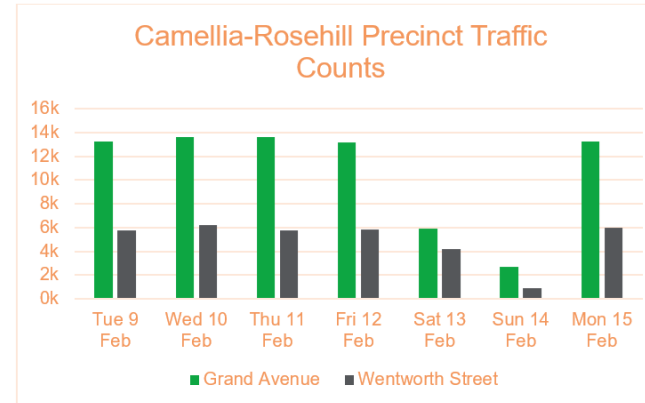


Figure 2-13 Camellia-Rosehill Precinct traffic counts Camellia-Rosehill Precinct traffic counts
Source: Matrix Traffic and Transport Data, 9 to 15 February 2016 survey

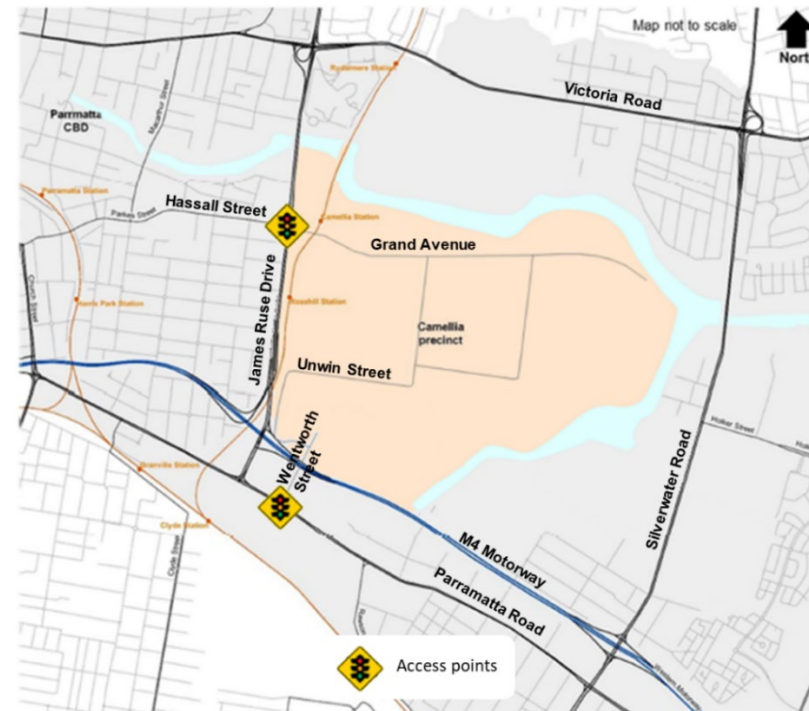


Figure 2-14 Existing road access points Existing road access points
Source: Camellia Precinct Traffic and Transport Assessment, WSP 2018

CAMELLIA-ROSEHILL PLACE STRATEGY – TRAFFIC AND TRANSPORT TECHNICAL IMPLEMENTATION REPORT

Table 2-1 AM peak hour traffic volumes (7-8am)

ID#	Street name	Number of lanes	Capacity (NB/WB SB/EB)	Volume (NB/SB)	Volume (WB/EB)
1	James Ruse Drive, north of Hassall Street	3 northbound, 3 southbound	2800 2800	2830/ 2650	
2	James Ruse Drive, south of Hassall Street	3 northbound, 3 southbound	2800 2800	2650/ 2680	
3	Hassall Street, west of James Ruse Drive	2 eastbound, 2 westbound	1900 1900		520/ 980
4	Grand Avenue, east of James Ruse Drive	1 eastbound, 1 westbound	900 900		310/ 560
5	James Ruse Drive, north of Parramatta Road	3 northbound, 3 southbound	2800 2800	1150/ 1430	
6	Parramatta Road, west of James Ruse Drive	2 eastbound, 2 westbound	1900 1900		1620/ 1650
7	Parramatta Road, east of James Ruse Drive	2 eastbound, 2 westbound	1800 1800		1890/ 2080
8	Parramatta Road, west of Stubbs Street	2 eastbound, 2 westbound	1900 1900		1170/ 1300
9	Stubbs Street, north of Parramatta Road	1 northbound, 1 southbound	900 900	340/ 140	
10	Carnarvon Street, west of Silverwater Road	1 eastbound, 1 westbound	900 900		230/ 210
11	Silverwater Road, south of Carnarvon Street	3 northbound, 3 southbound	2800 2800	2320/ 1790	
12	Silverwater Road, south of Clyde Street	3 northbound, 3 southbound	2800 2800	2420/ 2990	
13	Victoria Road, west of Park Road	3 westbound (1 bus lane), 3 eastbound (1 bus lane)	1900 1900*		1770/ 1830
14	Victoria Road, east of Park Road	3 westbound (1 bus lane), 3 eastbound (1 bus lane)	1900 1900*		1730/ 1990

Source: Matrix Traffic and Transport Data, 22 April 2021 survey

Capacity calculations are based on *Table 6.1 Typical mid-block capacities for urban roads with interrupted flow, Guide to Traffic Management Part 3* (Austroads, 2020)

* Capacity for Victoria Road excludes the bus lanes.

Note: Capacity is indicated separately by directionality for northbound (NB), southbound (SB), eastbound (EB) and westbound (WB).

Table 2-2 PM peak hour traffic volumes (4.30-5.30pm)

ID#	Street name	Number of lanes	Capacity (NB/WB SB/EB)	Volume (NB/SB)	Volume (WB/EB)
1	James Ruse Drive, north of Hassall Street	3 northbound, 3 southbound	2800 2800	3020/ 2550	
2	James Ruse Drive, south of Hassall Street	3 northbound, 3 southbound	2800 2800	2520/ 3150	
3	Hassall Street, west of James Ruse Drive	2 eastbound, 2 westbound	1900 1900		550/ 1260
4	Grand Avenue, east of James Ruse Drive	1 eastbound, 1 westbound	900 900		600/ 200
5	James Ruse Drive, north of Parramatta Road	3 northbound, 3 southbound	2800 2800	1240/ 1220	
6	Parramatta Road, west of James Ruse Drive	2 eastbound, 2 westbound	1900 1900		740/ 1860
7	Parramatta Road, east of James Ruse Drive	2 eastbound, 2 westbound	1800 1800		1110/ 2030
8	Parramatta Road, west of Stubbs Street	2 eastbound, 2 westbound	1900 1900		690/ 1300
9	Stubbs Street, north of Parramatta Road	1 northbound, 1 southbound	900 900	240/ 270	
10	Carnarvon Street, west of Silverwater Road	1 eastbound, 1 westbound	900 900		170/ 320
11	Silverwater Road, south of Carnarvon Street	3 northbound, 3 southbound	2800 2800	2020/ 1700	
12	Silverwater Road, south of Clyde Street	3 northbound, 3 southbound	2800 2800	3280/ 2610	
13	Victoria Road, west of Park Road	3 westbound (1 bus lane), 3 eastbound (1 bus lane)	1900 1900*		1440/ 2270
14	Victoria Road, east of Park Road	3 westbound (1 bus lane), 3 eastbound (1 bus lane)	1900 1900*		1520/ 2390

Source: Matrix Traffic and Transport Data, 22 April 2021 survey

Capacity calculations are based on *Table 6.1 Typical mid-block capacities for urban roads with interrupted flow, Guide to Traffic Management Part 3* (Austroads, 2020)

* Capacity for Victoria Road excludes the bus lanes.

Note: Capacity is indicated separately by directionality for northbound (NB), southbound (SB), eastbound (EB) and westbound (WB).

CAMELLIA-ROSEHILL PLACE STRATEGY – TRAFFIC AND TRANSPORT TECHNICAL IMPLEMENTATION REPORT

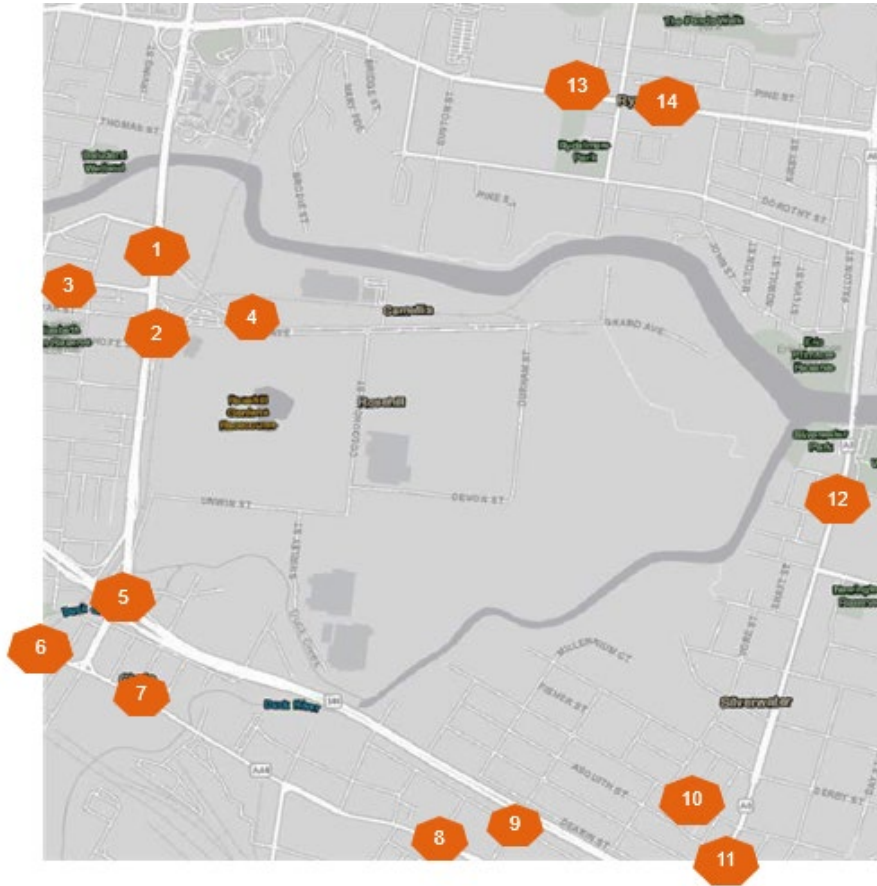


Figure 2-15 Traffic count locations (AM and PM peak periods)

Table 2-3 and Figure 2-16 summarise the current performance of intersections on major roads around the Precinct, based on SIDRA Intersection analysis. A Level of Service (LOS) of D or better is generally considered acceptable operation.

Currently, the intersection of James Ruse Drive/ Grand Avenue performs at LOS F during both AM and PM peak periods, an unsatisfactory level of performance. It is recommended that further detailed investigations into the performance of the road network should be conducted at a later stage of the planning process, which would

take into consideration network effects such as the impacts queuing on downstream intersections. Outcomes of these investigations would provide guidance on measures that may be taken to improve intersection operation.

Table 2-3 Summary of existing intersection performance

Intersection	Peak period	Average delay (s)	Intersection Level of Service
James Ruse Drive/ Hassall Street/ Grand Avenue	AM	138.5	LOS F
	PM	137.8	LOS F
James Ruse Drive/ Prospect Street	AM	26.3	LOS B
	PM	55.8	LOS D
Silverwater Road/ Carnarvon Street	AM	60.4	LOS E
	PM	56.1	LOS D
Silverwater Road/ Clyde Street	AM	20.5	LOS C
	PM	78.7s	LOS E
Parramatta Road/ Wentworth Street	AM	13.4	LOS A
	PM	13.6	LOS A

When creating new access points and bridges into the Precinct, the following would need to be taken into consideration:

- Performance impacts on the existing road network, including traffic on Victoria Road, Silverwater Road and Parramatta Road
- Potential rat-running routes that may be created
- Integration with new public transport and active transport links
- Integration with the overall Place Strategy for the Precinct and surrounding suburbs.

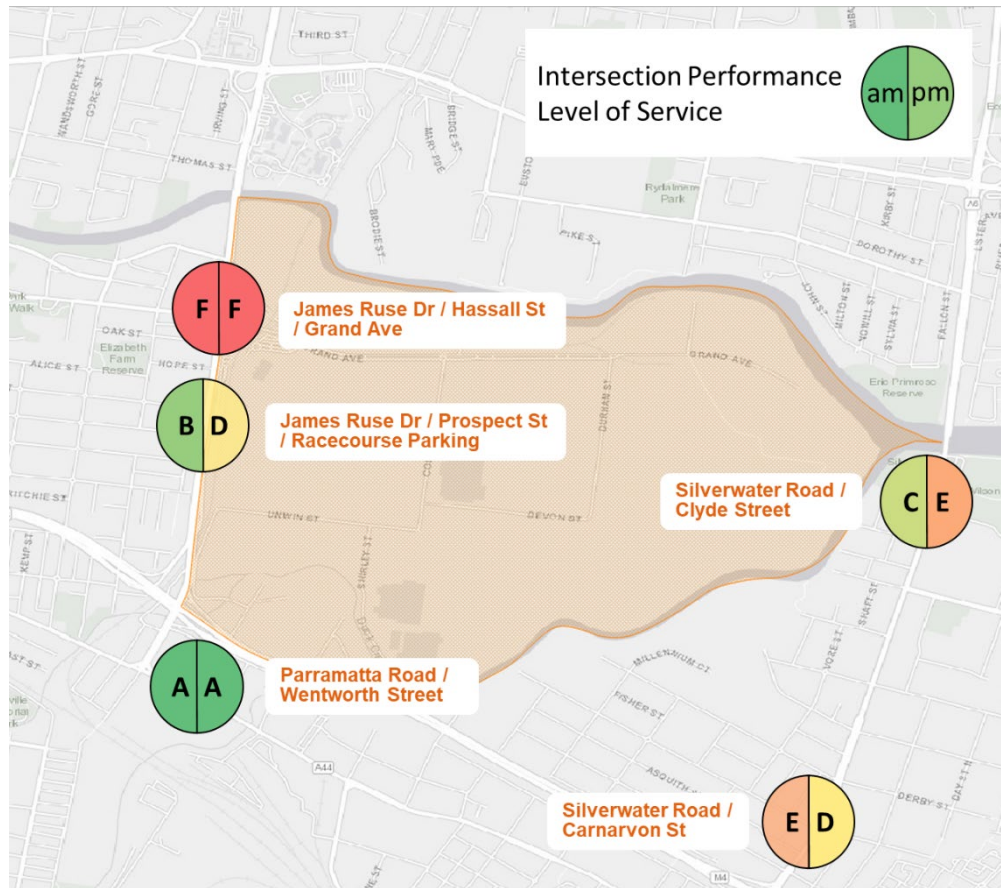


Figure 2-16 Summary of existing intersection performance

2.5 Current classification of street environments

Based on the current status of movement and place in the Precinct, a classification of street environments can be applied to the existing road network.

The Practitioner's Guide to Movement and Place has provided classification on street environments based on the interactions of movement and place. Civic spaces are places for people, with higher pedestrian activities and wider areas for non-vehicular movements, and in contrast, main roads include motorways and major roads and transit corridors. A movement and place matrix provides a relative measure of how streets are classified by movement and place functions.

2.5.1 Movement and Place street environments

Depending on movement activity and place value of a transport network element, corridors and links are classified as main roads (with higher movement functions), civic spaces (with higher place functions), main street (activated road and transport links), and local street (connection to land uses).

Figure 2-17 shows a key for the classification of movement and place, sourced from the *Practitioner's Guide to Movement and Place*. From this, a high-level classification as adopted in Figure 2-18, which highlights the current street environment within Camellia-Rosehill.

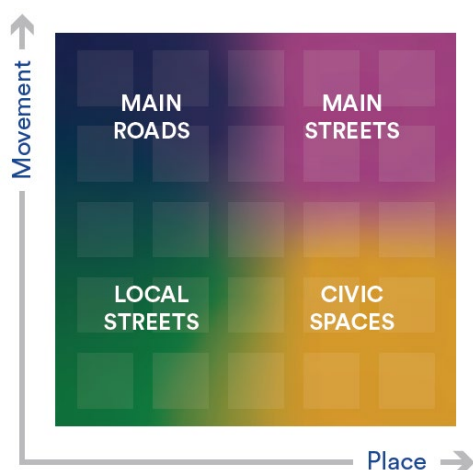


Figure 2-17 Street environments

Source: Practitioner's Guide to Movement and Place, Government Architect NSW

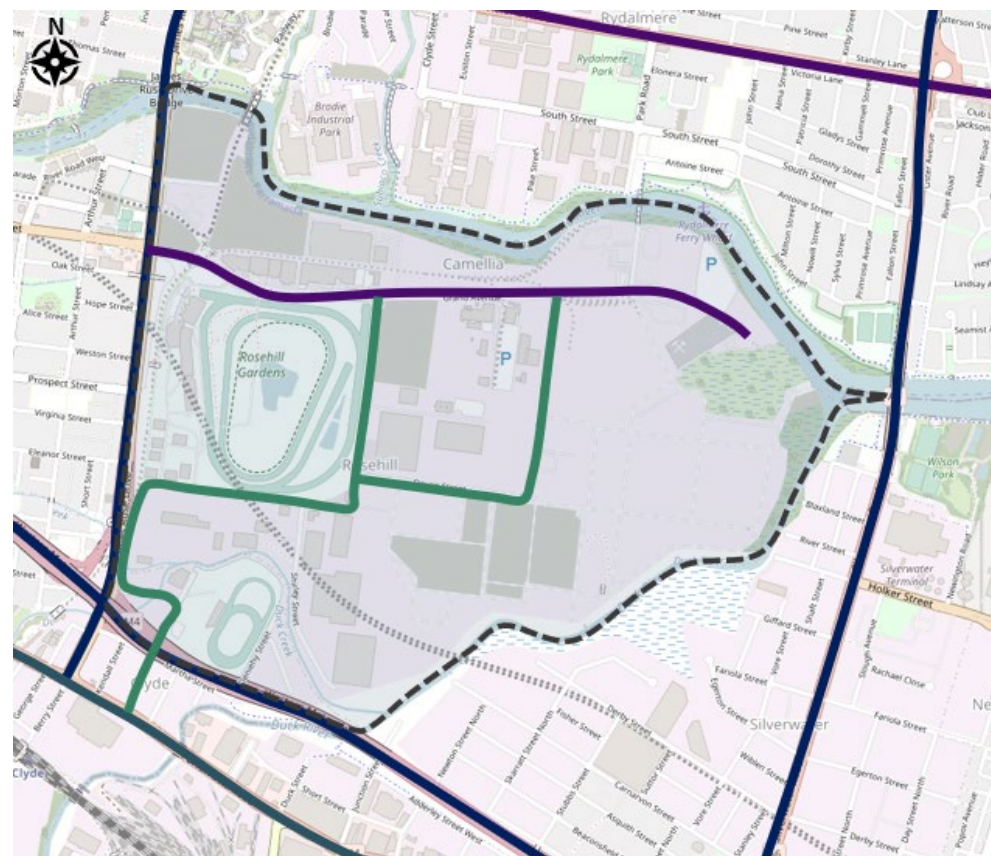


Figure 2-18 Current street environments in Camellia-Rosehill





Grand Avenue is the primary access point to the Precinct and provides access to a large number of businesses, and currently services heavy vehicle traffic generated by industrial land uses. Due to the industrial nature of this area, lot sizes are large, with the greatest density of businesses being located along Grand Avenue, and typical of that of business parks. With few areas that provide food retail or other services to employees of the precinct, street activation is low, and the Grand Avenue provides limited place value. While Grand Avenue currently has a function that lies between a main road and a main street, it possessed the greatest potential for activation due to alignment and existing uses.

Other streets within the Precinct currently reflect a similar environment and purpose, servicing heavy vehicle traffic travelling to lower density lots. These roads function as local roads with high heavy vehicle traffic movements connected to Grand Avenue.

ISSUES AND OPPORTUNITIES

Based on the Movement and Place discussion in the previous section and a review of gaps within the existing transport network, a summary of the issues and opportunities is provided in Table 3-1.

Table 3-1 Issues and opportunities

Focus	Issues	Opportunities
	<ul style="list-style-type: none"> Physical water constraints between Camellia-Rosehill and existing active transport links in Rydalmere and Sydney Olympic Park. Heavy industry land use does not allow for a pleasant walking and cycling experience. 	<ul style="list-style-type: none"> Additional active transport linkages along and across Parramatta River and Duck River and Duck Creek. Supporting walking and cycling trips with shading and tree canopy. Reimagining the inactive rail link in Camellia for active transport and enabling at grade activity on Grand Avenue.
	<ul style="list-style-type: none"> Current bus service only offers two services and two stops on James Ruse Drive, with 30-minute headway during weekends. Internal road infrastructure and land use do not support expansion of current bus services. Congestion on James Ruse Drive and distance between eastern side of the Precinct are deterrents for using public transport. 	<ul style="list-style-type: none"> Establishing a new bus service along Grand Avenue and existing road network in Camellia-Rosehill to support urban growth. Parramatta Light Rail Phase 2 enables further opportunities to connect internally within the Precinct and externally to the East and Sydney Olympic Park.
	<ul style="list-style-type: none"> Current heavy industries in the Precinct and lack of diverse access causes congestion on Grand Avenue and James Ruse Drive. Future opportunities to revitalise and renew the Precinct might not be compatible with heavy vehicle use on local infrastructure. Businesses such as Viva fuel energy import operate 24-hours resulting in on-going freight movement. 	<ul style="list-style-type: none"> Providing exclusive heavy vehicle accesses to the Precinct to connect to Silverwater Road, Victoria Road, and the M4 Motorway. Minimising conflict between heavy vehicles and other road users in and around the Precinct.
	<ul style="list-style-type: none"> Current land uses in the Precinct do not allow for better place value and function in the Precinct. Loss of river function due to pollutants and industries in the Precinct decreases current place value. 	<ul style="list-style-type: none"> Correcting cross regional active and green network in the Precinct. Revitalising the Racecourse to enable higher place function in the Precinct. Using Movement and Place framework to plan for land use and mobility networks interaction. Advocating for more recreational walking and cycling journeys and pathways between Camellia-Rosehill, Sydney Olympic Park, Parramatta, and Westmead. Creating and developing local character for the urban area and shared pathways. Removal of Grand Avenue Bridge and connect the Precinct through at-grade green links.

3.1 Problem statement

The Camellia-Rosehill Precinct currently consists of predominately industrial land use types that generate heavy vehicle movements. With no existing residential and community-serving land areas, the Precinct lacks the physical form, meaning and activity that contribute towards places for people. Both the demand and provision of public and active transport infrastructure for access to the Precinct are limited, and the lack of river crossings result in the Precinct functioning as a peninsula with congestion occurring at the few existing access points.

Camellia-Rosehill is at the cusp of its transformation journey to recovery and restoration – a place of economic prosperity but also a place where people love to live, work and visit. By 2041, the precinct will be enhanced through environmental improvements and better transport access via light rail, active transport, and road connections. It is envisaged to enhance the existing employment and industrial Precinct to a modern, sustainable, remediated mixed-use Precinct supporting the population and employment growth in Parramatta and the Central City District. New urban services employment areas will be introduced, and new opportunities will be provided for innovative and circular economy industries, complemented by a well-designed town centre, and new recreational facilities. The existing entertainment area that currently consists of the Rosehill Gardens Racecourse will be expanded to attract customers from nearby suburbs and enable an evening economy. In order to enable this transformation however, significant upgrades to the transport network will be required.

Though current and future customers will benefit from the substantial investment public transport infrastructure proposed for the area through the Parramatta Light Rail, the transport system needs to evolve and become better integrated to support this growth by facilitating multimodal access, with active and public transport infrastructure and services that meet customers' needs. This network needs to consider safety and become better connected locally and regionally, to make the journeys to and from the precinct less reliant on car-travel, while catering for those industries who need to access the precinct by car and heavy vehicles. The transport system serving Camellia-Rosehill needs to fit within a heavily constrained area, effectively balancing the competing demands and uses of the space available.

Lack of diverse accessibility is a recurring issue for the Precinct, which can be accessed via either James Ruse Drive or Wentworth Street. However, as the James Ruse Drive access is located along a primary north-south vehicle movement corridor that connects to both the Western Motorway and Parramatta Road, it serves as the primary access point for private vehicles and freight trucks for the Precinct. This is exacerbated by the physical barriers the Precinct experiences in Parramatta River, Duck River, Duck Creek, and James Ruse Drive, all of which create a lack of connectivity that particularly impact active transport modes.

With long-term occupancy of Viva Energy and other industrial businesses in the Precinct, consideration must be given to their 24-hour operating hours and need for connections to metropolitan freight routes.

The vision for Camellia-Rosehill is to be an industry and employment hub which supports essential city building and city serving industries, as well as a residential centre with a vibrant town centre. The Precinct will be supported by its recreational and entertainment areas, which will serve its residents and employees as well as attract visitors from nearby areas. However, the current transport system does not yet provide the level of accessibility, attractiveness, and connectivity expected of such a Precinct. To achieve the vision, the transport network will require upgrades and new connections that will both address existing issues around car dependency and congestion at accesses, and sustainably facilitate future demand.

STAKEHOLDER ENGAGEMENT

Consultation with TfNSW, Council representatives from the City of Parramatta and landowners was undertaken from the inception stage of the project to the final EbD workshop, and is currently ongoing as coordination with various other projects including Parramatta Light Rail, Sydney Metro and various road upgrades are required. This consultation focused on the transport constraints in the study area, current and projected mobility patterns, future transport strategies in the region, and proposed infrastructure upgrades. A summary of the key issues addressed during the discussions are shown in Table 4-1.

Table 4-1 Summary of key issues addressed

Criteria	Summary of inputs	Stakeholders
General	The transport and mobility issues of the Precinct require a resolution that is independent of the outcomes of the Traffic and Transport Technical Implementation Report, due to the strategic influence the road network has, and the parallel business case studies currently undertaken by TfNSW and the State Government.	Transport for NSW
Heavy and light vehicle conflicts	Additional access points and removing the conflict of heavy vehicles and private vehicles would improve the existing issues of the Precinct.	Transport for NSW and City of Parramatta
Public Transport	<ul style="list-style-type: none"> The impact of Parramatta Light Rail, proposed bus connections and stops and walking and cycling facilities in the Precinct for inter-regional, regional, and local trips (respectively) will enable a better outcome for vehicular traffic, as mode shifts decrease the impact on the existing road network. Two out of the three potential alignment options currently under consideration for Parramatta Light Rail Stage 2 would connect via the Camellia-Rosehill Precinct along the Sandown line. The connection to South Street north of the Parramatta River would be via John Street. 	Transport for NSW and City of Parramatta
Heavy vehicle access	With the M4 Motorway and the A6 (Silverwater Road) placed as heavy freight movement corridors, better heavy vehicle accessibility between heavy industries in the Precinct with these two corridors would relieve Grand Avenue and James Ruse Drive of freight demand.	Transport for NSW and City of Parramatta
Road Network	<ul style="list-style-type: none"> TfNSW is currently undertaking a Strategic Business Case (SBC) for James Ruse Drive and the outer Parramatta Ring Road. Potential changes to James Ruse Drive may be considered as part of the SBC. The function of James Ruse Drive as part of the Outer Ring Road around Parramatta CBD allowing a bypass of the city centre rather than a significant access point is key to understanding how trips access and egress the Precinct through Grand Avenue. Coordination with TfNSW and DPE indicated that while a route to Silverwater Road is advantageous to Camellia-Rosehill, any Duck River crossing to Silverwater must consider the impacts on M4 Motorway and Silverwater Bridge. The proximity of intersections to the north (such as Clyde Street and Holker Street) could result in vehicles queuing on Silverwater Bridge. To the south, Silverwater Road intersections with Derby Street and Carnarvon Street would impact sight distances to vehicles exiting the M4 Ramp to Silverwater Road. 	Transport for NSW, City of Parramatta, Viva Energy

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Criteria	Summary of inputs	Stakeholders
	<ul style="list-style-type: none"> Viva Energy highlighted that drivers using their internal roads have a different set of training to use the gantries and expressed concerns on suggestions to connect proposed Precinct corridors within their land, specifically across to Holker Street in Silverwater. 	
Place	<ul style="list-style-type: none"> The function of Parramatta CBD as a job generator, alongside the proximity of Camellia-Rosehill to Rydalmere and Sydney Olympic Park, would influence trip patterns in the future, especially for residents within the Precinct travelling to employment locations. Viva Energy owns and maintains the wetlands in Camellia-Rosehill and have highlighted the great placemaking and connection to country elements the wetlands have and would add to the Precinct. 	<p>City of Parramatta</p> <p>Viva Energy</p>
Grand Avenue	The Grand Avenue bridge removal aligns with the widening of Grand Avenue and is recommended for the Master Plan.	Transport for NSW and City of Parramatta
Parking	Parking allowances for the Precinct should be no greater than the Parramatta CBD rates.	City of Parramatta

4.1 Master Plan

As per the *Camellia-Rosehill Place Strategy Integrated Master Plan* (Cox Architecture, 2022), Figure 4-1 identifies the proposed land uses, which will have expected net population and employment figures as summarised in Table 4-2.

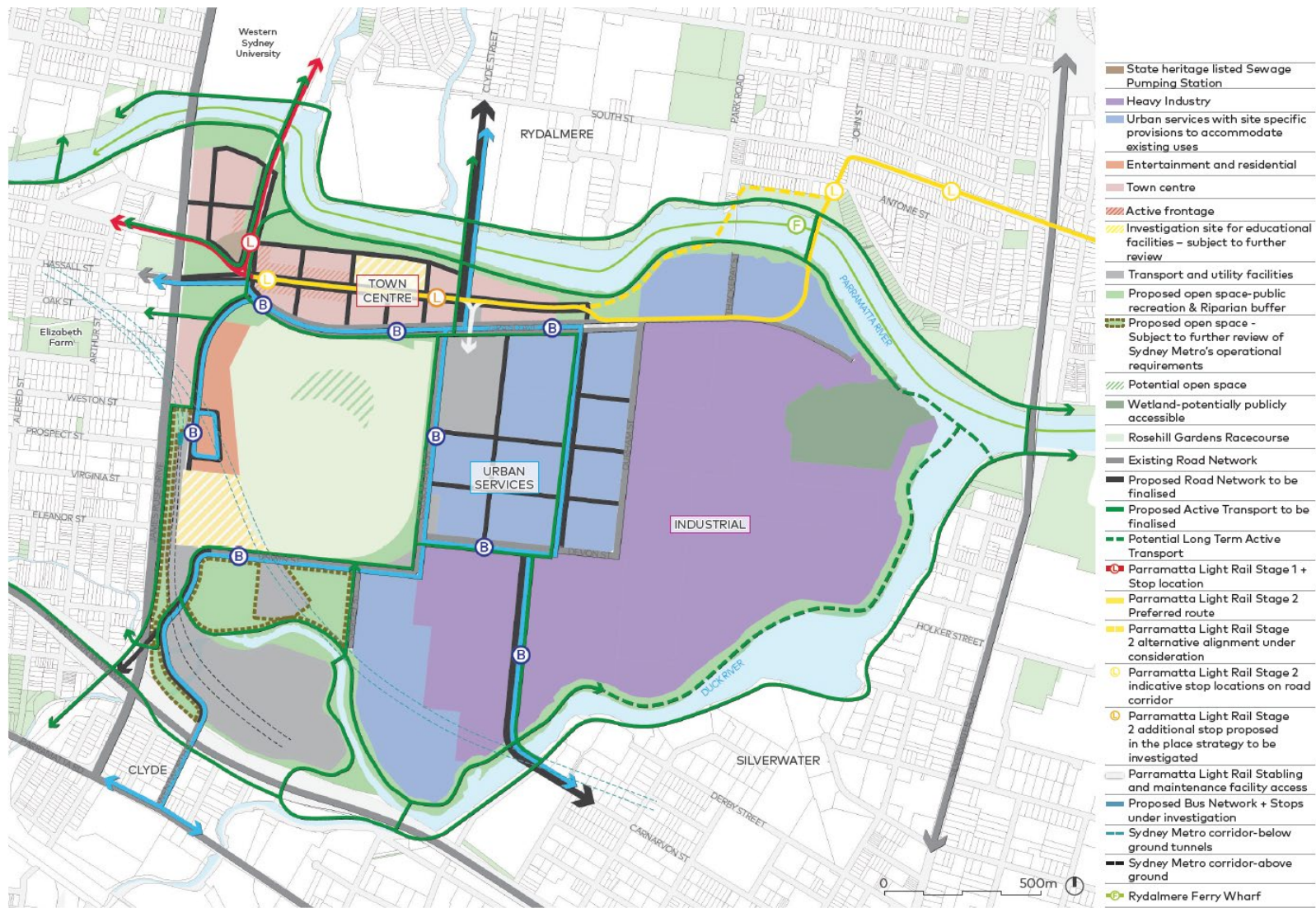


Figure 4-1 Proposed zoning and land uses

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Table 4-2 Detailed land uses and yields

ID	Land use type	Total land allotment (m ²)	Jobs	Efficiency	Dwellings	Population	Students
1	State heritage listed Sewage Pump Station	5,125					
2	Heavy Industry	1,061,335	2,653	100%			
3	Urban services with site specific provisions to accommodate existing uses	580,517	10,885	100%			
4	Entertainment and residential	52,773	501	95%	1,783	4,278	
5	Town centre (medium)	98,773	603	95%	4,457	10,697	
6	Town centre (high)	69,094	516	95%	3,811	9,146	
7	Investigation site for educational facilities – subject to further review - Primary School	20,198	100	100%			1,000
8	Investigation site for educational facilities – subject to further review - K-12 School	38,387	200	100%			2,000
9	Transport and utility facilities	282,708					
10	Open space-public recreation & Riparian Buffer	461,781					
11	Riparian buffer (viva energy)	61,241					
12	Wetland-potentially publicly accessible	98,714					
13	Potential open space	26,264					
14	Rosehill Gardens Racecourse	374,302					
15	Waterways	306,537					
Totals			15,458		10,050	24,121	3,000

4.1.1 Future movement and place environment

The proposed Camellia-Rosehill land use scenario would see the function, community and place value of the Precinct change significantly. With new residential land zoning and developments, community-serving facilities such as retail, entertainment and schools will become increasingly important, and businesses that thrive within the urban services zone will include those that support both the population and workforce.

Heavy industrial land use areas are concentrated in the eastern and southern parts of the Precinct, away from the town centre and pedestrianised areas in the north and west. As Grand Avenue is intended to become an area with high pedestrian activity with movements from locals and school children, as well as cyclists and local traffic, it is important for heavy vehicle traffic to be provided with attractive alternate routes in order to maintain the liveability and pedestrianisation of the town centre. The provision of new road links that will service freight movements and allow them to bypass Grand Avenue is critical to achieving the vision of a vibrant town centre.

The completion of the Parramatta Light Rail and Camellia light rail stop will enable residents and employees to access the precinct for housing and employment. The town centre will be located north of Grand Avenue, with food and retail active frontages following the light rail alignment. High pedestrian activity is expected along this corridor from both residents and employees of the Precinct.

The new public transport connections to the Rosehill Racecourse will increase its existing value as a recreational destination for Western Sydney and increase demand outside of race events. A new entertainment area located directly west of the Rosehill Racecourse is expected to attract visitors from nearby suburbs and establish an evening economy within the Precinct.

With a new active transport link fronting the wetlands to the north of the precinct and bridge connections over the Parramatta River, the Precinct will become connected to the recreational facilities in Rydalmere, including the Rydalmere Bike Path leisure link, parks, sports fields and reserves. Access to these leisure paths will enhance the lifestyle of Precinct residents and enable the connection and preservation of the mangroves and wetlands that border the Precinct. These active transport paths will also connect to existing routes of importance, such as the Parramatta Heritage Ride, which tours historic sites dating through the pre-settlement and early colonial years of the nation.

Rydalmere Wharf, newly accessible from the Precinct, will enable residents and employees of the precinct to travel between Parramatta and the Sydney CBD via Wentworth Point, Rhodes, and inner-city suburbs such as Abbotsford and Drummoyne, which are currently not easily accessible via other public transport modes.

The new light rail services and bus network will additionally allow for more accessible movement between the Camellia-Rosehill Precinct and the Parramatta CBD, as well as the growing Health and Education Precinct in Westmead, which is expected to grow as a major employment location within the Greater Parramatta area. These connections will improve access to jobs for future Camellia-Rosehill residents, whilst also improving access for commuters travelling to Camellia-Rosehill for work.



Figure 4-2 Camellia mixed-used town centre concept

Source: Camellia-Rosehill Place Strategy Package A Integrated Master Plan Preferred Scenario Report

4.1.2 Proposed mobility network

The development of the mobility network for the proposed master plan for Camellia-Rosehill ties in directly with the proposed vision and mobility outcomes for the Precinct. Figure 4-3 highlights the traffic, public transport, and active transport interventions proposed for the master plan. This section discusses the rationale for the proposed network.

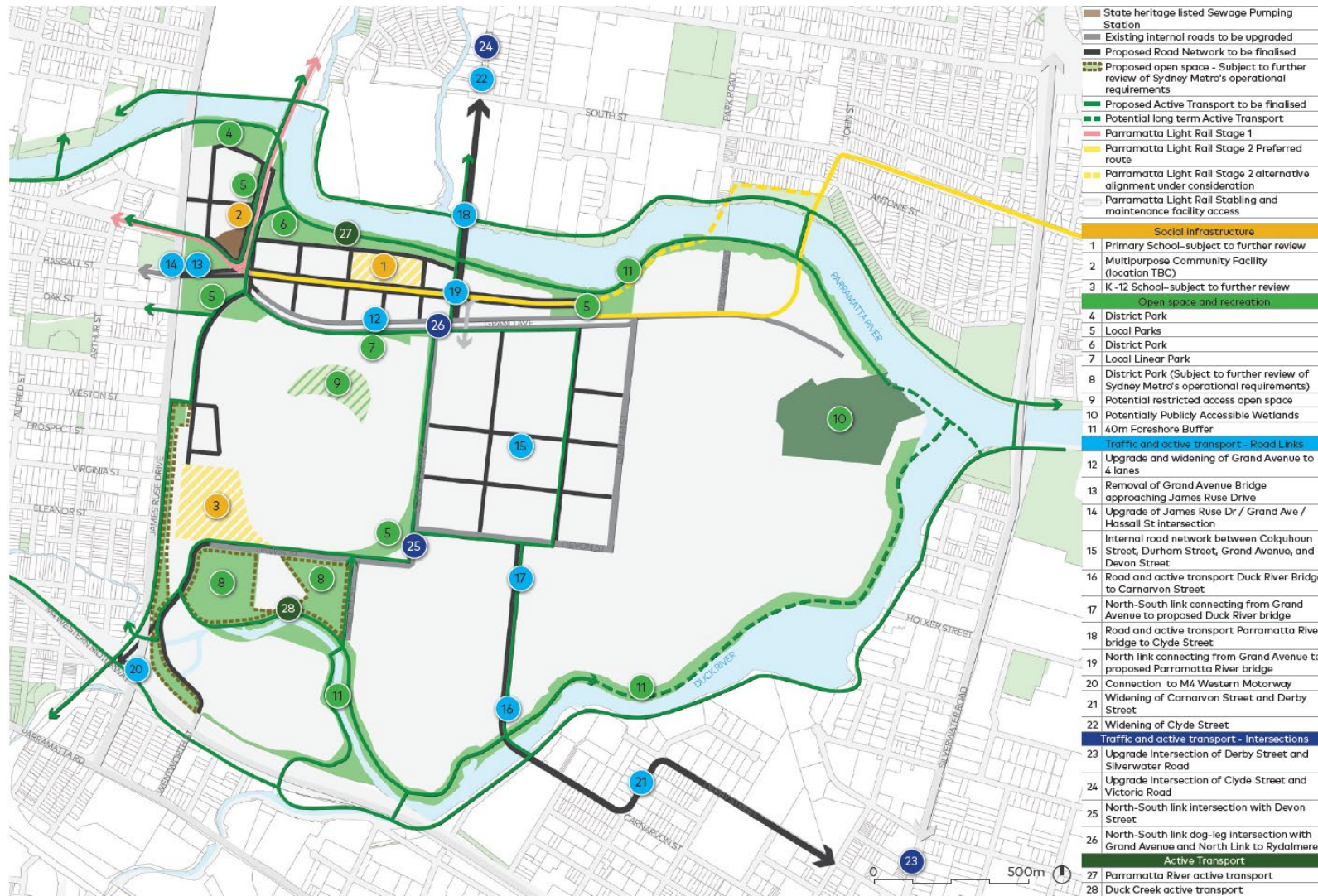


Figure 4-3 Proposed mobility network

With the maximisation of land uses within the Precinct to cater for existing land-owners, current visitors, and future customers and residents of the Precinct, the vision for road network is to accomplish the following:

- Ensure diversification of access to the Precinct through new bridges over Parramatta River and Duck River
- Manage mobility conflicts across different modes, in particular, between heavy vehicle movements and other road users
- Enable the transformation of Grand Avenue into a multimodal access with more focus on active transport to support surrounding residential growth
- Provide local connections to the emerging land uses.

4.1.2.1 Active transport

An essential outcome for the Place Strategy is to enable a substantial shift of mobility from car-based to active and public transport. The proximity of the Precinct to high job generating regions in Parramatta CBD and Sydney Olympic Park, as well as its river-facing opportunities, paves the vision for wider active transport connectivity internally and to the surrounding regions.

The key active transport links proposed for the Precinct are:

- Connections along the proposed Northern and Western connections
- Parramatta River active transport frontage
- Duck River active transport frontage (in Silverwater)
- Active transport links along Parramatta Light Rail.

The following design objectives have been identified to facilitate achieving the active transport vision:

- Wide footpaths supported by lighting, way-finding and mature trees within and around the town centre
- Shared paths that will facilitate an uptake in cycling, supported by bicycle parking around the town centre.

4.1.2.2 Public transport

Similar to active transport, achieving a substantial public transport mode shift is a key target for the success of the master plan. The current construction of the Parramatta Light Rail at Camellia serves the prospective occupants of the future residential developments at the north-west end of the Precinct.

Future extensions to the Parramatta Light Rail are still underway and under discussions in TfNSW, with two route alignment options currently under

consideration. Both routes run through the Precinct along the Sandown line and cross the Parramatta River to intersect with South Street in Rydalmere.

The proposed future transport connections from Grand Avenue over the Parramatta River to Clyde Street may potentially impact on the operation of the light rail. The operational requirements of the light rail and traffic signal management should be assessed at a later stage of the design.

Bus services along the proposed Duck River bridge, Colquhoun Street, and Grand Avenue have been proposed to support local public transport trips in the Precinct and beyond to Parramatta and Sydney Olympic Park, as well as act as a feeder system to the Parramatta Light Rail. Key public transport interventions include:

- Parramatta Light Rail Phase 2 (to be further investigated with TfNSW)
- Extension of bus services from Sydney Olympic Park and Parramatta through the Precinct.

The following objectives have been identified to facilitate achieving the vision for public transport uptake:

- Bus shelters should be provided for Precinct bus stops, particularly those located within and around the town centre
- High quality pedestrian access to bus stops, with bus priority on roads to decrease public and school bus journey times.

4.1.2.3 Traffic network

External road network

With the expansion and widening of the Precinct's internal road network, external connections to support the Precinct's growth and ensure the success of the vision are proposed. External connections will aim to relieve Grand Avenue and James Ruse Drive, separate heavy vehicles from light vehicles where possible, and connect directly to the wider, more accessible routes. Key external connections are:

- To the north, a new bridge over Parramatta River connecting to Victoria Road through Clyde Street:
 - This alignment of the north bridge through Clyde Street was agreed on to minimise the conflict with the potential Parramatta Light Rail alignment within the Precinct (as highlighted in Figure 4-3) and the PLR bridge across Parramatta River
 - An alternative river crossing connecting the Precinct to Pike Street in Rydalmere was identified through stakeholder consultation. However, this alignment results in a circuitous and indirect connection to Victoria Road and will unnecessarily increase vehicular demand on South Street, increasing the risk of congestion and queuing on the adjoining road network. The Clyde

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Street connection was preferred over this alternative as it provides better traffic performance outcomes.

- To the east, a new bridge over Duck River, connecting to Silverwater Road through Derby Street:
 - Due to potential routing and traffic performance issues associated with connections to Silverwater Road as well as site operations on the Viva Energy site, connections to the east can only be made through Carnarvon Street/Derby Street in Silverwater. Potential connections north of those would also have environmental impacts on the wetlands
- To the south, new ramps for heavy vehicles connecting to the M4 Western Motorway, as highlighted in Section 5.2.

The industrial businesses operating in the east will require 24 hour access to and from the Precinct. This connectivity is required to be maintained during off-peak hours as well as commuter peak periods, when traffic demand on the access roads and surrounding road network is greatest. The operational performance of accesses should be assessed through detailed traffic modelling at a later stage of the design.

Internal road network

The internal road network aims to provide local connectivity to the Precinct's land uses, circulate internal movements, and connect to the wider arterial network. Key upgrades to the internal road network are:

- Removal of Grand Avenue Bridge approaching James Ruse Drive and upgrades to the intersection
- Upgrading Grand Avenue to four lanes
- Internal road network between Colquhoun Street and Durham Street.

The vision for the town centre is a walkable and pedestrianised environment with low traffic speeds. The following design objectives have been identified to enable this vision:

- Local area traffic calming measures to be implemented around the town centre and sensitive land uses such as schools
- Low vehicle speeds to be implemented in areas with high pedestrian activity
- Traffic signals that prioritise the movement of active transport modes over vehicular traffic in the town centre.

TRANSPORT ASSESSMENT AND VALIDATION

5.1 Mode share

As changes are proposed to parts of the existing development types in the Camellia-Rosehill Precinct, historical mode choice decisions made by visitors of Camellia-Rosehill cannot be adopted in estimating future mode choice. Assumptions were therefore made on future mode share through considering the types of visitors and residents the Precinct is expected to service.

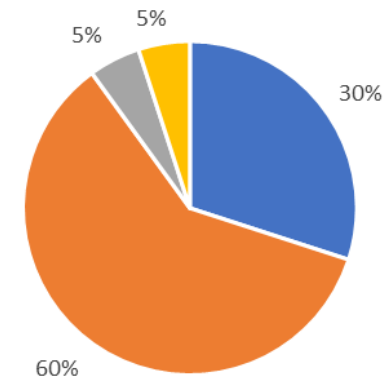
The mode splits adopted in the trip generation process are assumed to be consistent throughout the day, as shown in Figure 5-1.

The following mode share assumptions were made:

- A benchmark using Australian Bureau of Statistics (ABS) Census data of 2016 has been assumed for the different land uses, based on state suburbs (of usual residence) of similar nature to the proposed Precinct
- For residential land uses, Kingsford has been used as a benchmark suburb due to certain similarities with the proposed Camellia-Rosehill Precinct, such as its accessibility from a CBD via a light rail stop and bus network, and lack of a train station
- Due to the proximity of residential and entertainment areas from the Parramatta Light Rail stops and the Parramatta CBD, public transport would account for the greatest proportion of trips generated by those land use types
- Heavy industrial areas attract movements by workers who often require a vehicle to work. An assumption that 100 per cent of all movements to heavy industrial areas are by private vehicle has been adopted
- Businesses within the Precinct will consist of urban services and innovation and industry, which are assumed to result in a high private vehicle mode share
- The primary and proposed K-12 schools are located within a walkable catchment of the residential areas
- Primary school age students are expected to contribute a higher proportion of trips made by the private vehicle when compared to high school students. These trips are often linked with journey to work trips made by the driver.

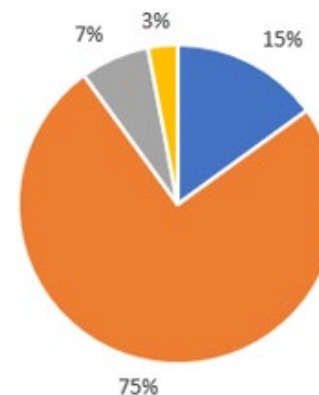
Detailed traffic modelling should be undertaken at a later stage of the design to ensure no adverse traffic impacts will be caused by movements contributed by the proposed schools.

Residential and urban services employment



Public Transport Private Vehicle Walking Cycling

Primary school



Public Transport Private Vehicle Walking Cycling

K-12 school

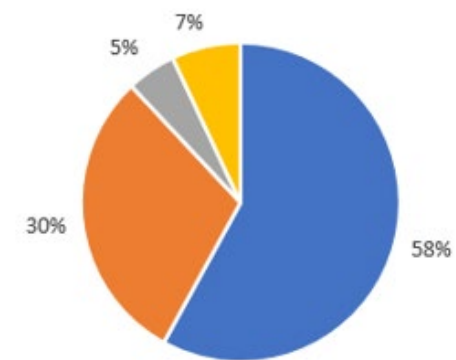


Figure 5-1 Mode splits for various land use

5.1.1 Person trip generation

Trip generation rates provide an estimate of how many trips originate or terminate at a location. This section documents the total trip generation assessment conducted for the Precinct, and includes private vehicle, public and active transport trips entering or leaving the Precinct. Traffic-specific generation and impacts are reported on in Section 5.2.5.2.

The number of trips generated by each scenario was calculated based on the area, efficiency percent and floor space ratio of each proposed new land use zone, excluding existing land use and background trip volumes. General assumptions adopted for total trip generation across all modes include:

- The numbers of dwellings were estimated from total residential provisions, with the assumption that the average size of a unit or dwelling is 90 square metres gross floor area (GFA). This assumption takes into consideration a mix of two-bedroom and three-bedroom dwellings
- Entertainment areas are assumed to generate 0.2 patrons per square metre area. This was benchmarked against trip generation of the Sutherland Entertainment Centre with minor adjustments to reflect the proposed entertainment district in the Precinct
- Trips made between various land uses within the Precinct are considered internal trips and have not been included in the assessment
- Residential developments in the Precinct are attached to ground floor retail (less than 5,024 square metres GFA each). Due to the small size of the retail developments, they are unlikely to attract shoppers from afar and therefore would only serve the local residents. Therefore, it is assumed that these retail areas generate no external trips
- Trip generation of existing businesses and land use that are to be remain unchanged (including future job growth) has been assumed to be part of the baseline conditions of the Precinct and have not been included in the assessment
- Residential person trip generation is based on rates for high density residential flat dwellings, sourced from Appendix B3 of *Guide to Traffic Generating Developments Updated traffic surveys* (TfNSW, 2013)
- 25 per cent of patrons to the entertainment areas travel by car. This is based on trip generation at the Sutherland Entertainment Centre and sourced from *Traffic and Parking Impact Assessment of Proposed Alteration and Additions to the Sutherland Entertainment Centre* (McLaren Traffic Engineering, 2020).

The total person trip generation rates applied for each land use type for the complete development scenario are summarised in Table 5-1 .

Table 5-1 Trip generation rates by land use

Land use type	AM peak	Daily
Residential/ mixed use	0.66/ unit	4.49/ unit
Schools	1/ teacher 1/ student	2/ teacher 2/ student
Heavy industrial	0.0007/ m ²	0.007/ m ²
Innovation and industry	0.32/ employee	2 per employee
Urban services	0.007/ m ² GFA	0.049/ m ² GFA
Entertainment	10% of daily trips	1/ visitor or employee

Through applying mode split assumptions to total person trip general rates, the trip generation was assessed for the weekday daily average and the morning peak hour, assumed to be the critical point in the day.

As the proposed master plan is a mixed-used development, an assumption of 10 per cent of self-contained trips have been made for all land uses, with the exception of schools. Due to the proposed Precinct population, it is assumed that 70 per cent of primary school trips and 30 per cent of trips to the K-12 school are internal within the Precinct.

The results of the morning peak hour trip generation are shown in Table 5-2. During the peak hour, it is estimated that 2,195 trips would be made into the Precinct and 3,008 trips would be made out of the Precinct.

Table 5-2 AM peak trip generation across modes

ID	Land use	AM trips into the Precinct					AM trips out of the Precinct				
		Public transport	Car	Walking	Cycling	Total	Public transport	Car	Walking	Cycling	Total
1	Heavy Industry	0	+586	0	0	+586	0	+147	0	0	+147
2	Urban services	+940	+1881	+157	+157	+3135	+235	+470	+39	+39	+784
3	Entertainment and residential	+205	+411	+34	+34	+684	+51	+103	+9	+9	+171
4	Town centre (medium)	+56	+111	+9	+9	+186	+501	+1003	+84	+84	+1671
5	Town centre (high)	+48	+95	+8	+8	+159	+429	+857	+71	+71	+1429
6	Investigation site for educational facilities – Primary School	+40	+198	+18	+8	+264	+10	+50	+5	+2	+66
7	Investigation site for educational facilities – K-12 School	+715	+370	+62	+86	+1232	+179	+92	+15	+22	+308
	TOTALS	+2003	+3652	+288	+302	+6246	+1405	+2721	+223	+226	+4575

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The results of the weekday average total daily trip generation are shown in Table 5-3. A high-level assumption was adopted for the calculation of total daily trips, where afternoon peak hour trip distributions are assumed to be the opposite of the morning peak hour distribution. Throughout the whole day, it is estimated that a total of 43,329 person trips will be made into or out of the Precinct across all modes.

Table 5-3 Daily trip generation across modes

ID	Land use	Daily trips (two-way) into/out of the Precinct				Total
		Public transport	Car	Walking	Cycling	
1	Heavy Industry	0	+4852	0	0	+4852
2	Urban services	+9404	+18809	+1567	+1567	+31348
3	Entertainment and residential	+1545	+3090	+257	+257	+5150
4	Town centre (medium)	+3778	+7556	+630	+630	+12594
5	Town centre (high)	+3230	+6460	+538	+538	+10767
6	Investigation site for educational facilities – Primary School	+99	+495	+46	+20	+660
7	Investigation site for educational facilities – K-12 School	+1786	+924	+154	+216	+3080
TOTALS		+19843	+42187	+3193	+3228	+68451

5.2 Future movements

5.2.1 Active transport

Being an existing industrial region, the Camellia-Rosehill Precinct suffers significantly from poor connectivity, reduced air quality, and minimal active transport infrastructure. Walking and cycling facilities require substantial upgrades and new installations to increase walking and cycling attractiveness in and through the Precinct.

A key Greater Sydney transport customer outcome in the *Greater Sydney Services and Infrastructure Plan* is for walking and cycling to be the most convenient option for short trips around centres and local areas, that are supported by a safe road environment and suitable pathways. Furthermore, with the uptake in technology and use of food delivery services, the provision of safe, active transport infrastructure is required to enable safety and connectivity.

The success of placemaking elements for the Camellia-Rosehill Precinct depends on how well connected and integrated the active transport network is to green spaces and high activity areas, and how accessible the network is to public transport stops. The reduction of vehicle movements on key active transport corridors and town centres is key to improving those placemaking elements, allowing for low speed environments that prioritise active movements and reducing the potential for conflict between pedestrians and motorists.

The Parramatta River and Duck River active transport frontages will enable the connection and preservation of mangroves and wetlands and provide excellent recreational cycling and commuter cycling opportunities to connect to Parramatta CBD, Sydney Olympic Park, and Rydalmere. Existing parallel cycling paths in Rydalmere and proposed paths in Silverwater provide more comprehensive active transport connectivity.

The proposed active transport routes throughout the Precinct will provide vital north-south connections, connecting to the Parramatta Valley Cycleway and shared paths running parallel to the M4 Western Motorway and Martha Street. It will support active transport connectivity to the Precinct and nearby employment centres such as Parramatta CBD, as well as open green space along the Parramatta River.

New active transport routes will additionally follow the alignment of the Parramatta Light Rail via Grand Avenue North over the new Parramatta River bridge, connecting onto the Parramatta Heritage Ride, which tours historic sites dating through the pre-settlement and early colonial years of the nation.

Bicycle racks are proposed near the light rail hub in the residential area and near open spaces and the entertainment lot which would provide the necessary infrastructure to support active transport usage.

Figure 5-3 highlights the proposed active transport connections within and surrounding the Precinct.

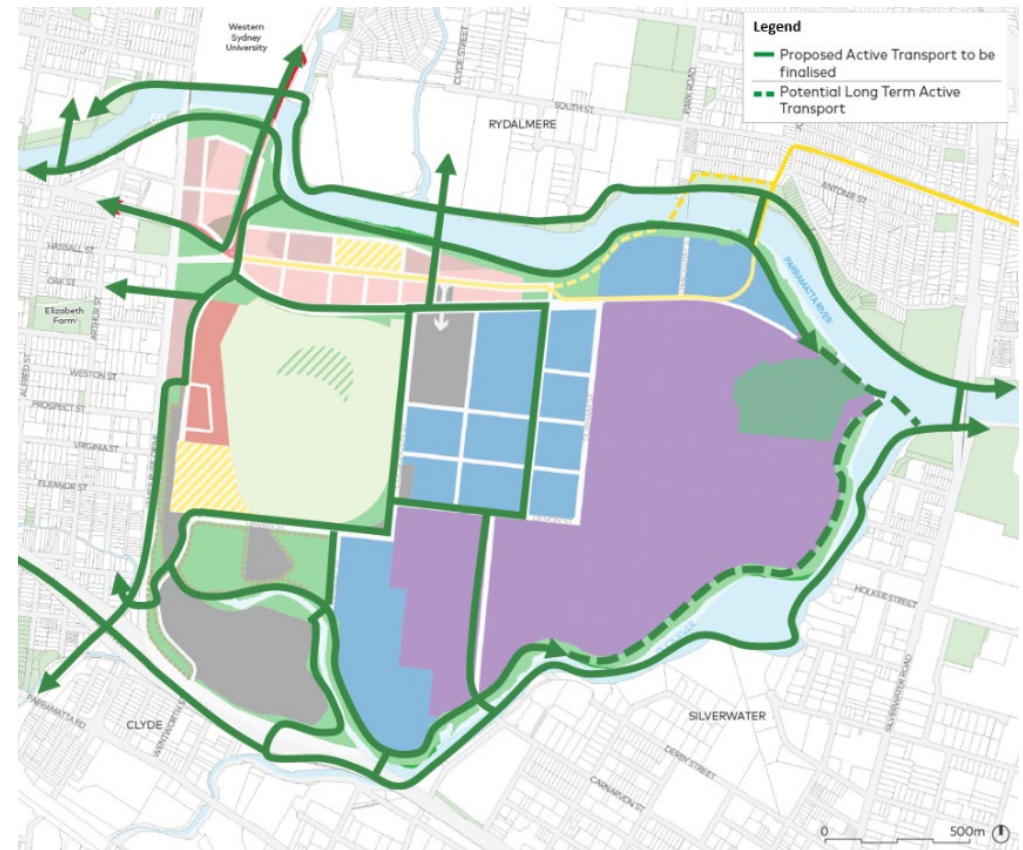


Figure 5-2 Proposed active transport network

5.2.2 Public transport

5.2.2.1 Light rail

The NSW Government has committed towards planning and development works of the Parramatta Light Rail Stage 2 was confirmed and has been considered for the analysis and outcome for the Camellia-Rosehill Master Plan. Parramatta Light Rail Stage 1 would connect Camellia to Parramatta to the west and Rydalmere and Carlingford to the north.

Stage 2 of the Parramatta Light Rail will connect the Parramatta CBD and Camellia to Ermington, Melrose Park, Wentworth Point and Sydney Olympic Park. A turn-up-and-go light rail service will improve connectivity of the Precinct to the wider GOP area and support the 30-minute city for people to access the places and services they need to get to. It will also allow for residents to access the wider rail network, by enabling a seamless interchange at Parramatta Station and supporting multimodal connectivity.

One light rail stop is included under Parramatta Light Rail Stage 1, located north of Grand Avenue at the site of the decommissioned Camellia railway station. An additional two light rail stops have been proposed for the Precinct under Stage 2. Of the three total stops proposed within the Precinct, the two stops located in the western region of the Precinct are envisioned to form a light rail interchange and public transport hub.

While three alignment options are currently under consideration for Stage 2 of the Parramatta Light Rail, Options 2B and 2C have been assessed in the development of this Traffic and Transport Technical Implementation Report as they will provide the greatest benefit to the development of the Camellia-Rosehill Precinct. This would involve:

- Stage 2 of Parramatta Light Rail potentially running east-west along the Camellia-Rosehill Precinct and making use of the Sandown Line for its alignment. This would provide residents and businesses within the Precinct convenient access to public transport and likely support the higher residential density within the Precinct. Furthermore, it would also create placemaking opportunities as the Precinct matures over time. The two options assessed for the Camellia-Rosehill Precinct are:
 - Option 2B – through Camellia, following Grand Avenue before crossing Parramatta River
 - Option 2C – through Camellia, following Grand Avenue until Durham Street, then continuing along the foreshore before crossing Parramatta River

- The Parramatta Light Rail bridge over Parramatta River would potentially connect to John Street/ South Street in Rydalmere.

Due to Stage 2 of the Parramatta Light Rail being in early stages of planning, further design investigations as the project progresses will inform the finalised river crossing arrangements and route alignment along the river foreshore. The finalised alignment of Parramatta Light Rail Stage 2, once agreed upon and made available, will be taken into consideration in further developing the Strategy in future stages.

The capacity of Parramatta Light Rail will be 4,800 customers per hour, travelling on a dedicated light rail corridor resulting in more reliable travel times. This capacity is equivalent to 100 buses per hour travelling, which often travels on heavily congested roads resulting in unreliable travel times.

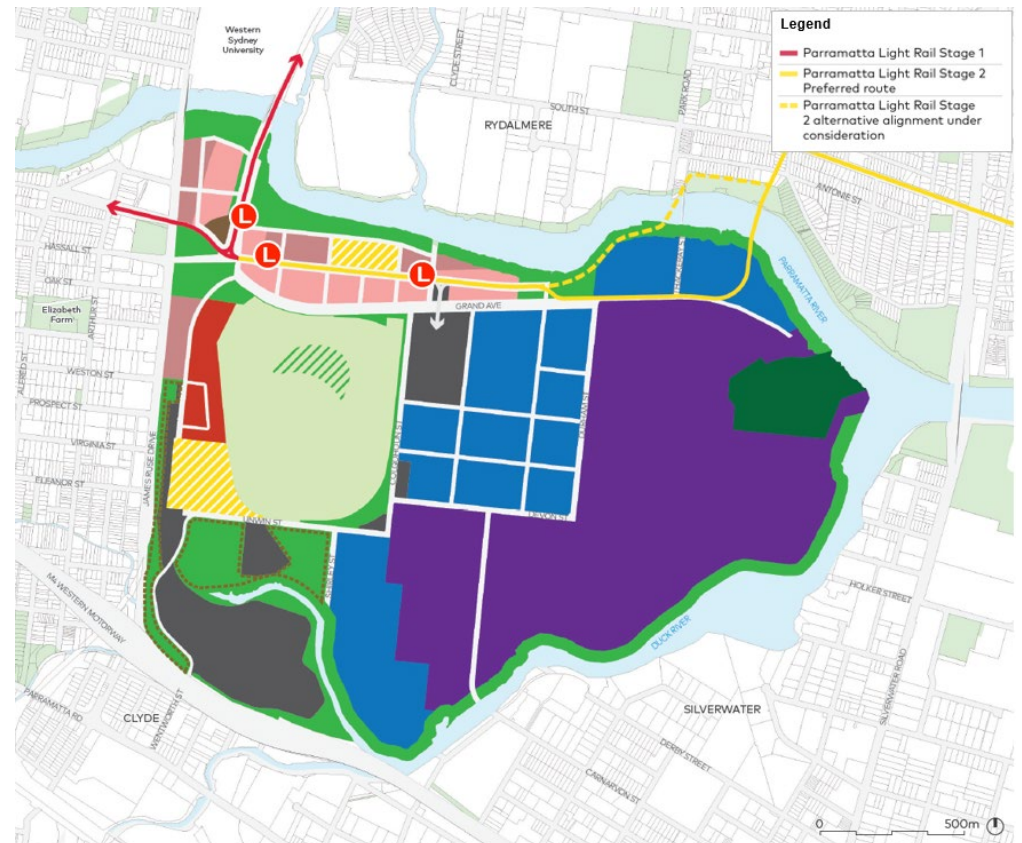


Figure 5-3 Parramatta Light Rail

5.2.3 Buses

There are currently no bus services that operate within the Precinct. However, the growing population introduced by the mixed-use residential areas and supported by the urban services hub and entertainment precinct offers an opportunity to expand current adjacent bus services into Camellia-Rosehill and introduce new connections to Silverwater, Rydalmere and beyond.

The proposed bus network aims to fulfil the following:

- Support the Parramatta Light Rail services and provide multi-modal connectivity for residents and visitors to areas that are not serviced by light rail
- Improve connectivity of Camellia-Rosehill to the wider Greater Sydney area via Victoria Road and Silverwater Road and capitalise on the existing bus lanes in the westbound and eastbound directions along Victoria Road
- Provide a sustainable alternative to the private vehicle for customers travelling to and from areas best serviced by the road network.

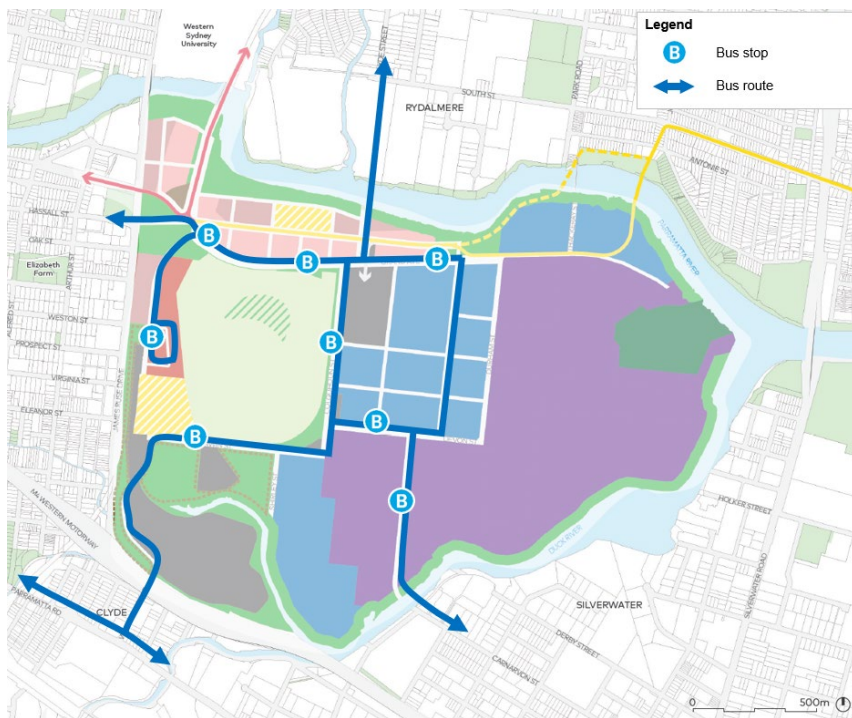


Figure 5-4 Proposed bus network

5.2.4 Ferry

The proposed bridge over Parramatta River identified in the Master Plan will support first-and-last mile active transport connectivity from the Precinct to the existing ferry service at Rydalmere Wharf. This connection will support employment within the Precinct through connections to primarily residential inner-city suburbs such as Drummoyne and Abbotsford via the high density residential hubs of Wentworth Point and Meadowbank. It will also support connectivity for residents residing in the Precinct that rely on key employment centres such as Sydney Olympic Park, Pyrmont Bay, Barangaroo and Circular Quay.

No ferry stop is proposed in Camellia-Rosehill. Ferry travel demand is expected to be adequately satisfied by Rydalmere Wharf due to its proximity to the Precinct, as well as the opportunity for the Parramatta Light Rail Stage 2 alignment to form a convenient interchange with the stop. Additionally, tidal issues preventing services from travelling beyond Rydalmere Wharf towards Parramatta at certain times of the day limits the benefit of a new stop located within the Precinct.

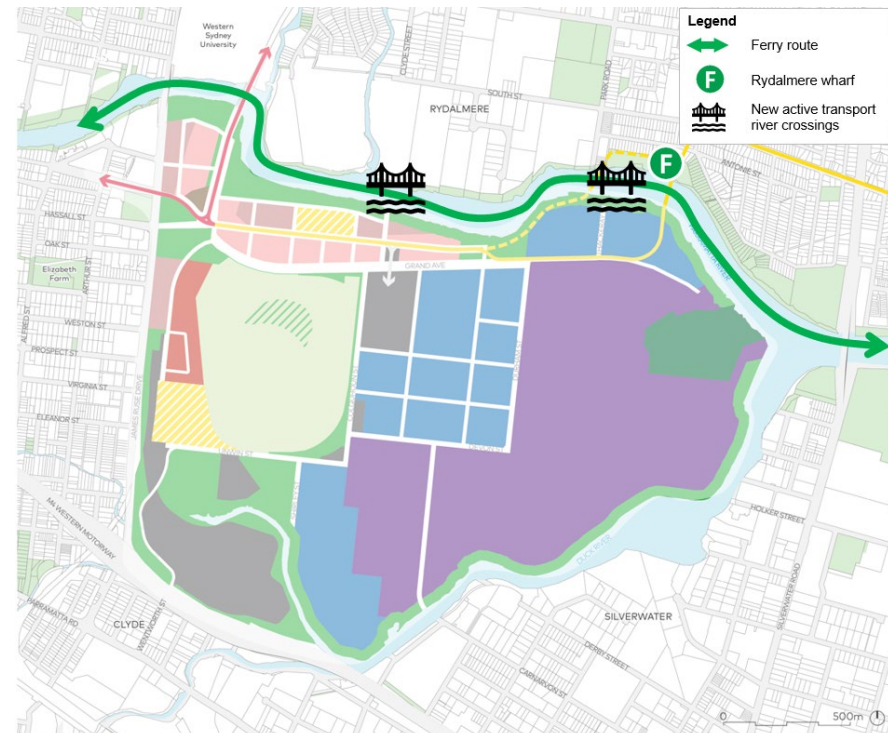


Figure 5-5 Improved connectivity to ferry services

5.2.5 Road network

This section provides an overview of traffic generated by the proposed developments, estimates a distribution in trip patterns and assesses the potential traffic impact on the surrounding road network.

5.2.5.1 Movement and Place classification

Through applying the Movement and Place Framework as a lens to understand the future street environment around the proposed land use scenario, a high-level classification of the future internal roads within the Precinct is shown in Figure 5-7.

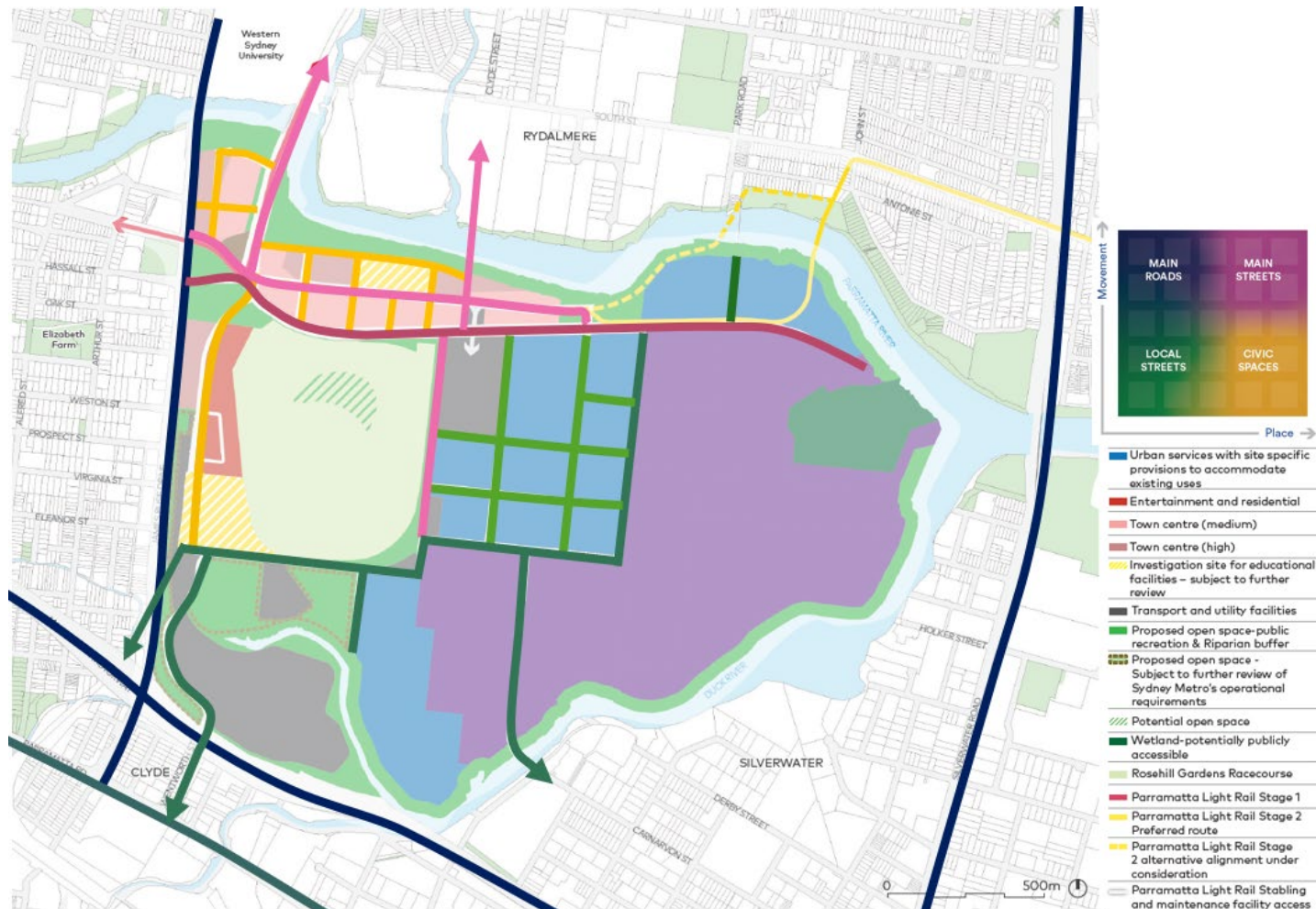


Figure 5-6 Internal road hierarchy as per the Movement and Place

The roads are classified as follows:

- Grand Avenue will evolve into the main street and primary east-west movement link in the Precinct. The street will provide access to mixed-use developments in the west and continue via the urban services employment centre until it terminates in the heavy industrial land in the east. It retains an important movement function within the Precinct, providing access from within the Precinct to both the existing intersection with James Ruse Drive as well as the new accesses to the west and north of the Precinct.
- Two alignment options are currently under consideration for the Parramatta Light Rail Stage 2. These routes run through Camellia, following Grand Avenue before crossing Parramatta River to connect with South Street in Rydalmere. These alignments would provide a new connection for residents and employees to population and employment hubs located in the west, north and east. New active transport crossings over the Parramatta River will be introduced with both Stages 1 and 2, which will contribute to the development of those routes into vibrant streets. These streets will serve a comparatively lower level of traffic than Grand Avenue but facilitate significant throughput of active and public transport movements.
- A new north-south link will connect the Precinct between Rydalmere and Victoria Road in the north, and Silverwater and Silverwater Road in the south-east. This route will introduce two new bridges over Parramatta River and Duck River respectively, and would support the movements of private vehicles, active transport, and bus services.
 - The northern extent will run through the urban services employment area serviced by various businesses including food retail and will develop into a vibrant centre serving the local community and Precinct employees.
 - The southern extent of the link will pass through industrial areas, and the Duck River access will be a shared access that will also service both private light vehicle and heavy vehicle movements. This section will experience limited activation but is still expected to play an important role for active transport users travelling to the south and east of the Precinct.
- The new north-south road located to the west of Rosehill Racecourse and connecting to Grand Avenue will function as a vibrant civic space, providing access the new entertainment district. Supported by the new light rail connectivity, this street will form the core of the Precinct's evening economy and provide recreational value to both residents and visitors alike. High pedestrian activity and slow traffic movements are expected along this street.
- Within the urban services area, the road environment will facilitate both pedestrian and vehicle movements. While some activation is expected due to the

density of businesses in this area, activity is expected to be concentrated along the north-south link.

- Roads located to the southern section of the Precinct will primarily service heavy vehicle movements generated by the industrial areas. Little activation will occur in these areas as Precinct activity will be concentrated in areas separated and protected from heavy vehicle traffic.

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5.2.5.2 Traffic generation

Of the morning peak trips generated by the Precinct, about 66 per cent of trips into the Precinct and 36 per cent of trips out of the Precinct will be made by private vehicles. Figure 5-8 provides an overview of total two-way daily vehicle trips generated by land use and considers the total trip generation for an average weekday as well as the AM peak trip generation, which is assumed to reflect the critical hour. Previous Section 5.1.1 provides a detailed breakdown of the directionality of generated trips.

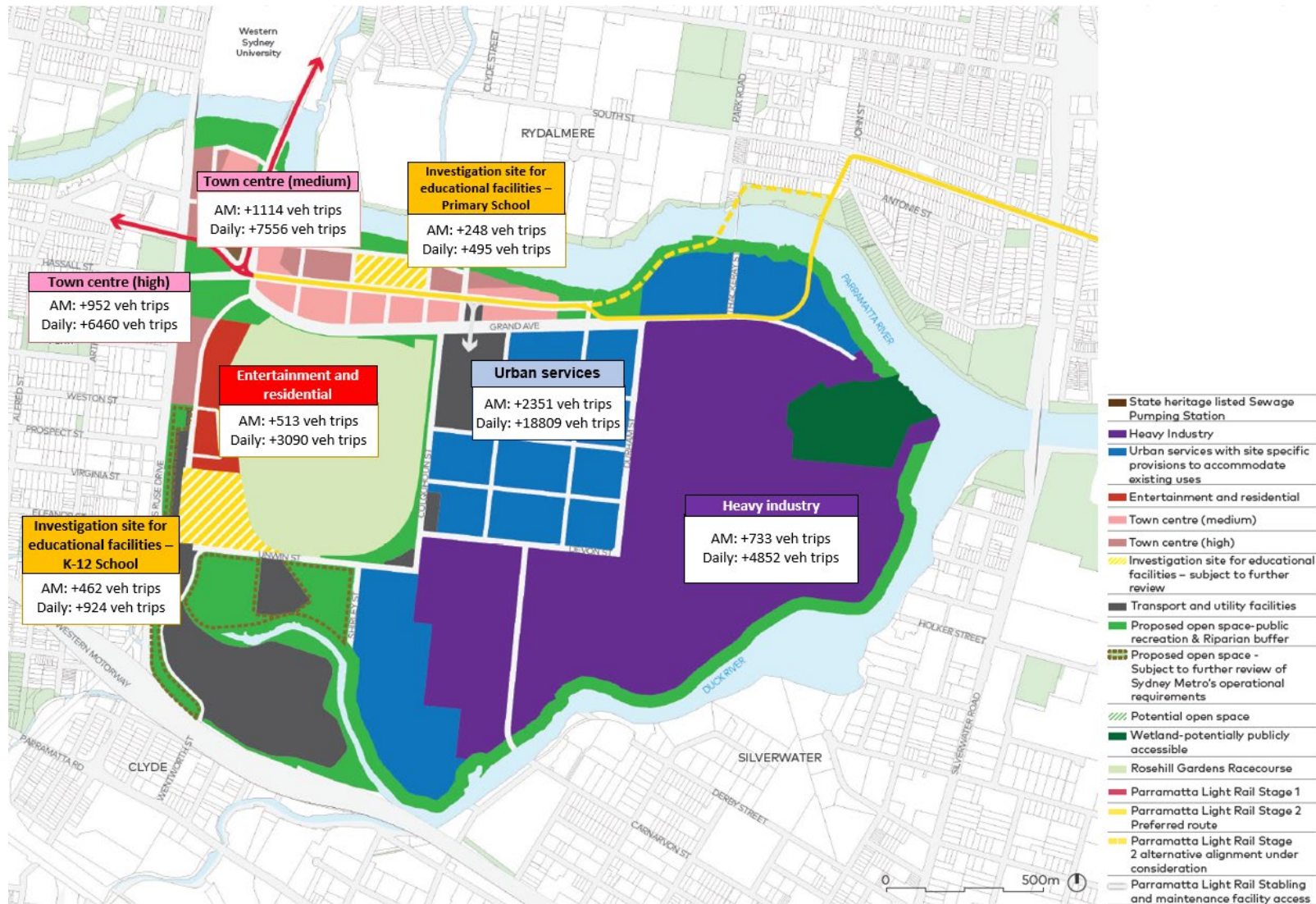


Figure 5-7 Total daily vehicle trips generated by the Precinct on an average weekday

5.2.5.3 Traffic distribution

To support the traffic expected to be generated by the developments in the Camellia-Rosehill Precinct, additional road accesses have been proposed to enable new connections to the north, south and east.

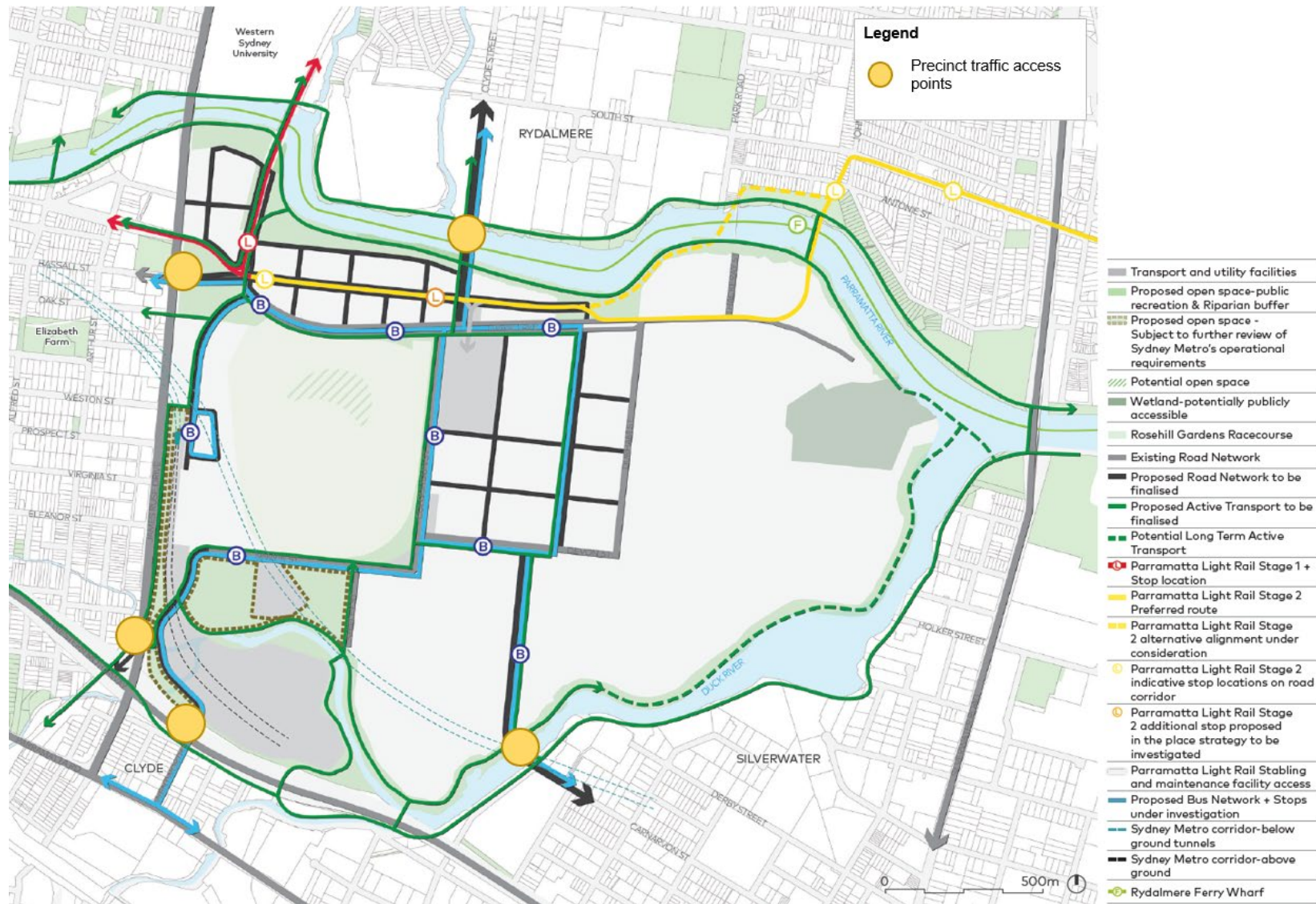


Figure 5-8 Precinct road access points

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The following access points are presented and depicted in Figure 5-9:

- **Clyde Street access** – A new bridge that extends north of Grand Avenue to intersect with Clyde Street in Rydalmere before connecting to Victoria Road. This access will be primarily utilised by light vehicles and buses, and will provide an alternative northern connection to the Precinct to the existing Grand Avenue access
 - **Grand Avenue access** – The existing primary access into Camellia-Rosehill will function as the high street, bordered by residential, mixed-use, and entertainment land use typologies. With the construction of new accesses that will connect traffic directly onto major corridors such as the M4 Western Motorway and Silverwater Road, it is expected that heavy vehicle demand on Grand Avenue will be gradually be phased out over the course of implementing the Strategy as freight desire lines are better enabled via other direct access points. The Grand Avenue access is expected to be utilised primarily by light vehicles and buses, and facilitate low travel speeds due to high pedestrian activity on the street
 - **Wentworth Street access** – The existing southern access into Camellia-Rosehill, which connects to the realignment of Unwin Street and serves both general traffic and heavy vehicles
 - **M4 Western Motorway direct access** – New entry and exit ramps between the M4 Western Motorway interchange and the realignment of Unwin Street. This new access is intended to alleviate the impact of the development-generated traffic on the surrounding road network, as well as to provide an alternate high-quality route for freight movements that will enable a reduction heavy vehicle usage of Grand Avenue. Investigations are ongoing to determine the design and feasibility, and will be further assessed as part of the Integrated Transport Study
 - **Carnarvon Street access** – A potential new bridge connecting over the Duck River from a new north-south road link through the Precinct west of the Viva Energy land area, to Carnarvon Street/Derby Street in Silverwater. In addition to servicing light vehicles and buses, this access will function as secondary access for heavy vehicles and will provide the eastern connection to the Precinct.
- located north of the Precinct. The road connects Parramatta to the Northern Suburbs and Lower North Shore areas. Key suburbs accessed by this route include Ermington, Ryde and Rozelle
- Five per cent of vehicles are expected to travel to and from the north of the Precinct via James Ruse Drive, accessed through Grand Avenue. This route will connect to the Hills District via Northmead
 - 11 per cent of vehicles are expected to travel to and from Parramatta, Sydney's secondary CBD located less than two kilometres west of the Precinct. These vehicles are assumed to primarily use the Grand Avenue access and travel via Hassall Street
 - 50 per cent of vehicles are expected to use the proposed new access onto the M4 Western Motorway, which would be used for travel to and from suburbs within the Greater Western Sydney region such as Blacktown and Penrith, or suburbs located in the east, including Strathfield, the Inner West region, and the Sydney CBD
 - 16 per cent of vehicles are expected to access Parramatta Road via either the Grand Avenue or Wentworth Street accesses. The road which would service similar travel directs to M4 Western Motorway, allowing vehicles to access the east and the west
 - 10 per cent of vehicles would use the Carnarvon Street access to Silverwater Road for travel to and from the north and south, accessing suburbs within the Hills District, Northern Sydney as well as Sydney's south-west regions. Key suburbs accessed through Silverwater Road include Castle Hill, Hornsby and Carlingford to the north, and Auburn, Bankstown, and Liverpool to the south.

5.2.5.4 Light vehicles

The distribution of trips made by private (light) vehicle to and from the Camellia-Rosehill Precinct on an average weekday was estimated by a strategic transport review undertaken by Transport for NSW. Travel movements have been assumed as follows:

- Eight per cent of vehicles are expected to use the Clyde Street access, which connects to Victoria Road, a major link to enable travel to and from suburbs

Figure 5-10 shows the vehicular distributions from general traffic access points between the Precinct and various regions of Sydney. These distributions were informed by a strategic transport review undertaken by Transport for NSW.

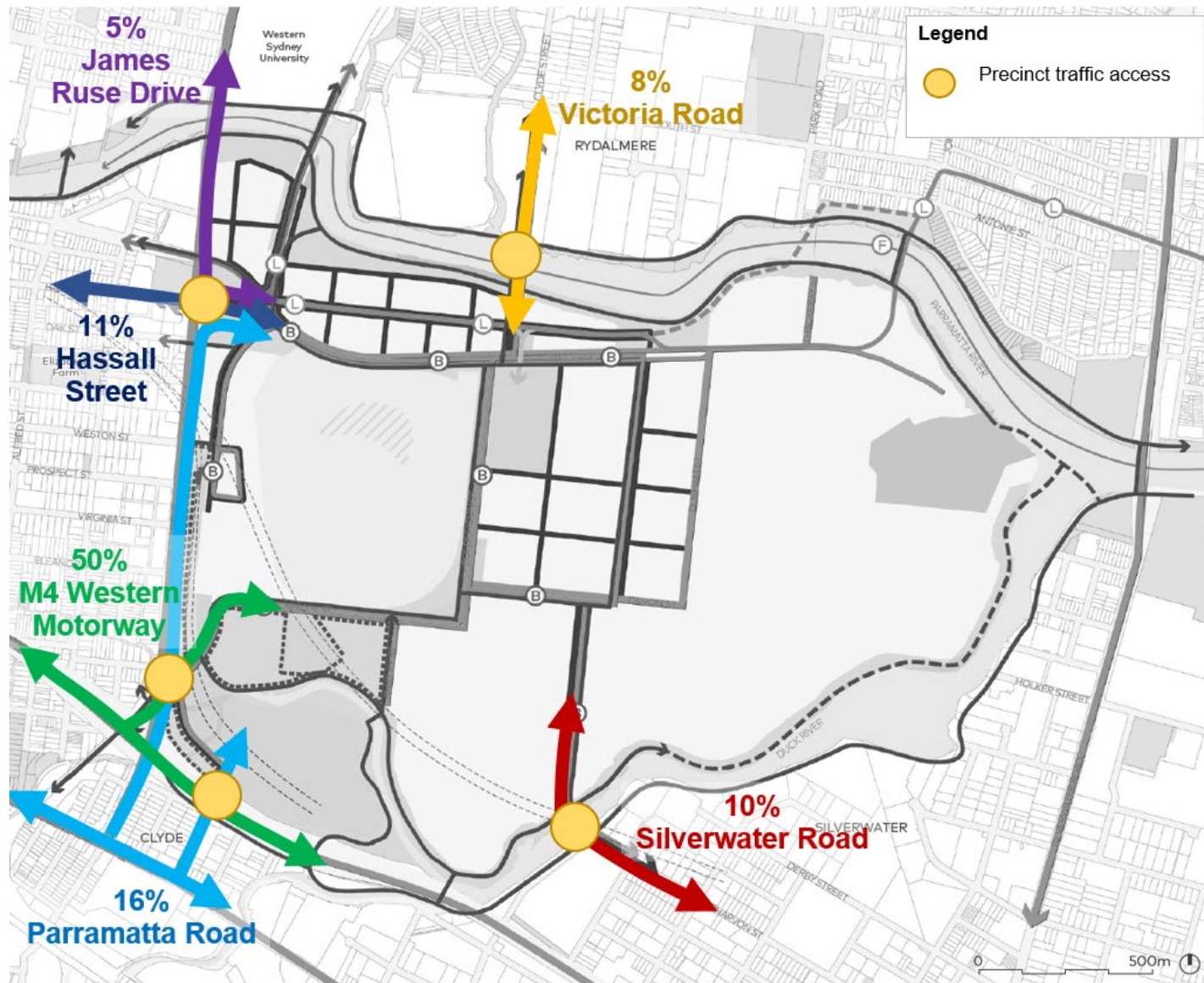


Figure 5-9 Vehicular distributions for private (light) vehicles

5.2.5.5 Freight and heavy vehicles

Heavy vehicles currently use the Grand Avenue access connected to James Ruse Drive to access the Precinct. However, Grand Avenue is intended to become a high street through Camellia, facilitating high pedestrian activity with movements from locals and school children, as well as cyclists and local traffic. The heavy industrial land uses have been concentrated to the southern and eastern parts of the Precinct, and away from the town centre in the north and west in order to maintain the separation of freight movements from other road users. The provision of attractive alternate routes that will allow freight movements and to bypass Grand Avenue is critical to achieving the vision of a vibrant town centre.

The following three accesses are intended to be the primary routes used by heavy vehicles and freight:

- **M4 Western Motorway direct access** – Connecting onto the M4 Western Motorway and the Higher Mass Limit network for 25/ 26-metre long B-doubles. Within the Precinct, Unwin Street and Kay Street form part of the General Mass Limit network for 25/ 26-metre long B-doubles. This access will allow a free flow connection onto a primary freight corridor and is expected to service most of the freight movements with an origin or destination east, west or south of the Precinct. Access must accommodate for PBS 2B vehicles
- **Wentworth Street access** – Running between Unwin Street within the Precinct and connecting to Parramatta Road to the south, this access is currently used as an existing heavy vehicle route part of the General Mass Limit network for 25/ 26-metre long B-doubles. Unwin Street, Kay Street and Wentworth Street are not currently approved routes for 4.6 metre high vehicles. The continual use of this access into the future is subject to discussion between the appropriate stakeholders due to the proposed M4 Western Motorway direct access
- **Carnarvon Street access** – Connecting via Carnarvon Street, currently part of the General Mass Limit network for 25/ 26-metre long B-doubles. This road connects to Silverwater Road and is expected to be used by freight movements with an origin or destination north of the Precinct. Access must accommodate for PBS 2B vehicles.

With more diversified types of traffic operation in the Precinct, the new freight crossings would reduce heavy vehicle conflicts with the proposed intensification of residential and retail land use around Grand Avenue, enabling the high street to become a higher-quality place for people. The proposed heavy vehicle network is primarily separated from sensitive land uses such as residential, entertainment and retail; however, where conflict may arise, traffic management interventions such as heavy vehicle bans should be implemented.

The provision of a high quality alternate freight route such as the proposed M4 Western Motorway direct access connection is critical to achieving the desired place outcomes within the Precinct, where heavy vehicle movements are directed away from Grand Avenue and the town centre.

A strategic transport review undertaken by Transport for NSW indicates the following distribution of heavy vehicle movements can be expected within the Precinct if no traffic management measures are implemented:

- 51 per cent of heavy vehicle volumes will use the Unwin Street access to the M4 Western Motorway
- 20 per cent of heavy vehicles will use the existing Wentworth Street access to Parramatta Road
- 14 per cent of heavy vehicle volumes will use the Carnarvon Street access to Silverwater Road
- Seven per cent of heavy vehicles will use the Clyde Street access to Victoria Road and nine per cent will use the Grand Avenue access.

Findings of the strategic transport review indicates that 16 per cent of total heavy vehicle volumes will use links accessed via Grand Avenue if no traffic management measures are implemented. Freight travelling through the town centre would adversely affect the walkability of the streets, providing safety and noise concerns as well as decreasing the overall liveability of the town centre.

Heavy vehicle traffic should be therefore encouraged to use alternate routes. This can be achieved through either a ban of heavy freight movements through Grand Avenue, or through the implementation of traffic calming measures that prioritise active transport movements. Examples of such measures include:

- Designation of Grand Avenue as a high pedestrian activity area with lowered speed limits
- Wombat crossings and traffic signal timings that prioritise pedestrian phases
- Footpath and kerb extensions
- Staggered carriageway
- Installation of medians.

While the residential and mixed-use areas should not service high heavy freight demand, it should be noted that service vehicles will still be required, and any new roads in the residential areas will need to cater for appropriately sized vehicles to service retail areas including garbage and retail servicing.

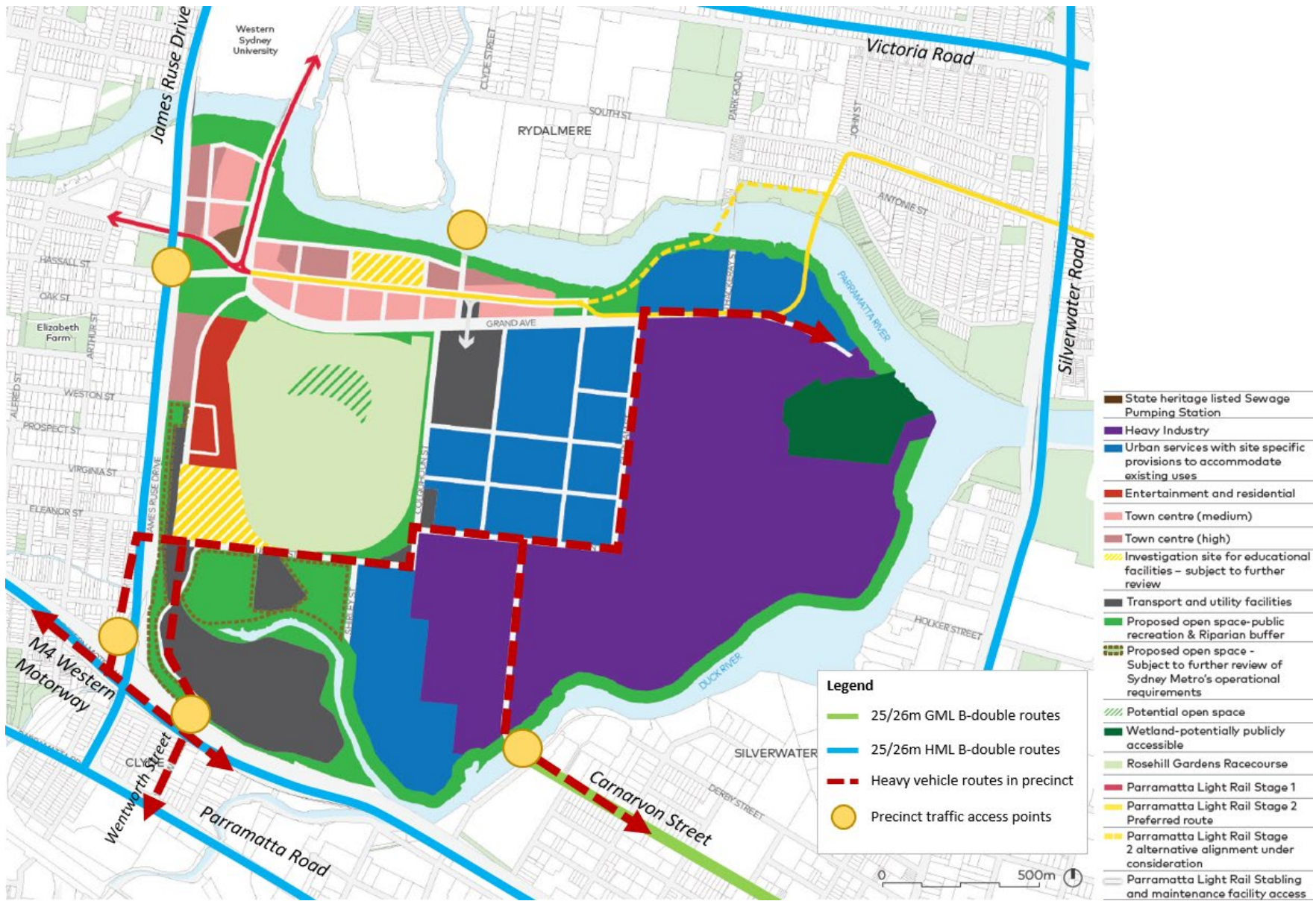


Figure 5-10 Land use and heavy vehicle routes Land use and heavy vehicle routes

5.2.5.6 Traffic assignment

The light vehicle trips generated by the proposed land use developments were distributed across the various access points in accordance with the trip distribution assumptions outlined in Section 5.1.1. These light vehicle trips include those made by residents of the Precinct, employees who travel to work in the Precinct, and vehicle trips made to access the schools. With Viva Energy remaining as the Precinct incumbent landowner during the development and delivery of the Master Plan, and through communications with Viva Energy, the expected heavy vehicle trip generation will likely remain consistent, with trip patterns occurring during off peak periods. Figure 5-12 highlights the *additional* vehicular volumes induced by the Master Plan delivery through the proposed access points.

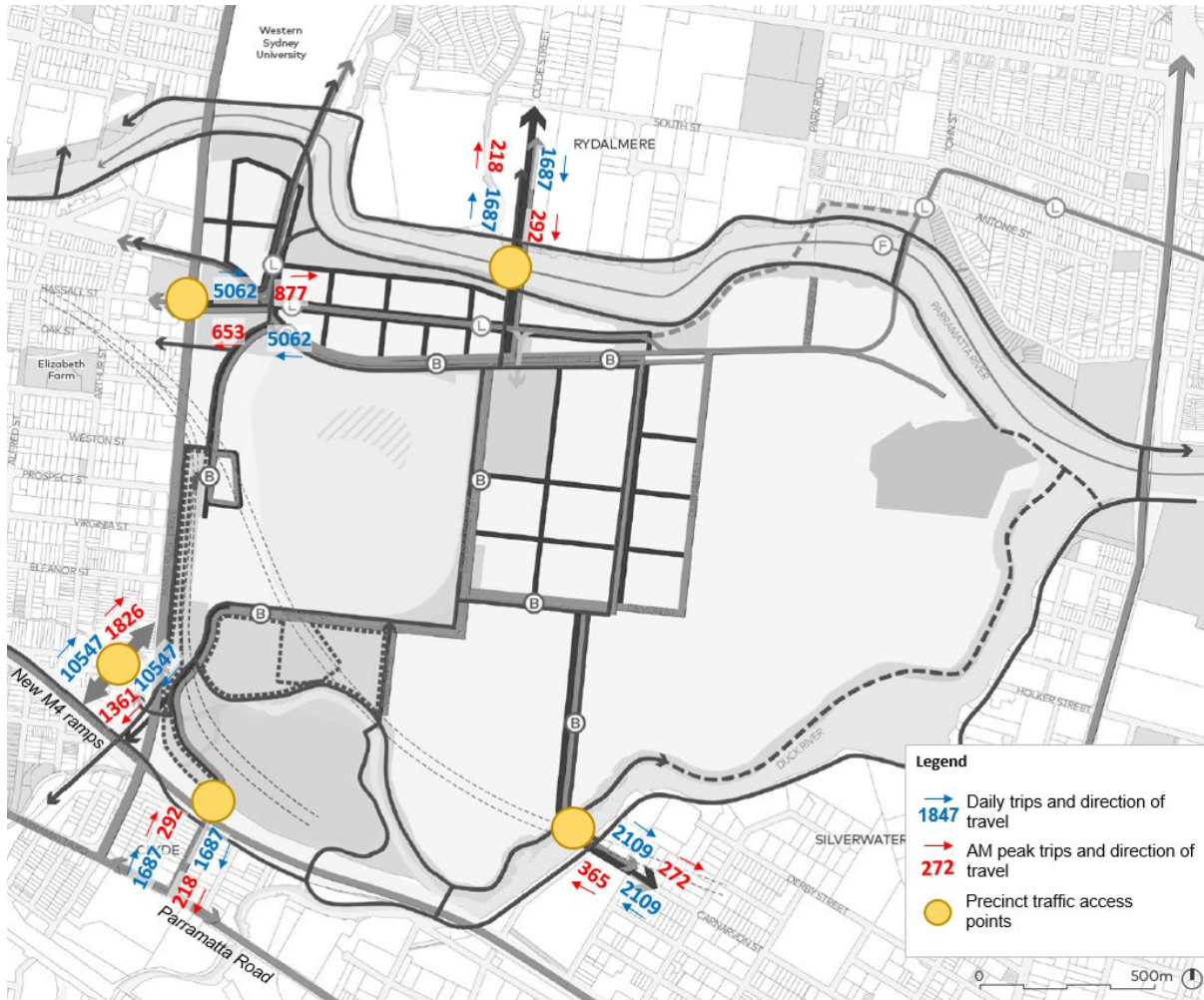


Figure 5-11 Traffic volumes generated at access points

5.2.5.7 Rat running

Rat running refers to when vehicles use residential streets or other local roads as a shortcut to their destination rather than the main roads that are intended to service high traffic volumes, and occurs primarily due to the high demand on main roads resulting in congestion and delays during peak periods. This introduces additional through movements into residential streets and town centres that were designed to facilitate and serve only the local vehicle and active transport movements, and leads to an increase in noise, emissions, congestion, and the potential for accidents involving other motorists and pedestrians. To preserve the liveability of local centres and residential neighbourhoods, it is therefore important that deterrence to rat running is put into place.

The proposed new access points into Camellia-Rosehill would connect the Precinct to Rydalmere in the north and Silverwater in the south-west, providing new direct links to the two areas. However, this also presents the risk of rat running by drivers who wish to bypass the congestion and traffic lights on James Ruse Drive and Parramatta Road, the tolls on the Western Motorway, or in favour of a more direct route to the Parramatta CBD that bypasses the ring road.

Measures to discourage rat running must therefore be put into place to limit the through movements that would travel through the Precinct, examples of which may include:

- Banning key movements on the James Ruse Drive/ Grand Avenue/ Hassall Street intersection to sever rat-running routes seeking to access the Parramatta CBD
- Restricting access to some or all the new Duck River crossings to only buses and heavy vehicles. This would sever the north-south rat-running routes whilst allowing heavy vehicles to avoid Grand Avenue and onto designated heavy vehicle routes
- Designing the internal road network to discourage through movements, such as block sizes and shapes that don't facilitate direct through movements, and maintaining the efficiency of the internal road network for users of the Precinct
- Proposing low road speeds on the internal road network that are suitable for local traffic, including high pedestrian activity areas or shared zones through the town centre and entertainment areas
- The installation of suitable traffic calming measures in the road network within the Precinct, including but not limited to speed humps, chicanes and road narrowing.

It should be noted that the implementation of specific measures against rat running should be carefully considered at a later stage after consideration of the types of

movements that should be facilitated on certain roads, recognising that certain traffic calming measures would not be suitable on certain roads, including but not limited to areas frequented by freight movements. Any measures made against rat-running should consider the Movement and Place Framework for the Precinct and ensure that the user types appropriate on each street are not hindered.

Detailed traffic modelling should be undertaken at a later stage of the design to inform and validate the implementation of suggested traffic management measures and determine infrastructure staging requirements.

5.2.6 Parking strategy and rates

5.2.6.1 Parking rates

As agreed in the final EbD Workshop with the project stakeholders, the existing City of Parramatta parking rates for the Parramatta CBD as outlined in the *Parramatta Local Environmental Plan 2011*, *Parramatta Development Control Plan 2011* and *Parramatta Integrated Transport Plan (City of Parramatta, 2021)* will be benchmarked in considering maximum allocations for the Precinct's residential lots parking rates. These parking rates have been further refined to ensure they facilitate adoption of the travel behaviour envisioned for the Precinct and do not exacerbate existing traffic performance issues in the surrounding area.

Based on the benchmarking exercise and review of parking rates as per the *TfNSW Guidelines*, Table 5-4 outlines the parking rates proposed to be used as a basis for further refinement based on discussion with stakeholders.

Table 5-4 Maximum parking rates

Land use	Maximum parking rates
Residential	Assuming a population average of 2.4 people per dwelling and the following split of residential apartment developments: <ul style="list-style-type: none">• Studios at the rate of 0.1 spaces per dwelling• One bedroom apartments at the rate of 0.3 spaces per dwelling• Two bedroom apartments at the rate of 0.7 spaces per dwelling• Three or more bedroom apartments at the rate of 1 spaces per dwelling.

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Land use	Maximum parking rates
Retail and commercial	<p>As for all land use scenarios assessed, with floor place ratio (FSR) less than 3.5:1:</p> <ul style="list-style-type: none"> • Offices – one space per 100 m² GFA plus 1 loading bay per 400 m² GFA • Retail – one space per 90 m² GFA plus 1 loading bay per 400 m² GFA.
Light industrial	<ul style="list-style-type: none"> • One space per 200 m² GFA plus 1 loading bay per 800 m² GFA.

A review was conducted of visitor parking provisions for the Parramatta area, other local government areas around Sydney and other similar developments. A visitor parking rate of one car space for every four residential dwellings is recommended for the Camellia-Rosehill Precinct.

5.2.6.2 Decoupled parking and car share

Decoupled parking refers to parking that is separated from individual lots and can be applied to residential and commercial developments, allowing parking spaces to be allocated as needed. This reduces the potential of underutilised parking spaces that would result from parking ownership by residents and businesses that do not require it. Shared parking would be provided to residents or employees of an area, primarily above ground, and should be designed so that they can be easily repurposed in the future for alternative land uses as the need for parking in the Precinct evolves with its development. Due to contamination issues within the Precinct, basement parking is unlikely to be provided unless under specific and limited circumstances as outlined in the Remediation Implementation Report (Golder, 2021). The use of decoupled parking has been identified as an industry best practice measure in *Austroads Guide to Traffic Management Part 11*. Decoupled or precinct-wide parking has been identified as a non-negotiable objective to be achieved in the Master Plan.

The decoupling of car parking provides several distinct advantages:

- The cost of private vehicle accommodation is traditionally embedded into the cost of real estate. The decoupling of parking would reduce the cost of housing

- Construction costs of developments are reduced as decoupled parking is usually provided above ground nearby, removing the need for costly excavation and remediation
- An explicit cost would be associated with car parking, which would serve as a solid deterrent to unnecessary vehicle ownership
- Decreased vehicle ownership within the Precinct would lead to better road network performance due to a lower demand
- As decoupled parking is opt-in, it prevents the problem of under-utilised parking
- Decoupled parking lots located above ground have more flexible future uses than underground parking lots and can be repurposed to better serve the Precinct in the future.

As car ownership and dependency is expected to reduce over the course of the development of the Precinct, the flexibility that is built into the proposed parking provisions is aligned with the vision of achieving Net Zero emissions by 2040.

The implementation of decoupled parking should be rolled out with the provision of car share for the community, which serves as an affordable alternative to owning and accommodating a car. Car share provides the mobility of private vehicle use without the costs and responsibilities of ownership, and customers pay only for the time that they drive. This model strongly discourages car use for trips that can instead be easily made through active or public transport modes.

A review of the Parramatta Development Control Plan (DCP) 2011 and case studies of parking provisions in other comparable developments and precincts in Sydney were undertaken. The following car share allocations are recommended to be adopted within the Precinct and provides a higher number of car share spaces than the DCP recommendation. The intent of this increase in car share allocation is to encourage a reduction on car ownership and adoption of more forms of sustainable transport:

- At least one car share space per 60 car spaces provided for residential developments
- At least one car share space per 40 car spaces provided for retail and business uses.

This recommendation satisfies and exceeds the requirements for minimum car share spaces recommended by the Parramatta DCP 2011.

5.3 Validation of transport interventions

The proposed master plan requires extensive development to the road network infrastructure, including additional access and egress points to the Precinct to cater to the expected increase in demand. A high-level assessment has been undertaken to support the proposed initiatives and a set of recommendations developed, which are summarised in Table 5-5. The purpose of this assessment is to identify any potential unresolvable issues in the initiatives presented and provide as much analysis as possible at this stage to support the proposed solutions. While high level challenges have been identified through this assessment, no detailed design has yet been undertaken and further feasibility studies will be required prior to the implementation of these initiatives.

Table 5-5 Key transport interventions assessment

Item	Initiative	Assessment	Recommendation
Internal network			
1	Upgrade and widening of Grand Avenue to four lanes	The removal of Grand Avenue Bridge and widening of Grand Avenue will likely encroach onto developable land but is needed to achieve place making outcomes for the Precinct.	To be included in the master plan, with further investigation required with TfNSW and DPE.
2	Removal of Grand Avenue Bridge approaching James Ruse Drive		
3	Upgrade of the intersection between James Ruse Drive, Grand Avenue and Hassall Street	Currently, the intersection of James Ruse Drive/ Grand Avenue/ Hassall Street performs at LOS F during both morning and afternoon commuter peak periods, reflecting significant delays.	Further detailed investigations into the performance of the road network should be conducted by TfNSW and DPE, incorporating traffic modelling and taking into consideration network effects such as the impacts queueing on downstream intersections.
4	Internal road network between Colquhoun Street, Durham Street, Grand Avenue, and Devon Street	With consideration of the redevelopment of the Precinct and the introduction of new land uses and external connections, internal roads will facilitate those new movements to the wider region.	To be included in the master plan, with further investigation required with TfNSW and DPE.
5	Internal road network east of James Ruse Drive to serve Entertainment Precinct and potential school	The north-south connection, east of James Ruse Drive, from Grand Avenue to Unwin Street, east of the dive site, is likely.	The area used by the Rosehill Racecourse east of the Sydney Metro dive site can be utilised for a north-south connection, and to be included in the master plan. The road network and land uses around the Clyde Stabling and Maintenance Facility to be reinvestigated with DPE, Sydney Metro, and the master planning team.
6	Internal road network north of Grand Avenue	The proposed road network serving the residential areas north of Grand Avenue are integral to the success of the Precinct and serve as multimodal accesses to plots and the proposed PLR station.	To be included in the master plan.
Proposed access points			

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Item	Initiative	Assessment	Recommendation
7	Road and active transport Duck River Bridge to Carnarvon Street	<p>A connection over Duck River to Carnarvon Street in Silverwater seems likely achievable, but would involve the following:</p> <ul style="list-style-type: none"> • Modelling of flood impacts of the bridge in major storms and the PMF to ensure that there are no upstream or downstream impacts in terms of flood levels • Provision for navigational clearance • A bridge span likely to be in excess of 150 metres requiring pier/s in Duck River • Significant property acquisition to the north and south of Duck River to allow for construction of the bridge approaches, and reconfiguration of the access to properties adjacent to the bridge approaches • Assessment of the visual impact of the new bridge • A full environmental impact assessment process. 	To be included in the master plan, with further investigation required.
8	Road and active transport Parramatta River bridge to Clyde Street	<p>A connection over the Parramatta River to Clyde Street in Rydalmere seems likely achievable, but would involve the following:</p> <ul style="list-style-type: none"> • Modelling of flood impacts of the bridge in major storms and the PMF to ensure that there are no upstream or downstream impacts in terms of flood levels • Provision for navigational clearance • A bridge span likely to be in excess of 200 metres requiring pier/s in the Parramatta River • Significant property acquisition to the north and south of the Parramatta River to allow for construction of the bridge approaches, and reconfiguration of access to properties adjacent to the bridge approaches • Assessment of the visual impact of the new bridge • A full environmental impact assessment process • Also note that the Parramatta Light Rail Phase 1 bridge over the Parramatta River at the north-west utilises the existing Carlingford Line rail bridge over the Parramatta River. 	To be included in the master plan, with further investigation required
9	New, free-flow ramps to M4 Western Motorway and internal road north of Unwin Street	<ul style="list-style-type: none"> • Part of development of the Metro West Clyde Maintenance and Stabling Facility (MSF - i.e. for Metro trains) Unwin Street, Kay Street and Wentworth Street will be realigned to run from the south west corner of Rosehill Gardens Racecourse more directly across to Wentworth Street just north of the M4 Motorway underpass, and across the proposed Clyde MSF yard with an overpass • A connection from Unwin Street directly to the M4 Motorway can be delivered, which is made possible due to the realignment of Unwin Street induced by the Sydney Metro MSF site at Clyde. Sydney Metro is currently exploring the optimum configuration of the realignment. 	Proposed free flowing ramps may be possible; however, further detailed investigation required to provide a comprehensive design to the proposal.
10	Alternative connection from Unwin Street to M4 ramps with James Ruse Drive	<ul style="list-style-type: none"> • An alternative arrangement for the Unwin Street connections to the M4 Motorway (as per the Camellia Town Centre Master Plan Traffic and Transport Study) is to connect a link underneath James Ruse Drive to the M4 Motorway off ramp intersection with James Ruse Drive, south of the study area. The arrangement is still subject to discussion and refinement. 	To be further investigated in consultation with DPE, Sydney Metro, and TfNSW.

Item	Initiative	Assessment	Recommendation									
		<ul style="list-style-type: none"> A preliminary intersection assessment using SIDRA has been undertaken to test the intersections (off ramp and on ramp) for the baseline scenario and the With Project scenario. <p>The results of the AM peak hour are highlighted below</p> <table border="1"> <thead> <tr> <th>Option</th> <th>Delay (sec)</th> <th>LOS</th> </tr> </thead> <tbody> <tr> <td>Baseline</td> <td>9.2</td> <td>A</td> </tr> <tr> <td>With project</td> <td>18.8</td> <td>B</td> </tr> </tbody> </table>	Option	Delay (sec)	LOS	Baseline	9.2	A	With project	18.8	B	
Option	Delay (sec)	LOS										
Baseline	9.2	A										
With project	18.8	B										
11	Widening of Carnarvon Road and Derby Street	Road reserve needs to be 19.30 metres wide to accommodate one lane of through traffic and one lane of parking in each direction (12-metre wide carriageway), together with adjacent footpaths, services, and planting. A review of aerial imagery suggests this width is met along Derby Street; thus, land acquisition is unlikely to be required along the road length. However, if cycleways or shared paths are proposed along either alignment, additional width would be required within the road reserve to accommodate all modes safely.	Likely achievable, to be further investigated.									
12	Widening of Clyde Street	Road reserve needs to be 19.30 metres wide to accommodate one lane of through traffic and one lane of parking in each direction (12-metre wide carriageway), together with adjacent footpaths, services, and planting. A review of aerial imagery suggests this width is met along Clyde Street; thus, land acquisition is unlikely to be required along the road length. However, if cycleways or shared paths are proposed along either alignment, additional width would be required within the road reserve to accommodate all modes safely.	Likely achievable, to be further investigated.									
Intersection upgrades												
13	Upgrade Intersection of Derby Street and Silverwater Road	There appears to be sufficient space to accommodate a signalised intersection without the need for land acquisition. However, this should be confirmed through traffic modelling as demand of turning traffic volumes would affect the footprint. Due to the proximity of the Silverwater Road/ Carnarvon Street intersection to the south, there is an additional risk that insufficient length is available to accommodate northbound vehicles travelling along Silverwater Road turning into Derby Street. This movement may need to be restricted to facilitate the intersection upgrade (noting right turns into the eastern leg of Derby Street are currently restricted, and the Silverwater Road/ Carnarvon Street intersection provides access to the area east of Silverwater Road).	Likely achievable, to be further investigated and confirmed.									
14	Upgrade Intersection of Clyde Street and Victoria Road	The angle of the intersection may restrict large vehicles travelling westbound along Victoria Road from turning left into Clyde Street. If this movement is desired, land acquisition may be required to facilitate the movement. Vehicles are also currently restricted from turning right out of Clyde Street onto Victoria Road (eastbound). While there appears to be sufficient space for this movement to occur, broader network operations should be considered and evaluated before allowing this movement.	Likely achievable, to be further investigated and confirmed.									

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Item	Initiative	Assessment	Recommendation
		<p>Increased demands of right turning vehicles from Victoria Road into Clyde Street can also be expected, and it should be confirmed through traffic modelling whether the existing right turn bay would be sufficient to accommodate the growth. If lengthening is required, the widening of the Victoria Road bridge over Parramatta Light Rail Stage 1 may be required.</p>	
Public Transport			
15	Parramatta Light Rail Phase 2	<p>The alignment of Stage 2 of the Parramatta Light Rail is still to be confirmed, with three options currently under consideration by TfNSW. Detailed assessments are currently underway to determine which route will proceed; however, the Camellia-Rosehill Master Plan has been developed for an alignment passing through the Precinct, and various proposed connections are contingent on the infrastructure provided by the Parramatta Light Rail.</p> <p>If the alignment with Camellia is committed, the light rail stations will provide connectivity to both the residential and city-shaping industrial sub-precincts.</p>	<p>The master planning scenario requires the implementation of Parramatta Light Rail Stage 2 within the Precinct. If approved, a detailed analysis of at grade intersections will be required to assess the impacts (if any) on vehicular movements.</p> <p>Currently under investigation by Parramatta Light Rail.</p>
16	Bus network	<p>Currently, the land uses at Camellia-Rosehill do not encourage public transport and bus mobility uptake.</p> <p>TfNSW has indicated willingness to invest in extensions to the bus network from Sydney Olympic Park and Rosehill, to connect through Camellia-Rosehill Precinct and to Parramatta.</p> <p>Bus services in the Precinct can also function as a feeder service to the Sydney Metro West station at Parramatta, and the Parramatta Light Rail station(s) at Camellia.</p>	<p>Highly achievable. The bus network will likely depend on the rollout of infrastructure in the Precinct, such as the Parramatta River and Duck River bridges.</p>
Active Transport			
17	Parramatta River frontage	<p>The Parramatta River active transport frontage is an opportunity to serve both recreational trips and work trips. Connecting to other proposed green links in the Precinct (along the proposed bridges on Parramatta River and Duck River), the Parramatta River frontage will benefit greatly from the proposed Parramatta Light Rail Phase 2 alignment along the foreshore, and will act as a supporting place-making element such as by enabling the delivery of foreshore linkage.</p> <p>Sydney Metro is currently exploring the optimum configuration of Unwin Street and Kay Street, two public roads located within the boundaries of the Clyde stabling and maintenance facility site. The proposed active transport corridor connection under James Ruse Drive will need to be integrated with the proposed realignment.</p>	<p>Achievable, to be further designed and studied along with options for Parramatta Light Rail Stage 2 and the realignment of Unwin Street as part of Sydney Metro West.</p>

COST ESTIMATION AND DELIVERY PLAN

As an outcome of the Master Plan, several pieces of infrastructure were identified to enable the success of the Precinct and provide wider accessibility to residential plots and work areas from the surrounding road network. The following section provide cost estimations for those identified infrastructure as well as a rollout and trigger plan for their construction.

6.1 Cost estimates

Based on the road network identified in the Master Plan, the following tables summarise the preliminary cost for the proposed infrastructure. The assumptions and measurements that support these cost estimates are included in a separate *Rosehill-Camellia Place Strategic Estimate Report* (Arcadis, 8 April 2022), which need to be considered with this summary. These cost estimates will need to be further developed following the Master Plan.

Table 6-1 Cost estimation by type and delivery stage

Network upgrade	Cost
Road links and upgrades	\$115,198,084
Active transport upgrades	\$166,291,283
External road upgrades	\$31,439,409
Proposed M4 connection	\$272,628,529
Total	\$585,557,304

6.2 Indicative infrastructure staging

Table 6-2 highlights the indicative staging of key infrastructure upgrades. The M4 Motorway ramps from Unwin Bridge are recommended as part of the enabling works of the site to immediately resolve heavy vehicle access and relieve the pressure on James Ruse Drive and Grand Avenue. Detailed operational modelling will validate and determine the infrastructure staging requirements.

Table 6-2 Staging and triggering of infrastructure upgrades (Indicative)

ID	Road links	Timing/ Trigger
1	Upgrade and widening of Grand Avenue to 4 lanes	Staged from first residents
2	Removal of Grand Avenue bridge approaching James Ruse Drive	Enabling works
3	Upgrade of the intersection between James Ruse Drive, Grand Avenue and Hassall Street	Enabling works
3	Internal road network between Colquhoun Street, Durham Street, Grand Avenue and Devon Street	Staged from first businesses
4	Road and active transport: Duck River bridge to Carnarvon Street	50% of businesses uptake
5	North-south link connecting from Grand Avenue to proposed Duck River bridge	With Duck River bridge
6	Road and active transport: Parramatta River bridge to Clyde Street	25% of businesses uptake or 25% of residents
7	North link connecting from Grand Avenue to proposed Duck River bridge	With Parramatta River bridge
8	M4 ramps connection to the Precinct	Enabling works
9	Widening of Carnarvon Road and Derby Street	With Duck River bridge
10	Widening of Clyde Street	With Parramatta River bridge
11	Upgrade intersection of Derby Street and Silverwater Road	With Duck River bridge
12	Upgrade intersection of Clyde Street and Victoria Road	With Parramatta River bridge
13	North-south link intersection with Devon Street	With Duck River bridge
14	North-south link dog-leg intersection with Grand Avenue and north link to Rydalmere	With Parramatta River bridge
15	Parramatta River frontage	Staged from first residents
16	Duck Creek active transport frontage	Enabling works
17	Active transport link along Parramatta Light Rail Stage 1 route	With Parramatta Light Rail Stage 1
18	Introduction of new bus local routes to service the internal network of the Precinct	Staged from first residents or completion of bridges

CONCLUSIONS AND NEXT STEPS

The Camellia-Rosehill Place Strategy has an overarching objective to provide an integrated 20-year vision, which recognises the strategic attributes of the Precinct, guides future land use and infrastructure investment decisions and which can be delivered with the support of State and local agencies in an economically robust manner. The broader directions of the Master Plan aim at:

- Recognising and celebrating Country
- Boosting economic activity and employment opportunities
- Improved access and sustainable travel options and choices Deliver high-quality place outcomes Enable a net zero precinct by 2040 and deliver a holistic approach to environmental management.

From a transport perspective, the Master Plan proposes:

- An active transport network that is well-connected to existing shared paths in all directions through bridges over the Parramatta River and Duck River
- Integration of active transport links with the foreshore through waterfront activation
- Safe separation of high pedestrian activity areas such as the town centre from freight and heavy vehicle movements generated by industrial areas
- A bus network that supports Parramatta Light Rail services by providing additional public transport connectivity to the town centre and employment areas
- High quality heavy vehicle accesses to the Precinct to enable freight movements to metropolitan Sydney, rural NSW, and the rest of Australia.
- Safe separation of general traffic movements from freight and heavy vehicles
- A road network that is well-connected to major road corridors in all directions through new Precinct access points, including bridges over the Parramatta River and Duck River.

The transport interventions proposed are critical in enabling the Precinct to achieve the vision outlined in the Camellia-Rosehill Place Strategy. A well-connected active transport network, walkable town centre and accompanying waterfront activation will transform the Precinct into an attractive residential and employment location, enabling the development of an entertainment district and evening economy.

New public transport investments will connect the Precinct to nearby transport interchanges will enabling travel to and from major hubs across Sydney and the mode shift towards sustainable transport.

With freight being a key economic driver for the heavy industrial businesses in the Precinct, proposed high quality connections onto major motorways will be essential in optimising journeys and maintaining the quality of the local street environment; and additional general vehicle accesses will reduce the demand on James Ruse Drive as the primary entry point to the Precinct, improving traffic performance outcomes and connectivity.

Next steps to support the Strategy include:

- The development of a detailed Traffic and Transport study into network upgrades necessary to support the Precinct, supported by strategic and microscopic traffic modelling, and intersection analysis. This would also include a traffic study to determine the viability of the proposed river crossings and the M4 Motorway direct access.