

Parramatta Integrated Transport Plan

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Parramatta Integrated Transport Plan

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Executive Summary

Parramatta Central Business District (CBD) is one of Australia's leading regions, and an area of strategic importance located at the hub of the 'Central River City'. Currently it performs a key economic, social and cultural role within Greater Sydney. However, as Western Sydney's population continues to grow, the city is experiencing rapid growth as a metropolitan employment centre.

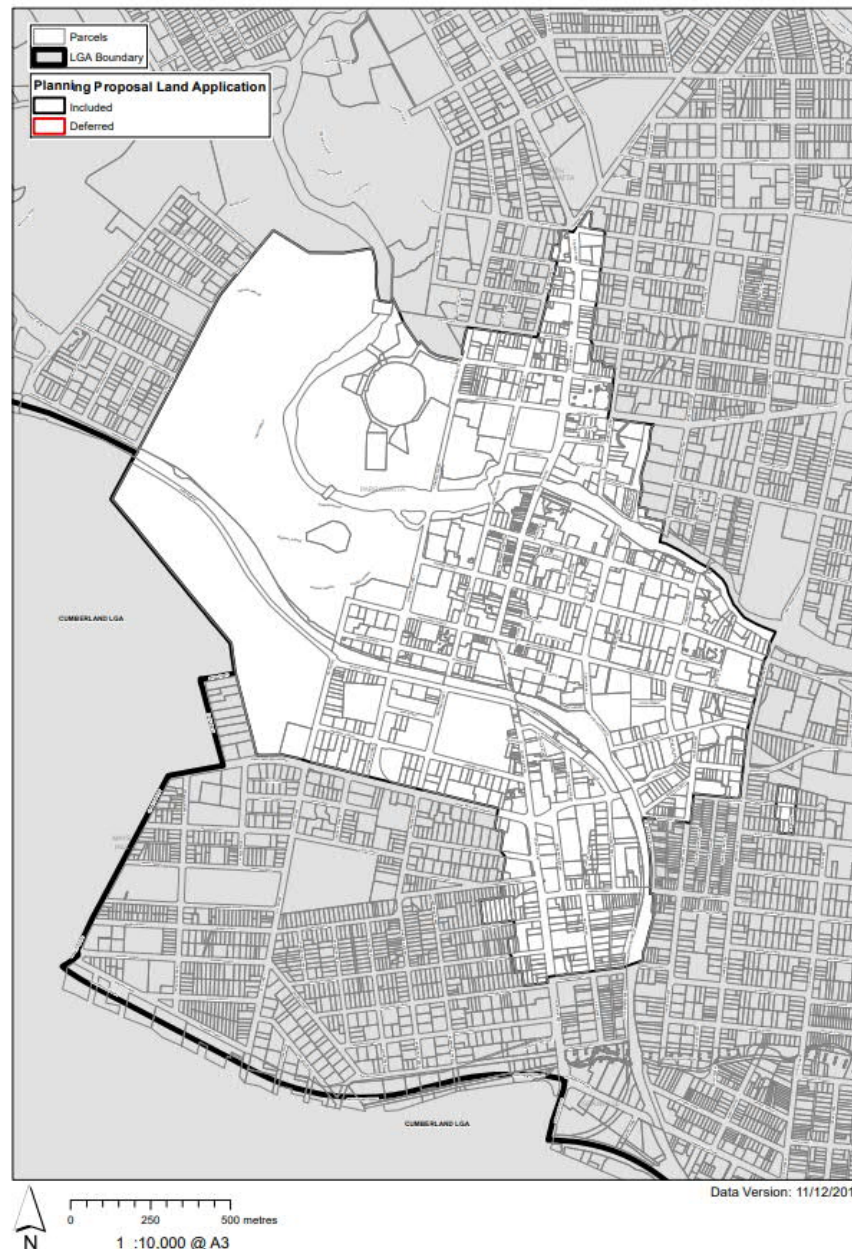


Figure 1: Planning Proposal Boundaries

This Integrated Transport Plan (ITP) for Parramatta CBD responds to the **Parramatta CBD Planning Proposal**, which has been prepared to amend the planning controls for the Parramatta CBD. Changes to the planning framework are needed to grow the Parramatta CBD to realise its full potential. This planned growth will generate significant travel demand to/from Parramatta CBD, placing greater demand on transport infrastructure and services. The planning proposal needs to be supported by a number of studies, including this ITP, which recommends a strategic plan to manage the existing and future sustainable transportation needs of the CBD.

The Parramatta CBD Integrated Transport Plan will support the City of Parramatta's broader vision to be Sydney's Central City, **sustainable, liveable, and productive – inspired by our communities.**

The Planning Proposal will result in a significant increase in transport trips starting or ending in Parramatta CBD from just over 51,000 to almost 111,000 in the AM peak alone. Since private vehicle use is currently the preferred mode of travel for commuters, this results in a more congested road network. There is a need to influence and change commuter's mode preferences. A transformation in the city will require a considerable leap in transport planning and delivery to dramatically increase walking, cycling and public transport trips to and from the CBD.

To attract and retain businesses and jobs, Parramatta CBD must operate efficiently without reducing its liveability and walkability. The Planning Proposal supports the delivery of well-integrated developments that sustains a neighbourhood which is easy and comfortable to carry out day to day life. An emphasis on safety, affordable and diverse housing, social cohesion and inclusivity, linked by high quality public and active transport will be needed to ensure community character and attractiveness are not eroded as the CBD population grows.

The **objectives** for this ITP are:

- 1 Deliver Parramatta Light Rail and Sydney Metro West, and planning for the future transport network
- 2 Improve existing train and bus links to extend the 30-minute catchment for transport access to Parramatta CBD
- 3 Adopt forward-looking policies, demand responsive services and innovative technologies that deliver transport solutions faster, and/or lower cost
- 4 Prioritise delivering walking and cycling improvements and supporting access within a 30-minute walk and ride of the CBD.
- 5 Align transport improvements with land use change to maximise the use of new services and sustainable transport mode share among new workers and residents
- 6 Identify and deliver targeted improvements to the road network to improve network capacity, and where necessary manage private vehicle trips to maximise the efficiency of the surface road network to support growth.
- 7 Leverage transport demand management techniques proven in the Sydney context, to maximise the efficiency of all transport modes in the network.

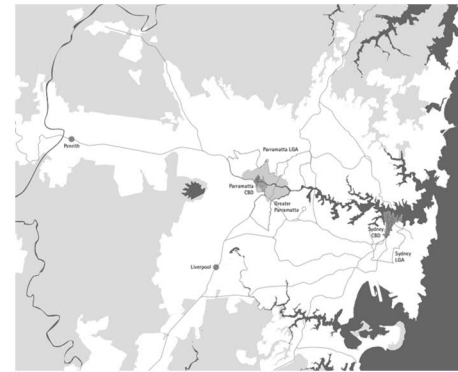
Strategic Context

The Parramatta CBD Integrated Transport Plan is committed to addressing transport challenges through the **development of a clear framework** for the future planning and development of the transport system.

The ITP aligns with and is supported by several regional, district and local strategic plans including:

- Future Transport Strategy 2056 (2018)
- The Greater Sydney Region Plan: A Metropolis of Three Cities (2018)
- Central City District Plan (2018)
- Greater Parramatta and the Olympic Peninsula Place-based Infrastructure Compact Pilot: A place supported by Infrastructure (2019)
- Central City Rail: Economic Impact Study (2018)
- Western Sydney Rail Needs Scoping Study (2018)
- City of Parramatta Community Strategic Plan (2018)
- City of Parramatta Local Strategic Planning Statement (2020)
- City of Parramatta Community Infrastructure Strategy (2020)
- Parramatta Night City Framework 2020-2024 (2020)
- Socially Sustainable Parramatta Framework (2017)
- Integrated Transport Plan for Parramatta City Centre 2009/10 – 2014/15 (2010)
- Draft Parramatta CBD Planning Proposal (2020)
- Various Council Transport Strategies

The **strategic direction** is framed by the three geographic settings which have provided the context for thinking about Parramatta CBD's transport future at different scales. The main themes of the Parramatta CBD ITP are described below:



Greater Sydney context

The city's 'second CBD'

As the Metropolitan Centre within the 'Central River City', Parramatta CBD sits in the demographic and geographic middle of the metropolis of Greater Sydney. Because of this central location, it is in principle, the most accessible location in the entire metropolis. However, in practice, this accessibility depends the performance of transport linkages, and on intensity of the urban development and activities that generate personal and freight travel to and from Parramatta CBD.

In the context of Greater Sydney, Parramatta CBD is the city's 'second CBD'. Increasing jobs and other measures of local economic activity within Parramatta CBD requires the scale of urban development across Parramatta CBD to keep pace with the level of investment in Parramatta Light Rail and Sydney Metro West. This means that when a business is making a locational decision, they should consider Parramatta CBD as a place able to offer amenities and infrastructure as attractive as Sydney CBD, for their workers, clients and suppliers to travel to and move around.

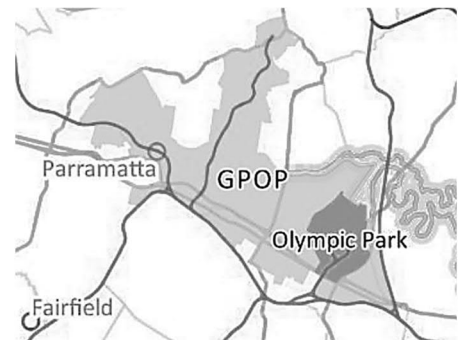
Greater Parramatta: the core of the Central River City

Greater Parramatta and the Olympic Peninsula (GPOP) refers to a 6,000 hectare area at the core of the Central City, and the centre of Greater Sydney. It spans 13 km east-west from Strathfield to Westmead and 7km north-south from Carlingford to Lidcombe and Granville.

Those living midway between Parramatta CBD and Sydney CBD should have the option of looking westwards for jobs, entertainment, shopping, tertiary education and all personal and business services expected of a city centre. Moreover, the Central River City should be positioned to enjoy the added advantage of it's own growing catchment to the north, south and west. Maximising Parramatta CBD's attraction of workers and visitors from across this catchment means upgrading and creating new transit links that minimise the burden of travel time and unreliable road-based access for personal travel. As each sustainable transport improvement is put in place, measures need to be introduced to reduce the provision of parking and competition with public transport, while protecting and enhancing service access to businesses.

Interconnected Parramatta

Parramatta CBD strives to be a place where people want to live and work. Parramatta CBD should be strongly interconnected with its surrounding precincts that people can move around the area as one vibrant urban quarter. The light rail is one important step in achieving this but does not end there. To enjoy interesting streets, build exercise into their daily routines or simply make short trips not served by transit, the built environment of Parramatta needs to aim to offer its residents and workers the same opportunities to be able to walk or ride at the same level as those in eastern Sydney. To make space for this, and for the constant flow of goods and services moving between the Regional Ring Roads and Parramatta CBD, the private car needs to gradually play a subsidiary role to free up space for public and active transport and commercial vehicles.



GPOP context



Parramatta CBD context

Common to all three themes is 'the MaaS opportunity'

Mobility as a Service (MaaS) refers to a service model that enables customers to plan and pay for their journeys using a range of services via a single customer interface. It has the potential to enable customers to access integrated, easy-to-understand journeys in a broad market of transport services. As technology improves, it is expected that its business model will play greater role in integrating services into fewer journeys for travellers making trips at every scale to and from Parramatta CBD.

Future transport network planning needs to be **multimodal** and consider how the whole network functions

Despite being one of the least space efficient modes, private vehicles continue to be a major mode of travel for work and other purposes in Parramatta. Increase in car traffic with its associated noise and safety impacts would adversely affect the walking and cycling amenity of Parramatta's streets. Added congestion on the road network would further slow buses, reduce their reliability and attractiveness of public transport. It is therefore crucial to manage the roads to discourage increases in traffic so to allow alternative modes of travel to be promoted. With the predicted increase in population and employment, the efficient use of road space becomes ever more critical.

To this end there needs to be more people than today walking and bike-riding within the 5km catchment that takes in precincts within the Parramatta Outer Ring Road boundary. Beyond this distance, bike-riders can take advantage of the river and creek-based green corridors that cross the Parramatta catchment. Demand-responsive bus, minibus and point-to-point services are able to fill in network gaps. Freeing up the road space would allow goods delivery and servicing operations to run more efficiently around the clock as it fits into the major city.

As Greater Parramatta transforms to become the Central River City, there will be changes to the function of streets, bring opportunities to create **more places for people, support civic spaces and reinforce movement corridors**.

The **Movement and Place Framework** provides a cohesive approach to balancing the movement of people and goods with the amenity and quality of places, contributing to the attractiveness, sustainability and success of cities and towns in NSW. The concept aims to improve the liveability of places through an integrated land use and transport planning tool, that sets customer focused outcomes and delivers wider benefits for the health and wellbeing of the community. The framework has informed the directions outlined in this ITP.

Mode Share Targets

A set of mode share targets were developed in the *Parramatta CBD Strategy Transport Study*, that transition along with the planned intensification of the Parramatta CBD and transport response and interventions. One of the key mode share targets outlined is to decrease journey to work car mode share to 40% by 2036 under the full Planning Proposal.

Strategic level modelling indicates that future land use and transport changes will result in a general trend of re-moding of travel away from the car. To achieve 40% work car mode share by 2036, significant re-moding of travel is required to shift car trips to public transport, and an active mode connectivity.

Observations that were made from the STM sensitivity testing of transport demands in the Planning Proposal area in 2036 showed that if the full Planning Proposal were to occur, the walking and cycling usage would increase to 4.7 times 2016 levels and public transport usage to 3.8 times 2016 levels by 2036.

The implication of this level of demand increase due to walking/cycling and public transport demands would likely take space currently used for road traffic, resulting in a reduction in road capacity and increased congestion. Assuming a 20% drop in car demand, public transport demands would be required to be 4.5 times 2016 levels by 2036 to accommodate for demand. Walking/cycling demands would remain at 4.7 times 2016 levels.

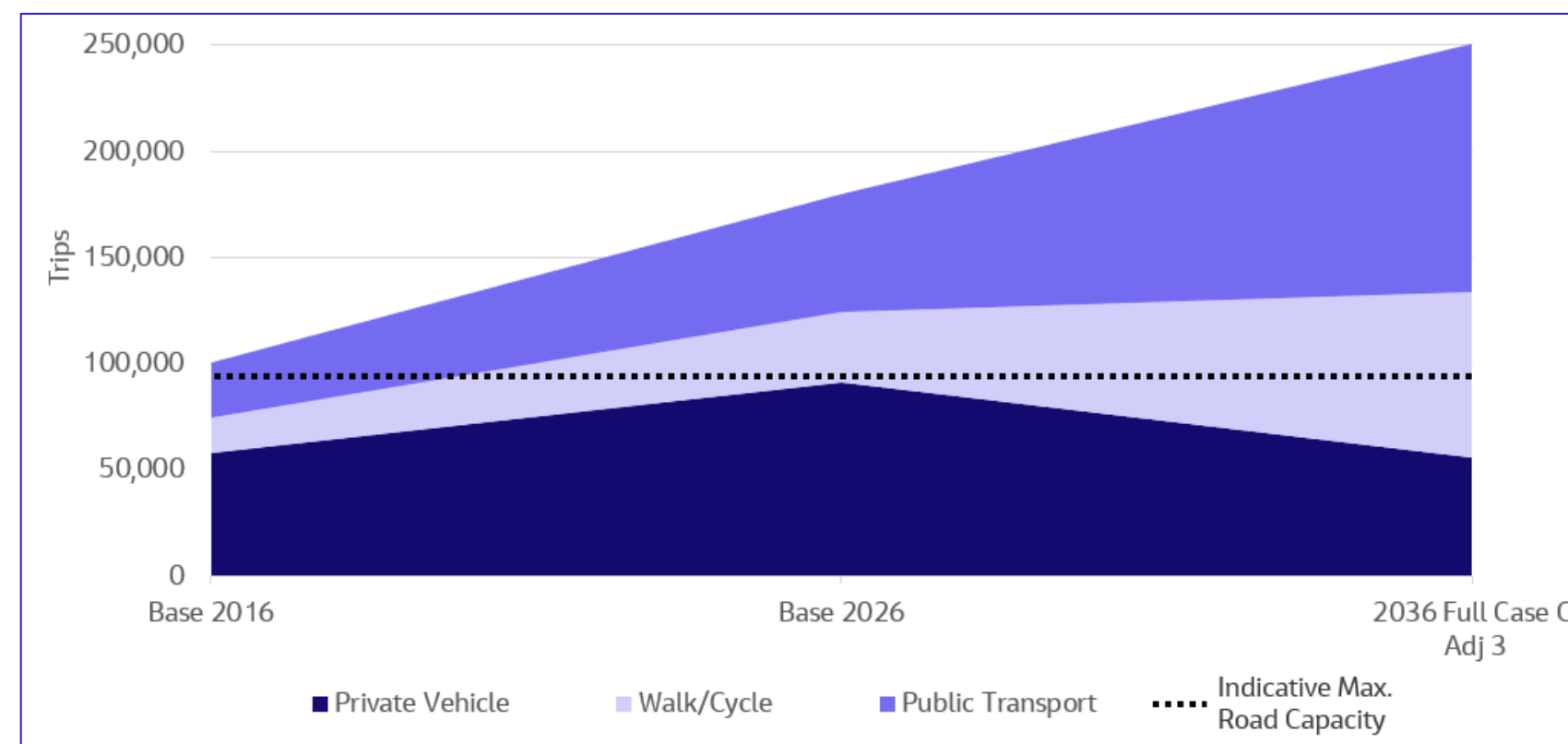


Figure 2: Mode share shift observed for 2036 Full Case C – Adjustment 3.

These observations demonstrate the need for public transport and walking/cycling improvements within Parramatta to cater for the increased demands as the population shifts away from car mode share as the dominant transport mode. A reduction in the role of the private vehicle, increased uptake of sustainable transport, and optimised use of space will be necessary to avoid complete saturation of the road network under future conditions.

Existing Situation and Future Direction

Mode	Existing Situation	Future Direction
Travel Demand Management	<p>Existing Travel Demand Management strategies within Parramatta include:</p> <ul style="list-style-type: none"> ▪ Green Travel Plans: Council requires Green Travel Plans for selected developments in the existing LEP. It also has a Green Travel Plan for its own operations. ▪ Cycling Education Programs: Council undertakes limited cycling education programs, which aims to encourage people of Parramatta to use cycling as a means of transport. ▪ Parramatta Light Rail Construction: The Sydney Coordination Office is expected to use Travel Choices during the Parramatta Light Rail construction phase. ▪ Parramatta Shuttle Bus: The Parramatta Shuttle Bus (Route 900 Loop) is a fast, free transport solution run by TfNSW that connects tourists, residents and commuters to landmarks of the city. 	<p>Five recommended TDM strategies for implementation in a growing central business such as Parramatta have been outlined:</p> <ul style="list-style-type: none"> ▪ Establish a Transport Management Delivery Agency – this can be delivered by local government, state government and/or a community organisation. ▪ Commute Trip Reduction Programs – programs give commuters resources and incentives to reduce their car trips. Commute trip reduction programs typically include some combination of commuter financial incentive, public transit encouragement and financial support, parking management, rideshare matching cycle facility improvements, information and encouragement. ▪ Freight Transport Management – includes various strategies for increasing the efficiency of freight transport. ▪ Transit-Orientated Development – refers to residential and commercial centres designed to maximise access by active and public transport, and features that encourage use of these modes. ▪ Efficient Parking Management – includes various strategies that encourage more efficient use of parking facilities. As a travel demand management strategy, parking management should emphasize strategies which reduce total vehicle travel.
Walking and Cycling	<p>Existing walking and cycling patterns within Parramatta:</p> <ul style="list-style-type: none"> ▪ Active transport only accounts for 4% of all JTW trips by Parramatta CBD workers, and 8% of those starting within the Parramatta–Rosehill SA2 ▪ Of all the trips within the LGA, 15% are by walking, and within the CBD, just over 10% of residents walk to their place of employment. By comparison, almost half of all trips in the City of Sydney, and a quarter in the City of Melbourne are by foot. <p>Barriers identified which may be contributing to low cycling mode share include:</p> <ul style="list-style-type: none"> ▪ There are a limited number of streets with dedicated bicycle infrastructure, resulting in a lack of safety. ▪ There are limited cycling opportunities and permeability in the CBD, negatively impact on cycling participation ▪ Many bike lanes end at intersections, reducing accessibility ▪ The topography north of Parramatta River is challenging for cyclists, especially with limited dedicated infrastructure in the area ▪ There is currently limited bicycle parking available within Parramatta CBD. 	<p>The <i>Parramatta CBD Strategic Transport Study</i> identified several strategies to improve walking and cycling:</p> <ul style="list-style-type: none"> ▪ Promote cycling as a means of accessing the CBD, ▪ Improve the walking experience in order to help achieve a mind shift towards walking in the city, ▪ Promote active transport trips within a 10km radius of the CBD <p>In the <i>Parramatta CBD Pedestrian Strategy</i>, five actions were prioritised that will potentially have the greatest impact on pedestrian amenity, priority and safety in the CBD:</p> <ul style="list-style-type: none"> ▪ Implementation of a 40km/hr speed zone throughout CBD ▪ An audit of all footpaths and upgrade or provide new infrastructure accessible by all users ▪ Application of movement and place functions to the CBD with consideration of all transport modes ▪ Amendment to DCP to permeable city blocks, active street frontages and provision for pedestrian infrastructure ▪ Require developers to prepare Green Travel Plans with clear pedestrian objectives and actions <p>Key actions that would be utilised and will be needed to support the CBD Planning Proposal include:</p> <ul style="list-style-type: none"> ▪ Completing the river foreshore paths on the northern and southern banks, ▪ A north-south physically separated bike path aligned with Marsden Street, Marist Place and Villiers Street, ▪ An east-west physically separated bike path along George Street. ▪ Civic Link: a shared pedestrian cyclist spine from the river to Parramatta interchange <p>The potential increase in cycling trips will need to be accommodated by appropriate bicycle parking provisions.</p>
Trains	<p>Train currently accommodates 30% of JTW trips by local residents in Parramatta.</p>	<p>Without increased rail capacity and services to address long term increases in demand, rail customers will shift to other car-dependent modes of transport, which would impact on other road users and increase congestion on the</p>

Mode	Existing Situation	Future Direction
	<p>Parramatta CBD is serviced by Parramatta Station, the fourth busiest train station in Sydney with over 90,000 customer movements on a typical weekday. The station is serviced by trains on the:</p> <ul style="list-style-type: none"> ▪ T1 Western line ▪ T2 Inner West line ▪ T5 Cumberland line ▪ Blue Mountains line <p>The station is also serviced by regional trains to the Central West and Broken Hill.</p>	<p>local and State road network. Reduced rail accessibility and increased car dependency and congestion could lead to decreased urban amenity and land devaluation in the CBD.</p> <p>Better train services with increased capacity and frequency on the T5 Cumberland Railway line will be needed.</p> <p>Committed projects include:</p> <ul style="list-style-type: none"> ▪ Sydney Metro West is a metro rail service to be provided mostly underground. The proposed stations at Parramatta, as well as Sydney Olympic Park, the Bays Precinct, Pyrmont and Sydney CBD (Hunter Street) will provide improved connections between Central River City and Eastern Harbour City, doubling rail capacity between these two areas. <p>Future initiatives for consideration include:</p> <ul style="list-style-type: none"> ▪ Parramatta to Epping high capacity train/mass transit links ▪ Parramatta to Kogarah high capacity train/mass transit links ▪ Parramatta to Norwest mass transit/train link ▪ East-West Rail Link between Greater Parramatta and Aerotropolis
<p>Light Rail</p>	<p>Light rail services do not currently exist in the Parramatta CBD; however, construction of a Parramatta Light Rail (PLR) has begun, with services scheduled to start in 2023.</p>	<p>The Parramatta CBD Planning Proposal will significantly increase the demand for trips to the Parramatta CBD from the Greater Parramatta area. Therefore, the delivery of Parramatta Light Rail Stage 1 and further expansions is required to ensure the trips are not taken via private vehicles, which contribute to congestion on the local and State road network</p> <ul style="list-style-type: none"> ▪ Stage 1 (under construction) of the light rail will connect Westmead to Carlingford via the Parramatta CBD and Camellia with a two-way track spanning 12 kilometres. It will link with existing public transport options, including train, bus and ferry, to form an integrated network capable of keeping Parramatta's future population moving in a convenient and sustainable way. ▪ Stage 2, if undertaken, is expected to connect with other public transport modes, including Sydney Metro West (at Sydney Olympic Park), the existing Parramatta and Olympic Park heavy rail stations and Sydney Ferry services at Rydalmere and Sydney Olympic Park.
<p>Bus</p>	<p>Four different operators provide a total of over 50 bus services in the Parramatta CBD; Sydney Buses, Hillsbus, Transdev and Transit Systems. Transport for NSW (TfNSW) also operates a free shuttle (route number 900) around the CBD.</p> <p>Within the CBD, Parramatta Interchange is where a significant majority of Parramatta's bus services converge. This interchange services approximately 250 bus services in each of the AM and PM peak hours. The current interchange is close to capacity. Some constraints to operations were already observed in the <i>Parramatta CBD Strategic Transport Study</i>, including:</p> <ul style="list-style-type: none"> ▪ Key layover storage areas at Argyle Street and Station Street were at or near capacity 	<p>The bus network would need to be restructured accordingly, identifying major corridors to maintain, reinforce or develop.</p> <ul style="list-style-type: none"> ▪ In the STM work done for this ITP, it is forecast that passenger numbers in all corridors are expected to increase, with largest increases along corridors in the southeast and southwest of Parramatta CBD. There are five bus corridors with greater than 5,000 passengers (total two-way) across the two-hour AM peak period in 2056: North-West Transitway, Parramatta Road, Bridge Street, Pitt Street and Centenary Road. ▪ Based on an analysis of the modelled bus patronage, the following three bus route services are forecast to have the highest increase in patronage due to the planning proposal: M91: Hurstville to Parramatta – travels to/from the Parramatta CBD via Church Street, 907: Bankstown to Parramatta, T80: Liverpool to Parramatta – travels to/from the Parramatta CBD via Argyle Street. Assuming a total capacity of 70 passengers per bus, the above results indicate that these three services would require an extra 20 services (M91), 6 services (907) and 4 services (T80) to cater for the additional bus patronage in 2056.

Mode	Existing Situation	Future Direction
	<ul style="list-style-type: none"> Passenger waiting areas can become crowded Bus queues can accumulate as clusters of users arrive at/depart the interchange simultaneously 	<ul style="list-style-type: none"> Within and around Parramatta CBD, there are several pinch points and corridors where growth has been occurring or expected to occur. Upgrade Parramatta Interchange to ensure a streamlined multi-modal network <p>For the medium term, initiatives for consideration and further testing in Parramatta include:</p> <ul style="list-style-type: none"> Some services to use the reopened Darcy Street to alleviate pressure on the existing interchange, although the design of the new street limits bus capacity Services accessing Parramatta CBD from Smith St – there is some potential to review the network, stopping patterns and termination points with the new Metro West station proposed between Macquarie Street and George Street. Changes to circulation of general traffic within the CBD to alleviate key congestion points around Parramatta Interchange such as the western approach along Pitt Street and the east on Station Street East / Smith Street. Improving the dual left turn from Great Western Hwy into Pitt St so buses no longer need to use the bus jump start and would receive more green time.
Ferry	<p>Ferry services accommodate less than 1% of the current mode share for employees accessing the Parramatta CBD. The low mode share can be caused by various factors including:</p> <ul style="list-style-type: none"> Slow journey times - the full-length ferry journey between Circular Quay and Parramatta is 75 to 90 minutes compared with 40 minutes by train and 40 minutes by car Infrequent services - services operate hourly even in peak periods. Perceived unreliability - services to/from Parramatta are affected by low tides. Passengers must consult a Transport for NSW calendar when this occurs, as replacement buses run between Parramatta and Rydalmere. 	<p>Whilst ferry services do not represent a large proportion of trips in and out of Parramatta, there are aspirations to continue improving its accessibility and efficiency to attract future customers.</p> <ul style="list-style-type: none"> Following the recent upgrade of Parramatta Wharf in 2019, the transformation of Parramatta Quay is underway, with the start of construction on the Escarpment Boardwalk and new plans to redevelop Charles Street Square. These projects will improve equitable access to the ferry terminal. Transport for NSW plans to modernise the ferry fleet, developing a new style ferry for the Parramatta River. These proposals will make ferry services more accessible, efficient and attractive and may result in some increased patronage at Parramatta. Improvements for ferry services including later and express services, as well as faster, lighter vessels offering more frequent service could attract future customers. Additional ferry wharves, services by smaller, more frequent vessels would also be beneficial in increasing transport options for residents of new developments in the Parramatta LGA.
Roads	<p>In Parramatta, an extensive road network serves the CBD, links to other precincts and provides regional connections to and from metropolitan Sydney.</p> <p>From the completed projects, Parramatta has already seen a shift in travel behaviours, with the WestConnex M4 Widening significantly improving the reliability of the M4 near Greater Parramatta and access across Sydney from commercial traffic. With the introduction of WestConnex, traffic volumes may decrease along parts of Parramatta Road and other parts of the road network, however they have increased on other key links such as the Great Western Highway due to toll avoidance.</p>	<p>There will continue to be investment in roads with a shift in focus on major roads to provide movement corridors between strategic centres to support key centre to centre journeys. Local roads will move towards providing opportunities for access and connections with the local community and businesses. Utilising movement and place analysis to understand the needs of road links that comprise Parramatta CBD could be key to supporting this shift.</p> <p>Some future road projects that are considered include:</p> <ul style="list-style-type: none"> Upgrading key intersections to improve access to Parramatta CBD, including Pitt Street/Marsden Street intersection along Great Western Highway, and the Woodville Road, Parramatta Road and Church Street intersection at Granville Increase capacity on mass movement corridors such as James Ruse Drive, Victoria Road, Great Western Highway

Mode	Existing Situation	Future Direction
<p>Freight</p>	<p>Parramatta is located near national key freight routes, including the M4 Western Motorway and the Main Western Railway Line. Based on the <i>Sydney Roads Freight Hierarchy Map</i>, the network can also be defined by three types of freight routes:</p> <ul style="list-style-type: none"> ▪ Primary freight routes: M4 Western Motorway and Cumberland Highway (A28) ▪ Secondary freight routes: James Ruse Drive, between Pennant Hills Road and the M4 Western Motorway, and Woodville Road, south of Church Street ▪ Tertiary freight routes: Great Western Highway, Parramatta Road, as well as sections of Church Street, Pennant Hills Road, Victoria Road, Pennant Street <p>Within Parramatta CBD, there are currently 46 loading zone spaces that enable businesses and commercial drivers to deliver and receive goods. This number is declining. Even with current capacity their utilisation is high throughout the weekday. Freight vehicles in Parramatta face strong competition for limited road and kerbside space between 9am and 12pm on weekdays. As a result, freight vehicle drivers need to walk longer distances to delivery points and therefore dwell longer in kerbside loading zones, further restricting access.</p>	<p>The Parramatta CBD Planning Proposal includes a directive on integrating land use and transport to ensure that urban structures, building forms, land use locations and development designs provide for the efficient movement of freight. Freight must not negatively impact the core development goals of increasing the amenity of the CBD. Last kilometre freight refers to the last leg of the journey of goods into shops, cafes, restaurants, offices and homes. As Parramatta grows, changes to the way everyone moves into the CBD will occur, including how freight is delivered. Potential directions include:</p> <ul style="list-style-type: none"> ▪ Exploring methods to quiet out of hours deliveries in the CBD ▪ Investigating opportunities for gathering and using freight data to improve freight efficiency, and ensuring new buildings are equipped to meet the freight requirements for receiving and dispensing goods and services. ▪ Investigate the provision of minimum loading space requirements for new developments ▪ Investigate opportunities for the implementation of Courier Hubs. By establishing a hub, deliveries can be completed on foot, by bicycle or carted. <p>Initiatives for investigation in the next 10 years include the development and implementation of the Last Mile Freight Policy in collaboration with industry to encourage more freight movements in centres to take place outside of normal business hours. Freight and servicing solutions that allow trade vehicles to deliver services to households and businesses in shorter, more direct lines will allow for a productive economy and liveable community. As Parramatta CBD grows, there will be increasing daily challenges and inefficiencies for freight delivery. Therefore, implementation of a last kilometre freight plan, as well as upgrades for freight access to the CBD are crucial for the success of Parramatta.</p>
<p>Private Vehicles and Parking</p>	<p>From analysing the current supply and demand in Parramatta, driving to work and parking in Parramatta is relatively attractive as a JTW option, because:</p> <ul style="list-style-type: none"> ▪ High supply: Parramatta CBD has more than 28,000 parking spaces, equating to roughly one car space for every 1.8 employees in the CBD. The City of Sydney estimates there is just one parking space for every 6 workers in the Sydney CBD. ▪ Low cost: Public 'early bird' parking rates are approximately a third less of those in Sydney CBD and have lower applied parking levies. 	<p>Council adopted an interim parking rate for Parramatta CBD to address the parking supply issue. This parking rate is based on the City of Sydney LEP parking rate following the parking rates applicable to Category A for Residential, and Category D for Commercial. The full parking rates are detailed in Appendix A. The implementation of the interim policy has been able to restrict the maximum number of parking spaces in Parramatta CBD per development based on the new parking rates.</p> <p>To maximise the effectiveness of efforts to reduce car use in Parramatta, the permanent adoption of the interim Parking rate should be implemented alongside other parking and transport management strategies. As parking becomes more stringent and costly, the transit network supporting Parramatta CBD needs to be prioritised in terms of serviceability and capacity</p>

Applying the Vision

The Parramatta CBD Planning Proposal is supported by transport measures that aim to ensure as population and employment increases, the transport system will keep up and continue to support and service the community efficiently. As shown in the modelling analysis, the growth in trips to/from Parramatta from the LEP cannot be accommodated in private vehicle trips. As users become encouraged to shift away from car mode share to walking/cycling and public transport, the demand increases to these modes will require additional infrastructure and improvements to cater for the demand.

It is important to integrate Parramatta's transport network and provide the appropriate level of transport service for all who want to travel to, from or within Parramatta. This will ensure its growth from the planning proposal is enabled and activated by transport options, rather than constrained by it.

Recommended Action		Timeframe	Responsibility	
G1	Council and State Government will coordinate and collaborate on implementation of the ITP and other plans for transport improvements serving Parramatta CBD.	Short	City of Parramatta, TfNSW	
G2	Council and the State Government will collaborate to prepare an Access Strategy for the Parramatta CBD.			
TD1	Establish a transport management delivery mechanism for Parramatta CBD to provide institutional support for transport and parking management services contingent upon identification of funding, resourcing, governance and delivery arrangements	Short	TfNSW	
WC1	Update requirements in DCP for end of trip facilities and bike parking in all new buildings	Short	City of Parramatta	
WC2	Encourage bike share and micro mobility schemes for residents, employees and visitors for short trips			
WC3	Deliver pedestrian prioritisation, safety and amenity measures such as street trees, lighting, additional crossing locations, shared zones and signal priority		City of Parramatta, TfNSW	
WC4	Deliver dedicated cycling infrastructure within the Parramatta CBD that connects to the Principal Bicycle Network			
WC5	Prioritise high quality pedestrian infrastructure that aligns with Parramatta Ways and other key walking routes within 2km of CBD		TfNSW	
WC6	Pedestrian modelling of demand in the CBD needs to consider Civic Link, Light Rail and Metro West		City of Parramatta, TfNSW	
WC7	Develop the Principal Bicycle Network to fill existing gaps, focusing on dedicated infrastructure to and within the CBD	Medium	City of Parramatta	
WC8	Provide sufficient footpaths to accommodate forecast increased pedestrian movements as density increases			
WC9	Implement infrastructure that supports, and investigate means to further improve and widen coverage of 40km/h zones within and surrounding the CBD.			
PT1	Address existing and forecast capacity issues along the T1 Western Line and improve service along the T5 Cumberland Line	Short	TfNSW	
PT2	Consider the need for, and plan for additional railway stations in the CBD to offer additional travel options from broader areas to the CBD and address future level of demand			
PT3	Investigate feasibility of prioritizing the potential for travel by rail to the CBD from other existing or new demand market include: <ul style="list-style-type: none"> Planned growth areas to the east such as the Greater Parramatta to Olympic Peninsula and the Bays Precincts, including via the Sydney Metro West Western Sydney Airport North West and South West Growth Centres Parramatta to Epping mass transit Parramatta to Kogarah mass transit Parramatta to Norwest 			
	PT4			Work with NSW government to investigate the prioritization of on-street public transport services and to investigate new bus layover areas
	PT5			Secure surface and underground corridor protection for future public transport services

Taking the Vision Forward

The development and actions outlined in this ITP respond to major transport and parking challenges, driven by substantial growth forecast in the residential population and jobs within the Parramatta CBD by 2056. The transport network objectives are designed to protect and enhance the characteristics of Parramatta CBD and build on these as the city continues to grow and develop in the future. Strong transport capacity and connections will be crucial for the success of Parramatta CBD in its role as the Metropolitan Centre for the Central City.

The direction outlined in this ITP supports the Parramatta CBD Planning Proposal, by providing a strategic plan to manage the existing and future sustainable transportation needs of Parramatta CBD. The planned growth on the network can be accommodated by:

- Improvements to the public transport network on high trip corridors
- Delivery of walking and cycling infrastructure to cost-effectively shift trips within 30 minutes of the CBD
- Targeted upgrades of the road network to ensure maximized use of the existing road network
- Application of proven TDM to ensure the most efficient use of resources and road space allocation

Recommended Action	Timeframe	Responsibility
PT6	Medium	TfNSW
PT7		
PT8		
PT9		
PT10	Long	TfNSW
RN1	Short	City of Parramatta, TfNSW
RN2		
RN3	Medium	TfNSW
RN4		
RN5		
RN6		
RN7		
FS1	Short	City of Parramatta, TfNSW
FS2		
FS3		
PV1	Short	City of Parramatta
PV2		
PV3		
PV4		
PV5	Medium	City of Parramatta

1.0 Introduction

1.1 Background

Parramatta Central Business District (CBD) is one of Australia's leading regions, and an area of strategic importance located at the hub of the 'Central River City'. Currently it performs a key economic, social and cultural role within Greater Sydney. However, as Western Sydney's population continues to grow, the city is experiencing rapid growth as a metropolitan employment centre.

The NSW Government's plan, *Greater Sydney Region Plan – A Metropolis of Three Cities* highlights the need to grow Greater Parramatta as the hub of the 'Central River City'. This will work to rebalance growth and deliver its benefits more equally and equitably to residents across Greater Sydney.

This Integrated Transport Plan (ITP) for Parramatta CBD responds to the **Parramatta CBD Planning Proposal**, which has been prepared to amend the planning controls for the Parramatta CBD. Changes to the planning framework are needed to grow the Parramatta CBD to realise its full potential. This planned growth will generate significant travel demand to/from Parramatta CBD, placing greater demand on transport infrastructure and services. The planning proposal needs to be supported by a number of studies, including this ITP, which recommends a strategic plan to manage the existing and future sustainable transportation needs of the CBD.

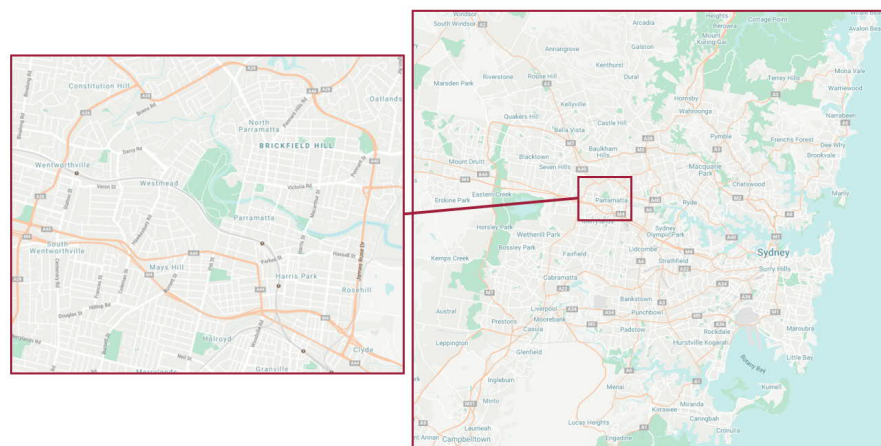


Figure 3: Locality Map of Parramatta

1.2 Vision

The Parramatta CBD Integrated Transport Plan will support the City of Parramatta's broader vision to be Sydney's Central City, **sustainable, liveable, and productive – inspired by our communities.**

The NSW Government and City of Parramatta (CoP) both share a vision to deliver the Central River City in the *Metropolis of Three Cities* as a place where residents live within 30 minutes of their jobs, education, health facilities, services and great places. Parramatta CBD, located at the hub of the Central River City, plays a central role in Greater Sydney to fulfil this vision.

However, current employment opportunities are concentrated in the east, with more than 250,000 people travelling to work from Central and Western Cities to the Eastern City every day. With this number projected to grow, distance and congestion are limiting accessibility to jobs for many communities, as well as imposing heavy social, economic and environmental costs for those who do commute. By re-balancing as three cities, Greater Sydney aims to broaden its economic footprint to support jobs growth with maximum accessibility, efficiency and productivity. Fundamental to this vision is the Planning Proposal. The Planning Proposal proposes to sharply increase the number of residents and jobs in the CBD profoundly re-shaping the CBD, the Local Government Area (LGA), and Greater Sydney at the metropolitan scale.

The Planning Proposal will result in a significant increase in transport trips starting or ending in Parramatta CBD from just over 51,000 to almost 111,000 in the AM peak alone. Since private vehicle use is currently the preferred mode of travel for commuters, this results in a more congested road network. There is a need to influence and change commuter's mode preferences. A transformation in the city will require a considerable leap in transport planning and delivery to dramatically increase walking, cycling and public transport trips to and from the CBD.

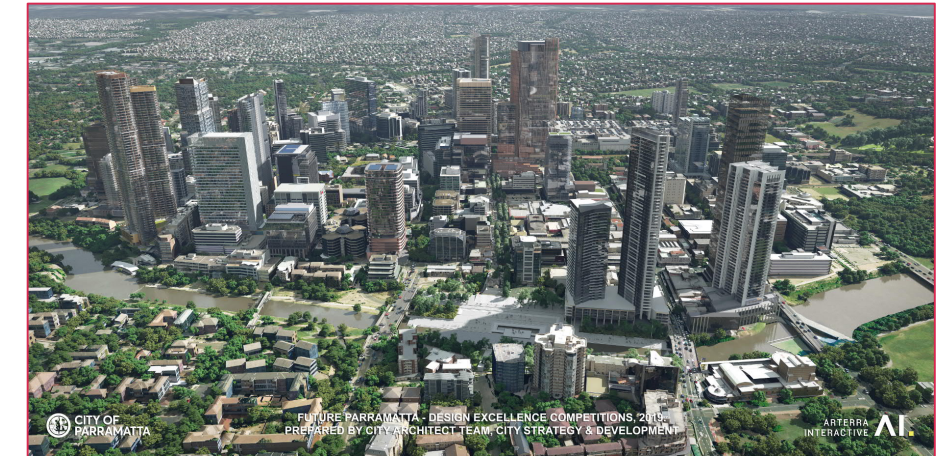


Figure 4: Future Parramatta – Design Excellence Competition Winners (Source: City of Parramatta)

In order to attract and retain businesses and jobs, Parramatta CBD must operate efficiently without reducing liveability and walkability in the CBD. The Planning Proposal supports the delivery of well-integrated developments that sustains a neighbourhood which is easy and comfortable to carry out day to day life. An emphasis on safety, affordable and diverse housing, social cohesion and inclusivity, linked by high quality public and active transport will be needed to ensure community character and attractiveness are not eroded as the CBD population grows.

This vision is already being enabled through strategies and actions implemented by both Local and State Government. However, to ensure the vision is delivered, additional investment and prioritisation is required. A productive, liveable and accessible Central City is a fundamental element to the success of the Greater Sydney region.

1.3 Parramatta CBD Planning Proposal

The Parramatta Local Environmental Plan (PLEP) was gazetted in 2011 setting local environmental planning provisions for land in accordance with the relevant standard environmental planning instrument. In response to the NSW Government's metropolitan strategies and in view of the insufficient capacity of current planning controls to accommodate significant long-term growth in the CBD, City of Parramatta endorsed a draft Planning Proposal for the Parramatta CBD in 2016 that proposes a number of changes to the PLEP.

At a strategic level, the aim of the Planning Proposal is to accommodate an expanded and more intense commercial core supported by higher density mixed use and residential development. Its specific stated objectives are to:

- Strengthen Parramatta's position as the Central CBD for metropolitan Sydney
- Increase the capacity for new jobs and dwellings so as to create a dynamic and diverse city
- Encourage a high quality and activated public domain with good solar access
- Facilitate the provision of community infrastructure to service the growing city
- Strengthen opportunities for the provision of high-quality commercial floor space
- Futureproof the city through efficient and sustainable use of energy and resources.
- To manage risks to life and property from flooding.
- Ensure tall buildings are of an appropriate form for their size and context
- To protect and manage the heritage values of Parramatta's local, State, national and world significant European and Aboriginal heritage items, conservation area, places and views.
- To promote active transport and use of public transport.
- To advocate for regionally significant transport infrastructure to connect residents within 30 minutes to jobs, education and health facilities, services and recreation including the Parramatta light rail and Sydney West Metropolitan rail link.
- To support the provision of regionally significant cultural and public domain infrastructure including the Riverside Theatre, the Museum of Applied Arts and Science, the Civic Link, Parramatta Square and the River foreshore.

The key transport, traffic and parking challenge for the Planning Proposal is for transport and access to support and complement urban intensification of the Parramatta CBD.

Specific issues to be considered include:

- The scale of the transport task required to support the Planning Proposal
- Capacity of existing and proposed public transport services and infrastructure
- Timing of infrastructure and services to support the identified land use mix for the CBD
- Managing transport demand and travel behaviour for the movement of people and goods

The Planning Proposal also contains draft controls to widen some roads as indicated in the draft Land Reservation Acquisition Maps (see Figure 75). These reservations, identified to support potential road, public transport and active transport improvements will be tested through transport modelling. The modelling will assess the benefits and timing of any upgrades, as well as the proposed off-street residential and commercial car parking rates.

For reference, the boundary of the Planning Proposal is shown in Figure 5.



Figure 5: Planning Proposal study area (Source: CoP Planning Proposal)

1.4 Purpose of this report

Jacobs has been engaged by the City of Parramatta to develop the Parramatta CBD Integrated Transport Plan (ITP) which supports and assesses the impact of the Planning Proposal, and identifies the required improvements in road infrastructure, public transport and active transport initiatives that are needed to manage the challenges.

The methodology to assess the Planning Proposal impacts has been to identify the gateways where trips are arriving and departing, and model future outcomes. Old gazetted road widening schemes in the PLEP 2011 are also addressed in this plan to better understand whether these schemes need to be retained. This document is supported by four technical working papers covering more detailed post-analysis of transport modelling outputs, parking strategies, existing situation and future directions, and travel demand management strategies.

1.5 Objectives

This ITP will identify types of intended transport improvements and interventions to a level of detail sufficient for the NSW Government to gazette the proposed amendment in the Parramatta CBD Planning Proposal to PLEP 2011. Changes that, subject to market conditions, will enlarge Parramatta CBD's employment and population over a forecast time. Through the analysis in the ITP, the significant increase in density of both employment and dwellings cannot be supported through a significant increase in private vehicle trips as even with improvements they would not fit on the network. Therefore, the objectives for the ITP are:

Objective 1	Deliver Parramatta Light Rail and Sydney Metro West, and planning for the future transport network
Objective 2	Improve existing train and bus links to extend the 30-minute catchment for transport access to Parramatta CBD
Objective 3	Adopt forward-looking policies, demand responsive services and innovative technologies that deliver transport solutions faster, and/or lower cost
Objective 4	Prioritise delivering walking and cycling improvements and supporting access within a 30-minute walk and ride of the CBD.
Objective 5	Align transport improvements with land use change to maximise the use of new services and sustainable transport mode share among new workers and residents
Objective 6	Identify and deliver targeted improvements to the road network to improve network capacity, and where necessary manage private vehicle trips to maximise the efficiency of the surface road network to support growth.
Objective 7	Leverage transport demand management techniques proven in the Sydney context, to maximise the efficiency of all transport modes in the network.

1.6 Report Structure

This report provides an overview of key factors that affect Parramatta CBD and has been structured as follows:

- **2.0 Strategic Context** – describes the overall land use and transport context for Parramatta CBD.
- **3.0 Parramatta Now** – acknowledges the existing conditions and challenges currently facing Parramatta CBD, and the way in which these challenges are likely to grow in the near future.
- **4.0 Parramatta Future** – identifies the principles that will guide future plans, summarising future transport networks for each mode and the context within which they will operate.
- **5.0 Transport Modelling** - provides an overview of the transport modelling methodology used in the assessment of the project and associated outcomes.
- **6.0 Applying the Vision** – discusses and recommends the transport planning tasks required to ensure Parramatta CBD can respond successfully to the growth identified in the Planning Proposal.

2.0 Strategic Context

The Parramatta Integrated Transport Plan is committed to addressing transport challenges through the **development of a clear framework** for the future planning and development of the transport system.

2.1 Geographic Context

To frame the existing and future transport function of Parramatta CBD, it is described in the context of three principal geographic settings below.

2.1.1 Greater Sydney

As the Metropolitan Centre within the 'Central River City', Parramatta CBD sits in the demographic and geographic middle of the metropolis of Greater Sydney. Because of this central location, it is in principle, the most accessible location in the entire metropolis. However, in practice, this accessibility depends on the performance of transport linkages, on intensity of the urban development and activities that generate personal and freight travel to and from Parramatta CBD.

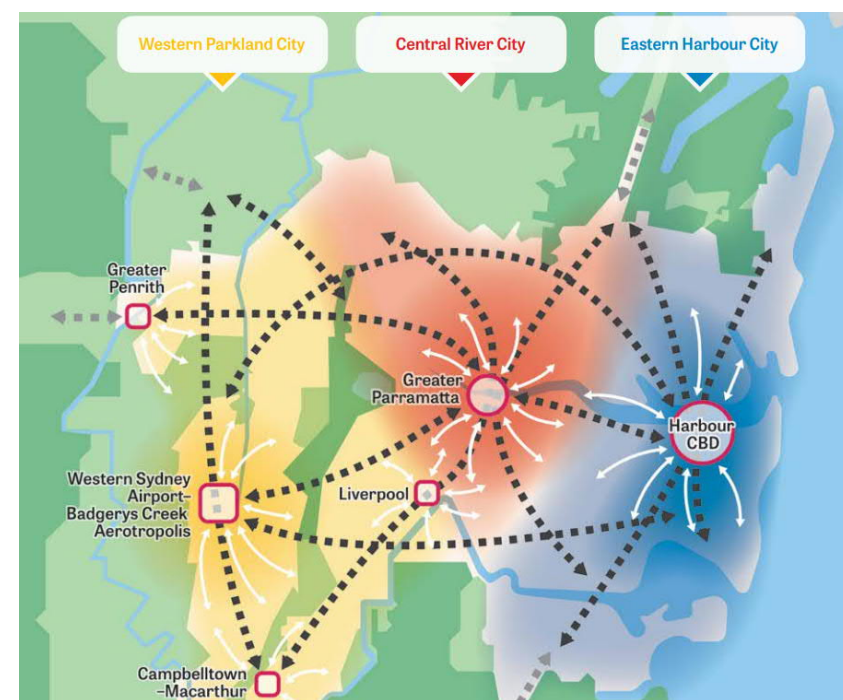


Figure 6: Three cities of Greater Sydney (Source: Metropolis of three cities)

For the NSW Government, future land use and transport decision making must maximise the proportion of Greater Sydney residents who can reach the nearest of their metropolitan centres within 30 minutes by public and/or active transport. For Parramatta CBD, the area accessible within this travel time aligns with available train and bus services, extending westward as far as Blacktown LGA and eastward to the Harbour CBD. However, there are still major gaps, particularly towards the north and north-west. By 2056, it is intended that these gaps will be filled, and that anyone living within a 15km radius of Parramatta CBD will be able to get there within half an hour using a sustainable transport option.

2.1.2 Greater Parramatta and the Olympic Peninsula

Greater Parramatta and the Olympic Peninsula (GPOP) refers to a 6,000 hectare area at the core of the Central City, and the centre of Greater Sydney. It spans 13 km east-west from Strathfield to Westmead and 7km north-south from Carlingford to Lidcombe and Granville.



Figure 7: GPOP Pilot Area (Source: GPOP Place-Based Infrastructure Compact (PIC) Pilot)

The vision for GPOP over the next 20 years is for a city and urban hub at Greater Sydney's heart – our true centre: the connected, unifying heart. As one of the fastest growing areas in

Greater Sydney, GPOP will continue to be a major generator of new jobs and housing in the future. For GPOP to reach its potential it must become more liveable, productive and sustainable as it grows. The success of GPOP is a critical step in bringing the three cities vision to life.

2.1.3 Parramatta CBD

At the local level, Parramatta CBD can be divided into four precincts: North Precinct, Cultural and Recreational Precinct, Central Precinct and South Precinct. It performs key economic, social and cultural roles, particularly for Western Sydney. Recognised as the heart of the "Central City", there is significant growth and changes expected in the CBD.

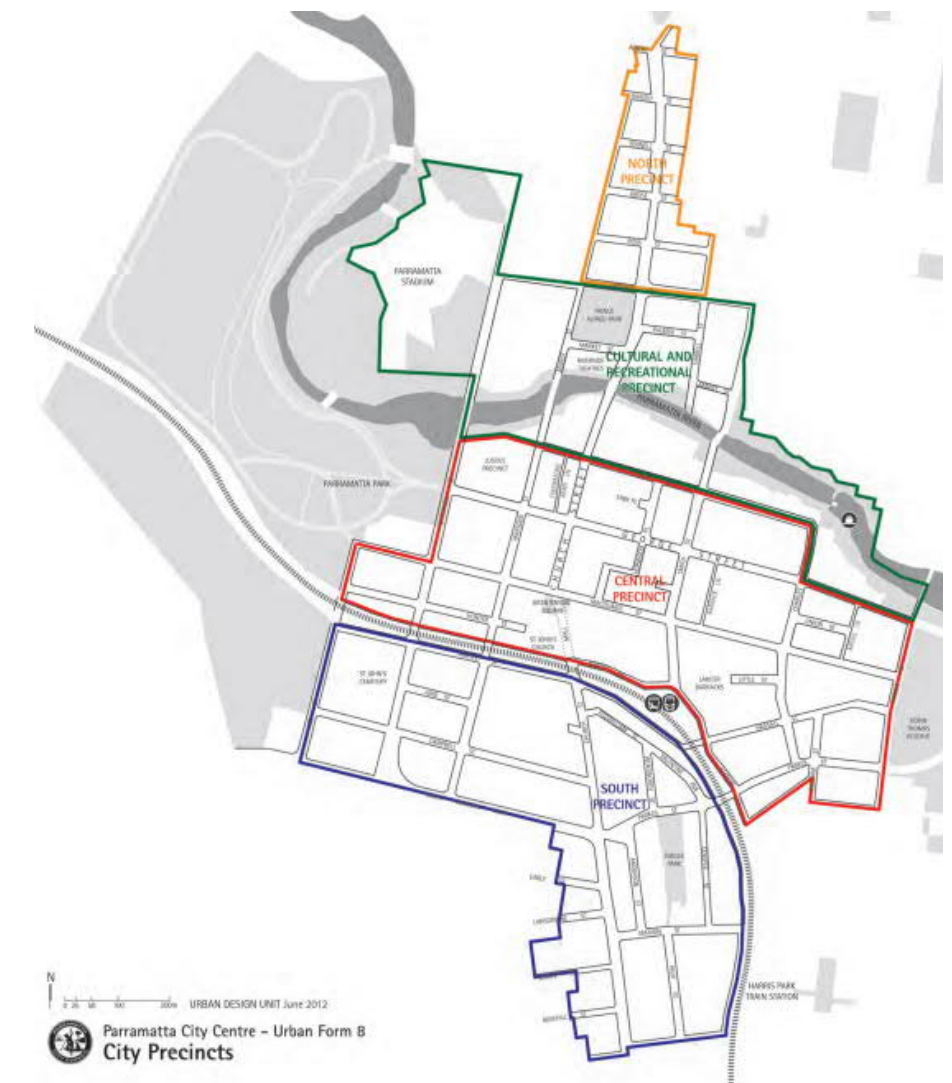


Figure 8: Parramatta City Precincts (Source: City of Parramatta)

2.2 Review of Strategic Plans

The Parramatta ITP aligns with and is supported by several regional, district and local strategic plans including:

- Future Transport Strategy 2056 (2018)
- The Greater Sydney Region Plan: A Metropolis of Three Cities (2018)
- Central City District Plan (2018)
- Greater Parramatta and the Olympic Peninsula Place-based Infrastructure Compact Pilot: A place supported by Infrastructure (2019)
- Central City Rail: Economic Impact Study (2018)
- Western Sydney Rail Needs Scoping Study (2018)
- City of Parramatta Community Strategic Plan (2018)
- City of Parramatta Local Strategic Planning Statement (2020)
- City of Parramatta Community Infrastructure Strategy (2020)
- Parramatta Night City Framework 2020-2024 (2020)
- Socially Sustainable Parramatta Framework (2017)
- Integrated Transport Plan for Parramatta City Centre 2009/10 – 2014/15 (2010)
- Draft Parramatta CBD Planning Proposal (2020)
- Various Council Transport Strategies

These plans and their relationship to the Parramatta ITP are detailed below.

2.2.1 Future Transport Strategy

The *Future Transport Strategy 2056* is a 40-year strategy that guides transport investment to deliver customer mobility for Sydney and regional NSW. It sets out a vision, strategic directions and customer outcomes with a focus on technology and innovation across the transport system to transform the customer experience, improve communities and boost economic performance.

Since the release of *Future Transport 2056* in 2018, TfNSW and land use agencies have been working to further develop Future Transport's 2056 network. The Greater Sydney Network Corridors have been analysed in more detail, with potential transport solutions examined to ascertain the best fit for the city-shaping and city-serving corridors. Indicative 2056 modal networks¹ developed are subject to further investigation and business case analysis, but provide an indication of future network options to inform place planning.

This ITP supports the development of liveable communities such as Parramatta, where transport is vital to mobility as a 'placemaker'. The plan integrates and aligns with long-term priorities for transport that can take advantage of emerging technology. It also recognises the need to build efficiently on Parramatta's existing transport networks, and outlines plans to improve 30-minute access, as well as unlocking capacity by focusing on new transport connections. This would lead to the realisation of wider benefits from investment and encourages a more desirable pattern of development, fulfilling a preferred outcome identified in the strategy.

2.2.2 Metropolis of Three Cities

A Metropolis of Three Cities – The Greater Sydney Region Plan establishes a 40-year strategic land use plan for Sydney. The plan was developed concurrently with *Future Transport Strategy*, aiming to deliver better connections for people across Greater Sydney. The land use vision for Greater Sydney is a metropolis of three cities (Eastern Harbour City, Central River City and Western Parkland City). Consistent with *Future Transport Strategy*, one of the key elements of the plan is the vision of a 30-minute city regardless of location. The goal for this vision is to provide transport infrastructure that allows people to reach their nearest Metropolitan or Strategic Centre within 30 minutes, seven days a week.

Parramatta CBD is identified in the plan as the Metropolitan Centre of the Central River City where enhanced radial transport links and urban renewal will be matched with quality public spaces and infrastructure to attract skilled workers and businesses. The project in conjunction with Sydney Metro West and other projects would therefore complement the Greater Sydney Commission's framework for a liveable, productive and sustainable Central River City.

Potential indicators to deliver the plan that would be relevant to Parramatta and this ITP include:

- Increased 30-minute access to metropolitan centres and clusters,
- Increased use of public resources such as open space and community facilities,
- Efficient transport connections,
- Safe and convenient walking and cycling routes,
- Well-connected jobs and skills,
- A place and city supported by infrastructure.

¹ Future Transport Greater Sydney Network Refinement:
<https://future.transport.nsw.gov.au/future-transport-strategy/greater-sydney-network/greater-sydney-network-refinement>

2.2.3 Central City District Plan

The *Central City District Plan* is a 20-year plan which guides the implementation of a *Metropolis of Three Cities* 40-year vision at a district level. It seeks to enhance Greater Sydney's liveability, productivity and sustainability into the future. Parramatta sits within the Central District Plan that also encompasses Blacktown, Cumberland and The Hills local government area. As the driver of the Central River City, Parramatta will require significant urban transformation over the next 10-15 years.

The Parramatta ITP is informed by the *Central City District Plan* and aligns with the plan via the following:

- Developing the economy with jobs and skills growth from unprecedented city-scale infrastructure, such as transport infrastructure,
- Establishing transport connections north, south, east and west from Parramatta to optimise Greater Parramatta's location in the centre of Greater Sydney,
- Linking parks, bushland, playgrounds and waterways through the Greater Sydney Green Grid with enhanced opportunities for safe walking and cycling paths.

Key precincts for investment in new homes, jobs, shops, public spaces and places to study that are relevant to this ITP include:

- Parramatta CBD** – with a significant number of developments in the planning stage, the CBD is adding approximately 200,000 sqm of office space over the next 5 years, equating to over 14,000 additional workers. This includes Parramatta Square, a three-hectare mixed use development including the new Western Sydney University campus, offices, shops and public spaces.
- Parramatta North Urban Transformation Program** – renewal of the 30-hectare Parramatta North area will create new homes and jobs to support the growth of Parramatta CBD and the Westmead health, education and research precinct

2.2.4 Greater Parramatta and the Olympic Peninsula Place-based Infrastructure Compact Pilot

The *Greater Parramatta and Olympic Peninsula Place-based Infrastructure Compact Pilot* (GPOP PIC) is a strategic planning model that looks holistically at a place to better align growth with the provision of infrastructure.

For GPOP to reach its potential it must become more liveable, productive and sustainable as it grows. Achieving this is only possible if:

- Growth is sequenced in a logical way
- Infrastructure is provided when it is needed
- Great places are created to support the needs of residents, workers and visitors
- Opportunities for all involved in making cities are maximised

This ITP supports the following proposed actions as outlined in the GPOP PIC:

- Proposed Action 1:** Focus precincts to align growth with already committed infrastructure, supporting job creation and new development. This includes Parramatta, Westmead and Wentworthville Precincts which support jobs services, tertiary education, housing diversity and creating great cultural experiences.
- Proposed Action 4:** Short term infrastructure priorities for GPOP – investigate to support demand across all the 26 precincts.
- Proposed Action 5:** Short to medium term infrastructure priorities for Sequencing Plan – Phase 1.

2.2.5 Western Sydney Rail Needs Scoping Study

In late 2015, the Australian and NSW governments announced the joint *Western Sydney Rail Needs Scoping Study* to determine the long-term need, timing and service options for passenger rail to service both Western Sydney and Western Sydney Airport, with an outcomes report published in March 2018 identifying a preferred long-term rail network for Western Sydney.

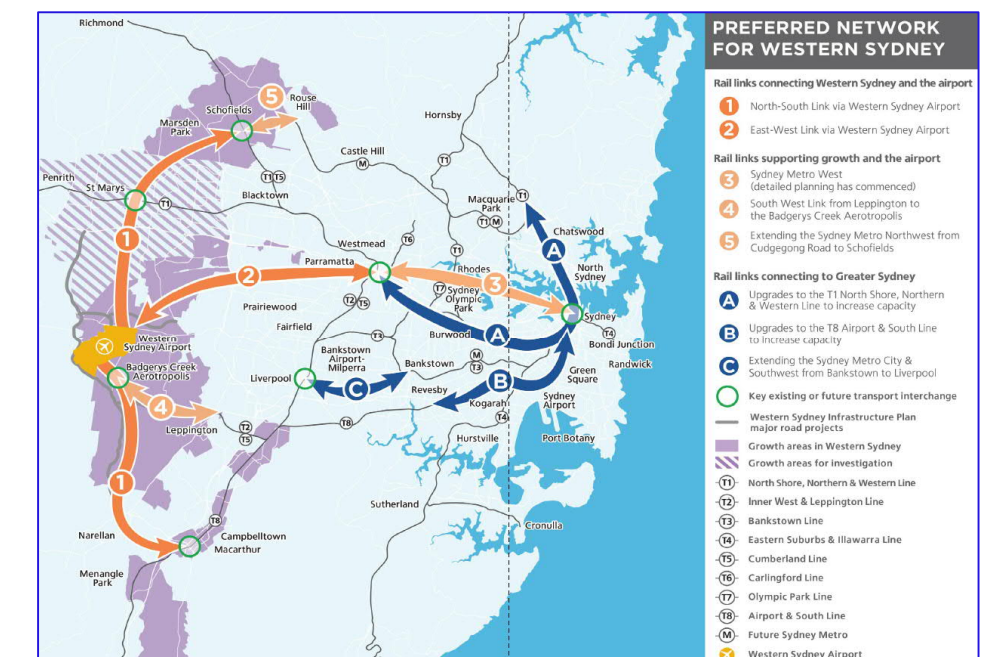
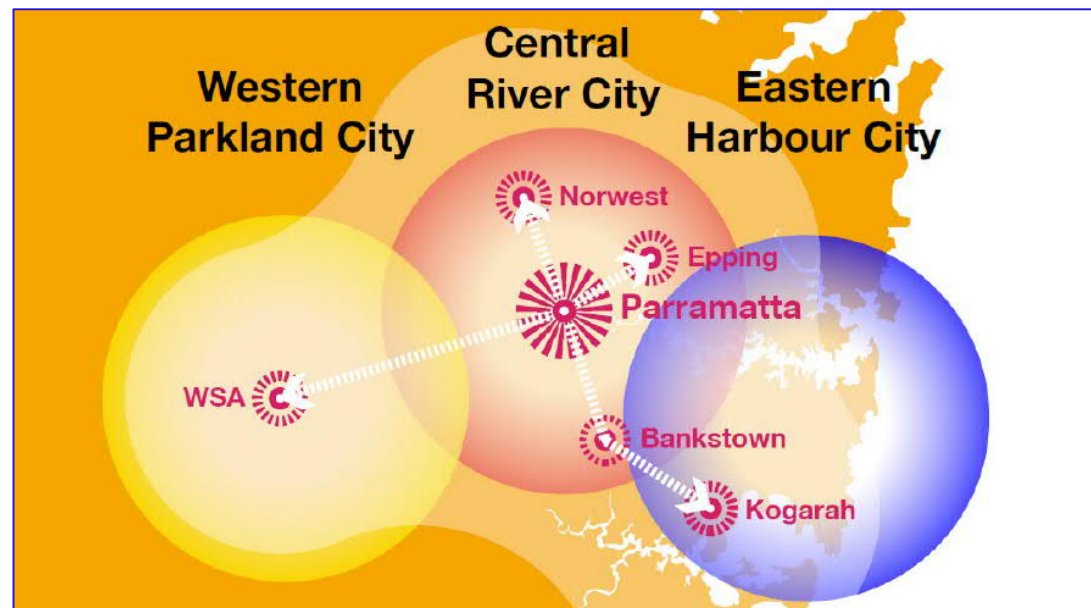


Figure 9: Preferred Network for Western Sydney (Source: Western Sydney Rail Needs Scoping Study)

The Preferred Network outlines the development of a series of rail projects that would create new links within Western Sydney, connect Western Sydney Airport and other parts of the existing rail network. Three of these elements of the preferred network pass through Parramatta and are expected to improve connectivity significantly if implemented.

2.2.6 Central City Rail: Economic Impact Study

The *Central City Rail: Economic Impact Study* was commissioned by the City of Parramatta to better understand the economics of rail infrastructure and what impact new rail will have on the competitiveness of the Central City. The report assesses the four lines that make up the Central City Rail Network: Parramatta to Norwest, Parramatta to Epping, Parramatta to Western Sydney Airport and Parramatta to Kogarah via Bankstown.



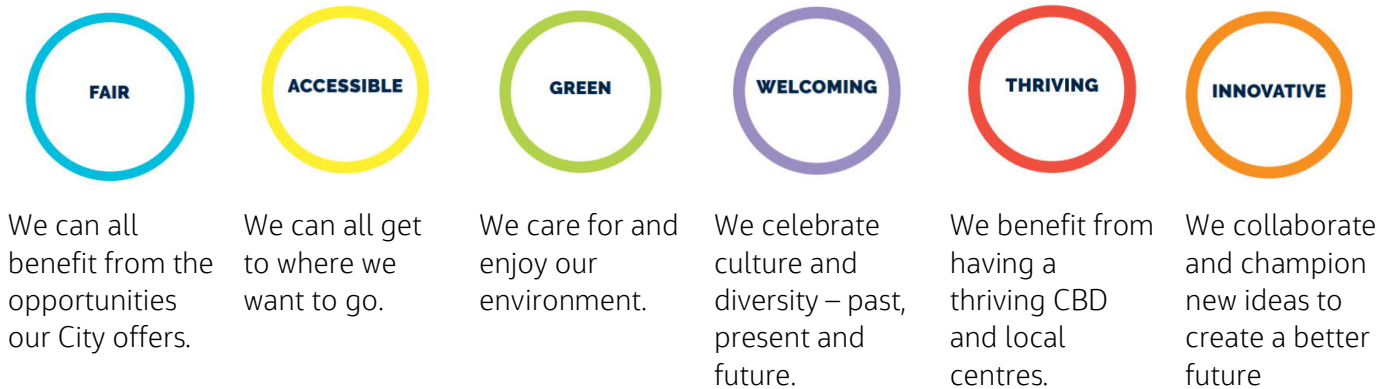
The proposed strategy to deliver the Central City Rail is detailed as follows:

- Drive the Three Cities vision for Sydney's growth and establish the Central River City as a second, connected transport hub for Sydney by providing comprehensive connections to the Eastern Harbour City via the Epping and Kogarah rail corridors as a priority. It will support economic competitiveness and provide opportunities for more rebalanced growth. It will increase the number of places desirable for housing and development.
- Prepare for rail expansion to growth areas in the Western Parkland City and Norwest. Complete planning and preserve corridors and provide immediate mode connections to support initial growth. Capital investment ought to be staged and prioritised to lines that deliver the highest economic return to society. Given the WSA corridor will take longer to develop capital investment ought to be allocated to this line in a staged manner and more funding allocated to corridors where economic need is greatest.
- Undertake a program of development of the rail network. Full integration and completion of all rail corridors and integrate networks extending Sydney Metro West to Western Sydney Airport. The completed network would support the realisation of the vision of Sydney's three successful cities and connect to Newcastle and Wollongong to create a network of five cities.

The program set out will enable Sydney to manage the growth in its Central River City to the benefit of all Sydneysiders. A program of rail investment of this kind will be required to deliver the area's fullest potential and to realise public policy ambitions set out in both the Greater Sydney Region Plan and Future Transport Strategy.

2.2.7 City of Parramatta Community Strategic Plan

The *City of Parramatta Community Strategic Plan* is a 20-year plan which identifies the main priorities and aspirations of the Parramatta community, providing a clear set of strategies to achieve this vision of the future. The plan is built around six key goals: Fair, Accessible, Green, Welcoming, Thriving and Innovative.



This ITP supports the City of Parramatta Community Strategic Plan by delivering the following:

- Accessible** – The location of jobs and opportunities, the structure of transport networks and congestion all influence the time it takes to travel between places. This ITP sets out increased public transport services and use, as well as walking and cycling improvements to create a better quality of life by reducing the time and stress associated with commuting.
- Green** – By creating investment in good outdoor environments that promote the use of sustainable transport, the ITP aligns with the community's 'green' vision.
- Thriving** – By improving links and connections, the ITP ensures major centres within the City of Parramatta have a thriving day and night-time economy.

The intensity of growth and investment in the City of Parramatta will create many opportunities for a new and more diverse mix of high-quality housing, jobs and infrastructure. This means that Council will have an increased capacity to improve the lives of all members of the community and provide more resources to upgrade and expand essential services and facilities.

2.2.8 City of Parramatta Local Strategic Planning Statement

The *City of Parramatta Local Strategic Planning Statement* provides strategic direction on how the City of Parramatta is planning for the next 20 years. The Statement looks at the role of Parramatta as part of Greater Sydney and seeks to achieve a future which is sustainable, liveable and productive. This ITP supports the following key priorities outlined in the statement:

- 1 – Expand Parramatta's economic role as the Central City of Greater Sydney
- 3 - Advocate for improved public transport connectivity to Parramatta CBD from the surrounding district.

- 10 – Improve active walking and cycling infrastructure and access to public and shared transport

2.2.9 City of Parramatta Community Infrastructure Strategy

The *City of Parramatta Community Infrastructure Strategy* identifies and assesses existing community infrastructure in the City of Parramatta LGA. It identifies contemporary challenges Council has for providing quality community infrastructure and key opportunities and direction for the 12 high growth areas. This strategy applies to the unique and diverse neighbourhoods of Parramatta as well as Parramatta CBD. The strategy will be used by the Council to identify priorities for future community infrastructure and guide decision making about planning, funding, delivering and negotiating for community infrastructure

2.2.10 Parramatta Night City Framework 2020 – 2024

The Parramatta Night City Framework, endorsed by Council on 10 February 2020, sets a vision for a future 24-hour CBD with later trading local and strategic centres, particularly Westmead, Epping and Sydney Olympic Park. Transport is a key feature of the Parramatta Night City Framework, due to the integral importance of transport for economic development, place-making, community safety and accessibility. Action 3.1 of the PNCF states to provide connected wayfinding signage that is legible at night, which promotes safe pedestrian routes and follows relevant universal design principles, including to and from Bankwest Stadium. This action is directly relevant to the ITP. Council's advocacy for later running transport services to and from Sydney CBD in Goal 6 of the Framework, as well as point-to-point connection, is also relevant to this ITP.

2.2.11 Socially Sustainable Parramatta Framework

The Socially Sustainable Parramatta Framework (SSPF) identifies specific ways that the opportunities of growth can be shared equitably by everyone in the community. The Framework was endorsed by Council in 2017.

This ITP supports the following key goals in the framework:

- **All people can access a job that enables them to live with dignity and security** – This ITP sets out transport planning strategies to allow more people to have public transport access to Parramatta CBD. This will enable more efficient access to workplaces, services and community facilities.
- **Green, inclusive and safe places to share** – This ITP supports the design, build and maintenance of good outdoor environments and corridors that promote the use of sustainable transport and are safe and inclusive for all.
- **All people can live healthy active lives** - By improving and increasing the walking and cycling links and connections, this ITP supports providing more opportunities for people to be able to live healthy active lives.

2.2.12 Integrated Transport Plan for Parramatta City Centre 2009/10 – 14/15

The previous Parramatta Integrated Transport Plan (ITP) was developed for 2009/10 to 2014/15. The plan identifies the importance of sustainable transport and responds to the need for future strategies to manage road congestion, reduce the reliance on car use, and increase the use of sustainable transport especially for local trips. This plan was developed in 2010 for Parramatta CBD and responds to the Parramatta City Centre Plan (2007) which sets the planning framework for an additional 30,000 jobs and 20,000 residents by 2031. The current ITP is an updated document of the 2010 version, responding to the recent CBD Planning Proposal.

Since the Parramatta ITP was developed, several key elements that support the ITP have been introduced. Council requires Green Travel Plans for selected developments in the existing LEP which encourage developments to support sustainable transport use. Council has also contributed to improving transport efficiency by introducing car sharing, provided by GoGet and adopted guidelines to facilitate expanding car sharing services.

Improvements to walking and cycling amenities within Parramatta CBD have been undertaken, including commencing the implementation of the Pedestrian Amenity Zone, and more cycle routes within the CBD. Continued improvements can be made, particularly regarding cycle parking and increasing walking and cycling facilities.

In terms of public transport, there have been many projects and upgrades to the Parramatta network since the ITP was developed. The Loop free city bus service was introduced in August 2008 and connects key Parramatta destinations. The Opal Card, introduced in 2012 in Greater Sydney, provides an integrated ticketing system which has significantly improved and allowed for an integrated public transport network to be created. Bus stop and bus priority improvements in Parramatta, such as the improvements on Smith Street and Wilde Avenue, have been completed as part of the NSW Government's Bus Priority Infrastructure Program. Committed projects such as Sydney Metro West and Parramatta Light Rail Stage 1 are expected to transform the connectivity of Parramatta and how people travel.

Many improvements for the road network in Parramatta have occurred since the ITP was developed, including along the 'Regional' and 'City' Ring Roads. Secure Taxi Ranks have been introduced and are available along Fitzwilliam Road, between Fire Horse Land and Wentworth Street, in front of City of Parramatta Library.

Recommendations which can be carried forward for further investigation in this ITP include:

- Support Environmentally Sustainable Vehicles through cheaper parking fees for hybrid vehicles
- Consider appointing an officer to Promote Sustainable Transport and develop policies and manage projects including an annual Sustainable Transport Month
- Develop a Council Travel Plan to show leadership and corporate social responsibility. Consider making Travel Plans a planning requirement for large developments located near good public transport.
- Offer the Walking School Bus program to all primary schools within the LGA.
- Lobby State & Federal Governments to construct the Parramatta to Epping Rail Link, prepare a feasibility study into the Parramatta to Castle Hill Rail Link and restore the Cumberland Line service.
- Lobby for improved Rail Services and Station Facilities including increased collection of performance data, requesting RailCorp to advertise station car park details and market larger ones as Park & Ride. Work with T&I to provide directional signs to all stations.
- Continue to lobby State Government for a Commuter Ferry Service to Parramatta from the Inner West.
- Increase Motorcycle Parking Spaces and Remove On-street Parking Fees.
- Council to instigate the Relocation of Long-Stay Commuter Parking from the City Centre to new multistorey car parks on the city periphery served by the Loop free bus.

2.2.13 Parramatta CBD Planning Proposal

The City of Parramatta has adopted a draft Planning Proposal for the Parramatta CBD which proposes a number of changes to the Parramatta Local Environmental Plan (PLEP). The Planning Proposal is informed by the vision and principles established in the Parramatta CBD Planning Strategy (2015).

The vision in the proposal outlines Parramatta will be Australia's next great city, defined by landmark buildings and high-quality public spaces with strong connections to regional transport. It will respect its heritage, be an exemplar in design excellence, facilitate job growth and ensure its streets are well activated.

The principles as outlined in the Planning Proposal are as follows:

- P1: Achieve world's best practice in the planning and development of cities
- P2: Achieve a strategic balance of land uses
- P3: Create an attractive and distinctive city skyline, defined by tall, slender towers
- P4: Create a liveable, active and highly desirable city
- P5: Promote economic diversity, prosperity and jobs growth
- P6: Improve the quality of urban design and the public domain
- P7: Achieve design excellence
- P8: Celebrate heritage and the natural environment
- P9: Facilitate the delivery of infrastructure to support Parramatta's growth
- P10: Improve access to the regional transport network

At a strategic level, the aim of the Planning Proposal is to produce an expanded and more intense commercial core supported by higher density mixed use and residential development.

The amendments proposed by this Planning Proposal to the current controls in PLEP 2011 include:

- Rezoning of selected land parcels
- A requirement for non-residential floor space in parts of the mixed-use zone
- Increasing the height and floor space ratios permitted on some parcels
- Increase of the height of buildings on some parcels
- A requirement for end of journey facilities for pedestrians and cyclists
- Encouraging high yield employment land uses, high performance buildings and the provision of community infrastructure

This ITP has been undertaken to inform the Parramatta CBD Planning Proposal, setting out a required plan to support the increased growth and employment in the city

2.2.14 Council Transport Strategies

A number of council transport strategies have also informed this ITP. These are outlined in Table 1.

Table 1: Council Transport Strategies

Transport Strategy	Description
<i>Parramatta CBD Strategic Transport Study (2016)</i>	The purpose of the <i>Parramatta CBD Strategic Transport Study</i> was to identify the travel patterns and travel demand generated by the future Parramatta CBD, and to develop an understanding of the scale and type of transport interventions required to support the proposed planning control changes within the Parramatta CBD Planning Proposal. It includes three supporting technical papers covering transport modelling outputs, CBD benchmarking, and a review of parking demand, supply and policy in the Parramatta CBD. This ITP builds on information supplied in the study.
<i>Parramatta CBD Pedestrian Strategy (2017)</i>	This strategy aims to guide the City of Parramatta for streets and city areas that are accessible, safe and prioritised for pedestrians. It takes into account the unique character and opportunities in and around Parramatta CBD, to enhance the walking experience and boost liveability. The <i>Parramatta CBD Pedestrian Strategy</i> was developed with the aim to provide safe, accessible and simple CBD pedestrian journeys.
<i>Parramatta Ways – Implementing Sydney’s Green Grid (2017)</i>	This plan sets out a guide to improve walkability across Parramatta, for not only improving transport but also increasing urban green, recreation and local centre amenity.
<i>Parramatta Bike Plan (2017)</i>	This bike plan has combined comprehensive cycling audit, current population and jobs forecasts, as well as the latest thinking in cycling infrastructure and community input. The plan sets out the proposed cycling network for the next 20 years and beyond for Parramatta, outlining future cycling network plans, education and behaviour change policies.
<i>Parramatta City River Strategy (2015)</i>	This strategy provides a plan for revitalising the foreshore of the Parramatta River between Gasworks Bridge and Rings Bridge, O’Connell Street. It aims to improve connection between the river and the city and create more recreational opportunities for city residents, workers and visitors. The strategy creates a new vision for the area and reclaims the river and its foreshore as a vibrant public space for the city and its people.
<i>City of Parramatta Environmental Sustainability Strategy (2017)</i>	This strategy outlines the City of Parramatta’s key environmental sustainability directions and priorities as Parramatta LGA grows, so that all residents, workers and visitors feel the benefits of the growing city, while meeting the bigger goal of building Australia’s next great city. Within the <i>Environmental Sustainability Strategy</i> , the community identified that transport, getting around and congestion as one of the top three concerns.
<i>Economic Development Strategy (2017-2021)</i>	This high-level four-year plan articulates the direction for economic development in the City of Parramatta LGA. Within the plan, continued improvements to transport and services is recognised as a key component to shaping the City of Parramatta’s economic growth.

2.2.15 Additional Strategic Inputs

This ITP supports the Parramatta CBD Planning Proposal by strategically assessing the future transport and land use system through a transport modelling and reporting process. In addition to the strategies outlined previously, the ITP also builds on information supplied by a mesoscopic traffic modelling investigation. A mesoscopic model analyses a transport network at a scale capable of showing the operation of road intersections, and intersection-to-intersection road lengths. TfNSW prepared a mesoscopic model for the Parramatta Light Rail (PLR) Stages 1 and 2 corridors, which will use and have significant operational impacts on parts of the Parramatta CBD street network. The modelling supporting this ITP uses a modified PLR mesoscopic model as a base model refined to help identify the traffic and transport impacts of the Parramatta CBD planning proposal, including the additional floor space resulting from the rezoning, along with identifying and testing potential mitigation measures such as reduced parking provision, or localised road widening and intersection upgrades.

2.2.16 Planning Proposal Boundaries

Since commencing the preparation of the Integrated Transport Plan to support the CBD Planning Proposal, Council has resolved to defer areas from the CBD Planning Proposal Boundary as per Figure 10. The 'red' coloured areas are the areas currently being deferred from the CBD Planning Proposal Boundary. This defers approximately 0.17km² of land from selected assessments discussed through this document. It is noted that should these areas be added back into the CBD boundary, this traffic analysis has considered these areas.

2.2.17 COVID-19

The modelling assessments conducted in this ITP have not considered the potential short and long-term transport impacts of COVID-19, as this has come in after the majority of the project had been completed. It should be noted due to the current situation, the long-term impacts of COVID-19 are unable to be quantified, as of August 2020.

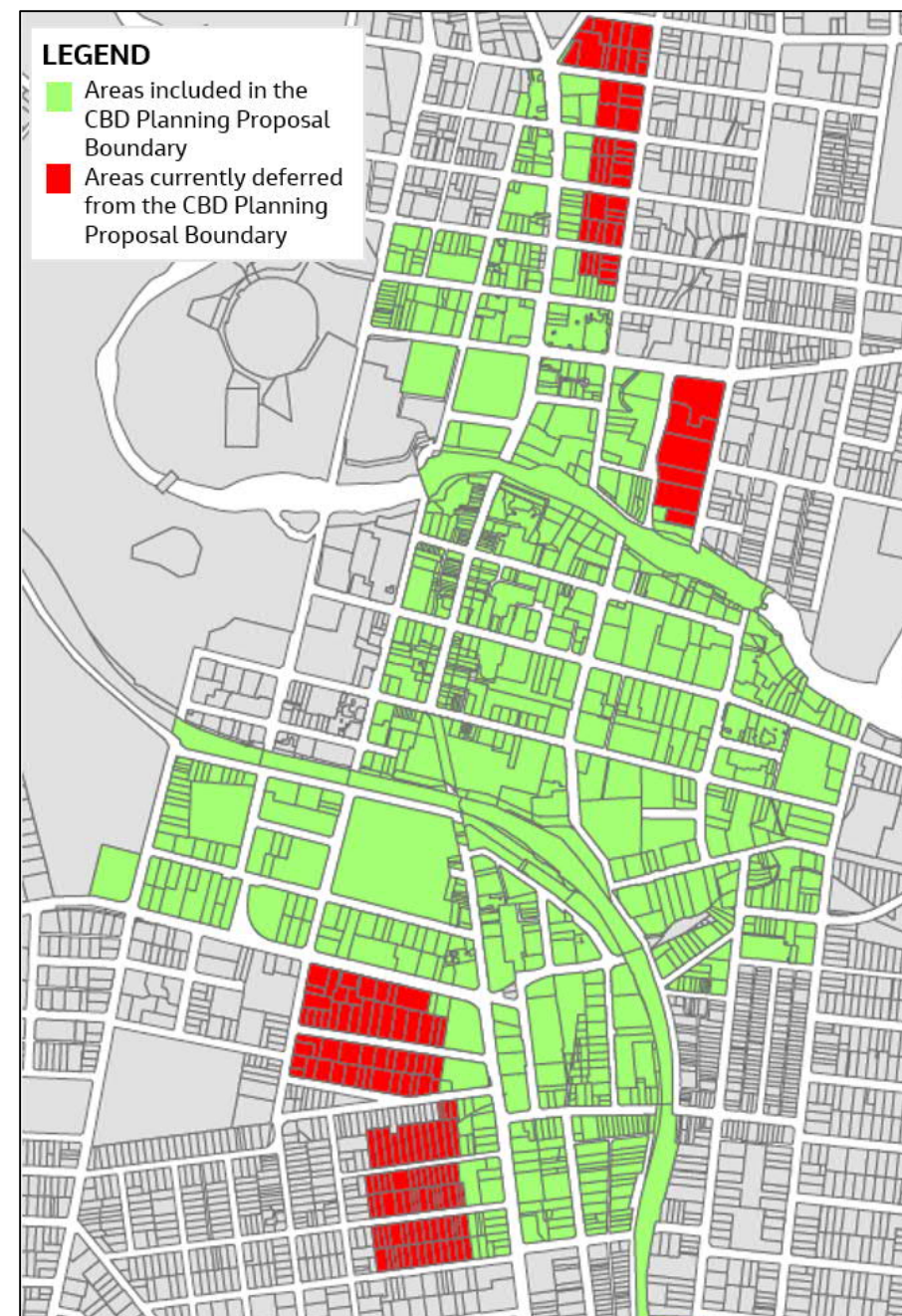


Figure 10: Planning Proposal Boundary Changes

3.0 Parramatta Now

As the Central River City within Greater Sydney, Parramatta is at the centre of a multi-modal transport network. The traffic and transport conditions of Parramatta taken from the Parramatta CBD Strategic Transport Study have been combined with analysis of TfNSW Journey to Work (JTW) and public transport data (Opal) to summarise the existing transport networks for each mode, and the context within which they operate.

3.1 Socio economic and land use context

3.1.1 Greater Parramatta

As indicated from the ABS 2016 census data, the City of Parramatta Local Government Area (LGA) is one of few across Sydney that has a jobs surplus (i.e. more local jobs than workforce), providing employment to workforce residing in many areas around Sydney. As of December 2019, there were an estimated 194,400 jobs in the Parramatta LGA according to the National Institute of Economic and Industry Research, with a resident labour force of approximately 146,000 according to the ABS.

Also, over 25,000 students are currently enrolled across the City's campuses, including Western Sydney University's Parramatta South Campus with 12,500 students and the Western Sydney University Parramatta City Campus with 6,500.

In combination with the retail precincts within the area, this makes Parramatta destination-dominant, serving as an attractor of travel demand. According to Tourism Research Australia, the LGA recorded approximately 252,600 domestic day trips in December 2019 and 113,100 domestic overnight trips.

Different land uses generate varying levels of transport demand and directionality, so a review of existing transport networks is required to provide the context the network operates within. As shown in Figure 11, dominant land use zoning in Greater Parramatta consist of the following:

- Commercial Core (B3) / Mixed Use (B4): comprising the Parramatta CBD.
- Residential (R2, R3, R4): including predominantly medium and high density residential, surrounding the Parramatta CBD and along the rail corridors, whilst outside of these low-density residential dwellings are dominant.
- Industrial (IN1, IN2, IN3): predominantly in Camellia and Rydalmere.
- Infrastructure (SP2): including the Westmead and Rydalmere Health and Education precincts, as well as trunk road and rail corridors.
- Recreation (RE1, RE2): including public recreation immediately to the west at Parramatta Park and private recreation (Rosehill Gardens).

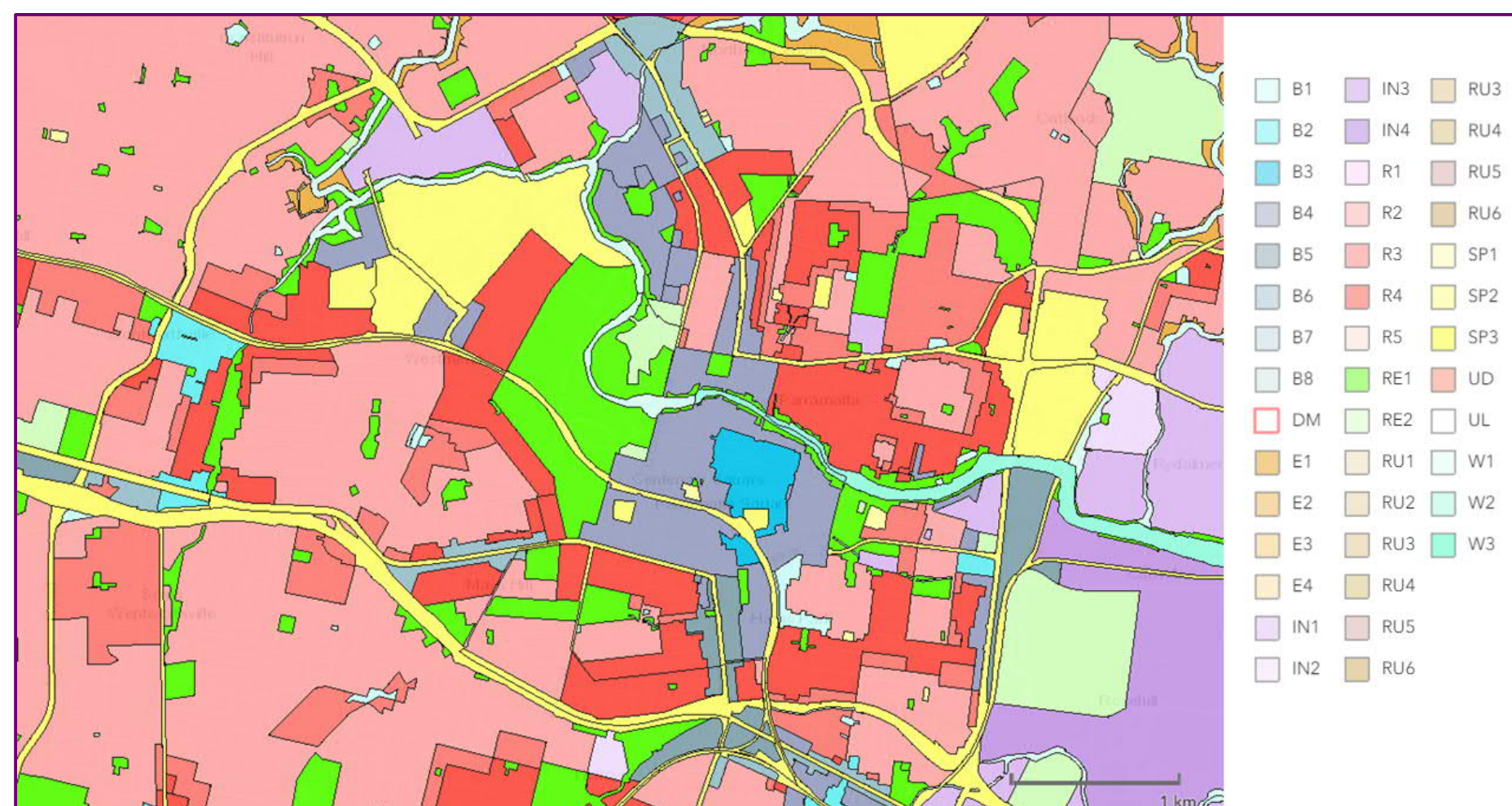


Figure 11: Current land use in Greater Parramatta (Source: NSW Planning Portal)

These land uses typically generate varying levels of transport demand and directionality throughout the day and week, however the AM peak is the focus of this work as it represents the 'peak' demand on a typical weekday. The Parramatta CBD commercial core yields one of Sydney's largest high-density employment centres, in combination with significant retail and civic uses. Commercial and retail land uses typically form the most intensive in travel demand generation, depending on the type of jobs and retail provided. Residential areas serve as trip origins for each of the above, including travel to work, education and shopping.

3.1.2 Parramatta CBD

The Parramatta CBD had a workforce of approximately 55,000, as of 2018/2019, according to the National Institute of Economic and Industry Research. As of January 2020, Parramatta has a total commercial office space of 768,400 sqm (Property Council of Australia), as well as significant retail floor space, such as Westfield Shopping Centre. These provide significant demand generators for Parramatta CBD.

The current land use zoning within Parramatta CBD has been shown in Figure 12. The commercial core (B3) is in the centre of the CBD, predominantly between Parramatta River and the railway line that runs through Parramatta. The Parramatta CBD commercial core yields one of Sydney's largest high-density employment centres, in combination with significant retail and civic uses. Commercial and retail land uses typically form the most intensive travel demand, depending on the type of jobs and retail provided.

A mix of low, medium and high-density residential land use (R2, R3, R4) are found within the northern and southern fringe of the Parramatta CBD precinct. More residential land uses can be found surrounding the Parramatta CBD precinct. Residential areas serve as trip origins for various purposes, including travel to work, education and shopping.

Mixed use (B4, B4PS, B4W) provides a mixture of compatible land uses, integrating business, office, residential, and retail to maximise public transport and encourage active transport modes. These surround the commercial core, making up most of the CBD. Towards the south of Parramatta CBD, there are areas used for business development (B5). These areas enable a mix of business and warehouse uses, and specialised retail premises that require a large floor area.

The Planning Proposal for Parramatta CBD will increase the size and density of the commercial core, continuing to generate demand to the CBD. Additionally, the Planning Proposal aims to create non-residential floor space in mixed use developments on the margins of the CBD that will serve as both trip origin and demand generators, potentially altering the existing travel patterns around the CBD.

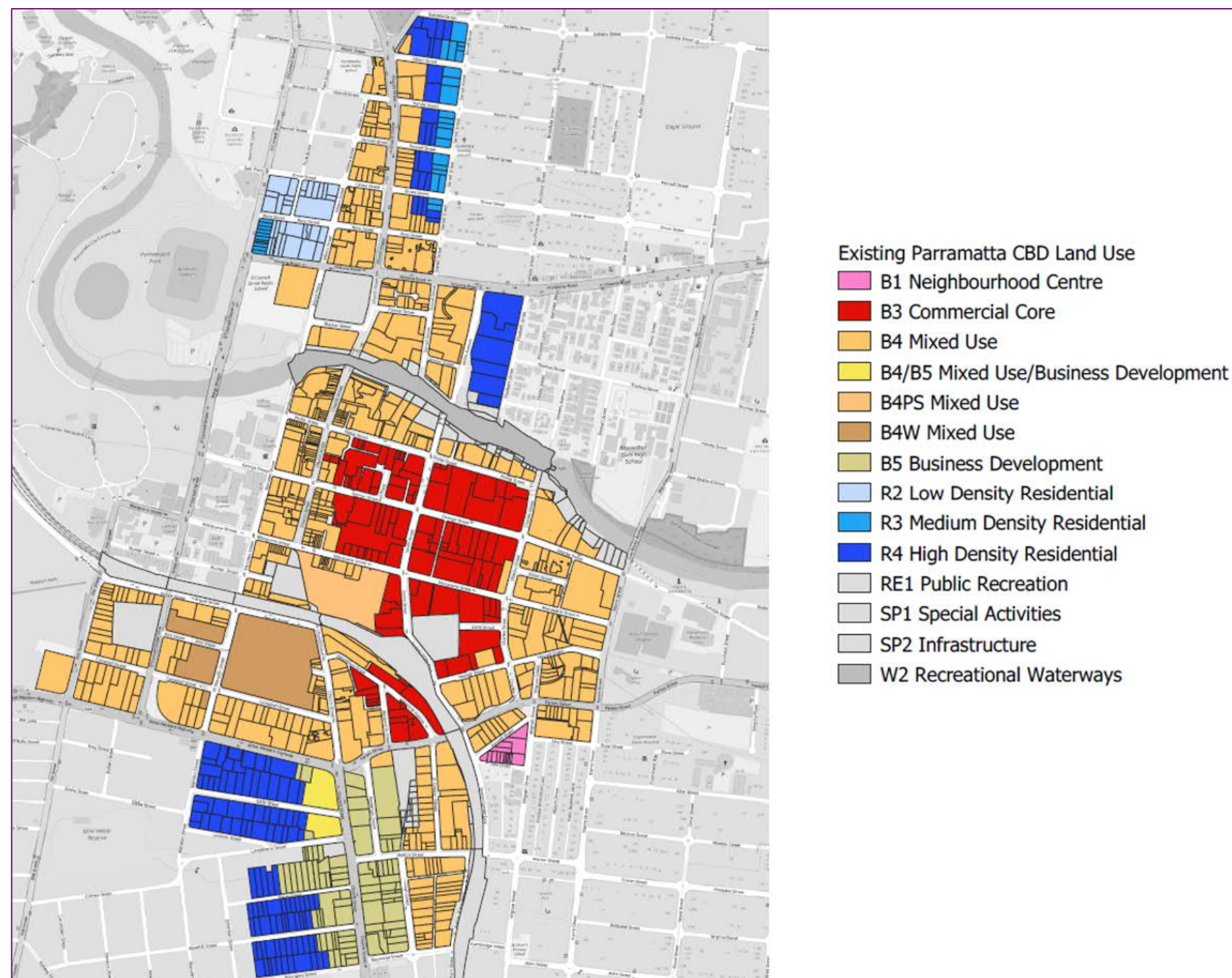
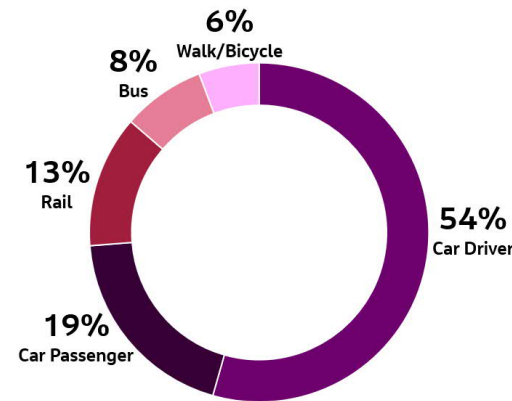


Figure 12: Current land use in Parramatta CBD

3.2 Travel Patterns

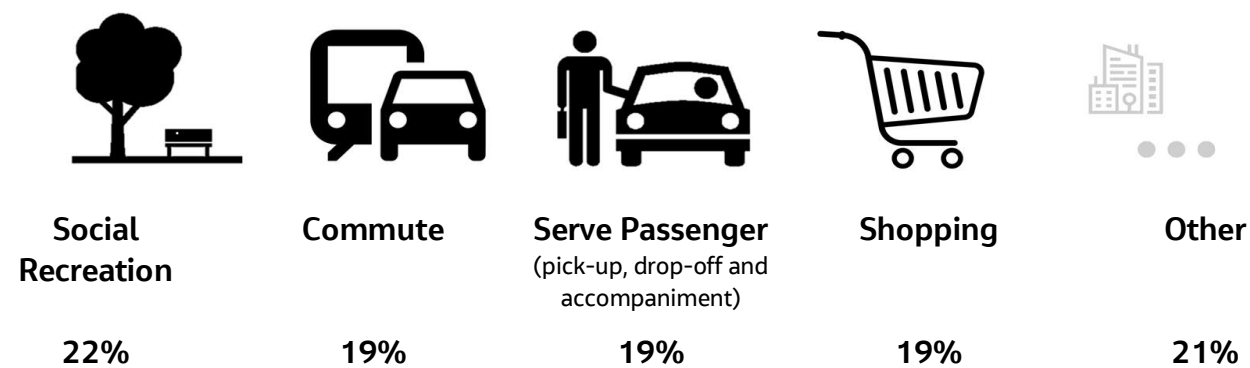
When planning transport infrastructure and services, travel behaviour and land use are important factors to consider in order to understand the reasons behind existing travel demands within a region. This includes understanding the trip purpose, as well as the location and intensity of land use that comprises it. It is these features that drives the need for, and type of transport responses.

In 2016, there were approximately **274,000 daily trips** in and out of Parramatta CBD. This includes trips from various modes, trip types, origins and destinations.



Mode share data indicates that private vehicle remains the predominant means of people travelling to and from Parramatta CBD, comprising of approximately three quarters of daily trips. In comparison, public transport comprises only 21% of trips, while walking and cycling comprise 6% of total daily trips. 71% of dwellings in the Parramatta-Rosehill Statistical Area 2 (SA2) region own at least 1 or more motor vehicle. Work-related trips are often done in private vehicles, while educational and commute trips have a higher proportion of public transport use.

The Parramatta CBD is a key destination for a variety of trip types. With many local jobs available, the journey to work or commute trip is dominant within the area. As the Parramatta CBD also includes a large amount of commercial and retail land uses, this can create increased travel demand generation for shopping and recreation. Thus, the four key trips in Parramatta CBD are outlined below. The Other category encompasses purposes that do not necessarily fit within the four key trip categories, such as business trips and various personal activities.



Varied levels of through movements occur within Parramatta. As Parramatta is centrally located in Greater Sydney, regional east-west bound trips between Sydney and Penrith, and north-south bound trips between Pennant Hills and Liverpool are likely to use the outer ring highways such as Great Western Highway, Western Motorway, and Cumberland Highway to pass Parramatta. For more

localised trips, for example from North Parramatta to Granville, trips through Parramatta CBD are more common.

3.2.1 Inbound Trips

Journey To Work (JTW) data on travel patterns and behaviour, derived from the 2016 census data has been used to guide this section. Within Parramatta-Rosehill (SA2) there are approx. 50,200 employees in the area, with an average commute distance of 19.05km. As shown in Figure 13, private vehicle is the most common mode of transport to arrive to work, accounting for 49% of trips, followed by public transport. Only 4% of employees used active transport to commute to work.

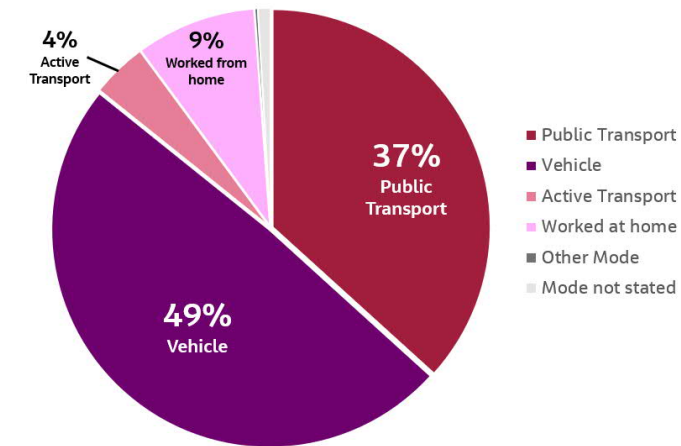


Figure 13: Journey to Work mode choice to arrive to work in Parramatta – Rosehill SA2

A summary of JTW trip origins to Parramatta-Rosehill SA2 is shown in Figure 14.

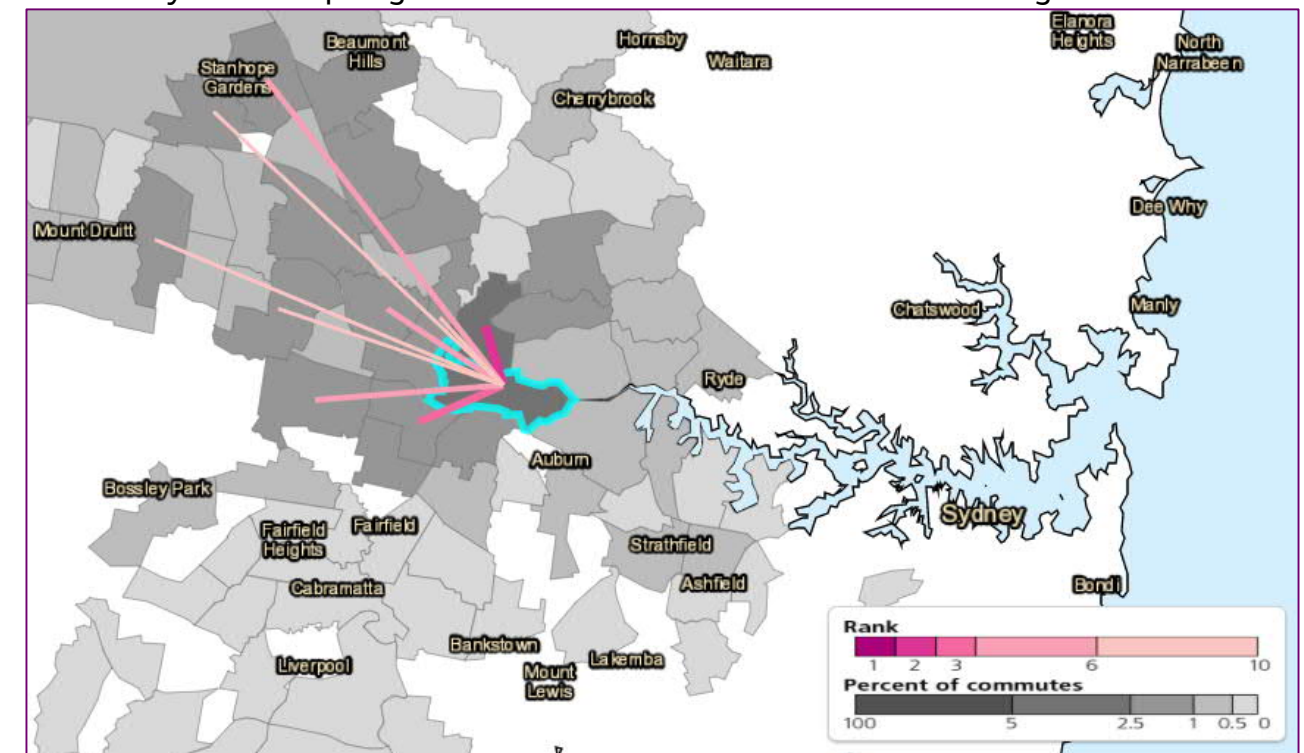


Figure 14: Summary of persons commuting to Parramatta – Rosehill SA2 (Source: ABS Census Data)

Of the commuters, approximately 4.4% live within Parramatta-Rosehill SA2. The second most common region is North Parramatta with 2.9%, followed by regions including Northmead, Lalor Park, Seven Hills – Toongabbie and Greystanes – Pemulwuy.

Several key messages regarding mode choice and trip origins are outlined:

- The dispersed nature of work origins underlines the strategic importance of the Parramatta CBD and its place as a major employment centre.
- The top destinations of workers commute to Parramatta CBD from the west. This reinforces Parramatta’s importance within Western Sydney and it’s centralised location as the ‘Central River City’.
- A high proportion of inbound trips originate from the suburbs directly surrounding Parramatta CBD.
- Public transport is currently the main transport mode for trips from areas located along the rail line particularly in the east, south and west. However, only a low proportion of trips to Parramatta CBD originate from these areas.
- Private vehicles are mainly used for areas without clear access to train services, as well as regions located in the vicinity of the Parramatta CBD. With private vehicle accounting for 49% of trips, this strains the road network and creates congestion as well as places demands on available long-term parking.

3.2.2 Outbound Trips

For residents of Parramatta-Rosehill (SA2), there are approximately 14,400 employed people living in the region; this is equivalent to less than 30% of JTW trip destinations to Parramatta CBD. The average commuting distance for these employed residents is 15km. As shown in Figure 15, 45% of residents took public transport, 38% took private vehicle and 8% used walking and cycling to travel to work.

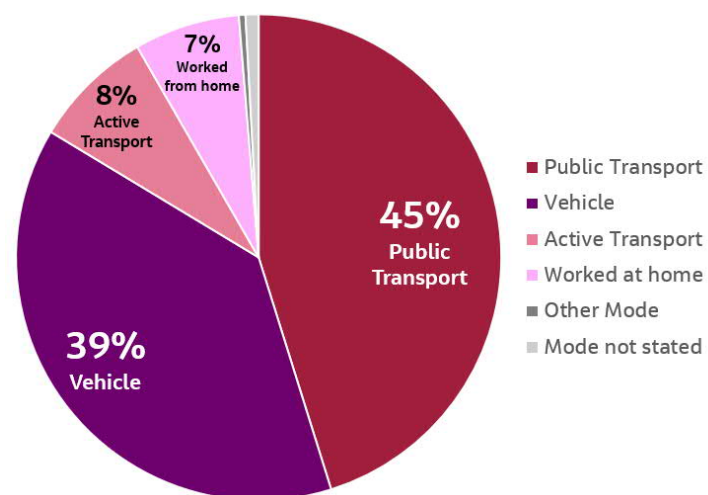


Figure 15: Journey to Work mode choice to travel to work from Parramatta-Rosehill SA2.

A summary of destinations of persons commuting from Parramatta-Rosehill (SA2) is displayed in Figure 16. As shown, the highest proportion of work trips from Parramatta-Rosehill (SA2) were to Sydney CBD, followed by North Sydney.

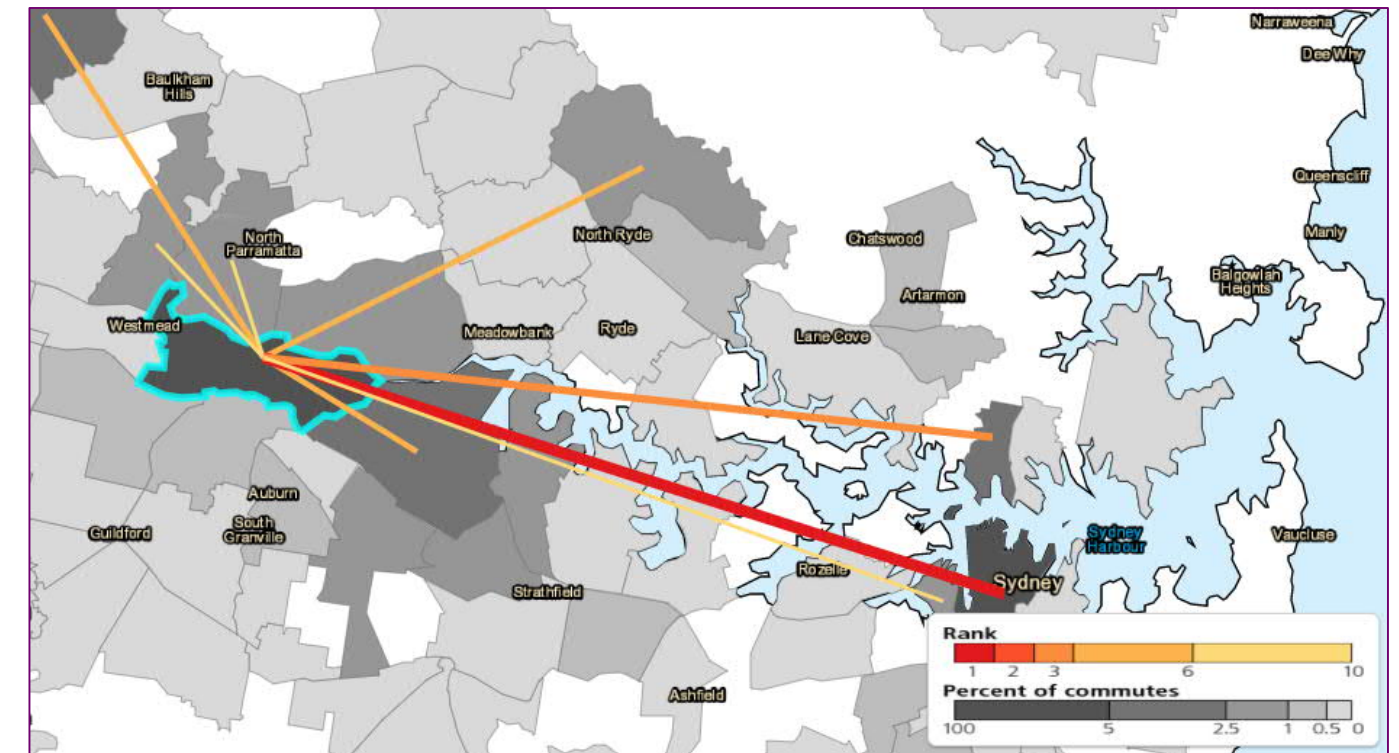


Figure 16: Summary of persons commuting from Parramatta – Rosehill SA2 (Source: ABS Census Data)

The following key trends regarding mode choice and trip destination were observed:

- A large proportion of trip destinations are to the Parramatta CBD itself (15.2%) and regions directly surrounding the CBD, such as Homebush Bay – Silverwater (3.2%), Ermington-Rydalme (1.4%), North Parramatta (1.7%) and Northmead (1.5%).
- A higher proportion of trips are made to the east, which is consistent with the location of the main employment centres such as Sydney CBD (17.6%), North Sydney (3.8%) and Macquarie Park (2.4%).
- There is a strong dependence on cars for the majority of trips except for the Sydney CBD, the eastern suburbs and the south where commuters tend to prefer public transport. Private vehicles are forecast to remain the main transport mode for areas directly surrounding the Parramatta CBD.
- This highlights car ownership for Parramatta CBD residents and their car-dependence particularly for shorter distance trips. Considering the relative residential growth expected for Parramatta CBD, parking supply policies should be used in aiding the reduction of traffic within and around the Parramatta road network.

3.3 Travel Demand Management

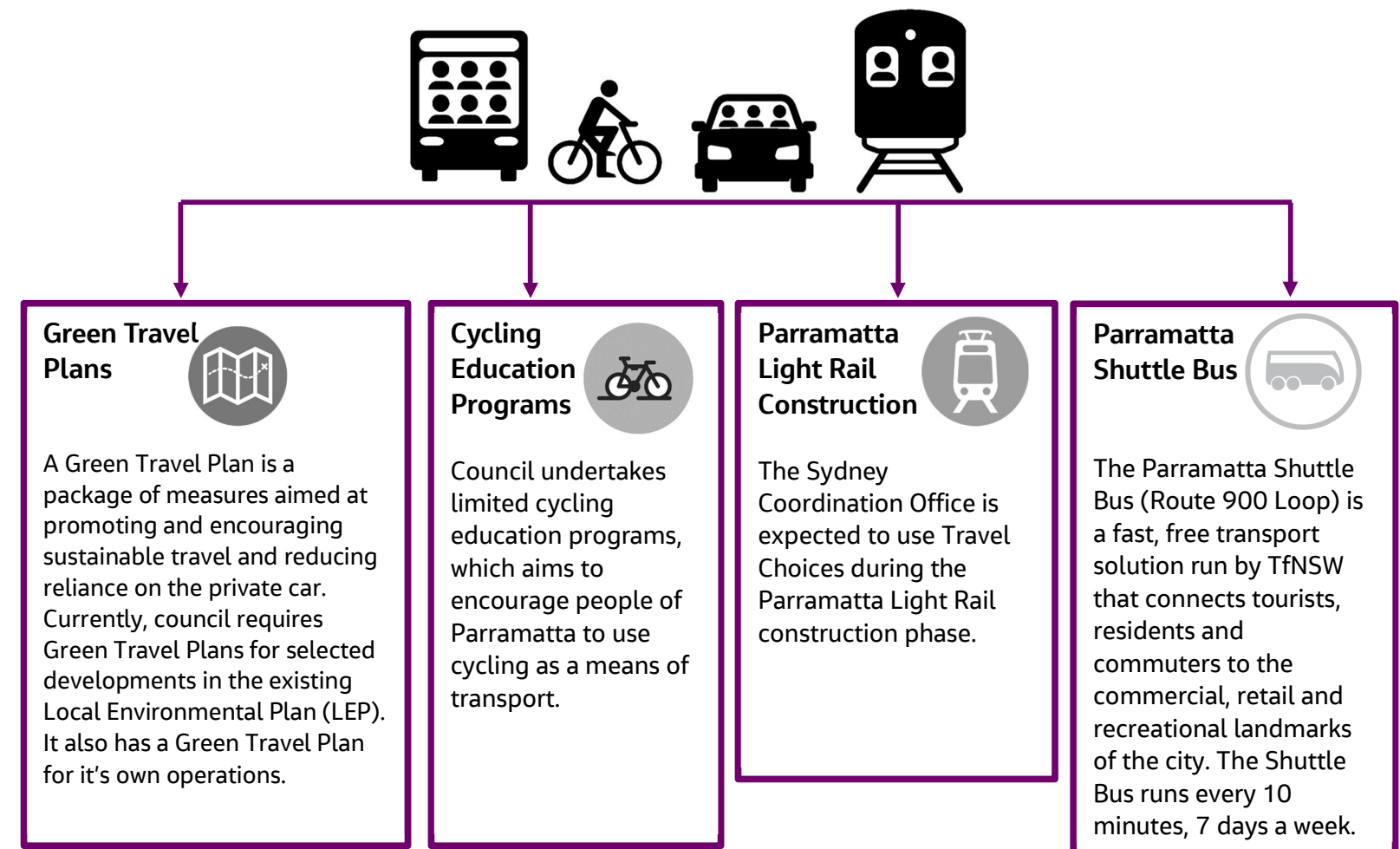
Travel Demand Management is a term used to describe strategies to influence demand on transport networks. This is achieved through redistribution of journeys to other modes, routes, times or minimizing the number of journeys made to improve network efficiency.

Parramatta CBD is already the major employment, retail and commercial centre for Western Sydney. Commercial centres, by definition, are places where many people and activities occur close together, so space is always scarce and valuable. Because cars are space-intensive, requiring more space for travel and parking than non-car modes, a city's liveability and economic productivity depend on limiting car use to what roads and parking facilities can efficiently accommodate.

Within Greater Parramatta, growth in travel demand within a context of constrained network capacity leads to congestion and a reduction in the quality of service to customers. This can be seen in:

- High car mode share (over 65%) for intra-regional work trips.
- Slower travel times and worsening reliability arterial roads and motorways such as the M4 Silverwater Road, Great Western Highway, Victoria Road, Cumberland Highway, James Ruse Drive.
- Peak hour travel times to the Parramatta city centre from within 15 kilometres are likely to increase by up to 10 minutes.
- Congestion on the rail system (e.g. Western Line) and at major transit interchanges (i.e. at Parramatta Bus-Rail Interchange).
- Buses on corridors approaching Parramatta often travel slowly in mixed traffic – reducing service reliability.
- Transport infrastructure (such as the Cumberland Rail Lines and parts of the T-way network) has significant spare capacity and as such is not delivering services as efficiently as possible.
- Conflicts caused by higher priority passenger rail operations in the metropolitan network as opposed to freight operations, and operational limitations set for freight trains.

Travel Demand Management strategies in Parramatta



3.4 Walking and Cycling

Active transport options are appealing to commuters who wish to **increase their journey time reliability, reduce their environmental footprint, improve health and avoid congestion.**

Parramatta is reasonably flat and has natural features such as Parramatta River and Parramatta Park, lending itself to high amenity active transport options. Despite this, active transport only accounts for 4% of all JTW trips by Parramatta CBD workers, and 8% of those starting within the Parramatta–Rosehill SA2.

3.4.1 Pedestrians

The Parramatta CBD includes basic pedestrian facilities such as paved footpaths, kerb ramps, tactile pavers and signalised crossings. Pedestrians have priority at selected scramble signalised intersections, at times with longer movement times than vehicles. Dedicated pedestrian and cyclist bridges are also provided across the Parramatta River at Elizabeth Street and within Parramatta Park. The amenity for pedestrians in the CBD varies significantly with high quality open pedestrian spaces provided around areas such as Parramatta Town Hall and along Parramatta River, whilst other areas may include older, aged footpaths.

The *Parramatta CBD Pedestrian Strategy (2017)* reports that the current “peak hour” for pedestrians in the city is in the middle of the day with a total of just over 80,000 movements. Figure 17 shows the peak hour pedestrian volumes by street within the CBD area. As shown, the principal set of pedestrian streets within the CBD include Church Street, George Street and Macquarie Street. Along the intersection of George Street and Church Street, the intersection experiences approximately 1200 pedestrian crossings in the peak of 12:30-13:30. They connect major transport, employment, recreational, cultural, service and retail destinations. Areas located near the Parramatta Interchange on Darcy Street also experience high pedestrian traffic, reaching over 2000 pedestrians in the peak hour.

Of all the trips within the local government area, 15% are by walking, and within the CBD, just over 10% of residents walk to their place of employment. By comparison, almost half of all trips in the City of Sydney, and a quarter in the City of Melbourne are by foot. Contextually, both City of Sydney and City of Melbourne have higher densities with greater concentration of attractions within walking distances. For Parramatta, these would be achievable in the medium and long-term, and should serve as targets for development plans to support greater walkability.

The *Integrated Transport Plan for Parramatta City Centre (2010)* supported the “creation of a pedestrian friendly city”. A key recommendation of the Plan was the implementation of a Pedestrian Amenity Zone across the CBD that included the reduction of the vehicle speed limit to 40 km/hr for the entire CBD, in addition to new or improved pedestrian facilities throughout and outside the CBD areas, encompassing signals, crossings and access paths to support greater pedestrian mobility. Some of the recommendations remain outstanding, however the designation of 40 km/hr CBD

speed limits has been implemented, as well as progress had been made on missing pedestrian legs at intersections and the introduction of scramble crossings.

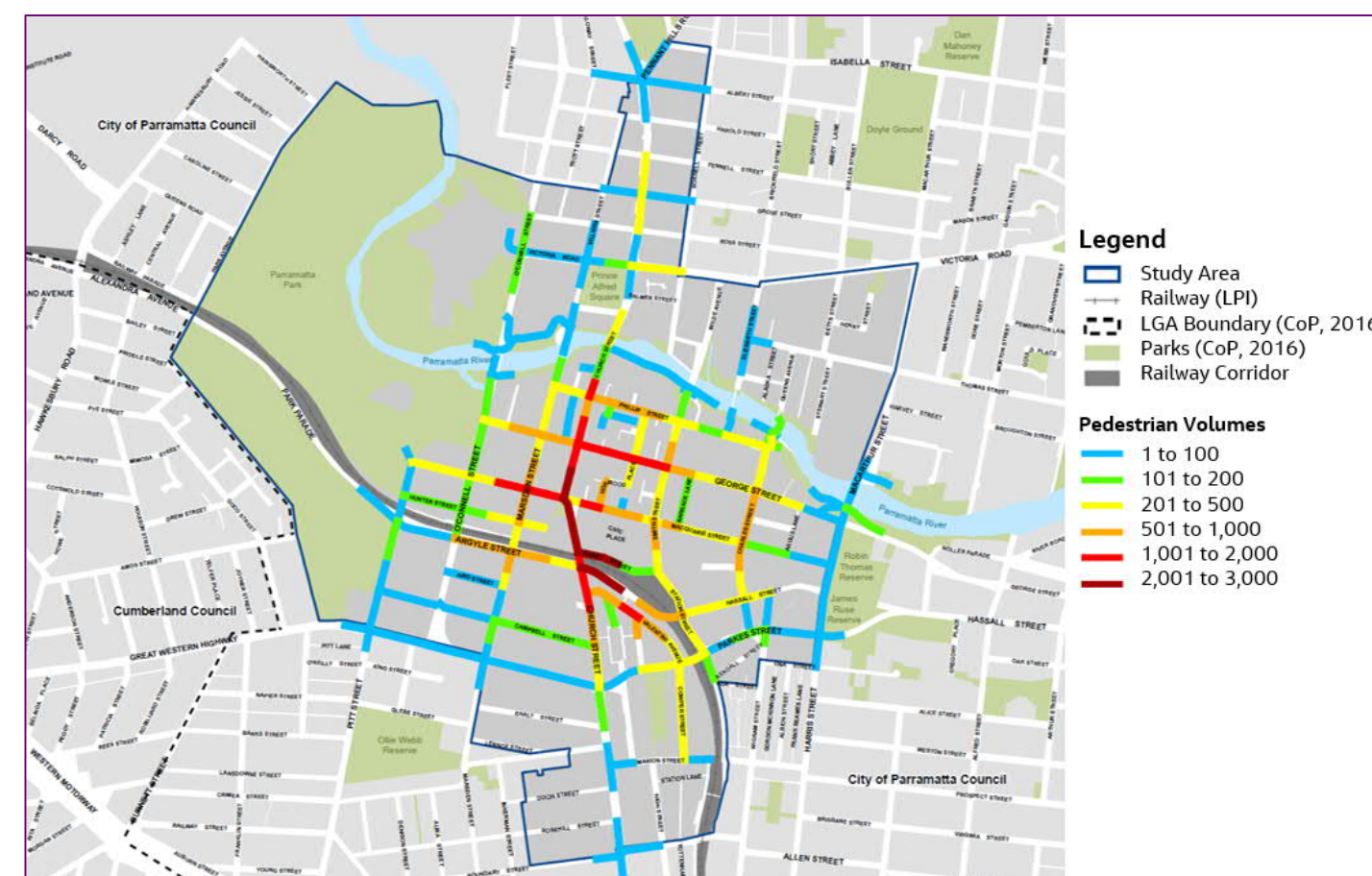


Figure 17: Current (2016) pedestrian volumes– Thursday PM Peak 12:30 - 13:30 (Source: CBD Pedestrian Strategy)

Note: Pedestrian count surveys, March to April 2016, Matrix

3.4.2 Cyclists

Parramatta’s existing cycling network provides connections to the CBD from most directions but there are no separated cycling facilities within the CBD. Existing routes incorporate a combination of primarily on-road (mixed traffic) and shared paths with pedestrians. Regional routes are provided from the east to west along the River Foreshore and alongside the M4, however the network lacks direct north-south connections. Existing and proposed cycle paths in proximity to Parramatta are presented in Figure 18. Some of these routes will be and are currently being impacted by Parramatta Light Rail.

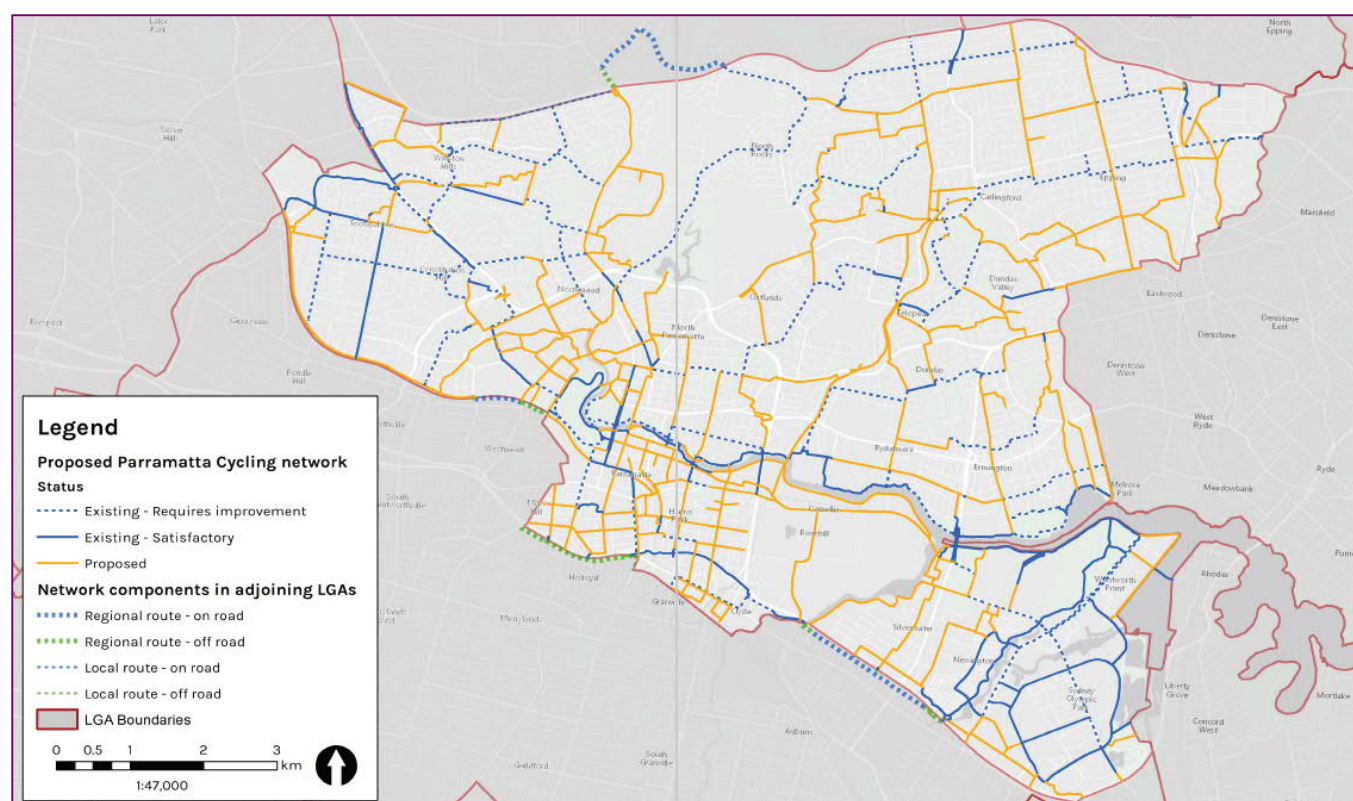


Figure 18: Existing and Proposed Parramatta Cycling Network (Source: Parramatta Bike Plan)

Some key routes within this area include:

- Existing on road routes include George Street, Phillip Street, and parts of Charles Street, Marsden Street and Hassall Street.
- Shared paths include Pitt Street and O’Connell Street, and access to the interchange is via Argyle Street and Station Street East.
- Both George Street and Marsden Street are the identified streets for physically separated bicycle paths in the future.

There are also a number of regional routes for cyclists; The M4 cycleway, the T-way from the north-west, and the Parramatta Valley Cycleway (PVC) from the east provide east-west links. From the south, there is the Parramatta-Liverpool Rail Trail and Duck River shared-path.

Figure 19 shows the popular routes for cycling near Parramatta CBD from Strava. The most common route is along Parramatta River, which is in line with the off-road cycle path existing on

that route. Church St and O’Connell St are popular routes within the CBD district, also including off-road. The Parramatta River carries a quarter of a million cyclists each year, and has steadily increased over the years as each section of the river path is unlocked.

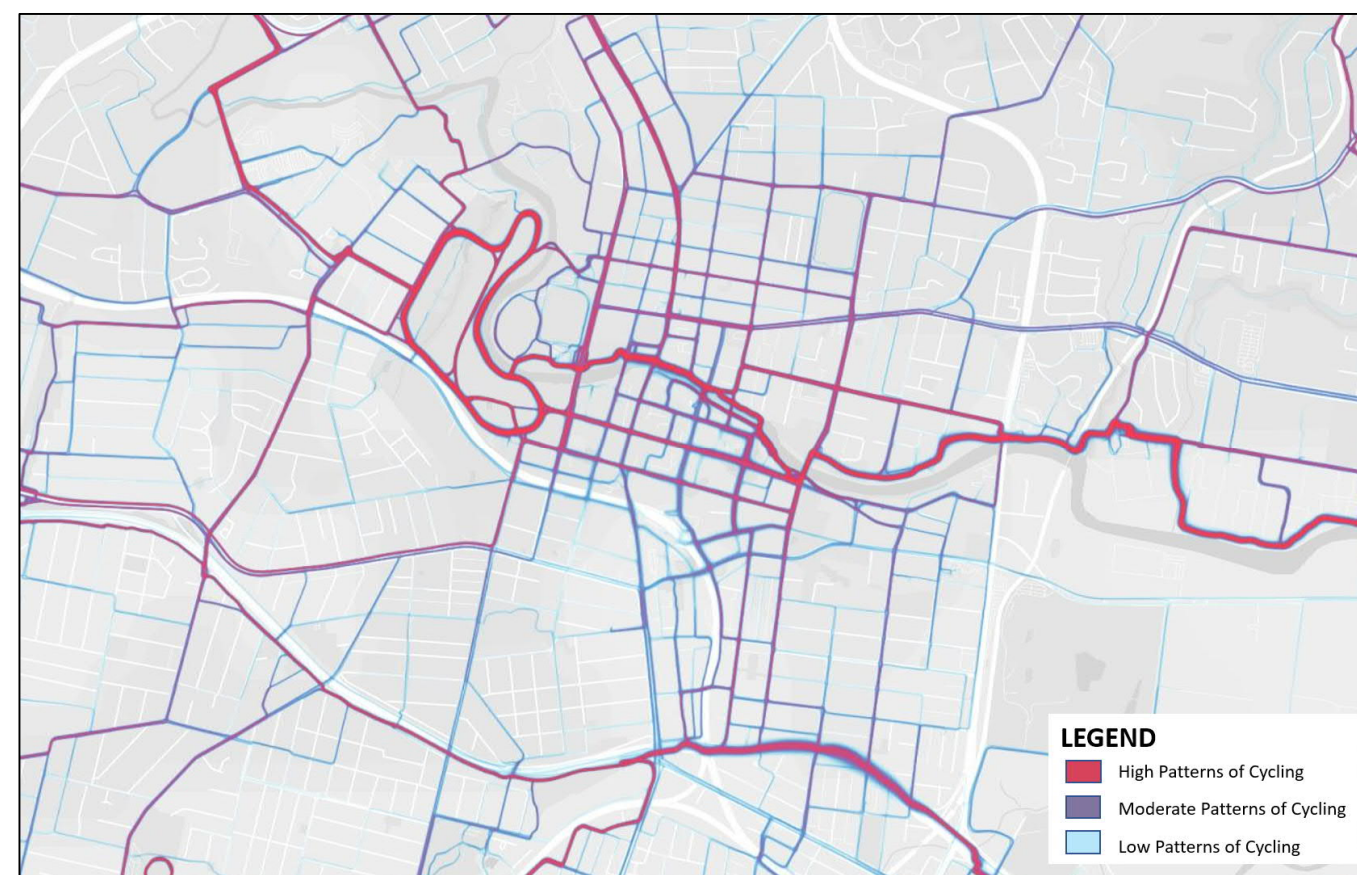


Figure 19: Popular Cycling Routes near Parramatta CBD (Source: Strava)

Secure and convenient bicycle parking at transport interchanges makes it easier to access public transport services on a bike. Parramatta Station has secure access bicycle parking facilities with individual lockers and a bike shed. North of the Parramatta CBD planning proposal area however, there are few safe cycling facilities. The cycle network is disconnected within and on approach to the CBD. Most cycle routes to the north are in an on-road environment with moderate to high difficulty for cyclists, with limited dedicated infrastructure.

Despite the presence of cycling infrastructure within Parramatta, there is still only a small proportion of people using the bicycle as a mode of transport. As mentioned in *Parramatta Bike Plan (2017)*, some of the barriers that may be contributing to this include:

- There are a limited number of streets with dedicated bicycle infrastructure, resulting in a lack of safety.
- There are limited cycling opportunities and permeability in the CBD, negatively impact on cycling participation
- Many bike lanes end at intersections, reducing accessibility
- The topography north of Parramatta River is challenging for cyclists, especially with limited dedicated infrastructure in the area

3.5 Public Transport

Public transport in Parramatta consists of trains, buses and ferry. Whilst public transport within Parramatta CBD is easily accessible, there are challenges that exist regarding multimodal integration and accessibility.

3.5.1 Train

Train forms the spine of the public transport network in Sydney, and this is no different for Parramatta. Train currently accommodates 30% of JTW trips by local residents.

Parramatta CBD is serviced by Parramatta Station, the fourth busiest train station in Sydney with over 90,000 customer movements on a typical weekday. The station is serviced by trains on the T1 Western line, T2 Inner West line, T5 Cumberland line and the Blue Mountains line. The station is also being serviced by regional trains to the Central West and Broken Hill.

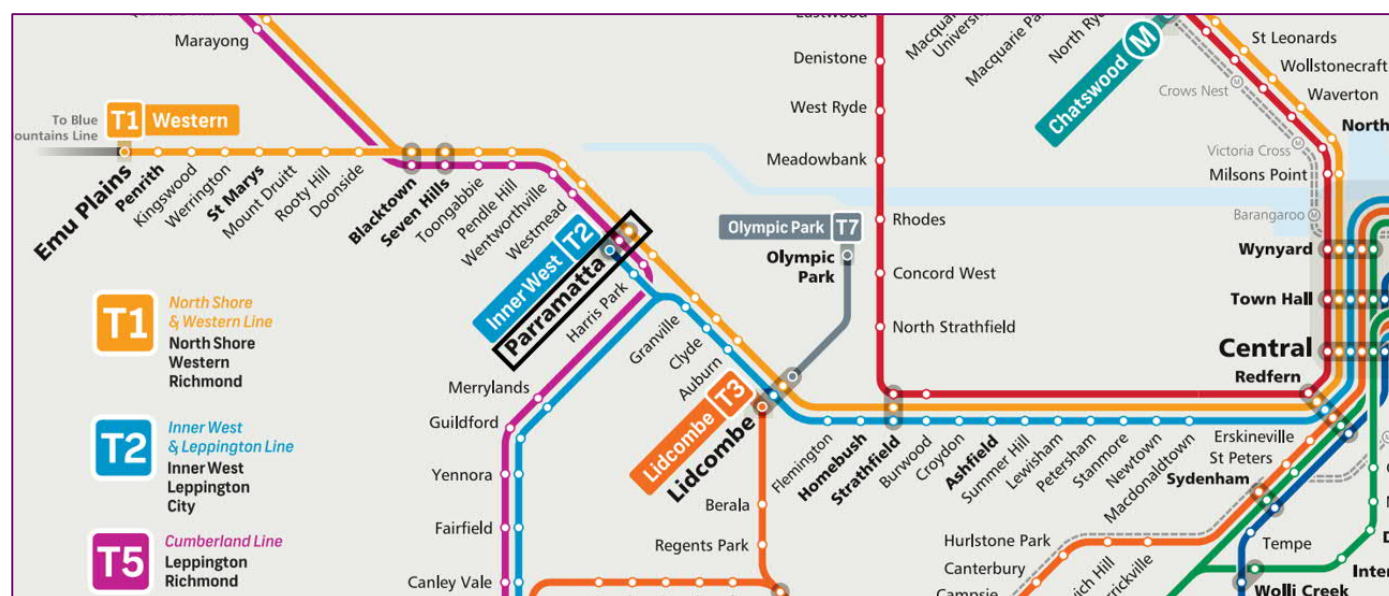


Figure 20: Train Lines servicing Parramatta Station (Source: Transport for NSW)

Analysis within the *Parramatta CBD Strategic Transport Study* suggested that in 2016, demand was approaching nominal capacity (in the peak hour, dominant direction) on the critical T1 Western Line and T5 Cumberland Line services. Following signalling and track upgrade works to increase capacity, improve journey times and reliability, a new timetable was introduced in November 2017 to increase the capacity on routes serving Parramatta which included:

- 40% more trains
- Up to 20 express services (a train every three minutes) between Parramatta and Sydney CBD at peak times
- Direct link between the Inner West and Parramatta (T2 Inner West line)

Opal Data captured in September 2019 indicated that on a typical weekday, there were approximately 49,900 train trips² taken from Parramatta Station and 51,900 trips were taken to Parramatta Station. The most popular destinations for outbound train trips were to Sydney Inner City (28%), followed by Blacktown (9%) and Strathfield – Burwood – Ashfield regions (7%). The most popular origins for inbound train trips were from Sydney Inner City (28%), followed by Blacktown (8%) and Strathfield – Burwood – Ashfield regions (7%).

Whilst existing improvements have allowed improved services, Parramatta’s growth is forecast to trigger a rise in passenger demand up to 2051– by 50 per cent on the T1 and Blue Mountains lines and 80 per cent on the T2 line. This means other measures to increase capacity on routes serving Greater Parramatta are vital.

3.5.2 Light Rail

Light rail services do not currently exist in the Parramatta CBD; however, construction of a Parramatta Light Rail (PLR) has begun, with services scheduled to start in 2023. This is discussed in detail in the Parramatta Future Section.

² All Opal Data processed assumed that trips <18 were assumed to have 18 trips in total.

3.5.3 Buses

Buses are a fundamental part of the public transport system in Parramatta. Since new services can be implemented faster and cheaper than other types of public transport, they are able to cover an extensive geographic catchment along key radial corridors from the CBD and beyond. Whilst the majority of JTW trips are made by car and rail, the bus network plays an important role in providing transit accessibility to the CBD and public transport access to the rail network at Parramatta Interchange. Key bus service routes are shown in Figure 21.

Four different operators provide a total of over 50 bus services in the Parramatta CBD; Sydney Buses, Hillsbus, Transdev and Transit Systems. Transport for NSW (TfNSW) also operates a free shuttle (route number 900) around the CBD.

Within the CBD, Parramatta Interchange is where a significant majority of Parramatta's bus services converge. This interchange services approximately 250 bus services in each of the AM and PM peak hours. The current interchange is close to capacity. From September 2019 Opal Data, the most common interchange combination is changing from bus to train at Parramatta Interchange to access Sydney Inner City.

However, some constraints to operations were already observed in the *Parramatta CBD strategy*, including:

- Key layover storage areas at Argyle Street and Station Street were at or near capacity
- Passenger waiting areas can become crowded
- Bus queues can accumulate as clusters of users arrive at/depart the interchange simultaneously

The *Parramatta CBD transport strategy* showed that the highest load of bus patronage is generally to the west of Parramatta CBD. Through the study, it identified the strategic importance of Park Parade, the Great Western Highway, Victoria Road and Church Street in terms of providing bus access to the CBD.

Opal data from September 2019 shows that the top bus trips from Parramatta – Rosehill (SA2) occur to destinations within the district (10%), or to neighbouring districts such as North Parramatta (SA2), Northmead, or Wentworthville-Westmead. The top bus trips to Parramatta-Rosehill also occur from origins within the district (12%), or from neighbouring districts such as North Parramatta (8%) or Ermington-Rydalmere (7%).

A high degree of priority infrastructure is available for buses; including two bus transitways (T-ways) to the north west and south west: these corridors also cater for the largest bus passenger volumes accessing the CBD. However, to cater for future bus patronage volumes, more infrastructure will be required to ensure smooth operation of additional services.

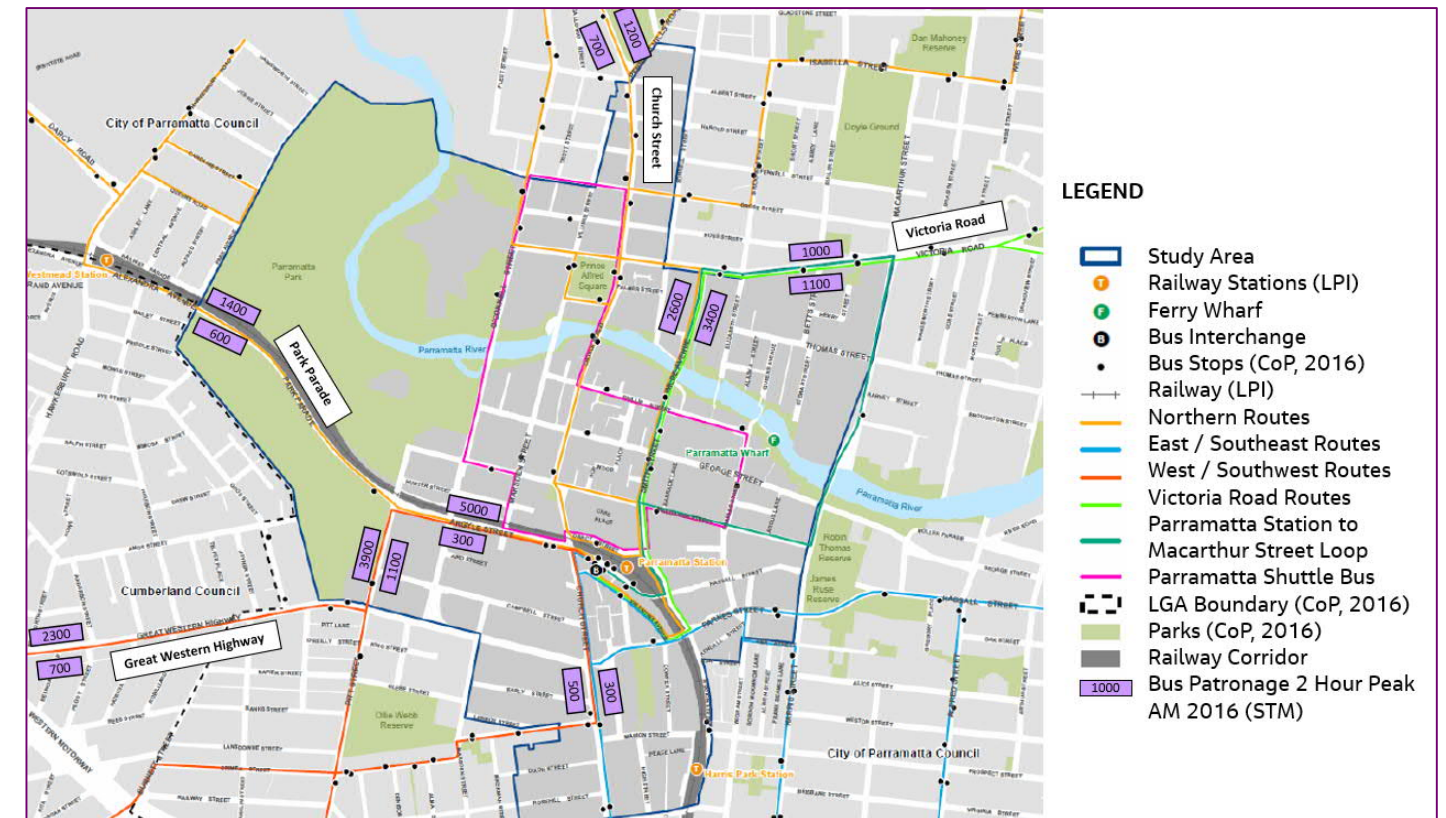


Figure 21: AM peak hour bus demand at key cordon locations (Source: CBD Pedestrian Strategy)



Figure 22: Existing Bus Infrastructure in Parramatta CBD (Source: Google)

3.5.4 Ferry

Parramatta Wharf provides access to the Parramatta CBD by ferry. The wharf is located on the Parramatta River, on the eastern fringe of the CBD. The wharf is serviced by the F3 Parramatta River route which operates from Parramatta to Circular Quay, as shown in Figure 23.

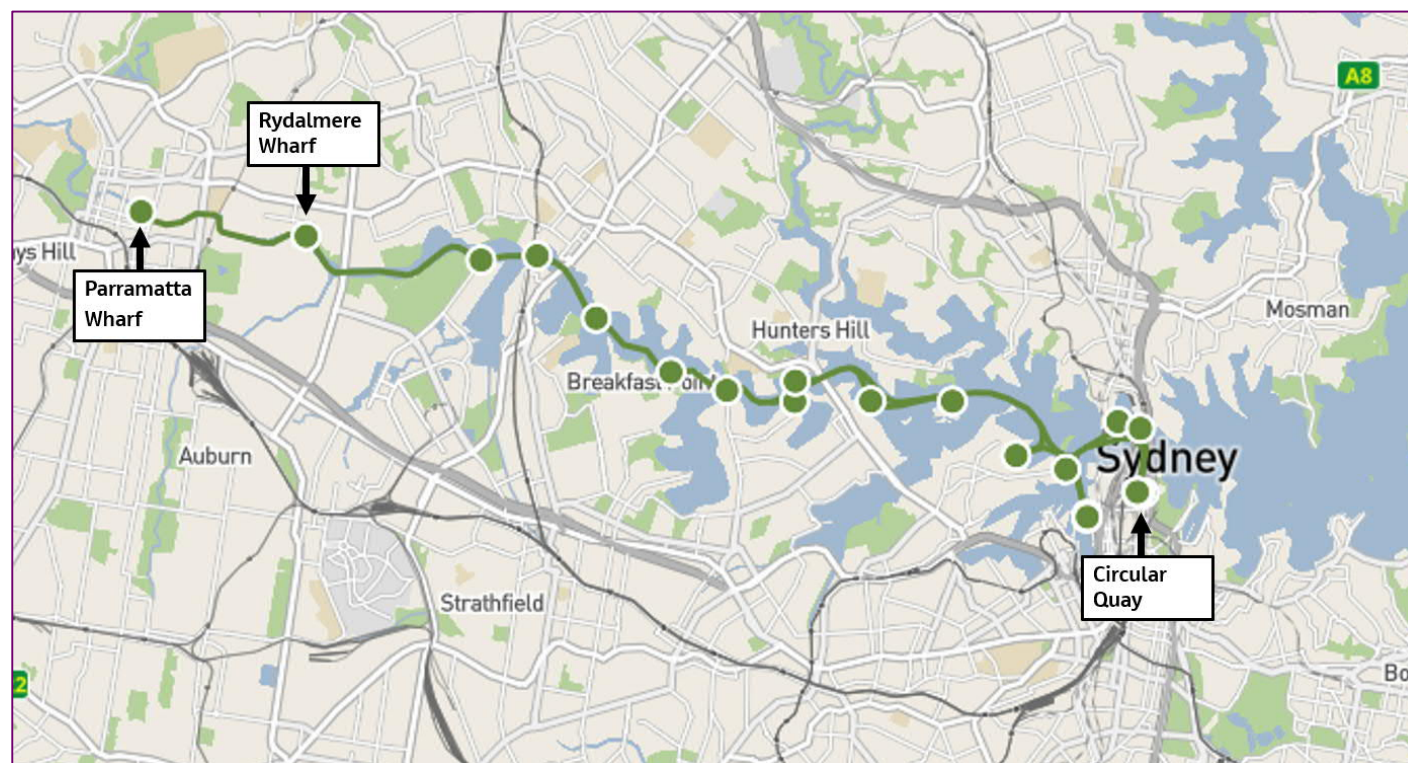


Figure 23: F3 – Parramatta River to Circular Quay Route (Source: Transport NSW)

Ferry services accommodate less than 1% of the current mode share for employees accessing the Parramatta CBD. In analysis conducted in the *Parramatta CBD transport strategy*, average line load data collected for the F3 Parramatta River ferry service illustrates very low patronage at wharves at the western end of the service during peak commuter periods, increasing at the eastern end in proximity to the Sydney CBD, however still remain below 70% seating capacity. Barrier count data shows that passenger movements accessing central Parramatta by ferry have been consistently less than 200 passengers per two-hour (weekday) peak period. This can be caused by various factors including:

- **Slow journey times** - The full length ferry journey between Circular Quay and Parramatta is 75 to 90 minutes compared with 40 minutes by train and 40 minutes by car
- **Infrequent services** - Ferry services operate hourly even in peak periods.
- **Perceived unreliability** - Ferry services to/from Parramatta are affected by low tides. Passengers must consult a Transport for NSW calendar when this occurs, as replacement buses run between Parramatta and Rydalmere.

Despite the above factors, Parramatta River Ferry services are popular with the local community and with Western Sydney more broadly, for the important recreation opportunities they provide, and their increasing contribution to the area's tourism offering. This popularity can be seen during the weekday off-peak and weekend periods, with loadings 400-600% higher experienced during Saturdays, Sundays and holiday periods compared to weekdays.

From Opal Data captured in September 2019, 19 minute trips to Rydalmere Wharf are the most common trip origin and destination for ferry trips to/from Parramatta. These trips are higher on weekends and highlights that commuters do not choose to use the ferry line as a means of travelling for commuting purposes, but rather are more popular for leisure.

In recent years, many improvements have been made to ferry services and infrastructure. In 2017, an additional 90 weekly services were added to Parramatta. The NSW Government also recently completed upgrading the Parramatta Wharf in 2019 as part of the Transport Access Program (TAP). The upgraded wharf provides improved amenity and safety, quicker and more efficient boarding and disembarking, and increased wharf capacity.

With the development of the new Powerhouse Precinct and Parramatta Square fast becoming a jobs hub, the ferry line will play a bigger role in connecting commuters to Sydney's Central River City in coming years. Council is advocating for smaller, low impact vessels, increased ferry speeds and more frequent services between Parramatta and Sydney Olympic Park.

3.6 Roads

Road users include public (buses), private (personal cars and taxis), and freight (LGV and HGV) vehicles. The road network facilitates the majority of the transport mobility task in Greater Sydney. In Parramatta, an extensive road network serves the CBD, links to other precincts and provides regional connections to and from metropolitan Sydney.

3.6.1 Wider Road Network and Road Hierarchy

Greater Parramatta has two designated ring-roads as shown in Figure 24. Parramatta CBD 'City Ring-Road' is on the outskirts of the Parramatta CBD and its function is to facilitate traffic circulation in the CBD. The 'Regional Ring Road' is made up of three key State roads, the M4 in the South, the Cumberland Highway in the West, and James Ruse Drive in the North and East. Its function is to direct regional traffic around the CBD.

Table 2: Key roads around Parramatta CBD

Road	Road Classification	Volume (in peak direction of travel)		Year Data Collected
		AM Peak	PM Peak	
James Ruse Drive	State Road	2,890 (NB)	2,430 (NB)	2014
M4 Western Motorway ³	Motorway	2,070 (SB)	1,910 (SB)	2015
Cumberland Highway	State Road	2,260 (SB)	2,850 (SB)	2016
Great Western Highway (A44)	State Road	1,620 (EB)	1,880 (WB)	2019
Victoria Road	State Road	1,190 (EB)	1,260 (EB)	2016
Macarthur Street	Regional Road (Parramatta)	990 (SB)	1,100 (SB)	2014
Pennant Hills Road	State Road	900 (SB)	740 (SB)	2019
Old Windsor Road (A40)	State Road	2,550 (SB)	2,420 (NB)	2019

The Great Western Highway / Parramatta Road and the M4 Motorway are the major east-west connections for the Metropolitan Region. These all pass-through Parramatta. As a result, the CBD's road network should manage cross-regional private vehicle and freight trips as well as shorter cross-town and local trips, without jeopardising the quality and function of the CBD. The road network within Parramatta CBD has a well-defined pattern by the railway line and Parramatta River, both of which run east-west. Parramatta Park on the western edge forms a barrier to through westbound movement.

In addition to the Ring Roads, other significant roads that lead to the Parramatta CBD include:

- Great Western Highway from Penrith and Blacktown
- Victoria Road from central Sydney along the north of Parramatta River
- Parramatta Road, Woodville Road and Church Street from the south of Parramatta
- Windsor Road and Church Street from the north of Parramatta and Baulkham Hills

The Parramatta CBD Transport strategy revealed that congestion is experienced at peak periods in locations on the 'inner ring road' network including the Great Western Highway, Pitt Street, Parkes Street, O'Connell Street and Macarthur Street at the Gasworks Bridge. Operations along key east-west and north-south inner CBD streets, were generally observed to be reasonable. The 'Regional Ring Road' experiences significant congestion along the M4 Western Motorway, particularly at the Church Street eastbound exit ramp; and at select locations on James Ruse Drive and the A28 Cumberland Highway, particularly at intersections with Old Windsor Road and Windsor Road.

AM volume to capacity ratios (VCR) on the road network surrounding Parramatta CBD from 2016 are shown in Figure 25. The VCR is a measure of the level of congestion on a road given the traffic volume and road capacity. When the VCR reaches 1, this indicates that the road is operating at 100% capacity. As shown, the majority of roads have a VCR of 0.85 or less. Roads within the Parramatta CBD, particularly along Marsden Street, experiences roads operating near or at 100% capacity.

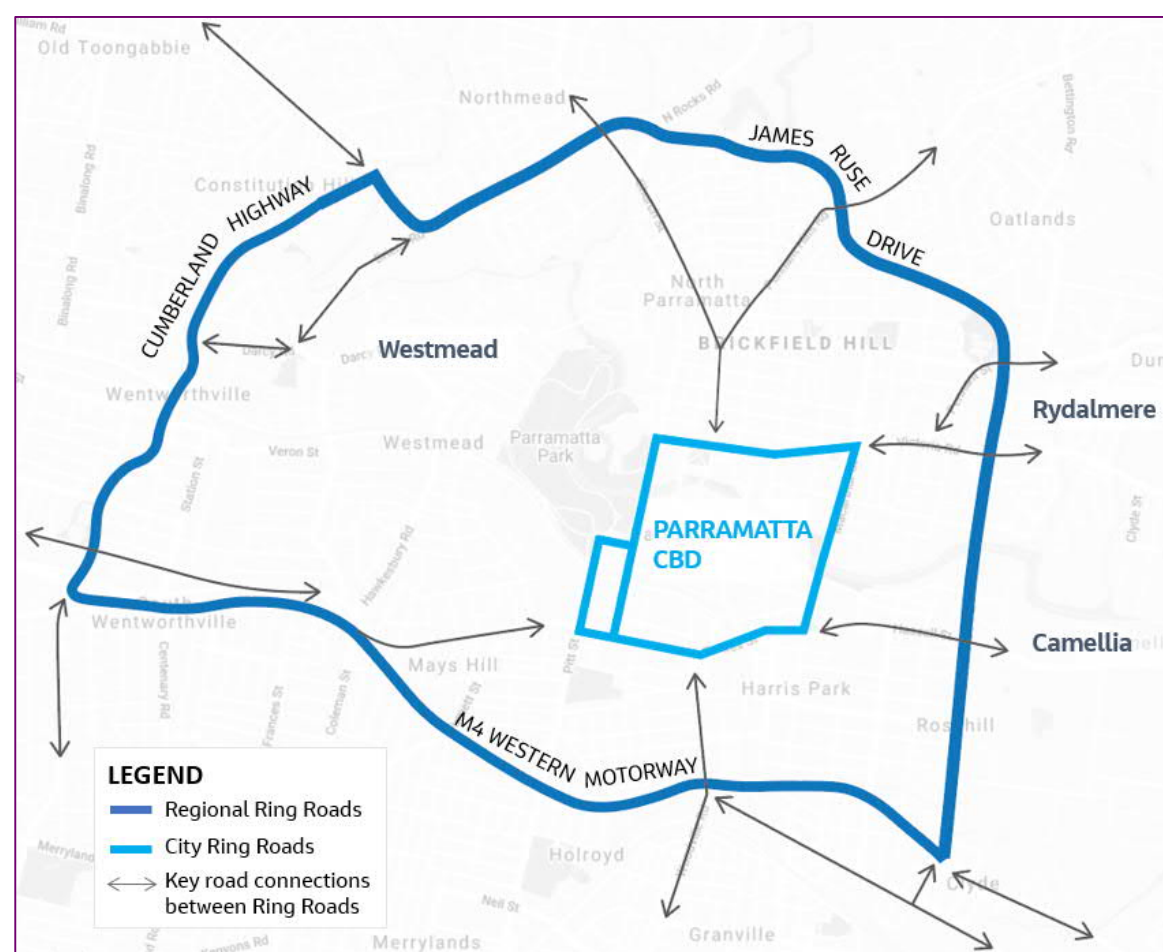


Figure 24: Parramatta CBD 'City' and 'Regional' Ring Roads

Characteristics of key roads within Parramatta CBD are shown in Table 2.

³ Data for M4 Western Motorway taken prior to Tollway introduction, near Sydney Olympic Park.

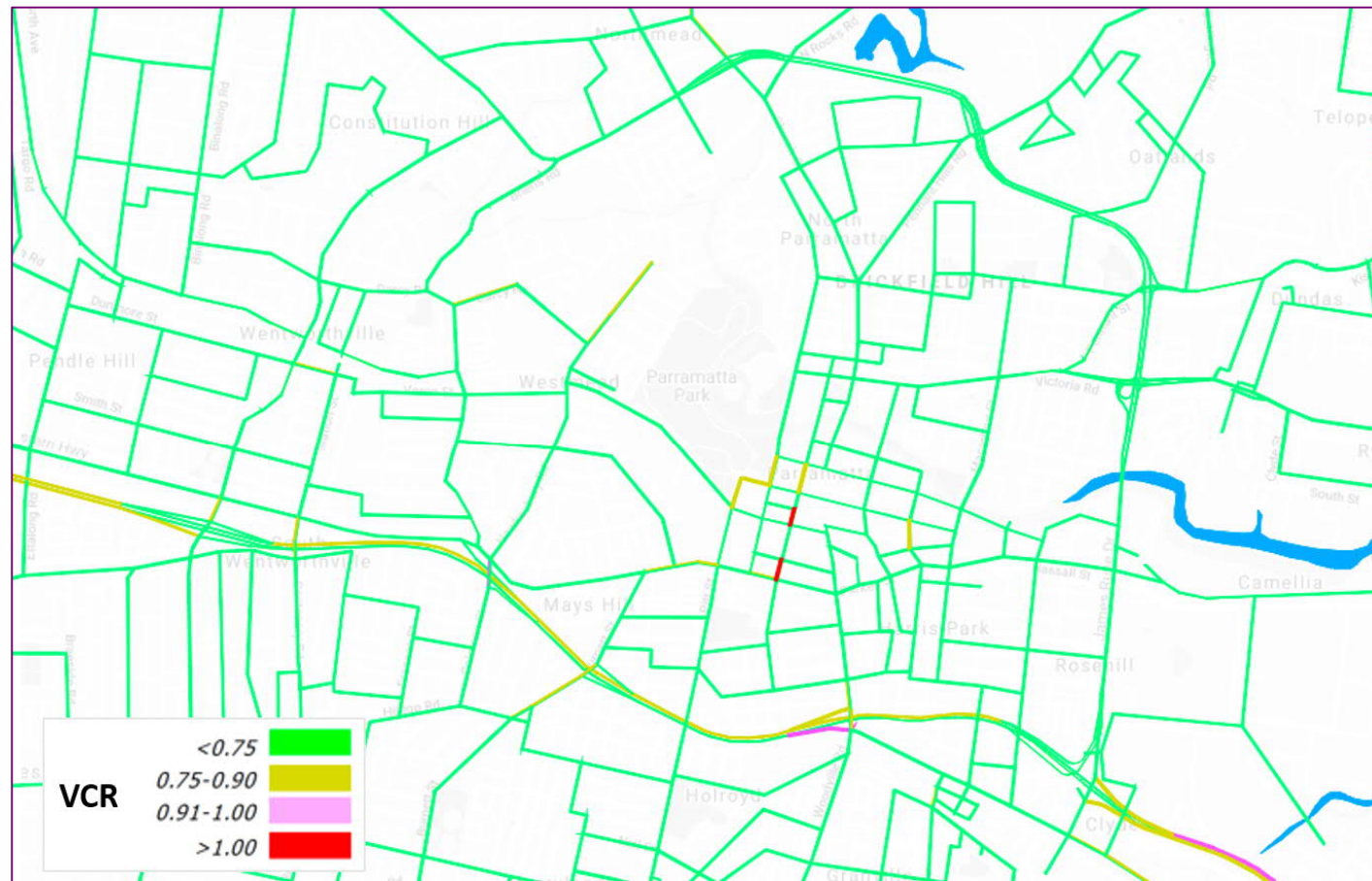


Figure 25: Base Year (2016) AM Peak (7-9am)- Volume to Capacity Ratio (Source: STFM)

Existing AM and PM peak typical travel speeds on the road network surrounding Parramatta CBD are shown in Figure 26 and Figure 27. Travel speeds provide a means of assessing the functional performance of a road network, by providing an aggregate measure of the performance of a route that considers the time to travel the links and the intersections along that route. It gives a good indication of quality of a route relative to alternatives as drivers generally select routes that are faster and minimise their travel times.

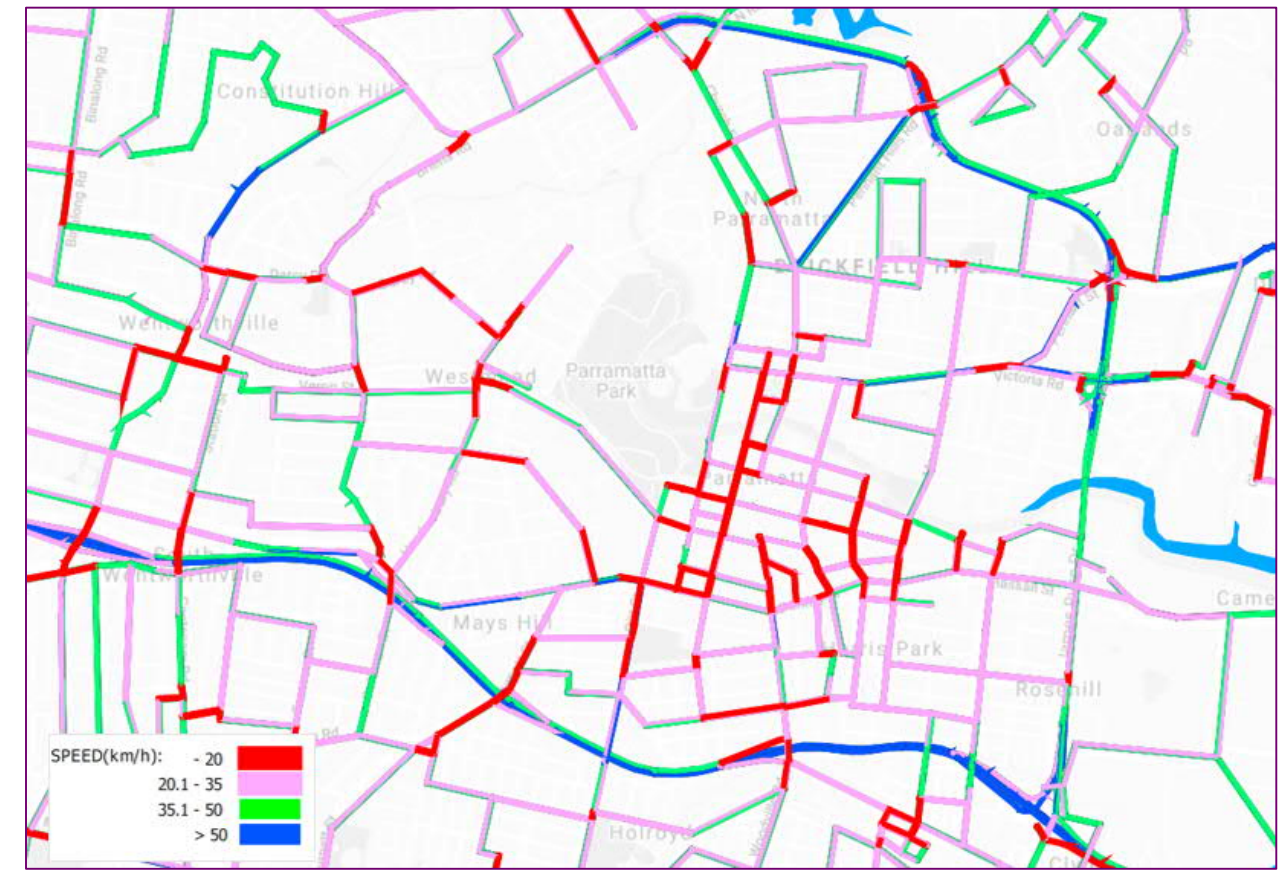


Figure 26: Current (2018) AM Peak (7-9am) – Travel Speeds (Source: STFM)

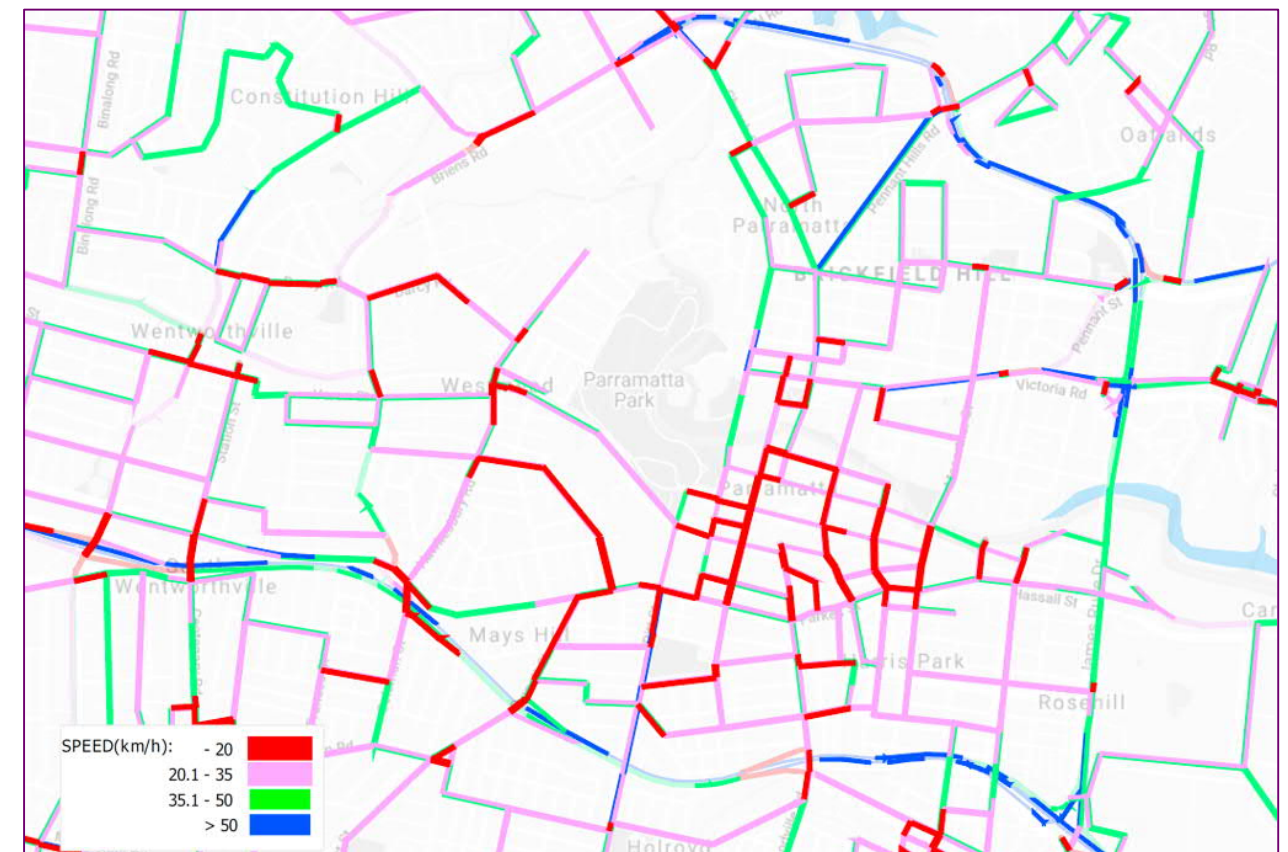


Figure 27: Current (2018) PM Peak (4-6pm) – Travel Speeds (Source: STFM)

Additionally, typical traffic obtained from Google was used to show the traffic congestion hotspots around Parramatta. As shown, during the AM peak congestion is generally observed along Parramatta Road and Woodville Road, near the intersection with Church Street, and along Darcy Road near Westmead Hospital. During the PM peak, congestion is generally observed the intersection of Great Western Highway, Parkes Street and Church Street and along Harris Street and Macarthur Street. Other hotspots include along James Ruse Drive near the intersection with Church Street.

Currently, trips on the road from Parramatta CBD to Sydney CBD take around 40 minutes – 1hr 25 minutes via the M4 toll in the AM peak. A similar trip without tolls takes between 50 minutes - 1hr 30 mins in the AM peak.

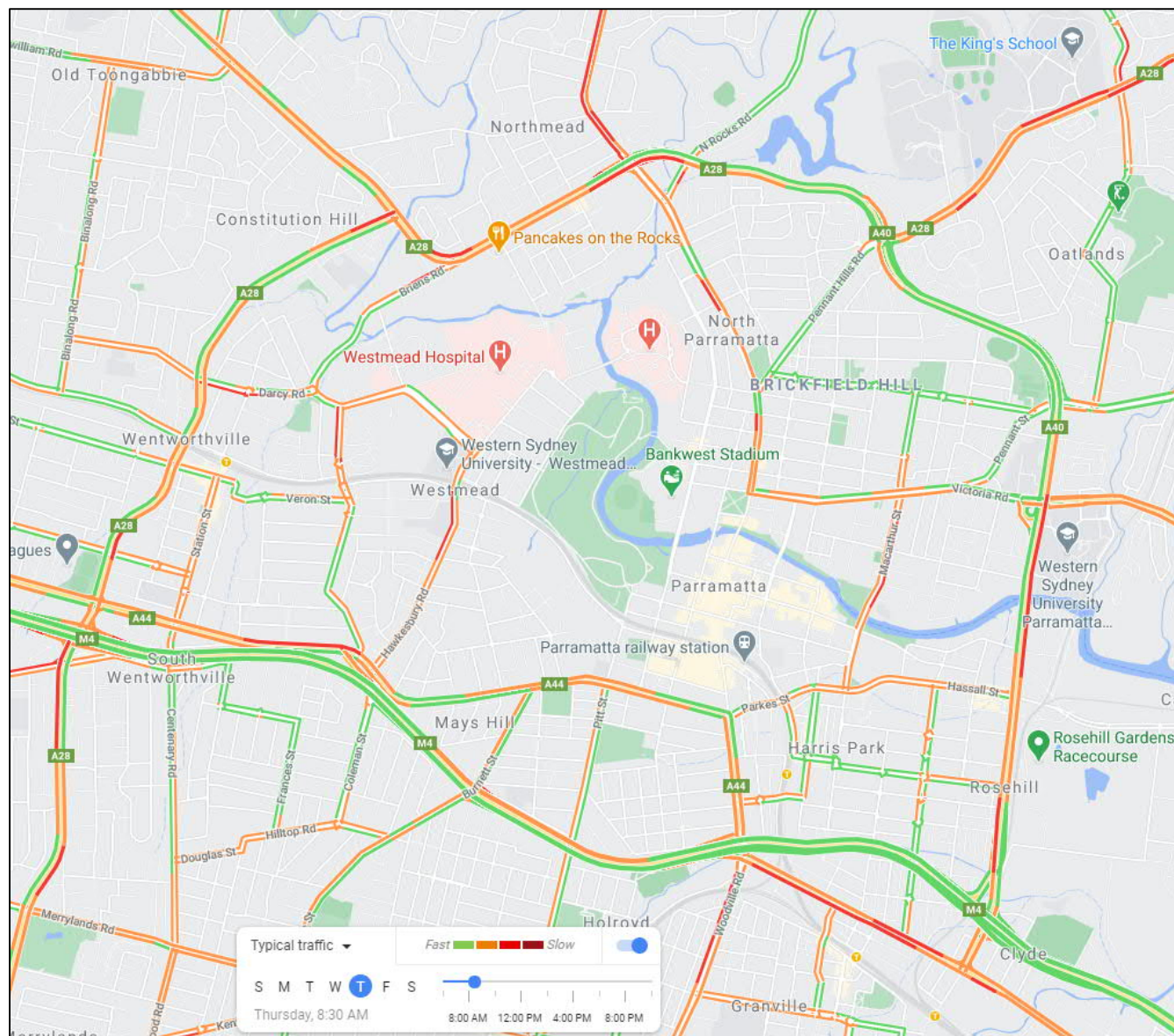


Figure 28: Typical Thursday 8:30am Traffic (Source: Google April 2021)

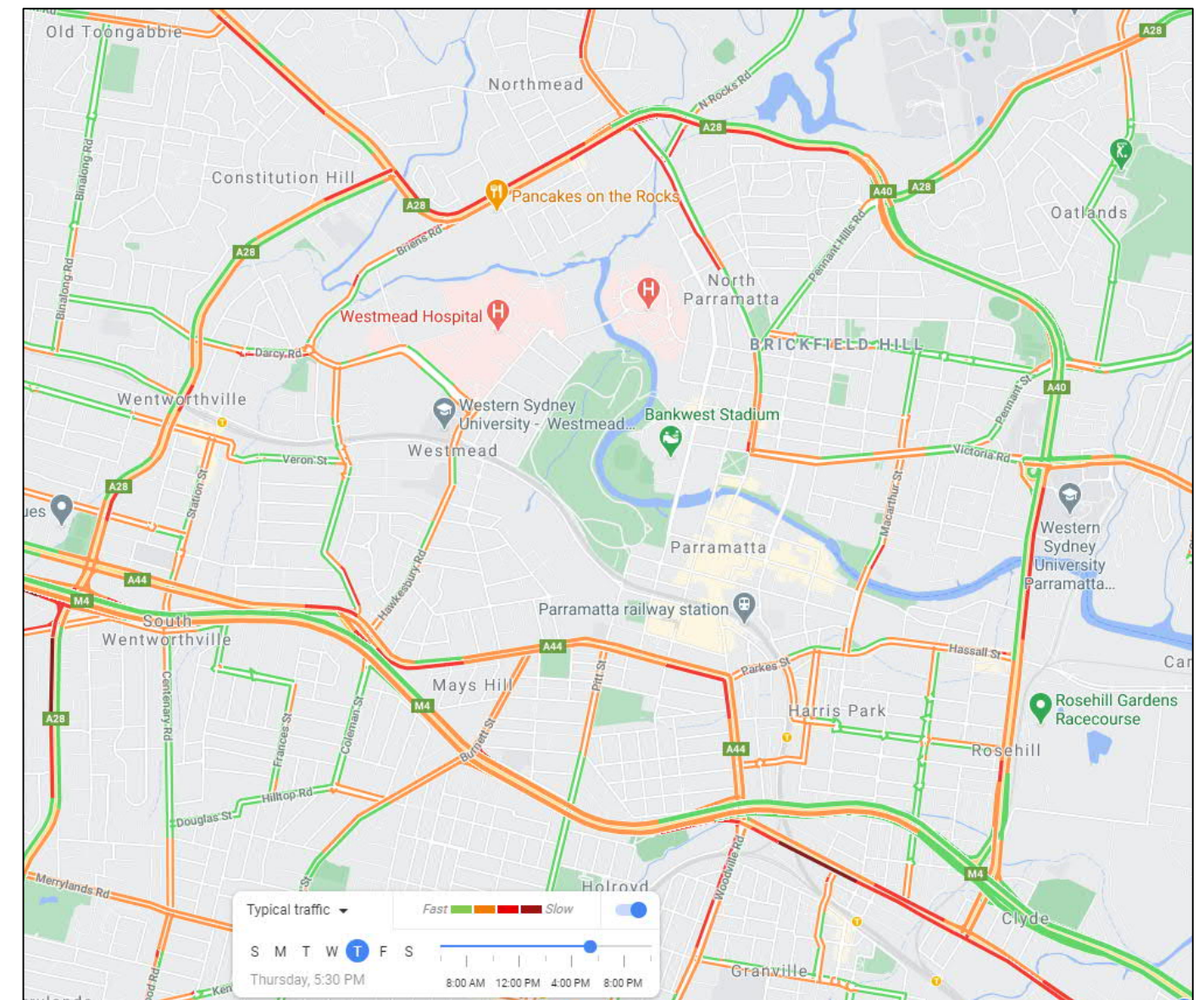


Figure 29: Typical Thursday 5:30pm Traffic (Source: Google April 2021)

3.6.2 Intersection Performance

The performance of a road network is largely dependent on the operating performance of its intersections which control and determine the capacity and travel speeds in a network.

SIDRA intersection modelling tool was used to aid with the design and evaluation of the key intersections within Parramatta. Stand-alone models of one simple intersection or a set of closely spaced intersections were used to provide a high level of detail including geometries, drive behaviour and signal plans. SIDRA provides estimates of capacity and performance statistics such as delays, queue length etc. by lane for all approaches to an intersection.

The list of intersections assessed, and their associated results are shown in Table 3. The SIDRA modelling shows that the majority of signalised intersections within and surrounding Parramatta are currently operating at capacity or are approaching their nominal capacities during the peak periods.

The following inner-ring intersections currently operate at LoS E or F during the peak periods:

- Parkes St / Harris St
- Great Western Hwy / Marsden St
- Great Western Hwy / O'Connell St

With the exception of Cumberland Highway (Hart Dr) / Old Windsor Road, the majority of outer-ring intersections currently operate at LoS E or F during peak periods. This includes:

- Great Western Hwy/ Cumberland Hwy (Jersey Rd)
- Cumberland Hwy (Hart Dr) / Darcy Rd
- Cumberland Hwy (Hart Dr) / Windsor Rd
- Cumberland Hwy / Pennant Hills Rd / James Ruse Dr
- James Ruse Dr / Hassall St / Grand Ave
- Great Western Hwy / Parramatta Rd / Woodville Rd / Church St

Table 3: 2016 Intersection Performance

Site	Network	Intersection	TCS	95% Queue (m)		Average Delay (sec)		Degree of Saturation (DoS)		Level of Service (LoS)	
				AM	PM	AM	PM	AM	PM	AM	PM
1	1.2	O'Connell St / Victoria Rd	1105	165	105	31	32	0.86	0.92	C	C
2		Victoria Rd / Villiers St / Marist Pl	742	64	81	33	39	0.90	0.92	C	D
3	3	Victoria Rd / Wilde Ave	1055	206	184	40	34	0.83	0.73	D	C
4	4	Victoria Rd / Macarthur St	749	210	166	39	41	0.76	0.69	D	D
5	5	George St / Macarthur St / Harris St	2049	310	367	15	24	0.82	0.85	B	C
6	6,7,8	Parkes St / Harris St	1899	128	144	72	60	0.99	0.92	E	E
7		Parkes St / Wigram St	3818	96	103	33	24	0.90	0.77	C	C
8		Parkes St / Station St E	2203	115	124	32	44	0.92	0.91	C	D
9	9,10,11,12	Great Western Hwy / Parkes St / Church St	108	184	156	58	59	0.92	0.92	E	E
10		Great Western Hwy / Marsden St	724	170	126	67	55	1.00	0.99	E	E
11		Great Western Hwy / O'Connell St	2291	150	178	49	44	0.99	0.97	D	D
12		Great Western Hwy / Pitt St	156	214	172	45	31	0.91	0.92	D	C
13	13,14	O'Connell St / Macquarie St	1065	199	39	19	14	0.90	0.90	B	B
14		O'Connell St / George St	1094	203	96	54	19	1.00	0.73	D	B
15	15	Church St / Pennant Hills Rd / Albert St	190	398	228	41	33	0.88	0.75	D	C
16	16	Church St / Barney St	1085	303	164	33	40	0.85	0.68	C	D
17	17	Great Western Hwy/ Cumberland Hwy (Jersey Rd)	2693	397	303	84	66	1.00	0.99	F	E
18	18	Cumberland Hwy (Hart Dr) / Darcy Rd	2329	287	313	59	73	0.97	0.99	E	E
19	19	Cumberland Hwy (Hart Dr) / Old Windsor Rd	1852	296	312	36	35	0.81	0.85	D	C
20	20	Cumberland Hwy (James Ruse Dr) / Windsor Rd	704	>500	>500	52	>100	0.96	1.41	D	F
21	21	Cumberland Hwy / Pennant Hills Rd / James Ruse Dr	1026	329	241	56	54	1.00	0.99	E	D
22	22	James Ruse Dr / Hassall St / Grand Ave	1565	>500	>500	61	66	0.97	0.98	E	E
23	23	Great Western Hwy / Parramatta Rd / Woodville Rd / Church St	84	457	450	69	66	1.00	0.99	E	E

3.6.3 Road Safety

The crash data for the Parramatta LGA area obtained from TfNSW has been analysed, which includes a dataset from 2014-2018. In the five-year period from 2014-2018, 3301 casualty crashes were recorded in the Parramatta LGA. A summary of the total crashes is shown in Figure 30. Figure 31 shows the types of crashes over the past 5 years in Parramatta LGA.

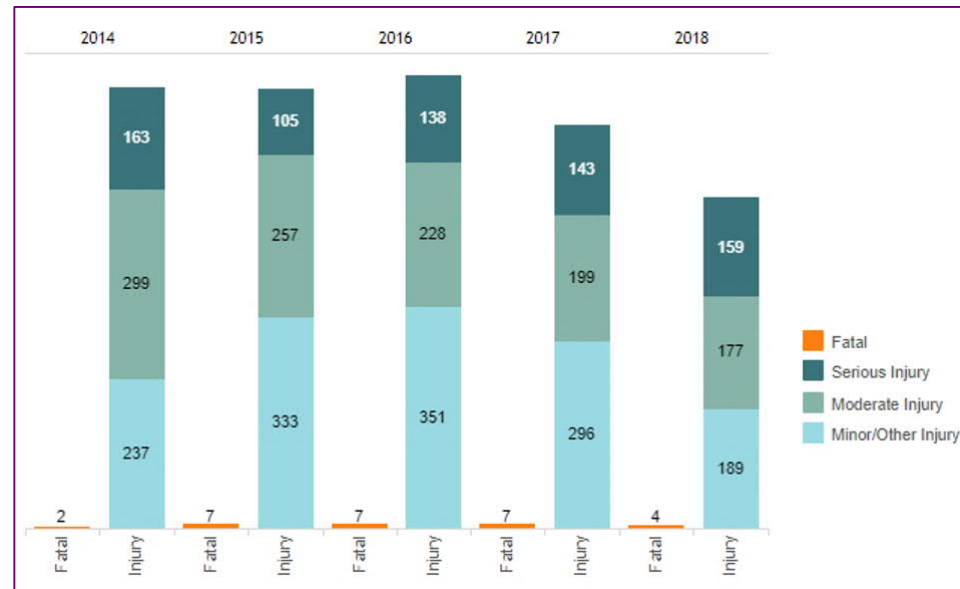


Figure 30: Summary of Casualty Crash Data in Parramatta LGA by year and severity (Source: Transport for NSW)

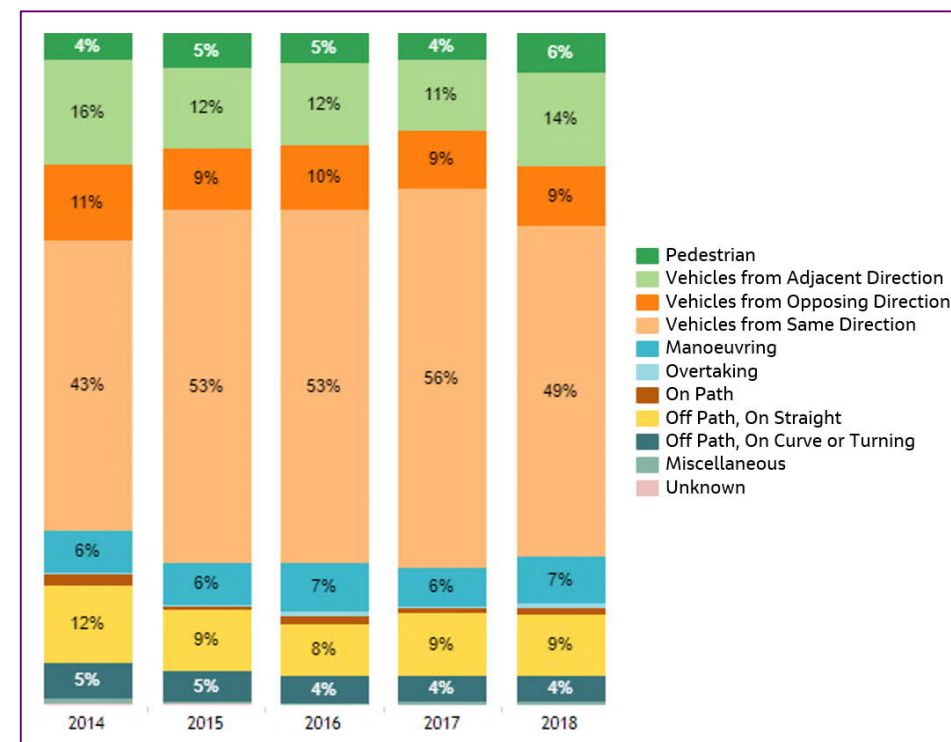


Figure 31: Type of Crash Types (Source: Transport for NSW)

Overall, the most common type of crash occurring in Parramatta involves vehicles from the same direction. The number of serious injuries has been increasing since 2015, with 159 serious injuries recorded in 2018. Moderate injuries have been decreasing since 2014, and minor/other injury crashes have been decreasing since 2016. However, it should be noted that as of 15 October 2014, self-reporting of non-casualty crashes was introduced, which meant NSW Police are not required to attend or investigate most crashes in which a vehicle is towed away but not one is injured or killed. The introduction of self-reporting crashes has resulted in a decrease in the number of crashes recorded by NSW police.

There has been a total of 27 fatal crashes within the 5 year period, 44% which were recorded to involve pedestrians. Figure 32 shows the location of the fatal crashes near Parramatta CBD. As shown, a large proportion of fatal crashes were reported on high speed roads, such as Western Motorway and James Ruse Drive (Cumberland Highway). A number of fatal crashes located in Parramatta CBD near Parramatta Station involved pedestrians, which highlights the importance of road safety for pedestrians in the CBD.

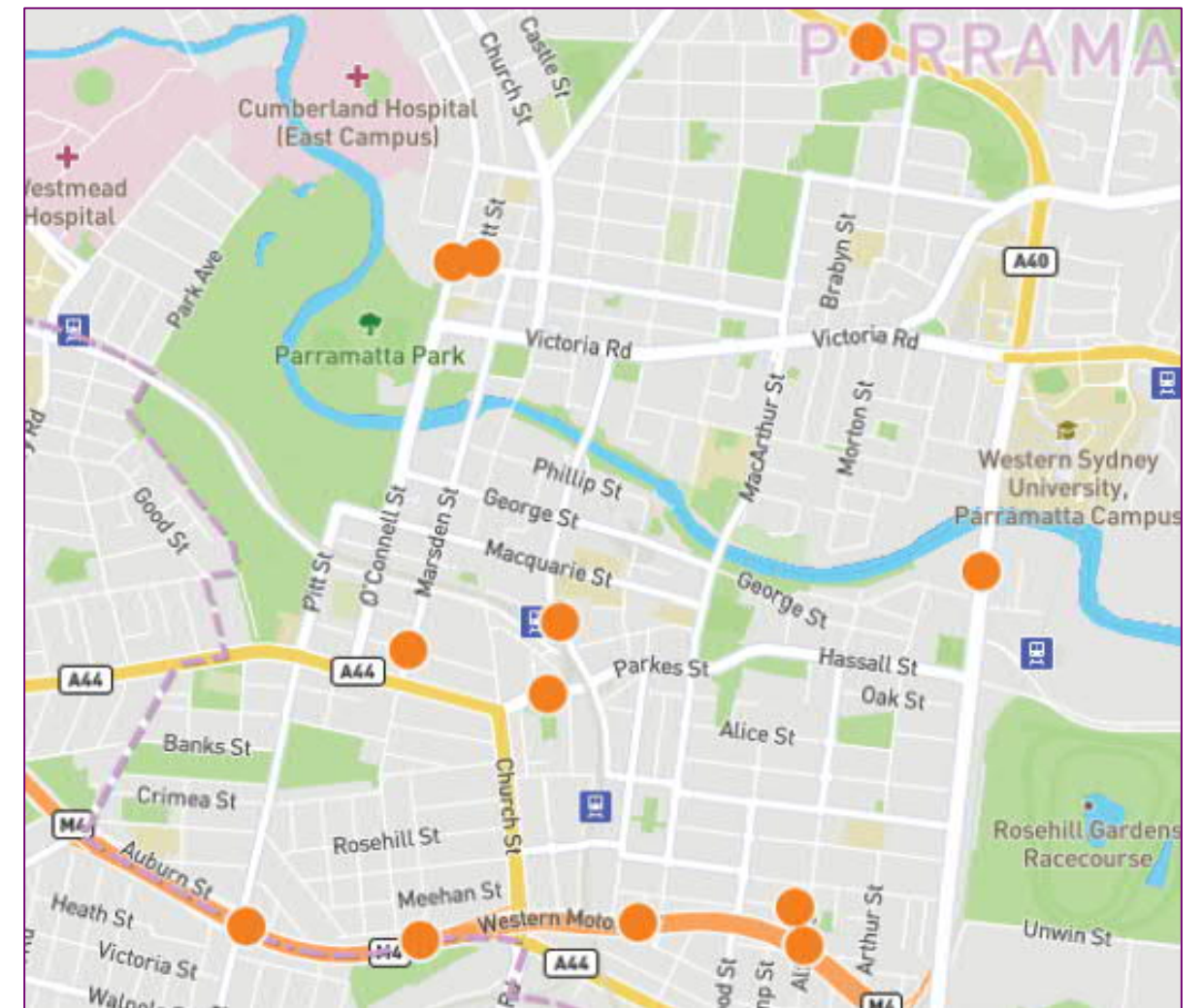


Figure 32: Fatal Crashes near Parramatta CBD (Source: Transport for NSW)

Speed and pedestrian safety will need to be prioritised in future plans to ensure a safe road environment for the Parramatta community.

3.7 Freight and Servicing

A major part of the State's freight and servicing activity is concentrated in key business districts and employment centres such as Parramatta CBD.

Parramatta is located near national key freight routes, including the M4 Western Motorway and the Main Western Railway Line. The M4 Western Motorway connects to the broader motorway network and industrial lands in Western Sydney. The Main Western Railway Line is a shared use freight line which started from Sydney and runs through the Blue Mountains, extending to the town of Bourke in the state's north-west.

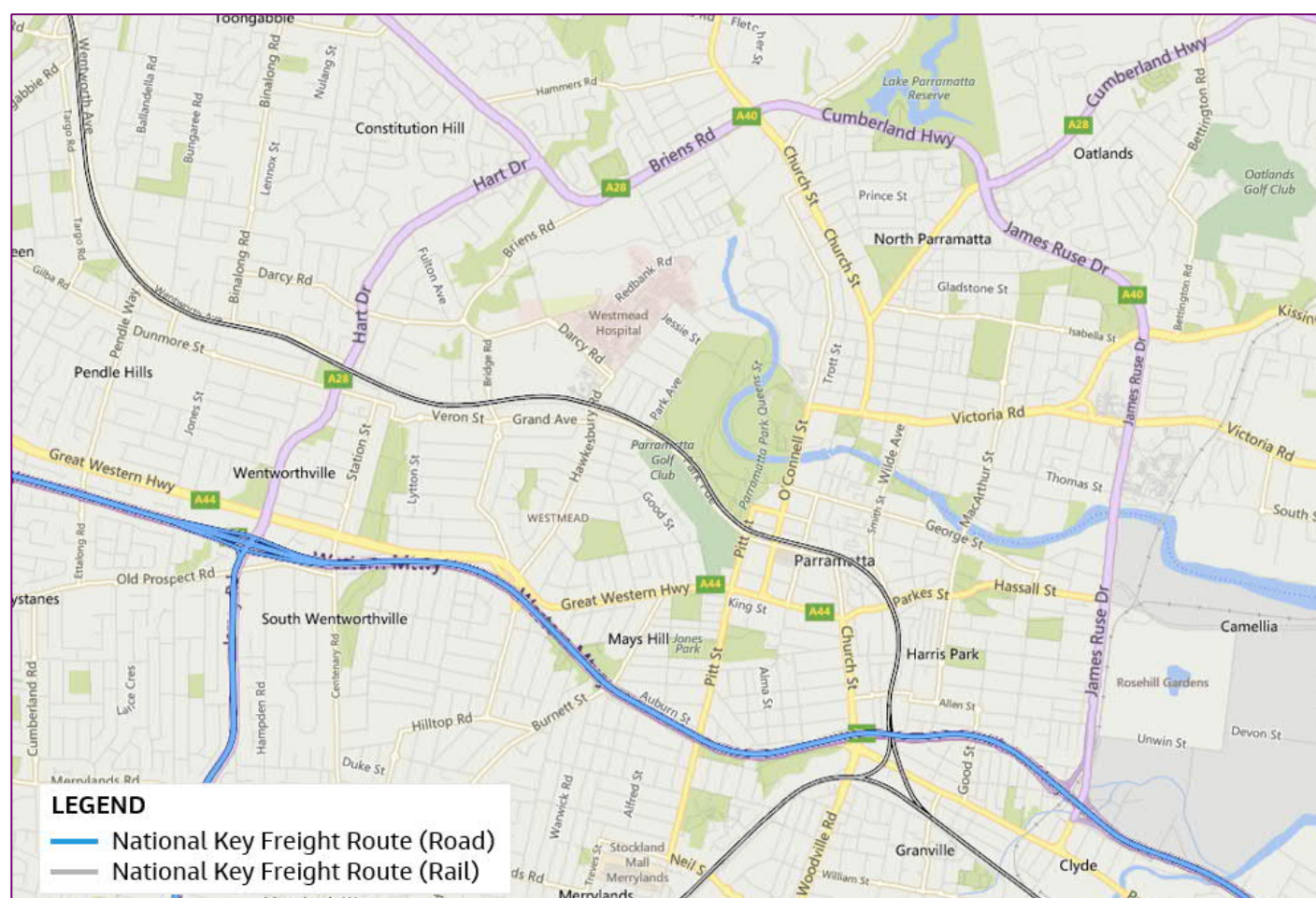


Figure 33: National Key Freight Routes near Parramatta⁴

As shown in Figure 34, the regional ring roads around Parramatta are included in TfNSW's Higher Mass Limit Network. On the fringes of Greater Parramatta is a major freight activity precinct spanning across Rydalmere, Camellia, Silverwater and Auburn which functions as a hub of freight and logistic functions. Access for freight into the precinct is challenging due to significantly constrained road network conditions.

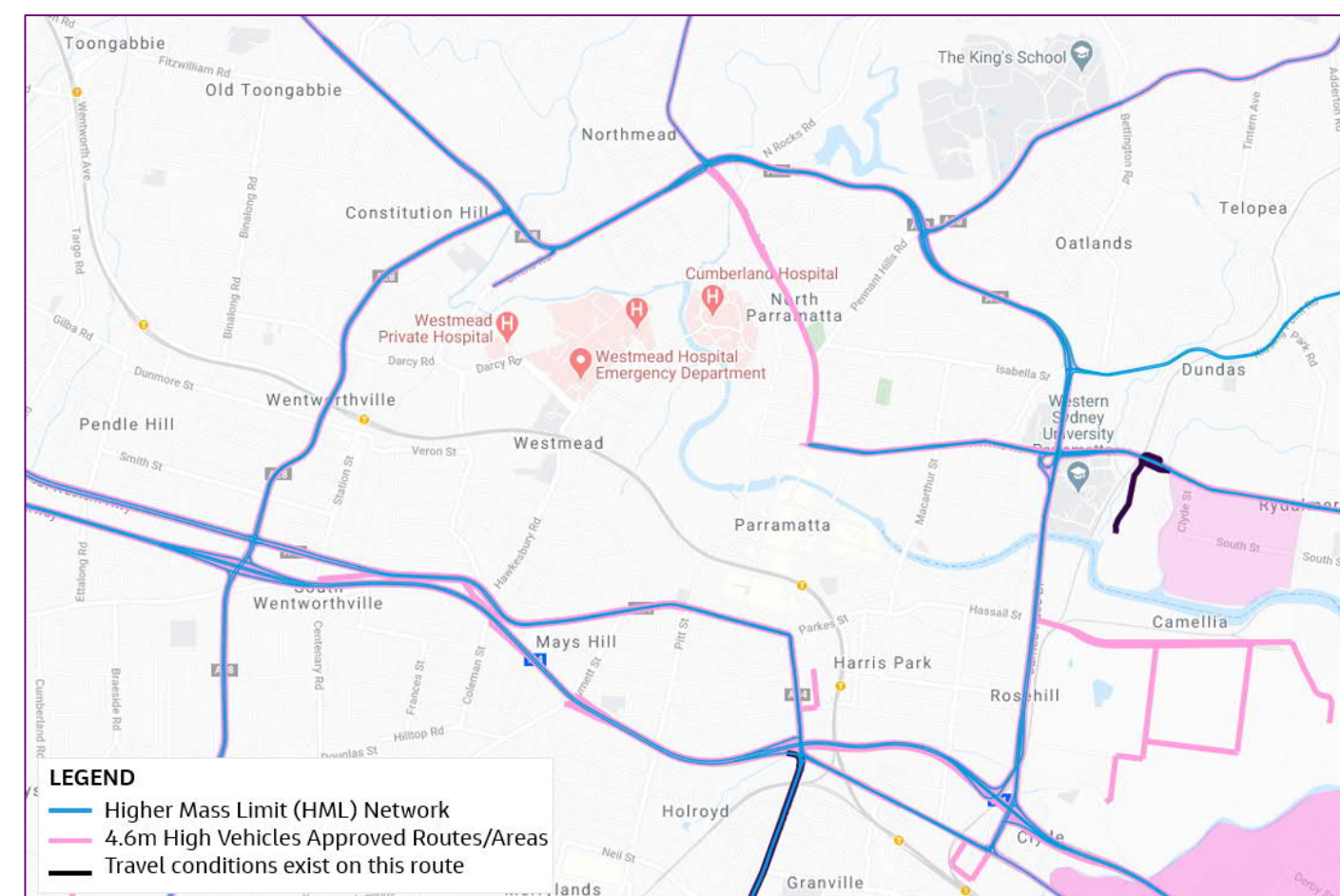


Figure 34: Higher Mass Limit Network near Parramatta⁵

Based on the Sydney Roads Freight Hierarchy Map⁶, there are three types of freight routes which the network can also be defined by:

- **Primary freight routes** typically carry high volumes of heavy freight vehicles and concentration. M4 Western Motorway and Cumberland Highway (A28) are identified as primary freight routes.
- **Secondary freight routes** provide links within regions for significant flows of freight. James Ruse Drive, between Pennant Hills Road and the M4 Western Motorway, and Woodville Road, south of Church Street, are identified as a secondary freight routes near Parramatta.
- **Tertiary freight routes** provide connections from the general Local Road system and the lower order elements of the State Road system to the primary and secondary freight routes. Tertiary freight routes near Parramatta include:
 - Great Western Highway
 - Parramatta Road

⁴ National Key Freight Routes Map, Department of Infrastructure and Regional Development, Accessed August 2020. <http://maps.infrastructure.gov.au/KeyFreightRoute/index.html>

⁵ NSW Combined Higher Mass Limits (HML) and Restricted Access Vehicle (RAV) Map, TfNSW, Accessed August 2020. <https://www.rms.nsw.gov.au/business-industry/heavy-vehicles/maps/restricted-access-vehicles-map/map/index.html>

⁶ Appendix D, Metropolitan Road Freight Hierarchy on the State Road Network Practice Note March 2011

- Church Street, between Cumberland Highway and Victoria Road
- Pennant Hills Road between Cumberland Highway and Church Street
- Victoria Road, between Church Street and James Ruse Drive
- Pennant Street, between Victoria Road and James Ruse Drive

Within Parramatta CBD, there are currently 46 loading zone spaces that enable businesses and commercial drivers to deliver and receive goods. This number is declining. Even with current capacity their utilisation is high throughout the weekday. Freight vehicles in Parramatta face strong competition for limited road and kerbside space between 9am and 12pm on weekdays. As a result, freight vehicle drivers need to walk longer distances to delivery points and therefore dwell longer in kerbside loading zones, further restricting access.

To increase efficiency, designing infrastructure and regulations that support innovative and efficient freight, as well as supporting private sector efforts of best freight practices should be explored further.

3.8 Private Vehicles and Parking

Private vehicle is the primary transport mode for areas without immediate access to public transport. The relative attractiveness of accessing destinations by car can be strongly tied to parking supply and the cost of parking. Parking can also be very important for supporting visitation, local businesses and traders in Parramatta CBD.

3.8.1 Parking Supply

In 2016, there were more than 28,000 total parking spaces in Parramatta CBD⁷, with 13,000 publicly accessible parking spaces and 15,000 private parking spaces. The publicly accessible parking spaces comprises of Council-owned on-street, on-grade and multi-level car parks, as well as private facilities such as Westfield Shopping Centre. The private parking spaces in Parramatta CBD are found in commercial and residential buildings that are inaccessible to the general public.

Figure 35 shows the commercial blocks with the highest volume of parking are generally found in the traditional core of Parramatta CBD and is linked to existing land uses as the greatest commercial and retail activity is located within the traditional Parramatta CBD. For example, Westfield Parramatta accounts for approximately 17% of all existing parking spaces in the area.

As mentioned in the *Strategic Transport Study Technical Paper 3*, almost 14,000 additional parking spaces are proposed as part of new developments in the Parramatta CBD planning proposal area. The location of the proposed additional parking is shown in Figure 36. The additional spaces are shown to be largely centred adjacent blocks with high existing parking numbers. It is considered that large contributors to these increases are high-density mixed-use proposals at the northern end of Auto Alley (south of Westfield Parramatta) and Parramatta Square development. The location of many of these parking spaces closely coincides with critical transport infrastructure services both current (buses accessing Parramatta interchange) and proposed (Parramatta Light Rail); inferring potential conflict for road space between modes and congestion.

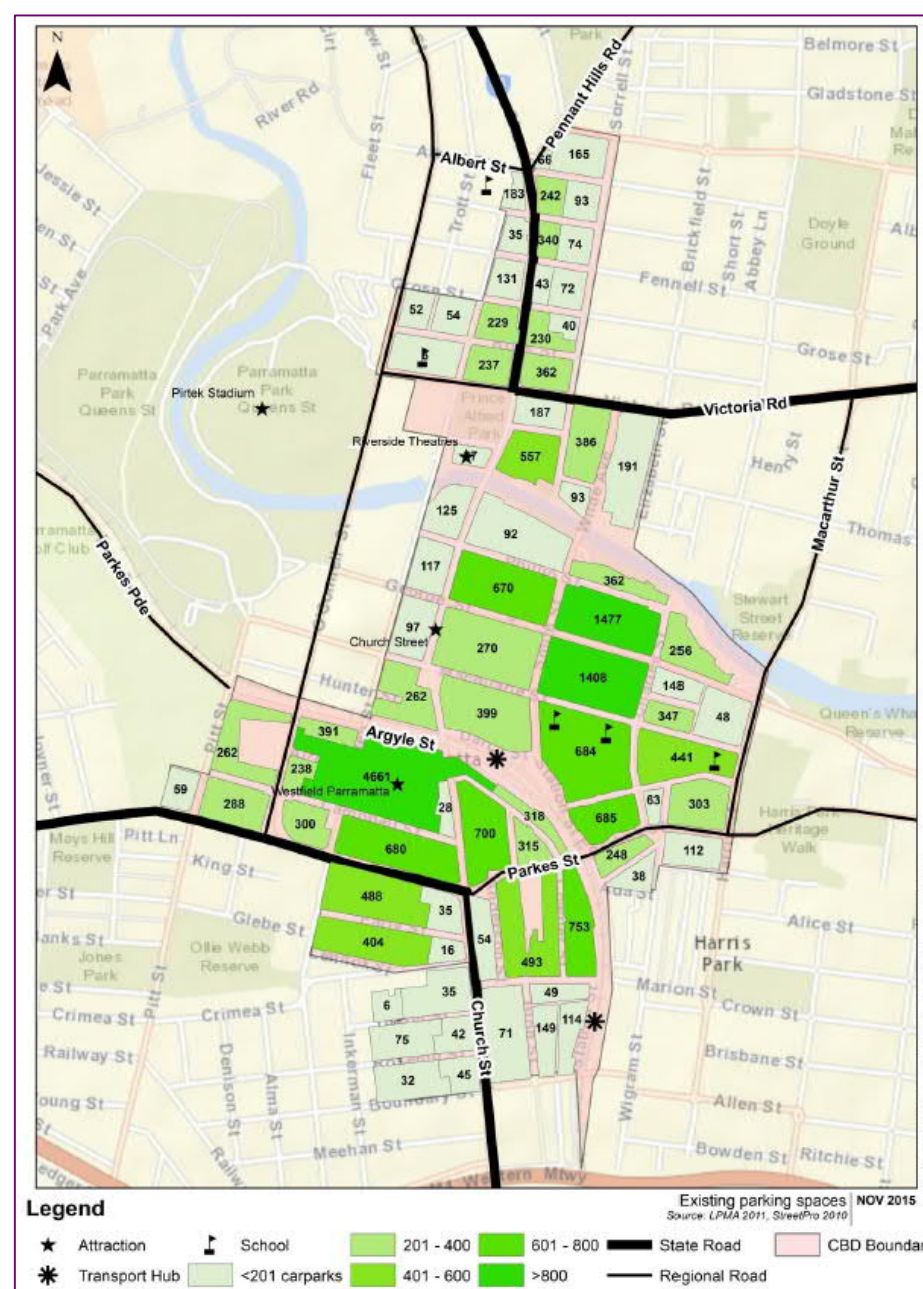


Figure 35: Existing (2016) parking supply in Parramatta CBD (Source: Strategic Transport Study, Technical Paper 3, Parking Review, 2017)

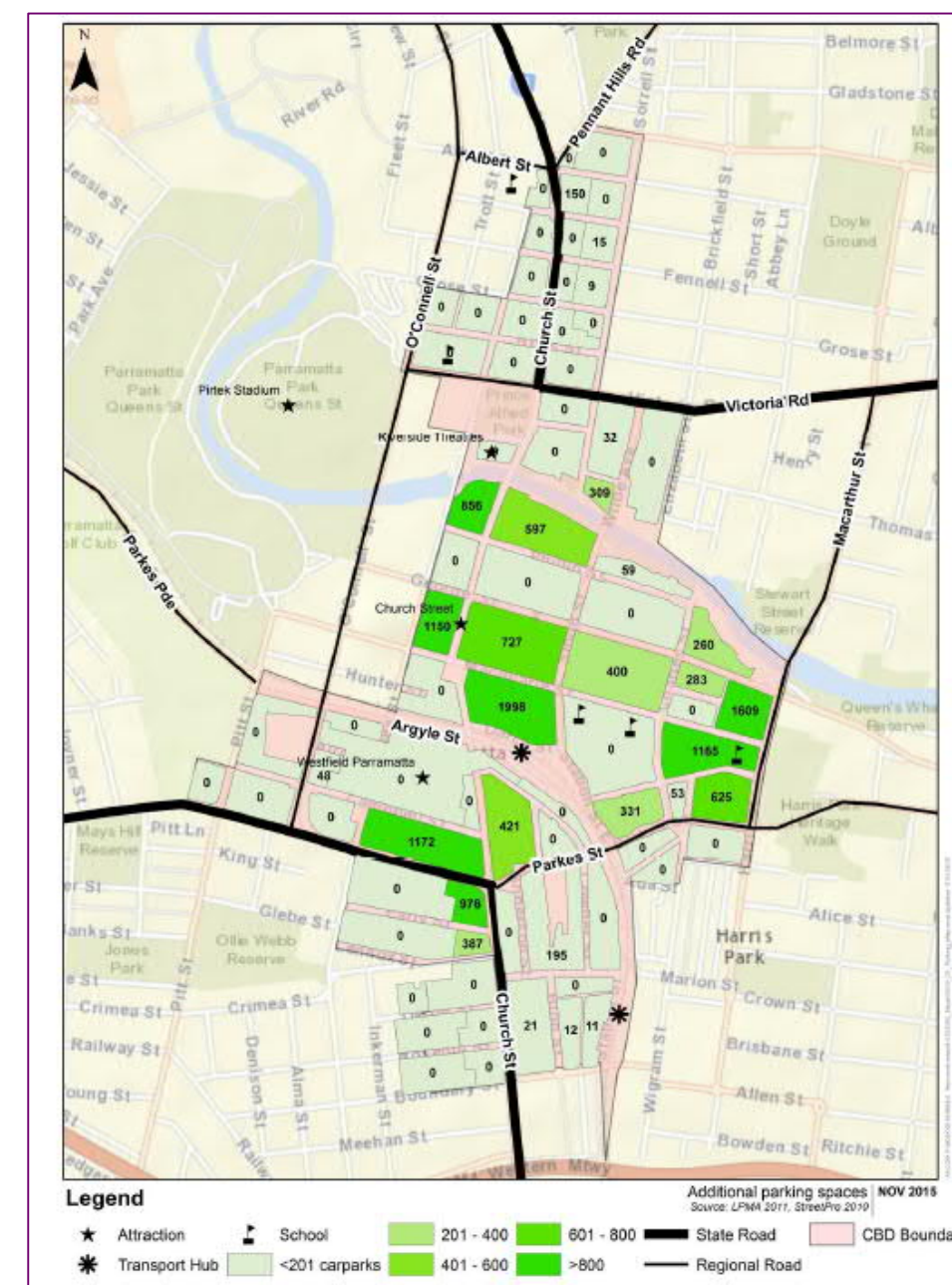


Figure 36: Additional parking supply in Parramatta CBD⁸ (Source: Strategic Transport Study, Technical Paper 3, Parking Review, 2017)

⁷ Parramatta CBD Public Car Parking Strategy (Draft), City of Parramatta (2017) (www.cityofparramatta.nsw.gov.au); at <https://www.cityofparramatta.nsw.gov.au/sites/council/files/inline-files/Public%20Car%20Parking%20Strategy.pdf>

⁸ Note, the additional parking supply shown does not consider recent changes, such as the closure of the Riverbank carpark (Powerhouse), the closure of the City Centre carpark (Sydney) and the changes to kerbside parking on George Street and Macquarie Street as part of the Parramatta Light Rail project.

3.8.2 Parking Requirements for Development

The original Parramatta parking rate as indicated in the 2011 Parramatta Local Environmental Plan (PLEP) is shown in Table 4.

Table 4: Original Parramatta Parking Rate (Source: PLEP 2011)

Land Use	Maximum Parking Rate
Multi dwelling (Residential)	1 space/ dwelling plus 1 parking space to be provided for every 5 dwellings for visitors
Commercial	1 space/ 100m ² GFA

For commercial (office) land use, this allowed up-to one parking space for every 4.12 employees, suggesting theoretically, developments could support a 24% car driver mode share in Parramatta. In contrast, commercial land use in North Sydney CBD allocates a maximum of one parking space available for every 16.67 employees (6% car driver mode share).

In 2017, Council adopted, on an interim basis, lower maximum requirements for car parking based on City of Sydney rates for all CBD development being considered through a planning proposal or design excellence approval process.

However, this history of greater parking allowances has led to Parramatta having a greater number of parking spaces than other comparable CBDs within Sydney. And these figures are further inflated by publicly accessible car parking spaces available. Based on JTW data, actual observed car drive mode share could be much higher than 24% (closer to 49%), once other parking spaces such as on-street, public and private parking spaces are considered in Parramatta CBD.

3.8.3 Cost of Commuter Parking

The early bird and hourly costs of commuter parking at key parking areas within Parramatta are shown in Figure 37. As shown, hourly costs range between \$3-\$5 per hour and the early bird rate fluctuates between \$14-\$21. This is low in comparison to rates in Sydney CBD which are generally \$25-\$45 per day. It should be noted that incomes may be lower in Parramatta CBD than other CBDs which may affect the demand for paid parking.

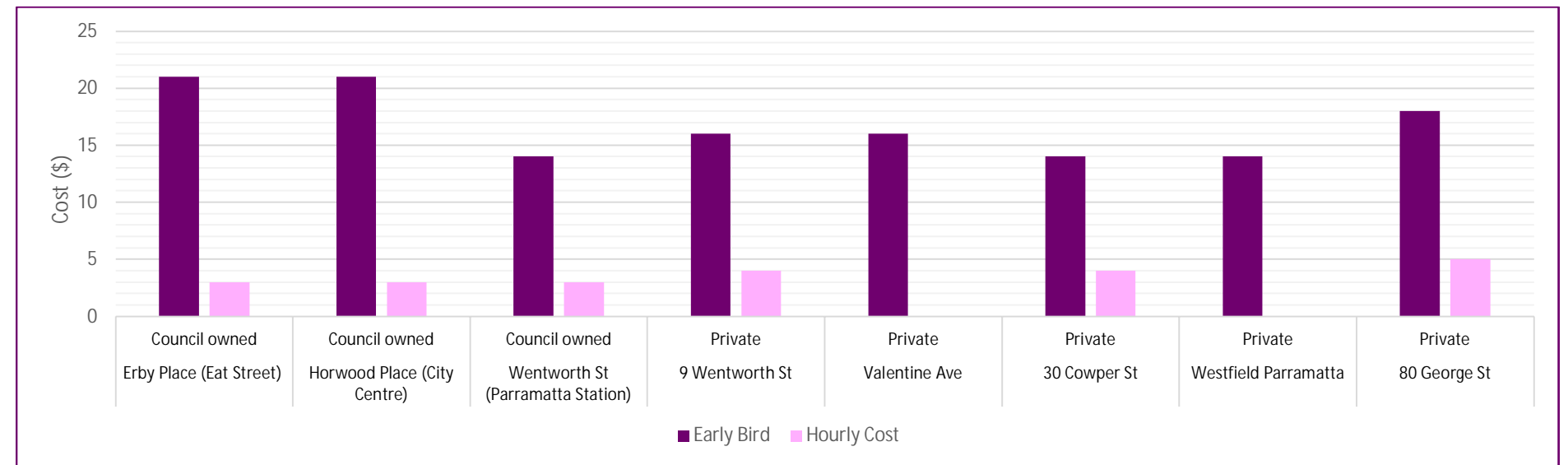


Figure 37: Parramatta CBD Parking Costs – Early Bird and Hourly Costs

An analysis of current parking costs shows early bird parking costs in Parramatta are generally lower than comparable CBDs in Greater Sydney. Figure 38 shows early bird parking costs, comparing Parramatta CBD with other comparable CBDs within Greater Sydney. With an average cost of \$17, Parramatta CBD is significantly lower than the other benchmarks, suggesting the comparative attractiveness for workers and visitors to drive and park in Parramatta.

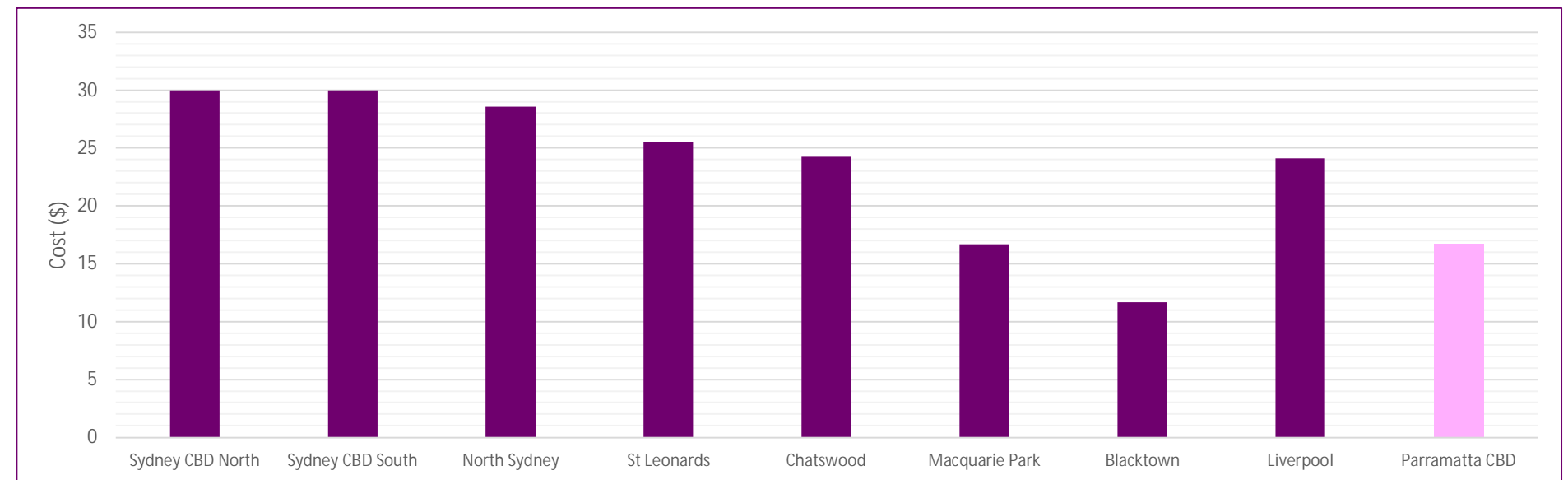


Figure 38: Early Bird Parking Cost Comparison with Comparable CBD's in Greater Sydney

A comparison of early bird parking costs with associated daily public transport rates in selected Australian CBD's is shown in Table 5. With the daily public transport rate cap for Greater Sydney (Opal) at \$16.10, the Parramatta CBD's average early bird rate of \$19 offers an inexpensive price that may influence car users to continue choosing to drive to work, given its convenience. This contrasts with Sydney CBD and Melbourne CBD, where vehicle use is below 20%, and early bird rates are significantly higher than the cost of public transport.

Table 5: Early Bird Parking Cost vs. Public Transport Daily Rate Cap in Comparable CBDs (Accessed March 2020)

Comparable CBD	Early-bird Rate	Public Transport Daily Rate Cap	Car Drive Mode Share (JTW)
Parramatta CBD	\$19	\$16.10	49%
Sydney CBD	\$30	\$16.10	13%
Melbourne CBD	\$21	\$9.00	19%

Parking space levies are imposed on owners of off-street commercial and office parking spaces with the aim of discouraging car use to reduce congestion. They are currently applied within Parramatta, levied at a rate of \$840 per space per year. This is significantly lower than the rate imposed in Sydney CBD and North Sydney of \$2,350.

3.8.4 Parking Demand

In the 2016 Census, there were approximately 10,500 private dwellings in Parramatta (SSC), with an average of 1 motor vehicle per dwelling. In comparison, the 2011 Census showed Parramatta (SSC) had approximately 8,400 private dwellings with an average motor vehicle of 1.1. Whilst average motor vehicles per household decreased slightly, there is still a 13.5% increase of total motor vehicles in Parramatta within the 5 year period. The observed trend shows that as population growth in Parramatta (SSC) grows, car growth is also observed within the suburb. This could have a direct implication for Parramatta CBD's future, with greater numbers of cars likely to drive demand for more parking facilities.

In Council-owned carparks within Parramatta CBD (shown in Figure 39), the Erby Place (Eat Street) and Horwood Place (City Centre) parking facilities accommodate a high number of daily vehicles, with occupancy rates over 90%. In contrast, the Wentworth St (Parramatta Station) carpark has more parking spaces, but accommodates fewer cars daily, with a daily occupancy of 55%. Horwood Place Carpark will be closed to accommodate the proposed Metro West station in Parramatta.

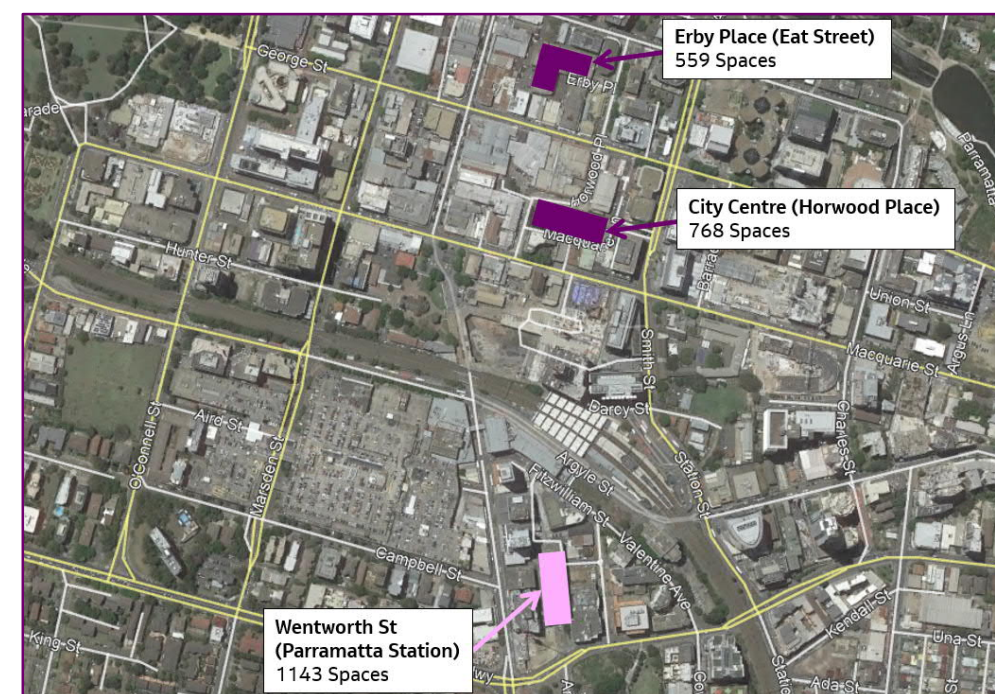


Figure 39: Location of selected Council-owned carparks

3.8.5 Key Parking Supply and Demand Issues

From analysing the current supply and demand in Parramatta, driving to work and parking in Parramatta is relatively attractive as a JTW option, because:

- **High supply:** Parramatta CBD has more than 28,000 parking spaces, equating to roughly one car space for every 1.8 employees in the CBD. The City of Sydney estimates there is just one parking space for every 6 workers in the Sydney CBD.
- **Low cost:** Public 'early bird' parking rates are approximately a third less of those in Sydney CBD and have lower applied parking levies.

Although Council limits on-site parking supply, the maximums as indicated in the current Parramatta CBD parking rate, are about twice for residential and four times for commercial than in North Sydney and Sydney CBD. Based on the expected growth of commercial and residential space in Parramatta, the current Parramatta CBD parking rates have the potential to enable significantly higher volumes of private vehicle traffic. This could otherwise result in a surplus of parking.

The cost of parking to users is an important factor affecting commuter's decisions on mobility. The low cost of parking in Parramatta CBD may encourage people to drive alone rather than carpool, walk, bike or take public transport. This results in more people on the roads and a higher demand for parking. If Parramatta is committed to encouraging the growth of sustainable transport and reducing private vehicle use, parking policy and pricing changes are needed to achieve Parramatta CBD's development goals of reducing car use.

4.0 Transport Modelling

Transport modelling is an important component of the methodology used to assess the quantitative impacts of the Parramatta Planning Proposal on the transport network.

Through the modelling process, it can better identify the full benefits and impacts of transport plans and how the Parramatta Planning Proposal will impact the network in 40 years. It is also used to understand how many people or vehicles will be using the proposed network to scale it efficiently.

4.1 Transport Modelling Approach

The process involved a multi-tier transport modelling approach to carry out an assessment of the current and future performance of the increase in travel demand as a result of the implementation of Parramatta CBD planning proposal. The assessment of future travel demand and travel patterns of the Parramatta planning proposal area was undertaken using a suite of modelling tools that informed the study of the transport needs to support Parramatta's growth. Table 6 provides an overview of the transport modelling methodology used in the assessment of the project and is described in the following sections.

Table 6: Transport Modelling Approach

Modelling Tool	Purpose
Sydney Strategic Travel Model (STM)	Forecast trip generation, trip distribution and transport mode share
Sydney Traffic Forecast Model (STFM)	To inform what roads motorists will choose to travel on for 2026 and 2036
Aimsun mesoscopic traffic model	Detailed assessment of road network capacity in 2026
Sidra Intersection Model	Assess the intersection network performance for peak hour traffic demand

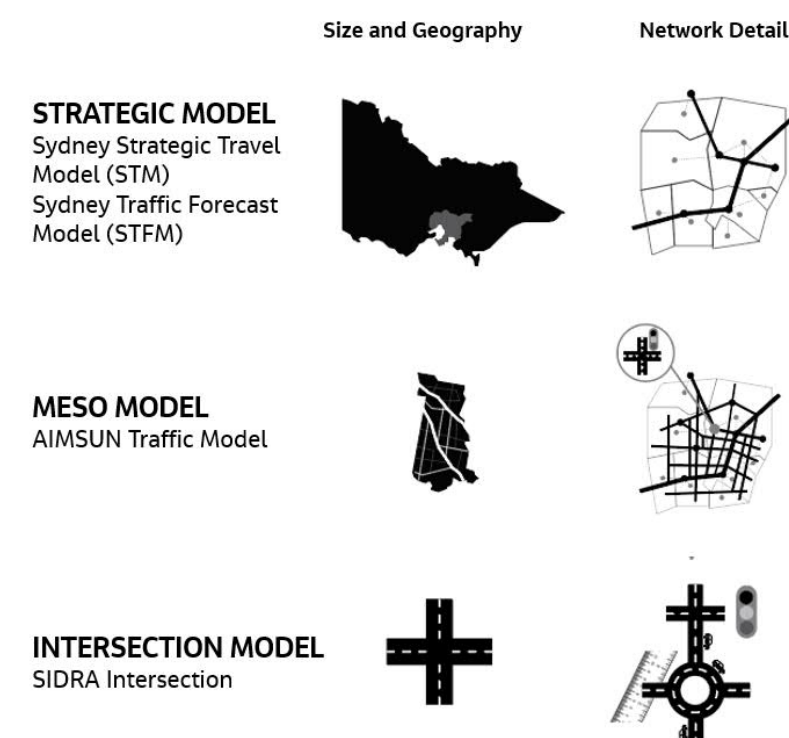


Figure 40: Transport Modelling Hierarchy

4.1.1 Sydney Strategic Travel Model (STM)

To identify the transport needs to support Parramatta's growth, the Sydney Strategic Travel Model (STM) was used. STM is a multi-modal strategic model developed and maintained by TfNSW to analyse high level impacts of land-use and transport network changes; forecast growth in demand by private vehicle and public transport modes that consider future land use, transport network and policy scenarios. For this study, STM was used to:

- Forecast travel demand generated by the Parramatta CBD
- Identify mode share trends in mechanised modal demand, travel directionality and trip distances
- Estimate growth along key transport corridors and links on approach to the Parramatta CBD and other select locations.

4.1.2 Sydney Traffic Forecast Model (STFM)

The Sydney Traffic Forecast Model (STFM) is developed and operated by TfNSW. It provides a platform to understand changes in future weekday traffic patterns under different land use, transport infrastructure and pricing scenarios. For the Parramatta ITP, STFM was used to determine traffic flows across

the road network within the study for the theoretical years of 2026 and 2036.

It should be noted that there are limitations with strategic modelling. On the aggregate level, macro-models have been shown to be accurate, however their accuracy diminishes when focussing on a specific route or site. Generally, macro-models cannot directly or accurately model the effect of capacity constraints on the transport network, without the aid of other modelling software, such as AIMSUN and SIDRA.

4.1.3 Mesoscopic Operational Model

While strategic modelling tools such as the STM and STFM can be used to identify the performance of the road network, their assumptions are broad-based and generally do not model intersections which are key determinants constraining network capacity. For the assessment of this project, the Greater Parramatta and Olympic Park Model (GPOP) Aimsun model developed for Parramatta Light Rail was used to cordon off a subarea covering the study area specified by TfNSW. The road network within the study area was updated to include the latest changes to land use and infrastructure. The model was principally used to identify the travel route of vehicles based on the level of congestion and delay in the network for the "Base Case" year of 2016 and for the 2026 future year scenario to test the impact of the partial planning proposal on travel patterns and Interim Parking Rates.

4.1.4 SIDRA Intersection Model

SIDRA intersection modelling tool was used to aid with the design and evaluation of the key intersections within Parramatta. Stand-alone models of one simple intersection or a set of closely spaced intersections were used to provide a high level of detail including geometries, driver behaviour and signal plans. SIDRA provides estimates of capacity and performance statistics such as delays, queue length etc. by lane for all approaches to an intersection.

4.1.5 Geographic Model Extents

The extent of the study area and location of intersections to be surveyed were identified in consultation with TfNSW. The model area, shown in Figure 41 covers a region broadly defined by the Parramatta Outer Ring Road covering James Ruse Drive, Cumberland Highway and M4 Motorway. The Parramatta CBD area is defined for modelling purposes as the area bound by the inner ring roads around the CBD, including sections of the Great Western Highway, Harris Street, Victoria Road and O’Connell Street, illustrated in green.

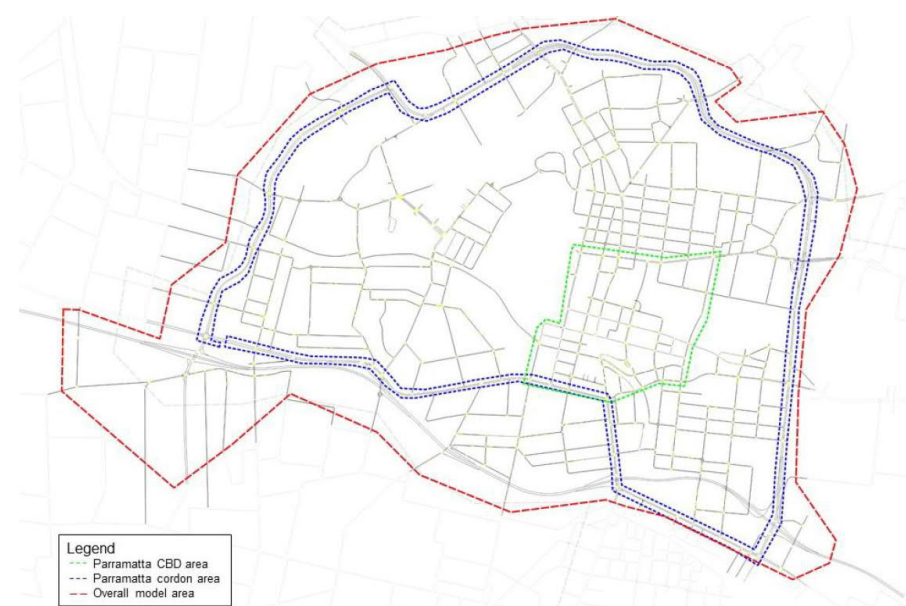


Figure 41: Core Model Areas (Source: STM)

4.1.6 Modelled Scenarios

There are three modelled land use scenarios used in this analysis, detailed in Table 7.

Table 7: Parramatta CBD planning proposal land use scenarios

Scenario	Description
Base Case	Assumes business as usual (no Parramatta CBD Planning Proposal) and includes full development of the already gazetted Parramatta Local Environmental Plan 2011 (LEP)
Partial Parramatta CBD Planning Proposal (Partial PP)	Includes full development of the LEP plus known site-specific planning proposals
Full Parramatta CBD Planning Proposal (Full PP)	Assumes full 40-year supply to 2056

Three theoretical forecast years of 2026, 2036 and 2056 were selected to be modelled to align with land use forecasting years. For the purposes of testing the CBD planning proposal, it is assumed that known site-specific planning proposals could be delivered to market by 2026. By 2036 and 2056, additional development over and above site-specific planning proposals is more plausible, up to a full build out of the capacity of the CBD planning proposal (subject to market conditions). The population and employment for the three forecast years are for the purpose of assessment of the incremental impact of the planning proposal against a base. The actual take up of residential and commercial developments would be driven by the market demand at each forecast year.

To undertake a comparison against an assumed baseline, the following scenarios were assumed and outlined in Table 8.

Table 8: STM Scenarios

Scenario	2026	2036	2056
Base	Yes	-	-
Partial PP	Yes	Yes	Yes
Full PP	-	Yes	Yes

Notes: 2026: Full PP land use forecast not considered achievable as this represents 40 years of development
2036 and 2056: Base land use forecast not considered realistic as a baseline comparison

As shown, the full Parramatta CBD planning proposal (Full PP) has not been modelled for the 2026 forecast year, as it is not considered achievable as this represents 40 years of development. In addition, the base land use forecast (full development of the existing LEP) has not been modelled for the 2036 or 2056 forecast year, as the known site-specific planning proposals (as represented by the Partial PP scenario) are assumed to have been approved and constructed by 2036. For 2036 a test of full PP has been done although it would be unlikely for the full PP materialising by that year.

The impacts of the Planning Proposal can be observed through comparing the difference in results between the Partial PP and the Full PP.

4.1.7 Demographic Projections for CBD

The land use forecasts provided by City of Parramatta are provided in Table 9. As shown in the table, there is significant growth observed, with both employment and population expected to more than double in the next 40 years. This will result in more trips in and out of Parramatta CBD.

Table 9: Parramatta CBD planning proposal land use forecasts

Year	Employment	Employment Growth	Population	Population Growth
2016	51,300		23,700	
2026	81,600	+30,300	33,800	+10,100
2036	88,700	+7,100	42,700	+8,900
2056	110,600	+21,900	64,500	+21,700

4.2 Forecast travel trends

4.2.1 Daily Trips

The daily number of trips, regardless of mode, are forecast to increase by approximately 50% (141,000) under the current LEP when it is fully implemented. The development of the known site-specific planning proposals results in an 8% increase on top of the 2026 base in daily volumes to/from the planning precinct area. This increase is not significant when compared to the increase that would be experienced under the current LEP when fully implemented.

When compared to the current LEP (2026 Base), the implementation of the full Planning Proposal (PP) results in the daily number of trips increasing by another 48% (198,000) in 2036 and by 54% (225,000) in 2056 when compared to 2026 under the current LEP.

Figure 42 shows the change in the total number of daily trips across the planning scenarios.

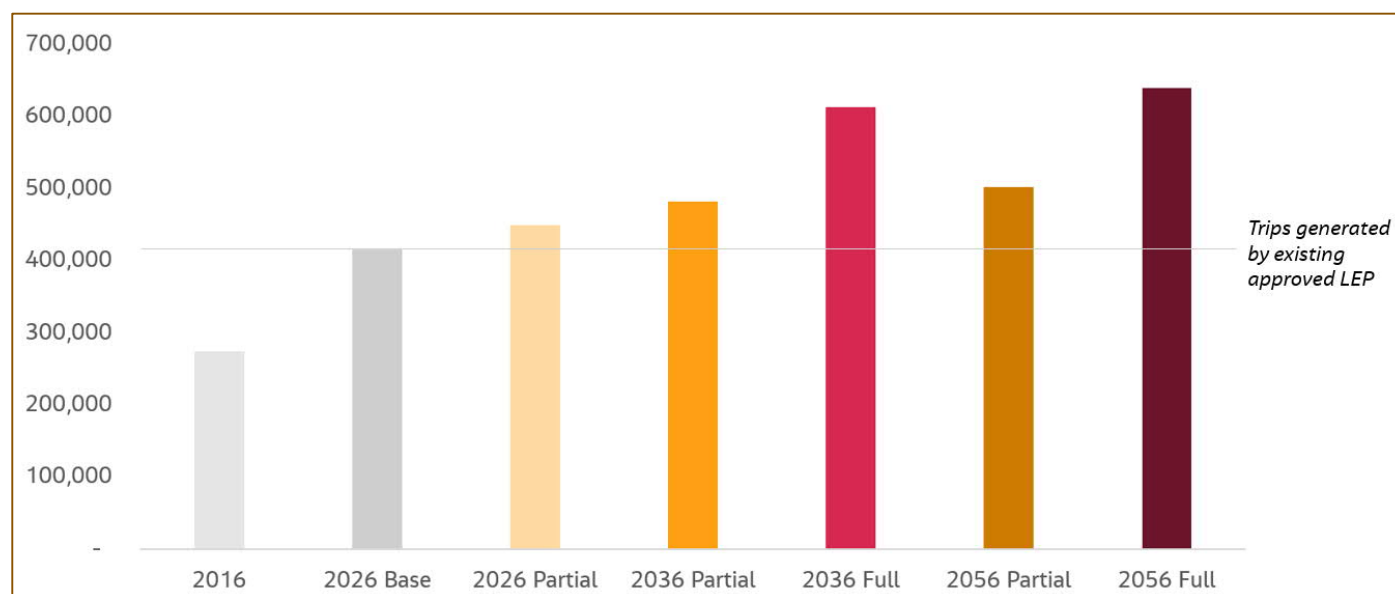


Figure 42: Total Daily Trips (Source: STM)

4.2.2 Modal Share

STM modelling has been used to assess modal share across the forecasted scenarios. Strategic models such as the STM have the capability of modelling travel demand across the full spectrum of travel modes over large areas (usually at the city-wide scale). These models are focussed on replicating the behaviours associated with travel choices including trip generation, trip distribution and mode choice. To allow these behaviours to be modelled at a large scale, assumptions and simplifications to the capacity of the transport network are usually made that mean these models are not constrained by capacity. It should be noted that STM modelling does not consider capacity constraints of the Parramatta road network. Further mode share sensitivity testing can be found in Section 4.6.

The assessment of mode of travel of people travelling to and from Parramatta CBD area shows approximately three quarters of daily trips are made by cars with only 21% of trips by public transport. Walking and cycling comprise 6% of total daily trips.

The implementation of Parramatta Light Rail (PLR) stage 1 and 2 by 2026 and Sydney Metro West by 2036 reduce the car mode by 9-10% with corresponding increases in public transport modes share to almost 30% of all trips by 2036. Operation of Sydney Metro in modelled year 2036 does not appear to impact the rail / light rail / ferry mode share significantly but increases the bus mode share in 2036 and onwards. This is likely to be due to the changes in the bus network to support Sydney Metro West.

By 2056, the car mode share would comprise approximately 62% of all daily trips or a reduction of 12% compared to the base year.

The implementation of the planning proposal does not alter the mode share across each year of assessment although the total number of trips increases due to higher level of land use from the planning proposal. The gradual shift in mode share away from car is due to network changes that includes improved public transport and a higher level of congestion on roads increasing the car travel times that make them less attractive than public transport. The daily mode share of trips to/from the planning proposal area for each scenario is summarised in Table 10 and illustrated in Figure 43.

Table 10: Daily Mode Share (Source: STM)

SA3 Region	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP	2056 Partial PP	2056 Full PP
Car Driver	149,000	210,000	227,000	235,000	294,000	236,000	295,000
Car Passenger	53,000	72,000	77,000	77,000	98,000	74,000	95,000
Rail	34,000	76,000	83,000	89,000	112,000	98,000	124,000
Bus	22,000	34,000	37,000	53,000	71,000	63,000	85,000
Walk/Bicycle	16,000	24,000	25,000	29,000	37,000	32,000	42,000
Total	274,000	415,000	451,000	482,000	613,000	502,000	640,000

Notes: Rounded to nearest 1,000 trips

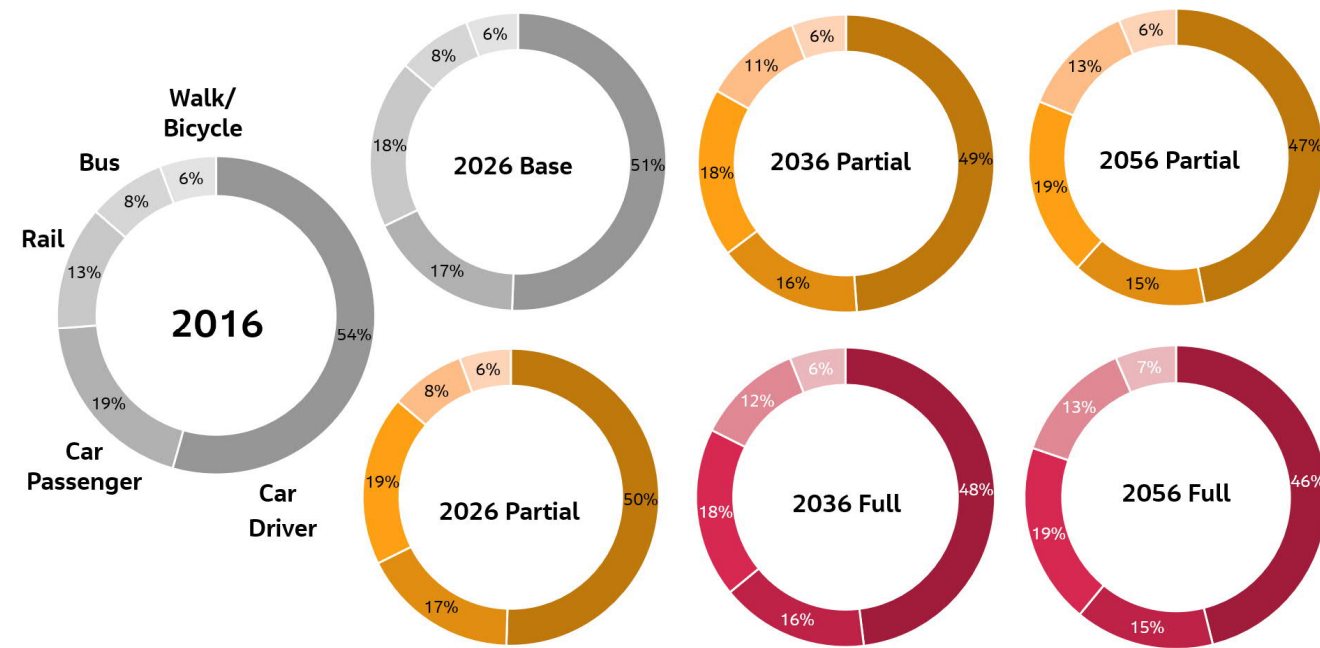


Figure 43: Daily Mode Share for Daily Trips to/from Parramatta CBD (Source: STM)

The AM and PM peak hour mode share proportions across the future year scenarios are summarised in Table 11.

Table 11: AM and PM peak Mode Share Proportions (Source: STM)

To/From PP	Mode	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP	2056 Partial PP	2056 Full PP
AM Peak (2-hour)								
From PP	Car	68%	63%	61%	60%	58%	58%	56%
	Car (Work)	54%	49%	47%	44%	43%	41%	40%
	Public Transport	18%	21%	22%	24%	24%	26%	26%
	Walk/Bicycle	15%	16%	17%	16%	18%	16%	18%
To PP	Car	60%	52%	52%	49%	49%	46%	46%
	Car (Work)	56%	48%	48%	44%	44%	40%	40%
	Public Transport	28%	35%	34%	37%	36%	40%	39%
	Walk/Bicycle	12%	13%	14%	14%	15%	13%	15%
PM Peak (3-hour)								
From PP	Car	64%	59%	58%	56%	56%	54%	54%
	Car (Work)	62%	55%	55%	52%	51%	47%	47%
	Public Transport	21%	26%	25%	27%	26%	30%	29%
	Walk/Bicycle	15%	16%	17%	16%	18%	16%	18%
To PP	Car	76%	73%	72%	71%	69%	70%	68%

To/From PP	Mode	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP	2056 Partial PP	2056 Full PP
AM Peak (2-hour)								
	Car (Work)	64%	60%	58%	54%	54%	51%	50%
	Public Transport	11%	14%	14%	16%	16%	17%	17%
	Walk/Bicycle	12%	13%	14%	14%	15%	13%	15%

As shown, during the AM peak, the journey to work (JTW) car mode share declines to 44% in 2036 Partial PP, and under the 2056 Full PP, it declines to 40% in both directions. In the PM peak, the JTW car mode share remains between 47-50% under the 2056 Full PP. These proportions are higher than the visionary target outlined in the *Parramatta CBD Strategic Transport Study* of 40% JTW car mode share by 2035.

4.2.3 Trip Generation

The number of daily trips to/from the Planning Proposal area from each SA3 region across Sydney has been calculated, with the top nine SA3 regions shown in Figure 44.

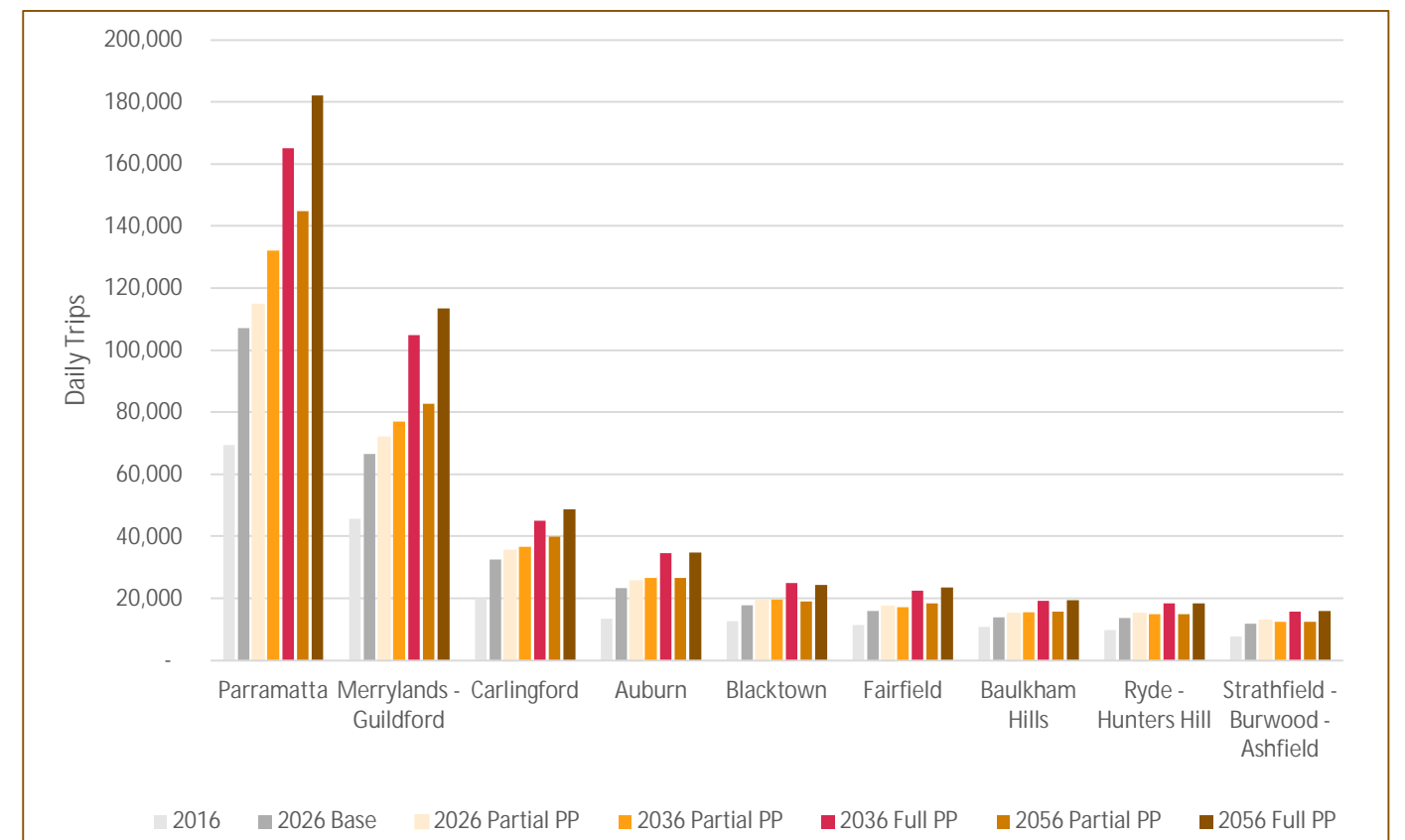


Figure 44: Daily Trips to/from Parramatta CBD by SA3 comparison (Source: STM)

As shown, there is a large increase in the number of trips within the Parramatta SA3, with more than 182,000 trips expected under the full 2056 PP, an increase of 113,000 trips compared to the 2016 base. This is likely an outcome of increased land use forecasts, the proposed significant residential component of the CBD, and densification of nearby precincts such as Parramatta North and Camellia. The increase in shorter trips are expected as homes are provided closer to jobs.

Merrylands-Guildford SA3 similarly experiences increased trips to/from Parramatta CBD. Located adjacent to Parramatta SA3, Merrylands-Guildford is connected to Parramatta CBD via the T2 and T5 rail lines, as well as bus services such as Route 907. Woodville Road and Church Street provide key road corridors to access Parramatta CBD. A significant increase in daily trips to/from the study area from Merrylands-Guildford is seen under the full PP scenario compared to the partial PP scenario. This may be associated with the significant increase in employment along Church Street in the southern end of the study area as a result of the implementation of the planning proposal.

The proportion of daily trips to/from the planning proposal area from each SA3 region across Sydney has been calculated, with the top nine SA3 regions shown in Figure 45. These trips are also illustrated in Figure 46 for 2056 under the full PP.

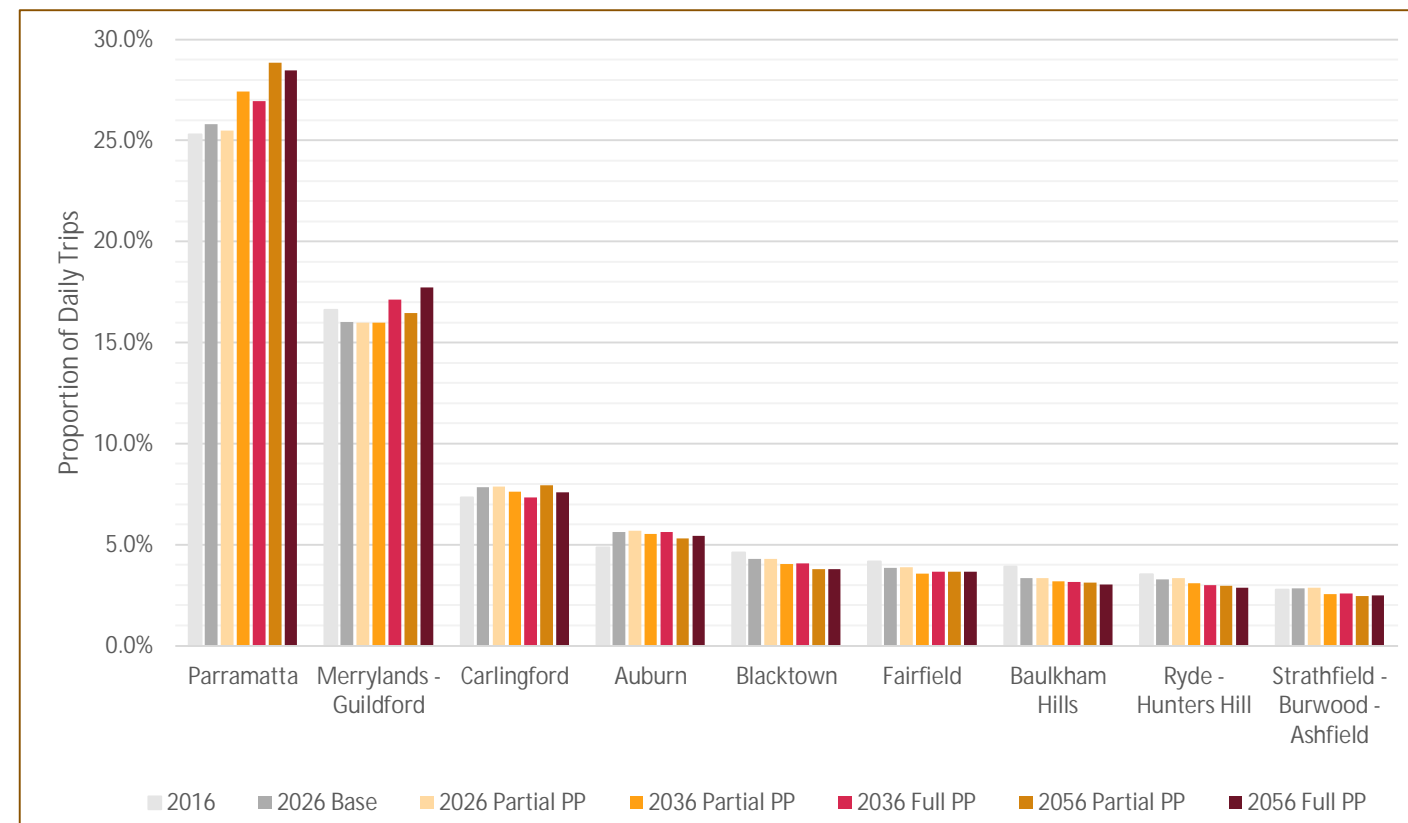


Figure 45: % of Daily Trips to/from Parramatta CBD by SA3 comparison (Source: STM)

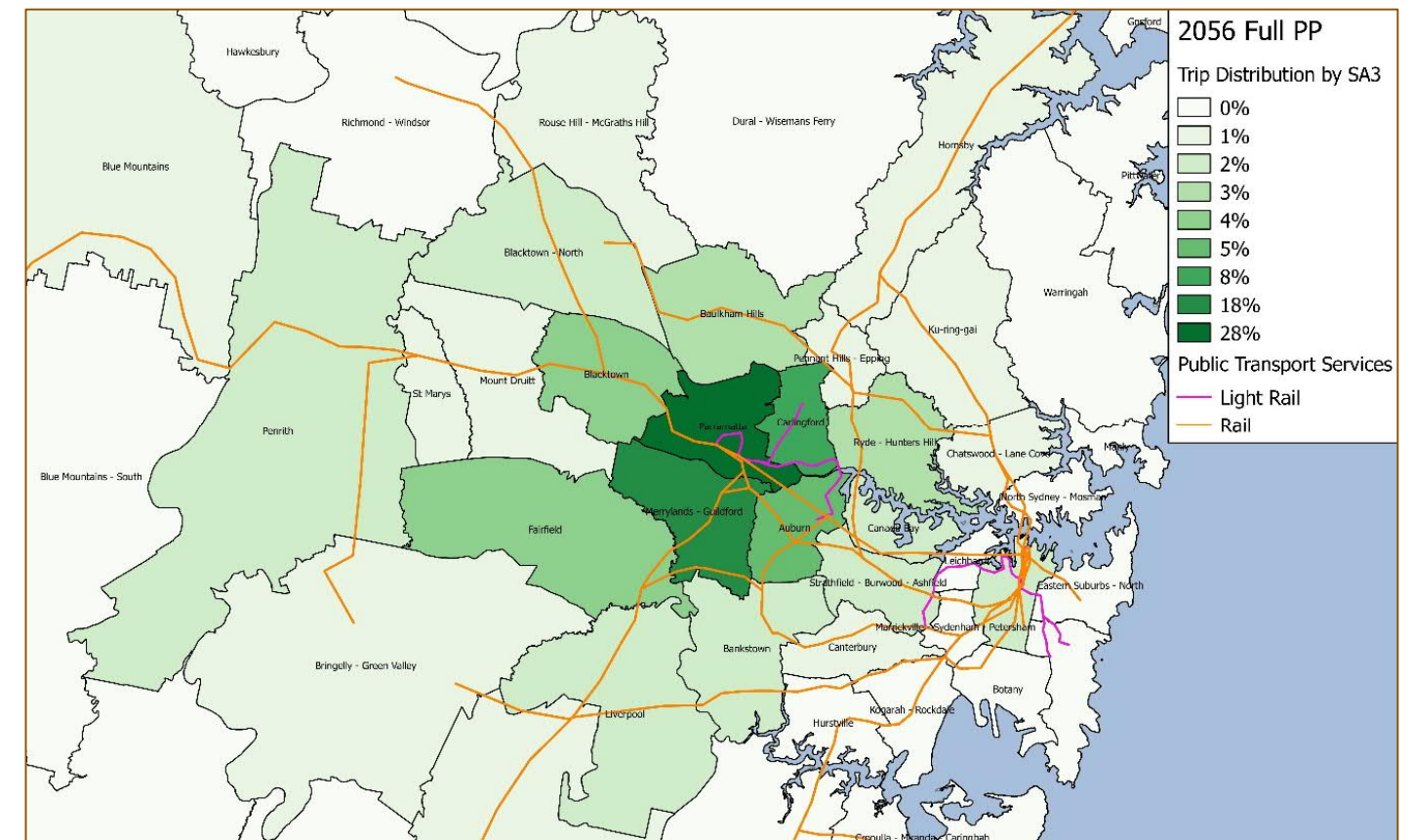


Figure 46: Daily trips by SA3 Map for 2056 under full PP (Source: STM)

The results indicate an increase in the trips to/from Parramatta, Carlingford and Auburn. This may reflect the changes in travel patterns associated with Parramatta Light Rail (Stages 1 and 2) which improves accessibility to Parramatta from these areas.

SA3 regions that are not connected directly with Parramatta by rail or light rail include Baulkham Hills, Ryde / Hunters Hill (transfer at Strathfield) and Bankstown (transfer at Lidcombe). For Fairfield SA3, although served by the T5 line, their western end is far from the rail stations. Fairfield SA3 is connected to Parramatta via the Liverpool-Parramatta T-way. As shown, the proportion of trips decline although the number of trips increase. Additional improvements to public transport and active transport may need to be investigated to determine how to better service this region.

4.3 Public transport patronage

4.3.1 Rail Patronage

STM was used to assess the impact of the planning proposal on rail ridership. The rail patronage for the two-hour AM peak period for selected locations are provided in Table 12 for each scenario.

Table 12: Rail Trips - AM 2 Hour Peak Period (Source: STM)

SA3 Region	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP	2056 Partial PP	2056 Full PP
T1 (Eastbound)							
West of Westmead	28,500	38,100	38,300	48,900	49,600	65,900	66,700
Westmead to Parramatta	29,900	39,600	39,800	45,900	46,700	59,500	60,500
Parramatta to Harris Park	31,200	48,000	48,900	52,500	54,000	68,600	69,900
Harris Park to Granville	31,200	46,800	47,600	51,000	51,900	66,700	67,400
East of Granville	40,900	52,900	53,700	56,900	57,600	75,200	75,600
T1 (Westbound)							
East of Granville	8,900	18,300	19,000	18,900	20,600	24,500	25,900
Granville to Harris Park	8,800	17,000	17,700	17,500	19,200	22,200	23,800
Harris Park to Parramatta	10,600	25,700	26,500	28,700	30,400	37,900	39,500
Parramatta to Westmead	4,000	8,000	8,000	11,900	11,800	17,900	17,800
West of Westmead	2,900	6,700	6,700	8,900	9,000	12,700	12,700
T5							
Merrylands – Harris Park	1,400	8,000	8,100	10,400	11,000	14,700	15,400
Harris Park – Merrylands	400	1,200	1,200	1,300	1,400	1,700	1,700
Sydney Metro West (SMW) - Eastbound							
Westmead to Parramatta	-	-	-	9,700	9,500	16,300	16,000
East of Parramatta	-	-	-	15,400	15,800	24,500	24,900
Sydney Metro West (SMW) - Westbound							
East of Parramatta	-	-	-	6,100	6,500	8,700	9,300
Parramatta to Westmead	-	-	-	1,800	1,800	2,900	2,900

Notes: Rounded to nearest 100 trips

By 2056, rail demand on the T1 line between Parramatta and Harris Park is expected to reach 70,000 passengers in the eastbound direction. Assuming a capacity of 1,200 passengers per train, this would require a service almost every 2 minutes to accommodate the increased demand. Currently rail services to Parramatta arrive every 2-3 minutes, however other stations such as Westmead and Harris Park only experience a service every 6-15 minutes due to express services skipping the station. Increased frequency and capacity upgrades to existing trains could be considered to accommodate the increased demand.

There is also a significant increase in the northbound direction on the T5 line between Merrylands and Harris Park, reaching 15,400 passengers during the two-hour AM peak in the 2056 Full PP scenario. Assuming a capacity of 1,200 passengers per train, this would require a service at least every 10 minutes to accommodate the demand. Currently train services on the T5 line run approximately every 30 minutes, therefore patronage demand cannot be accommodated within the existing rail services.

The highest increase due to the planning proposal is observed on the T1 line in the outbound direction (1,700 passengers between Granville and Parramatta in 2036. This represents a 10% increase in passengers between Granville and Harris Park stations and a 6% increase in passengers between Harris Park and Parramatta.

The rail boarding and alighting volumes for the two-hour AM peak period for selected rail stations are provided in Figure 47 and Figure 48 for each scenario.

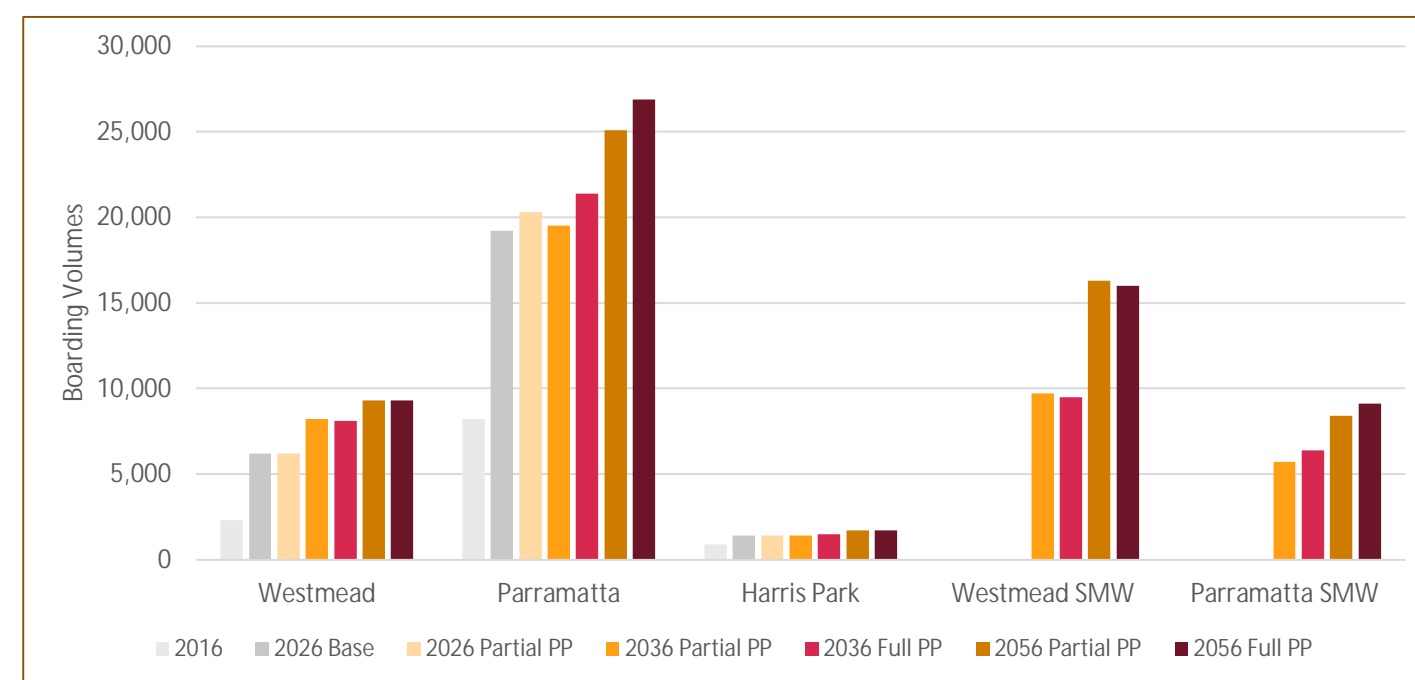


Figure 47: Rail Boarding Volumes - AM 2 Hour Peak Period (Source: STM)

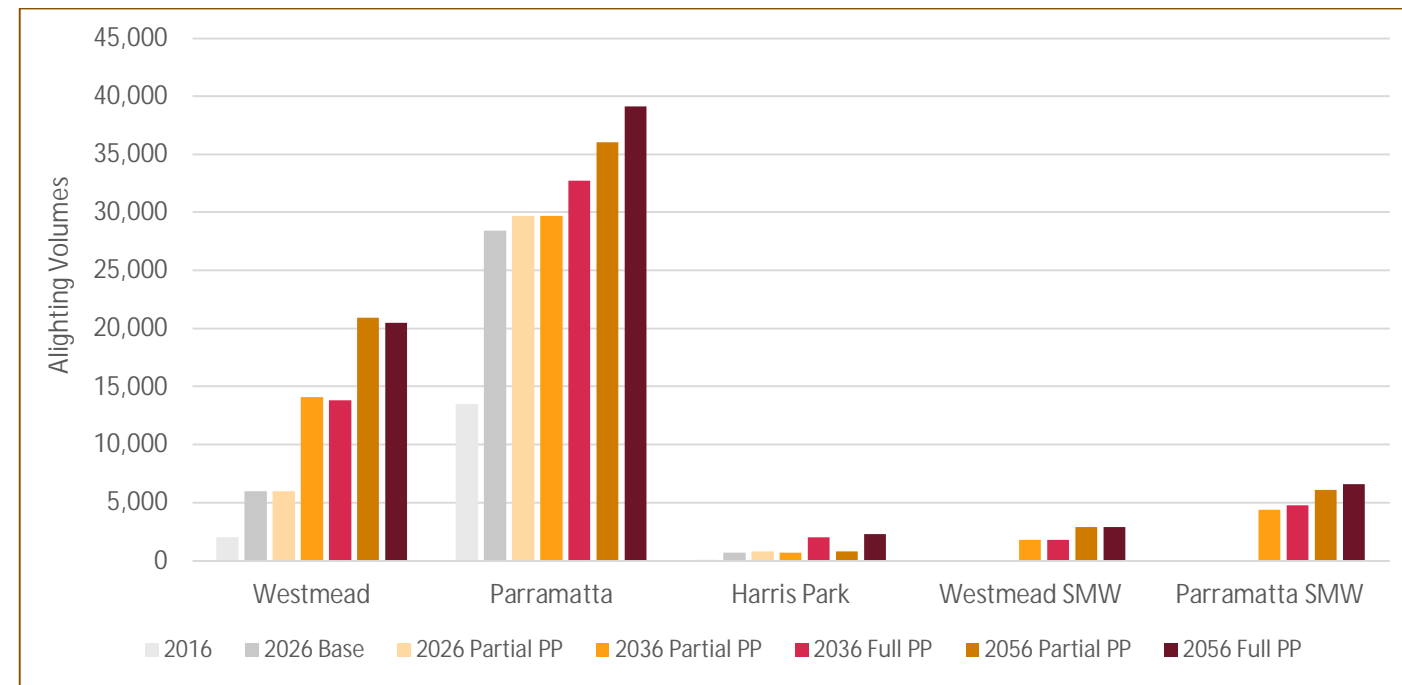


Figure 48: Rail Alighting Volumes - AM 2 Hour Peak Period (Source: STM)

As indicated, the full CBD planning proposal would increase boarding and alighting volumes by up to 10% at Parramatta and Parramatta (Sydney Metro West) stations. At Harris Park, the full CBD planning proposal is expected to result in an increase of 1,300 in 2036 and 1,500 in 2056 during the 2-hour AM peak, with an almost tripling of alighting passengers at Harris Park. This is likely due to extending the Commercial Core down Church Street to the Auto Alley Precinct.

The change in boarding and alighting volumes at Parramatta station is shown in Figure 49.

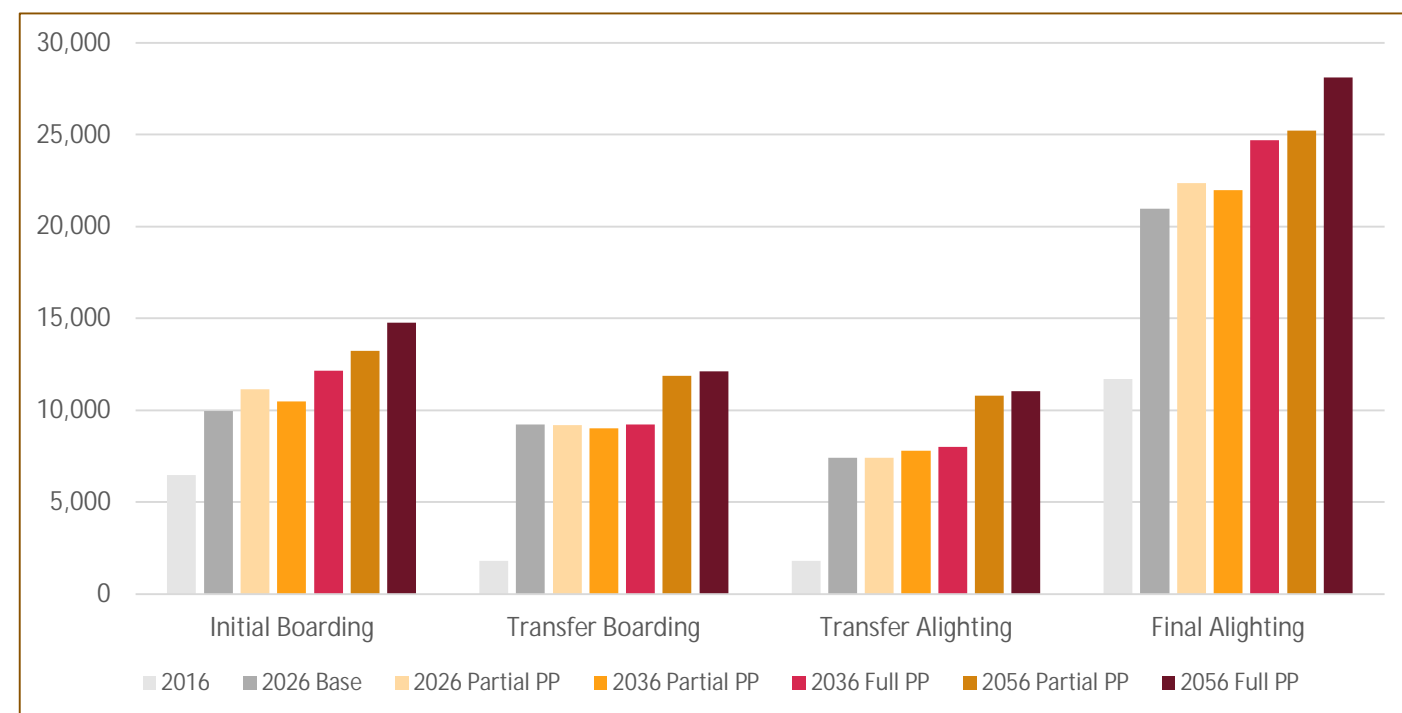


Figure 49: Rail Boarding / Alighting Volumes 2 hour AM peak period - Parramatta Station (Source: STM)

At Parramatta Station, there are 70 services per hour (total in both directions) stopping, which includes the Blue Mountain trains. Under the full planning proposal, there would be an additional 4,900 passenger movements at the train station during the 2-hour AM peak by 2056. This represents an average of about 55 passenger movements per train in the peak one-hour period, based on a peak hour factor of 77%. Such increases in passenger movements at Parramatta Station may require increased rail capacity and services, as well as potential upgrades to station capacity. Without increased rail capacity and services to address long term demand growth, rail customers may shift to other car-dependent modes of transport, which would impact on other road users and increase congestion on the local and State road network.

4.3.2 Light Rail Patronage

The construction of Stage 1 of Parramatta Light Rail recently commenced. It spans between Westmead and Carlingford with 16 stops to be delivered by 2023. Stage 2 of PLR will connect Stage 1 and Parramatta CBD to Ermington, Melrose Park, Wentworth Point and Sydney Olympic Park with 10-12 stops. A final Business Case for the second stage of Parramatta Light Rail is still being considered by the NSW Government. However, the TfNSW standard assumptions for 2026 includes PLR Stage 1 and Stage 2 therefore both are assumed. The change in light rail patronage in 2026, 2036 and 2056 due to the different land use scenarios are summarised in Table 13.

Table 13: Change in light rail patronage - AM 2 Hour Peak Period (Source: STM)

Year	Base	Partial PP	Full PP	Difference	% Difference
2026	8,200	8,400	-	200	2.4%
2036	-	11,400	11,700	300	2.6%
2056	-	14,500	14,800	300	2.1%

Notes: Rounded to nearest 100 trips

The results show a marginal increase in light rail patronage due to the planning proposal. With 64 light rail services over the two-hour AM peak period (across both the Stage 1 and Stage 2 alignments), this would represent an increase of about 5 passengers per service averaged over the two-hour peak period in 2036 and 2056. The full planning proposal scenario is expected to increase patronage on PRL (Stage 1 and Stage 2) by under 3% in 2036 and 2056. No additional upgrades should be needed to cater for the increased patronage if the full planning proposal scenario were to proceed.

4.3.3 Bus Patronage

Bus Routes

Based on an analysis of the modelled bus patronage, the following three bus route services are forecast to have the highest increase in patronage due to the planning proposal:

- M91: Hurstville to Parramatta – travels to/from the Parramatta CBD via Church Street
- 907: Bankstown to Parramatta
- T80: Liverpool to Parramatta – travels to/from the Parramatta CBD via Argyle Street

The change in patronage for these three services is shown in Table 14.

Table 14: Change in bus patronage on key routes – AM 2 Hour Peak Period (Source: STM)

Bus Route	2026		2036		2056	
	Difference	% Diff	Difference	% Diff	Difference	% Diff
M91	<50	1%	1,200	15%	1,400	12%
907	<50	2%	300	28%	400	22%
T80	<50	1%	300	3%	300	2%

Notes: Rounded to nearest 100 trips

Assuming a total capacity of 70 passengers per bus, the above results indicate that these three services would require an extra 20 services (M91), 6 services (907) and 4 services (T80) to cater for the additional bus patronage in 2056. Other services not mentioned above may also require some additional services to accommodate the additional forecast passenger demand.

Two-way Bus Patronage Roads

The two-way bus patronage for the two-hour AM peak period for key roads which cross the outer cordon of James Ruse Drive, Great Western Highway and M4 Motorway are provided in Figure 50 for each scenario. The increases in patronage due to the planning proposal at these locations are generally under 5%, with some locations expecting an increase of between 5% and 11%.

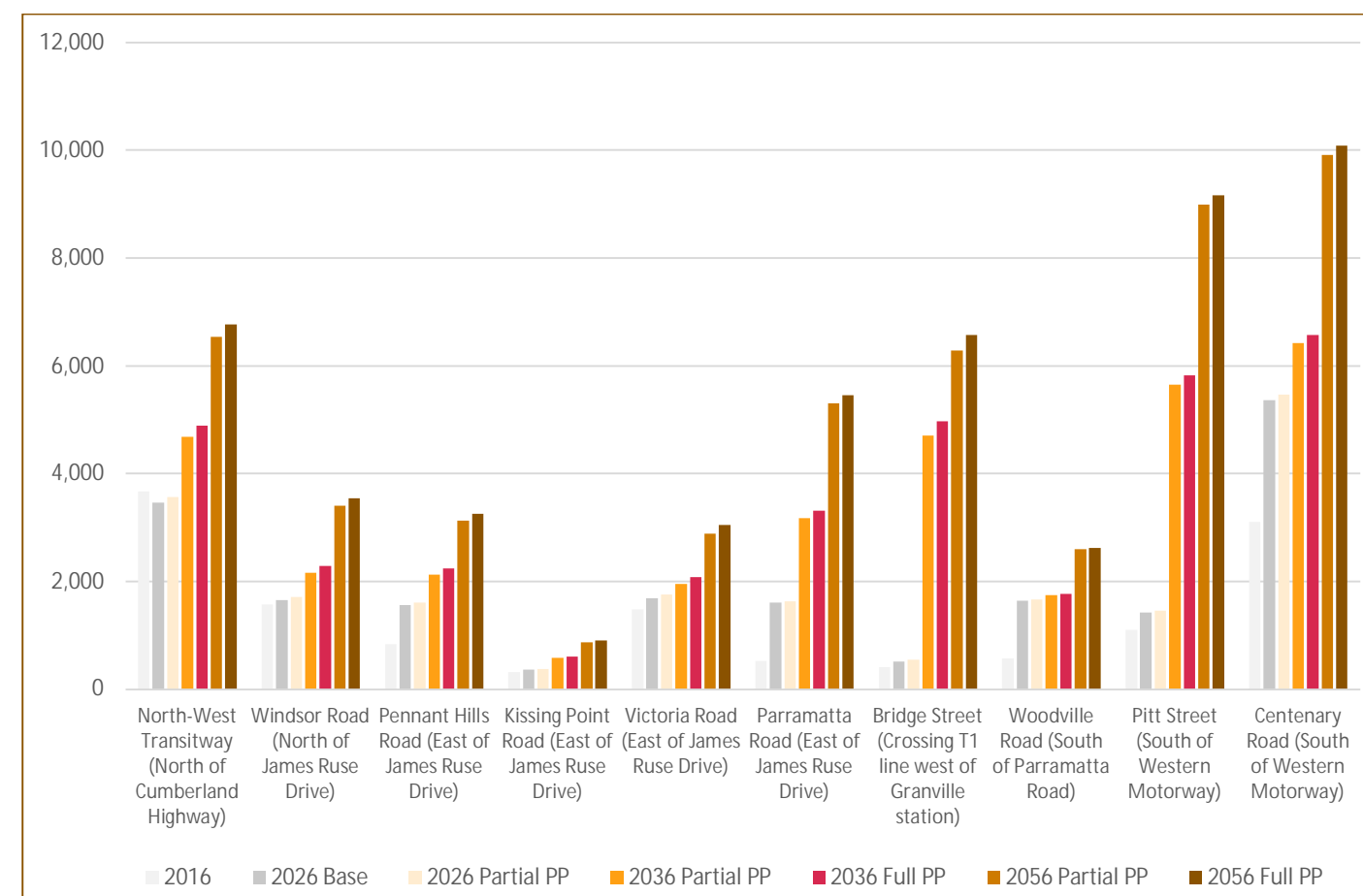


Figure 50: Two-way bus patronage at the outer cordon – 2hr AM Peak (Source: STM)

There are five bus corridors with greater than 5,000 passengers (total two-way) across the two-hour AM peak period in 2056: North-West Transitway, Parramatta Road, Bridge Street, Pitt Street and Centenary Road. Assuming a total capacity of 70 passengers per bus, it would be expected that this would mean more than 71 bus services (total two-way) across the two-hour AM peak period would be expected along these corridors. Bus services along these corridors would be expected to occur every 3-4 minutes to cater for the increase in patronage.

4.3.4 Visionary Metro Lines

The *Greater Sydney Services and Infrastructure Plan* of Transport for NSW's *Future Transport 2056* plan identifies that initiatives for investigation for 10-20 years include the following:

- Parramatta to Epping high capacity train/mass transit links
- Parramatta to Kogarah high capacity train/mass transit links

Visionary initiatives (20+ years) that will be explored near Greater Parramatta include:

- Parramatta to Norwest mass transit/train link

To assess the patronage of these three visionary metro lines, STM was used. Note, these three lines are not in the reference STM model but were added as a test to identify what the line loading would be if in place by 2056.

Parramatta to Epping

The Parramatta to Epping rail link is approximately 9km in length, connecting Parramatta to Epping, via North East Parramatta and Carlingford. The two-hour AM peak boarding and alighting volumes across the indicative station locations between Parramatta and Epping is shown in Figure 51. Note, station locations shown are for modelling purposes only and are subject to change.

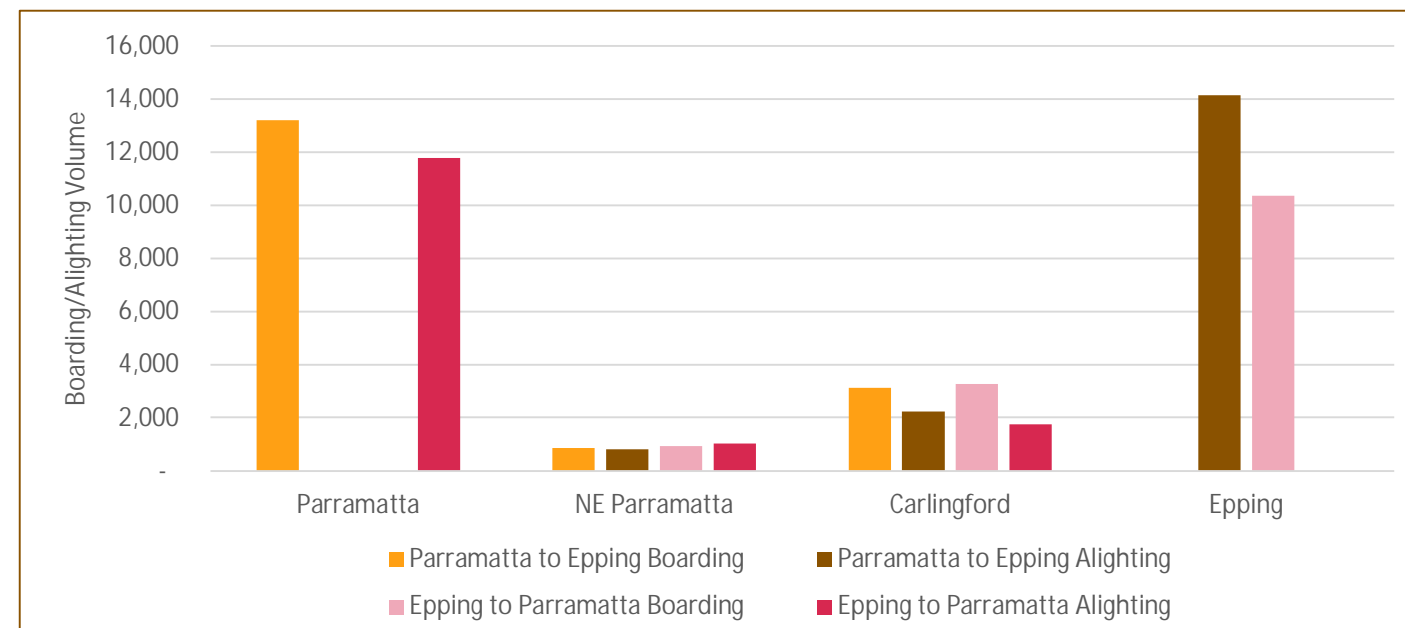


Figure 51: Boarding and Alighting Rail Patronage between Parramatta and Epping (two-hour AM Peak)

The line in the northbound direction from Parramatta to Epping is estimated to carry a rail patronage of 17,200 passengers in the two-hour AM peak. There are around 13,200 passengers boarding from Parramatta CBD (Sydney Metro West) and 3,100 passengers from Carlingford. 14,100 passengers are expected to alight at Epping.

The line travelling from Epping to Parramatta is estimated to carry a lower rail patronage of 14,500 passengers in the two-hour AM peak. From the STM modelling, the most popular stations to board are from Epping, with around 10,300 passengers, and Carlingford, with around 3,300 passengers boarding. Approximately 11,800 passengers are expected to alight at Parramatta.

Line loadings are shown in Figure 52 and Figure 53. The highest segment volume is 14,100 passengers between Carlingford and Epping. For westbound movements (Epping to Parramatta), the highest segment volume is 11,900 passengers between Carlingford and North East Parramatta.

Assuming a total capacity of 1,150 passengers per metro train, this level of demand would equate to more than 12 services in the northbound direction, and 10 services in the southbound direction across the two-hour AM peak period to cater for demand. This equates to a service every 10-12 minutes.

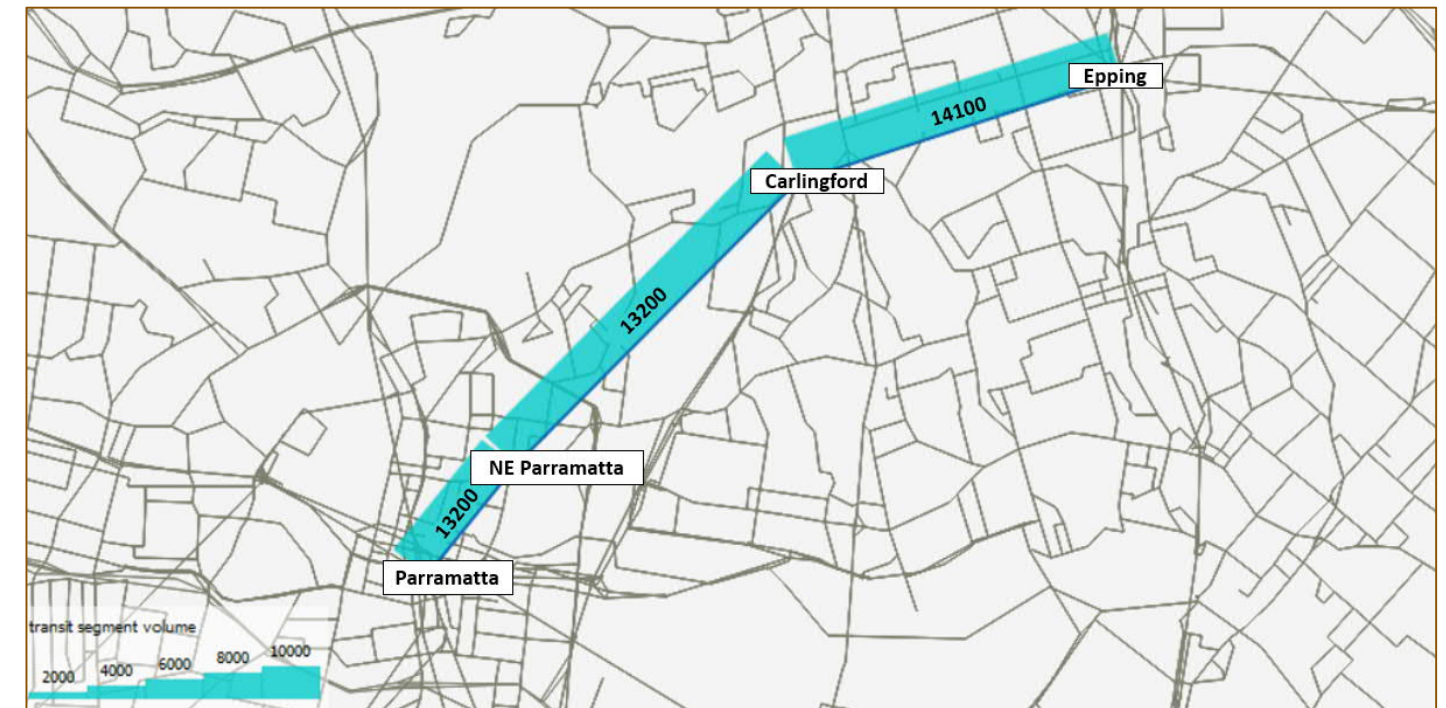


Figure 52: Parramatta to Epping two-hour AM Peak Period Rail Patronage 2056

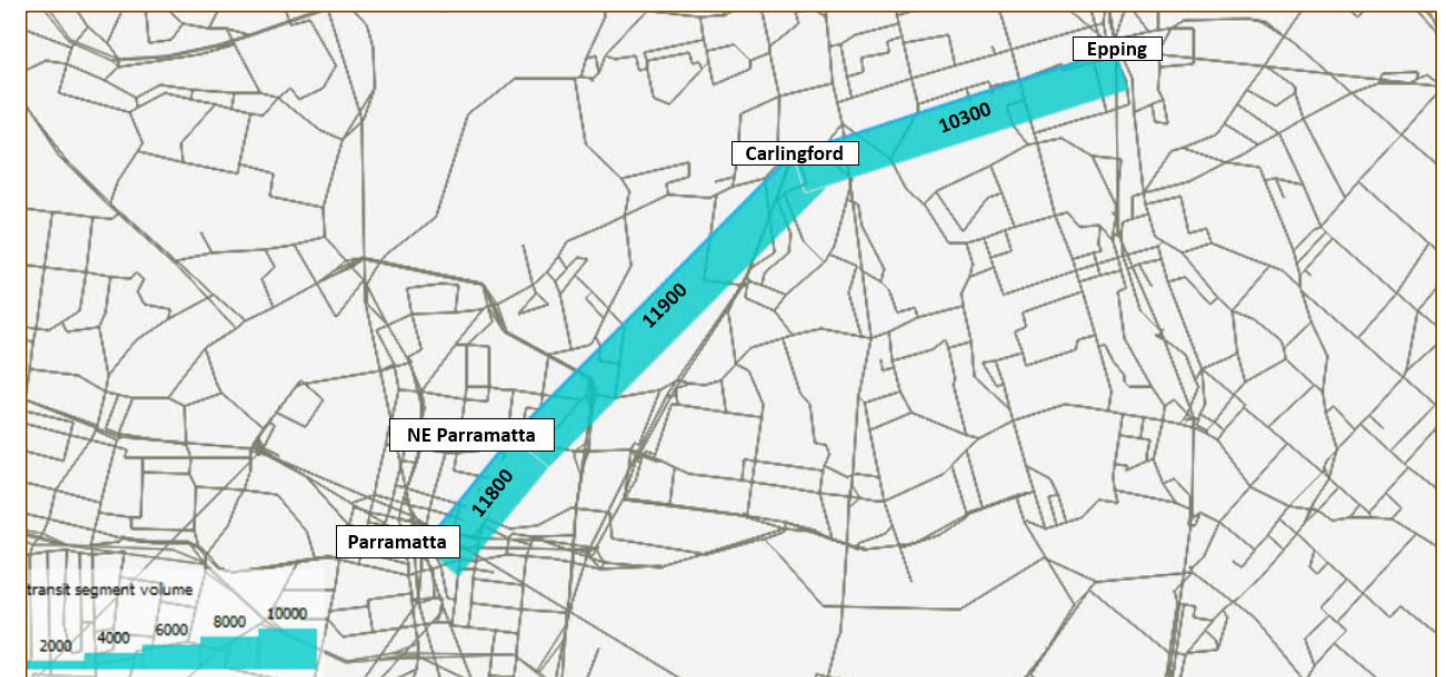


Figure 53: Epping to Parramatta two-hour AM Peak Period Rail Patronage 2056

Parramatta to Kogarah

The Parramatta to Kogarah high capacity mass transit link is approximately 24km long, connecting Parramatta to Kogarah, via Bankstown, with ten stops along the line. The two-hour AM peak boarding and alighting volumes across the indicative station locations between Parramatta and Kogarah is shown in Figure 54. Note, station locations shown are for modelling purposes only and are subject to change.

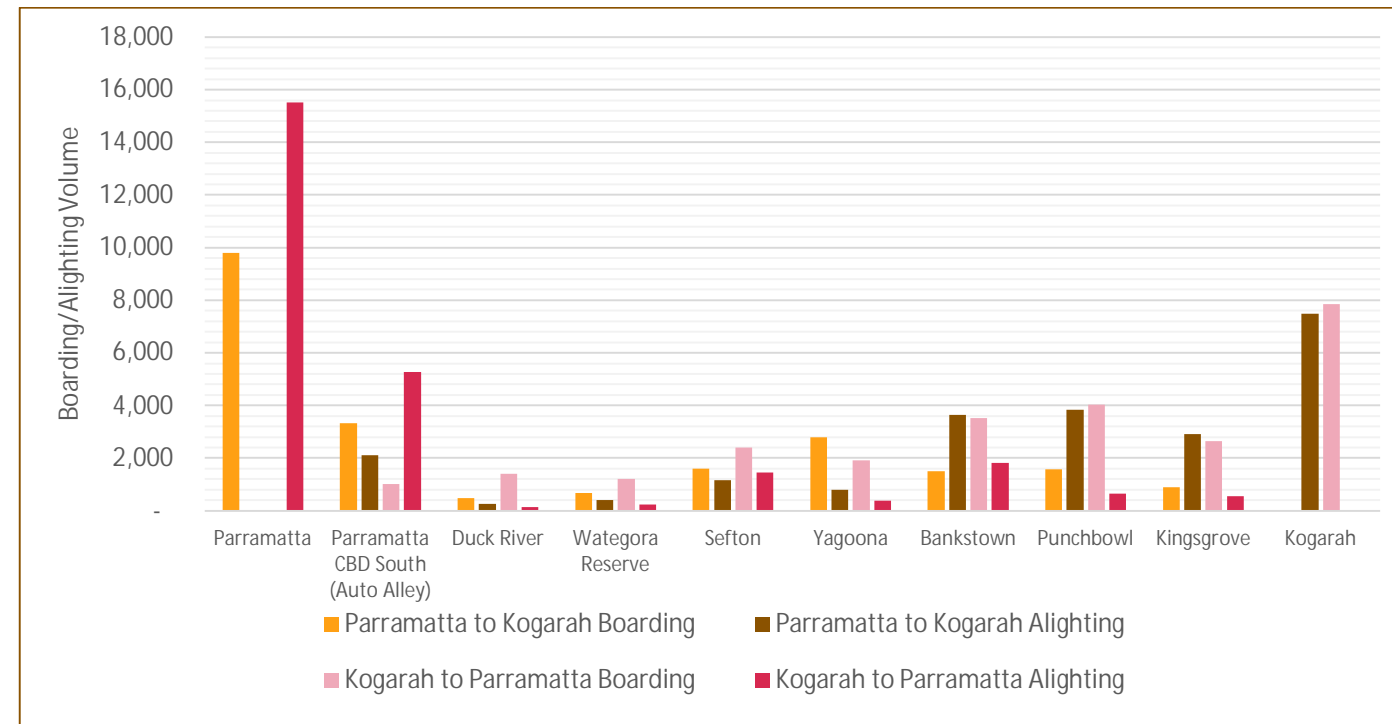


Figure 54: Boarding and Alighting Rail Patronage between Parramatta and Kogarah (2 hour AM Peak)

As shown above, the line from Parramatta to Kogarah is estimated to carry a rail patronage of 22,600 passengers in the two-hour AM peak. The most popular stations to board are at Parramatta, followed by Parramatta CBD South. Short rail trips appear common, with around 2,100 passengers expected to board at Parramatta and alight at Parramatta CBD South (Auto Alley). Stops with high alighting volumes include Kogarah followed by Punchbowl and Bankstown.

The line travelling from Kogarah to Parramatta is estimated to carry a higher rail patronage of 26,000 passengers in the two-hour AM peak. The most popular stations to board are at Kogarah, followed by Punchbowl and Bankstown. Approximately 15,500 passengers are expected to alight at Parramatta CBD, and 5,300 passengers at Parramatta CBD South.

Transit segment volumes of the line are shown in Figure 55 and Figure 56. The STM modelling for Parramatta to Kogarah high capacity train and mass transit links showed that for northbound movements (Kogarah to Parramatta), the highest segment volume was 19,800 passengers between Parramatta CBD South and Duck River. For southbound movements (Parramatta to Kogarah), the highest segment volume was 13,900 passengers between Yagoona and Bankstown.

Assuming a total capacity of 1,150 passengers per metro train, it would be expected that more than 12 services for the southbound direction, and 17 services for the northbound direction across the

two-hour AM peak period are required to cater for demand. This equates to a service every 7-10 minutes.

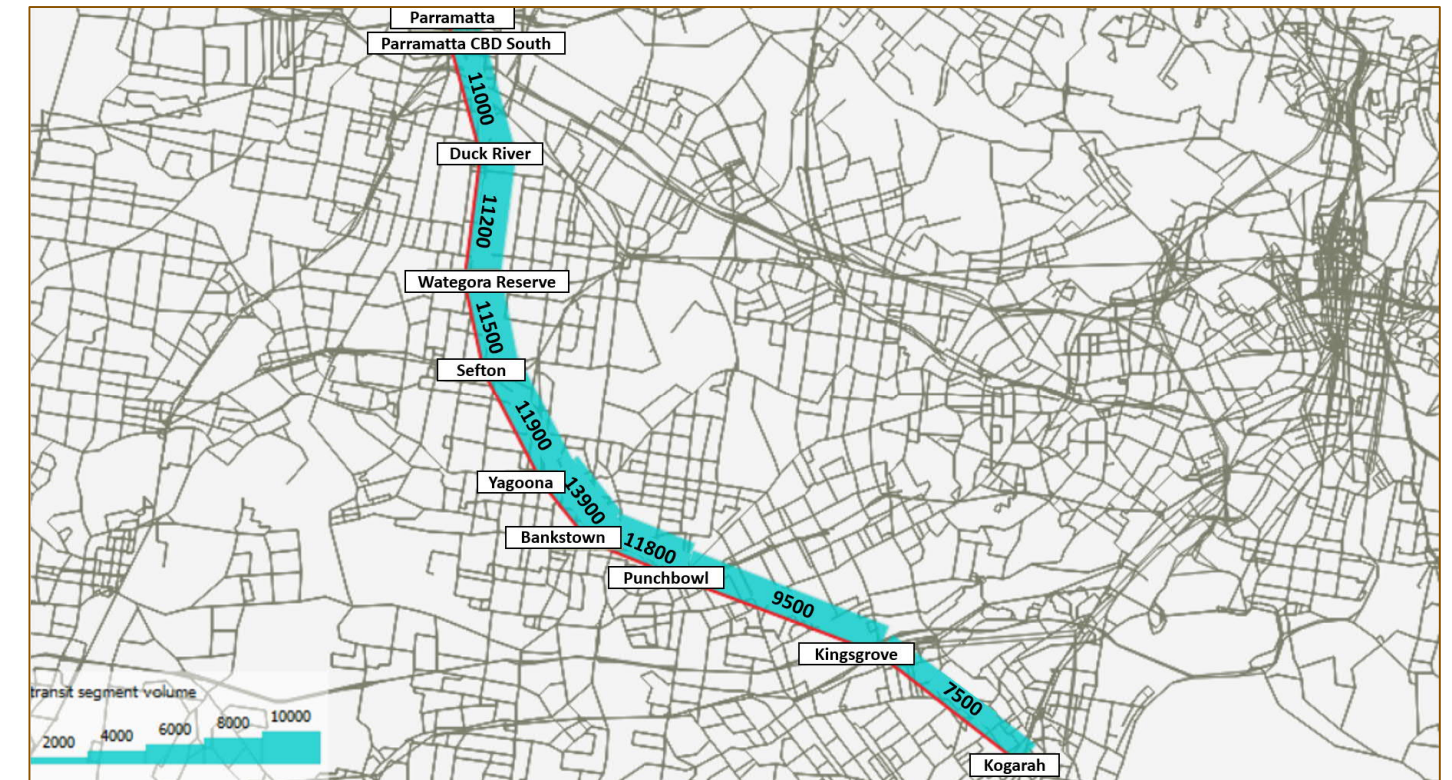


Figure 55: Parramatta to Kogarah two-hour AM Peak Period Rail Patronage

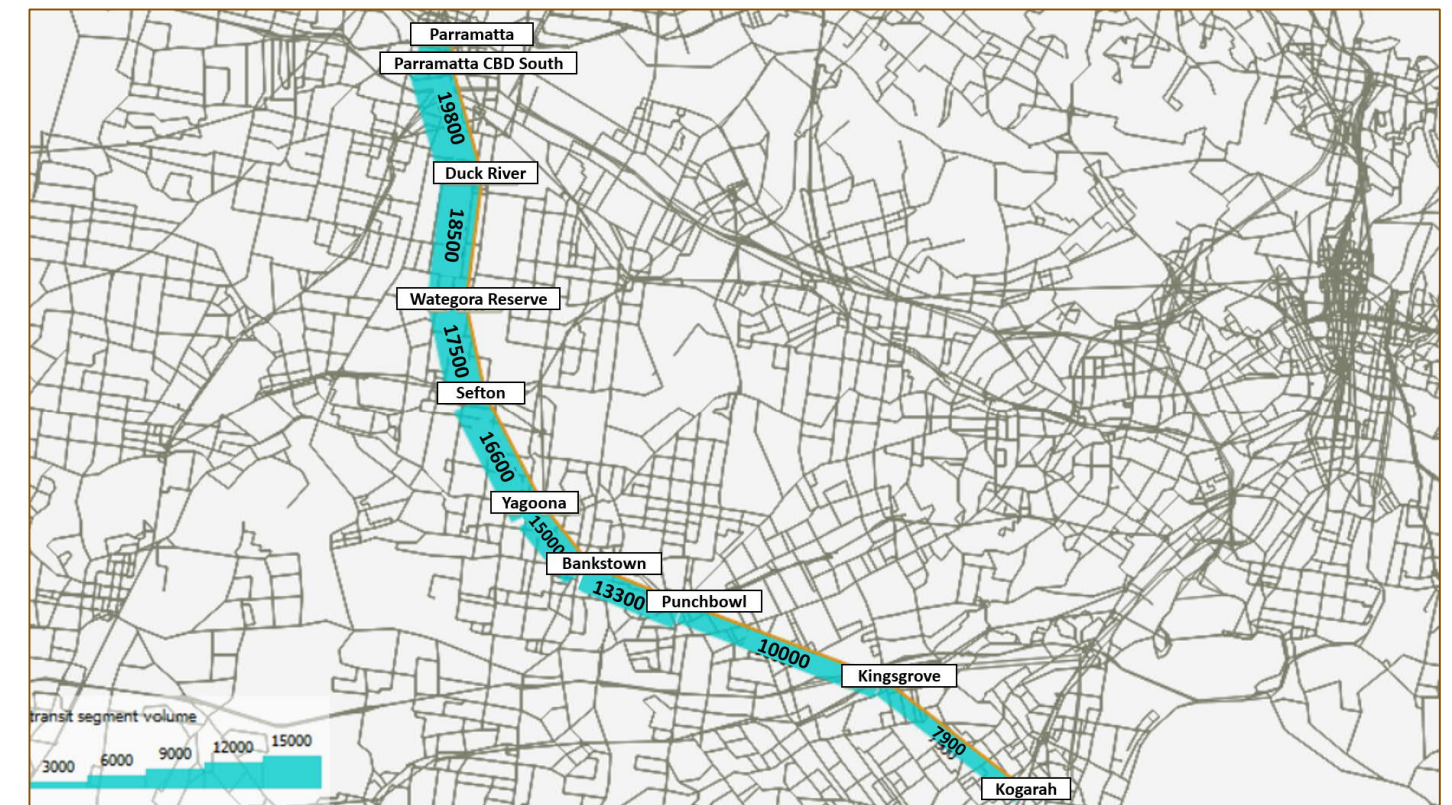


Figure 56: Kogarah to Parramatta two-hour AM Peak Period Rail Patronage

Parramatta to Norwest

The Parramatta to Norwest high capacity train/mass transit is approximately 11km long, connecting Parramatta to Norwest, via Baulkham Hills. The 2056 boarding and alighting volumes across the indicative station locations between Parramatta to Norwest is shown in Figure 57. Note, station locations shown are for modelling purposes only and are subject to change.

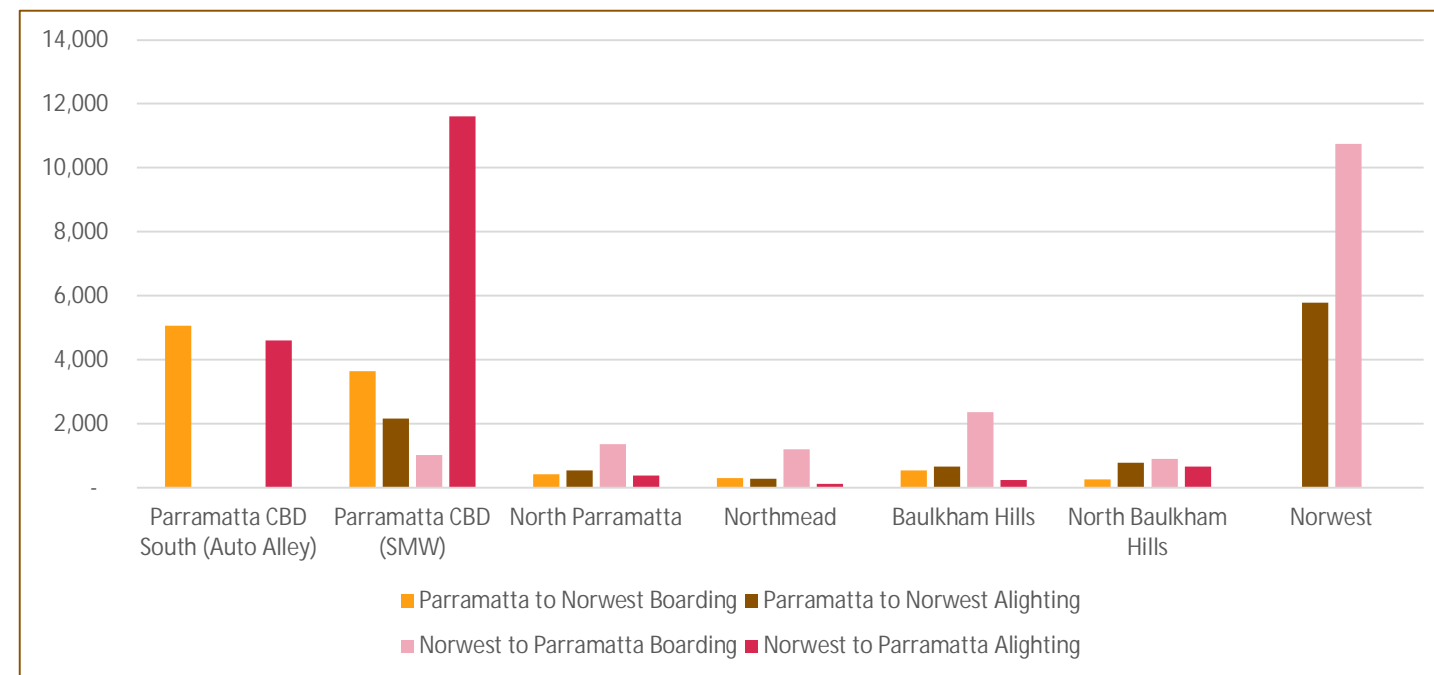


Figure 57: Boarding and Alighting Rail Patronage between Parramatta and Norwest (2 hour AM Peak)

The line from Parramatta to Norwest is estimated to carry a rail patronage of 10,200 passengers in the two-hour AM peak. The most popular stations to board are at Parramatta CBD South, followed by Parramatta CBD (Sydney Metro West). Short rail trips appear to be common, with around 2,200 passengers expected to board at Parramatta CBD South (Auto Alley) and alight at Parramatta CBD (Sydney Metro West). Approximately 5,800 passengers are expected to alight at Norwest.

The line travelling from Norwest to Parramatta is forecast to carry a higher rail patronage of 17,500 passengers in the two-hour AM peak. The most popular stations to board are from Norwest, with around 10,800 passengers, followed by Baulkham Hills with around 2,400 passengers boarding. Approximately 11,600 passengers are expected to alight at Parramatta CBD, and 4,600 passengers to alight at Parramatta CBD South.

Transit segment volumes of the line are shown in Figure 58 and Figure 59. For southbound movements (Norwest to Parramatta), the highest segment volume was 15,200 passengers between North Parramatta and Parramatta CBD. For northbound movements (Parramatta to Norwest), the highest segment volume was 6,500 passengers between Parramatta CBD and North Parramatta.

Based on a total capacity of 1,150 passengers per metro train, it would be expected that more than 13 services for the southbound direction, and 5 services for the northbound direction across the two-hour AM peak period are required to cater for demand. This equates to a service every 9-20 minutes.

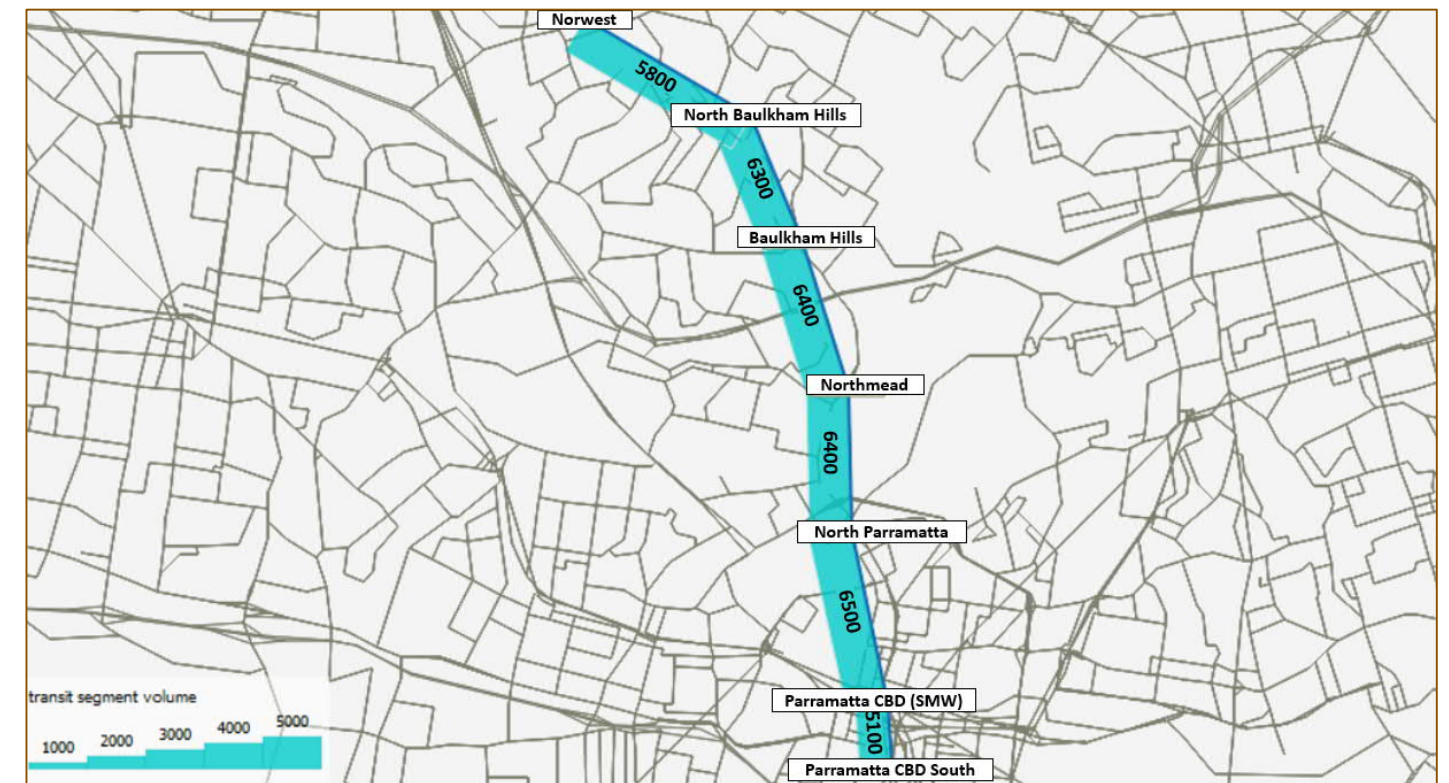


Figure 58: Parramatta to Norwest two-hour AM Peak Period Rail Patronage

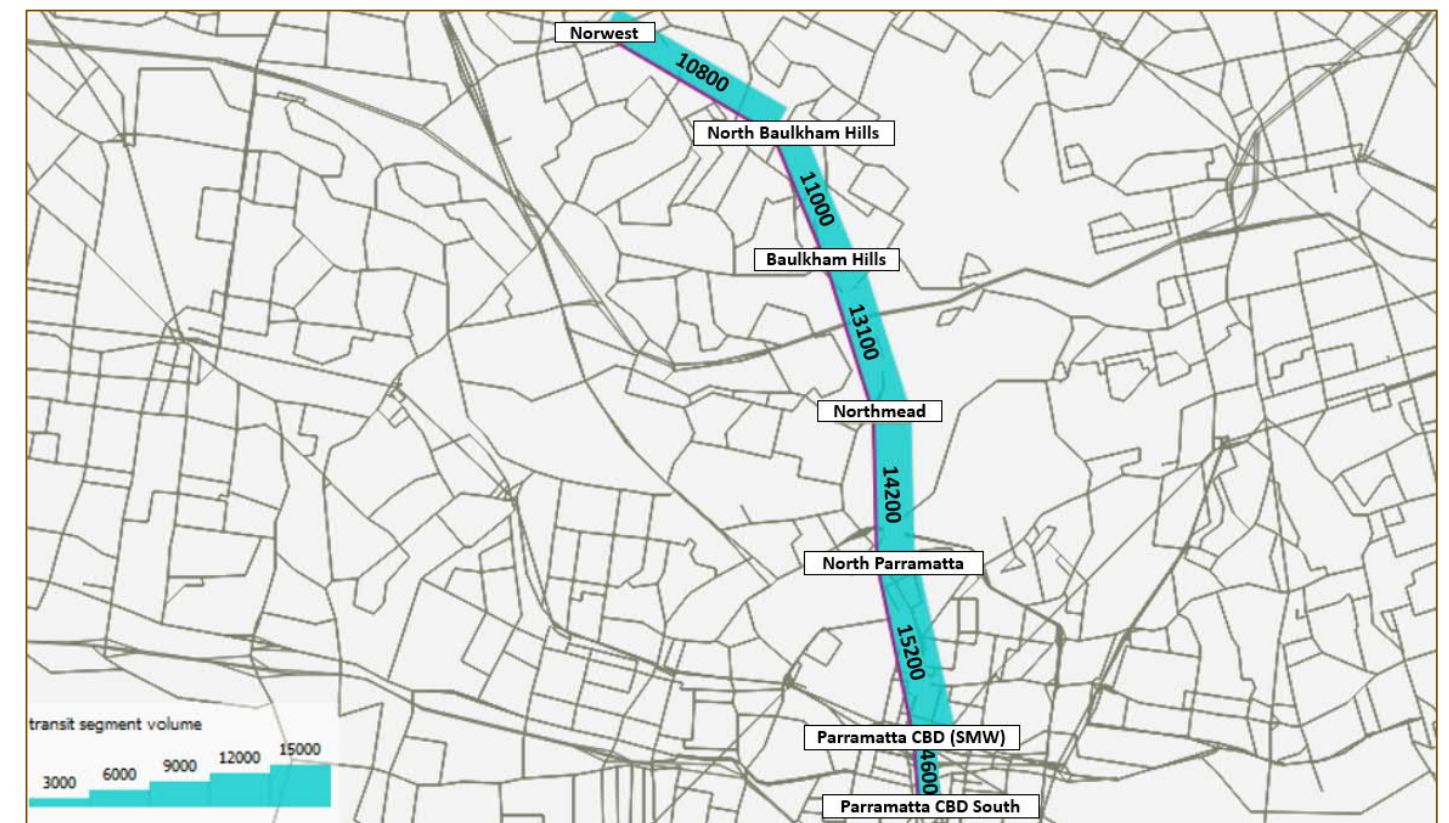


Figure 59: Norwest to Parramatta two-hour AM Peak Period Rail Patronage

Impact on Mode Share

The impact of including the three visionary metro lines on mode split between private vehicle and public transport for people travelling to and from Parramatta CBD was assessed through STM. A comparison of the 2056 full Planning Proposal with the 2056 including the three visionary metro lines is shown in Figure 60.

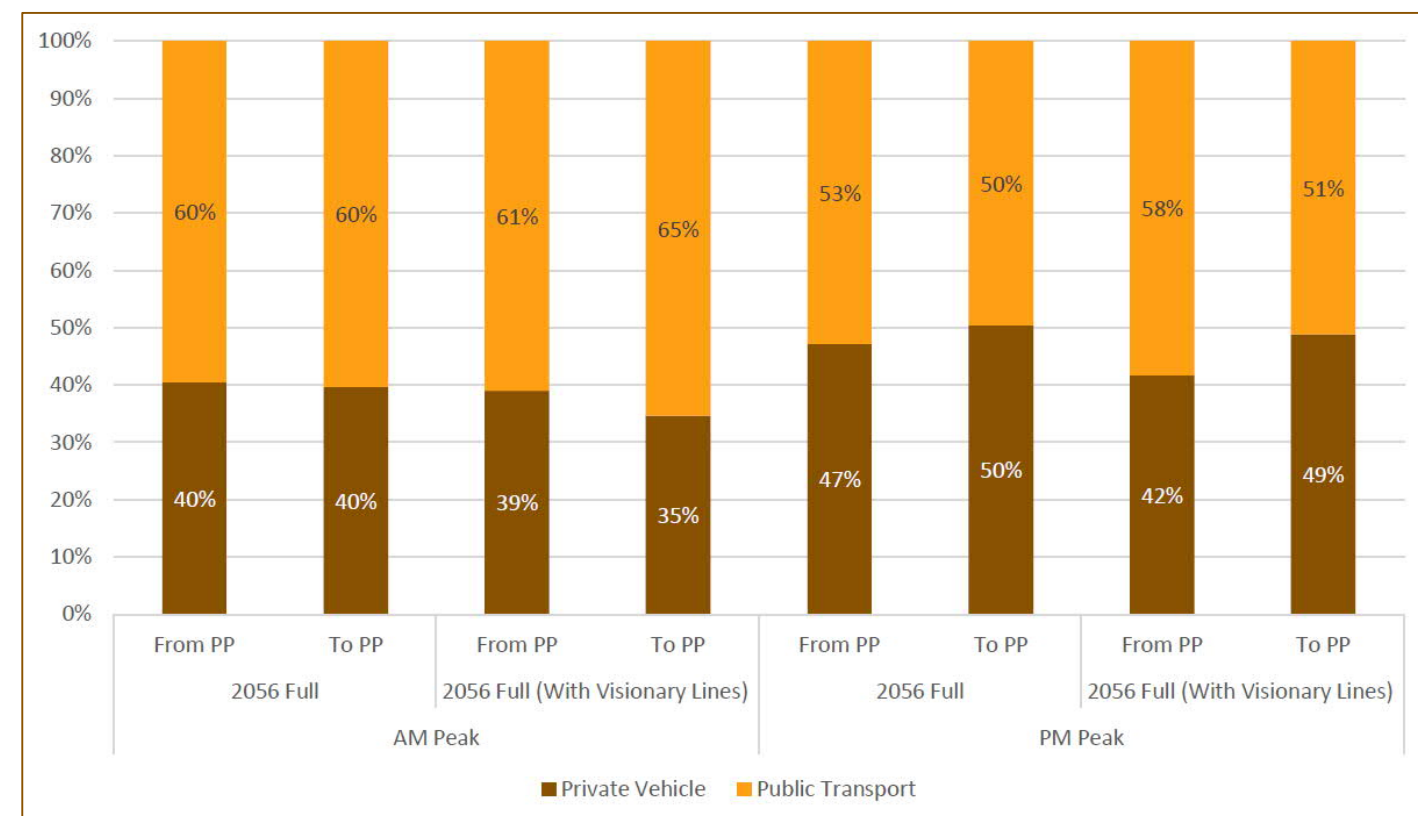


Figure 60: Visionary Lines Mode Share Comparison 2056 Scenario

For the AM peak, the 2056 scenario with the full planning proposal implemented results in a mode share of 60% public transport use and 40% private vehicle for both trips in and out of Parramatta CBD. The inclusion of the visionary lines results in an increase in the proportion of users taking public transport increasing by 5% to 65% to Parramatta CBD. Trips out of Parramatta experience an increase in public transport of 1% only to 61%.

For the PM peak, the 2056 scenario with the full planning proposal implemented results in a mode share of 53% public transport use, 47% private vehicle use out from Parramatta CBD. A 50/50 mode split in public transport and private vehicle use is forecast for trips into Parramatta CBD. With the inclusion of the visionary lines, public transport trip proportions increase by 5% for trips out from Parramatta CBD, and a 1% increase for trips into Parramatta CBD.

The STM analysis shows that the three visionary metro lines can increase the proportion of users taking public transport, by 1-5%. The greatest difference is observed for trips into Parramatta during the AM peak, and out from Parramatta in the PM peak, suggesting the visionary lines will be beneficial to support Parramatta CBD as a major employment hub.

Major increases in mode shift to public transport greater than 5% are not observed in this STM analysis. Reasons that could explain this include:

- The distribution of trips coming into Parramatta is largest from south and southwest of Parramatta, for example Greystanes. The visionary lines do not serve this corridor.
- The modelling has assumed no intensification of population and employment near the future metro stations i.e. transit-orientated developments to draw demand from. Land uses near the metro stations are predominately low-density residential or commercial and insufficient to generate higher demand.
- Regional buses in the STM modelling have not been rerouted or curtailed to avoid competition with the metro lines.
- There are no new feeder buses introduced to serve the new metro stations in the analysis. This limits the size of the metro catchment demand to within walking distances from these stations.

Overall, the visionary metro lines will increase the number of people that can access the Central River City within 30 minutes, supporting jobs growth in Parramatta and help to manage pressure on transport links by spreading demand across the city.

4.4 Peak Hour Car Travel

TfNSW traffic assignment model STFM was used to assign the 2016, 2026 and 2036 STM demand matrices to the road network. The 2026 and 2036 road networks in Parramatta CBD were updated in STFM to include the changes due to the implementation of Stage 1 of Parramatta Light Rail.

4.4.1 AM Peak Period

Changes in the 2-hour link flow as a result of the implementation of the current LEP and with the Parramatta CBD Planning Proposal were assessed in STM analysis. The locations of the counts (gateways) were chosen to be at the major entry and exit points to the Parramatta CBD located mainly on the inner and the outer ring roads around the CBD. Table 15 shows selected roads with the largest change in traffic volumes.

The largest change in traffic volumes occurs between 2016 and 2026 when the existing LEP is assumed to be fully in place and traffic volumes across most locations increase as a result. The implementation of the first stage of Parramatta Light Rail by 2026 would also cause a change in travel pattern with reduction in traffic volumes on Church Street (south of Victoria Road) and increase along the alternative O'Connell St, Marist Place and Wilde Avenue as traffic in the affected part of Church Street re-routes to nearby roads due to new restrictions in Church St.

The impact of the full implementation of the Planning Proposal can be observed from a comparison of partial and full PP in 2036. The greatest impacts are evident within the southern part of the CBD in Church Street which would experience a peak increase of 740 vehicles over 2 hours in the northbound direction and Great Western Highway 520 in the eastbound direction. These changes are significantly lower than those as a result of the full implementation of the current LEP in 2026 and increase in traffic associated with new developments.

The impact of the current LEP on the outer ring road is greatest at James Ruse Drive at Hassall Street where 2-hour traffic volumes increase by 1080 vehicles. In comparison, the change in traffic flows due to the full planning proposal is negligible with little change in traffic flows along the outer ring road.

2-hour Volume to Capacity ratios (VC) are also summarised. The implementation of Stage 1 of Parramatta Light Rail would result in a high VC ratio for southbound traffic in Marist Place in 2026. VC ratios also increase in Church Street north of M4 ramp and Marsden Street North of Great Western Highway which consistently shows high volumes across all

scenario years. Public transport, such as buses, should be considered for high VC routes to fit more customers into the available road space.

Table 15: Volume Differences and Volume Capacity Ratios 7-9am (Source: STFM)

Location	2026 Base – 2016	2026 Partial – 2026 Base	2036 Full – 2036 Partial	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP
	Volume Difference			Volume Capacity Ratios				
Inner Ring Roads								
O'Connell St (south of Victoria Rd)								
Northbound	130	60	-130	0.5	0.6	0.6	0.7	0.6
Southbound	1010	290	410	0.6	0.8	0.8	0.9	0.9
Marist Place (south of Victoria Rd)								
Northbound	50	30	190	0.2	0.3	0.3	0.3	0.5
Southbound	1090	-10	110	0.4	1.3	1.3	1.4	1.5
Church St (south of Victoria Rd)								
Northbound	-580	20	100	0.2	0.1	0.1	0.1	0.2
Southbound	NA	NA	NA	0.3	NA	NA	NA	NA
Wilde St (south of Victoria Rd)								
Northbound	120	70	50	0.3	0.3	0.3	0.3	0.4
Southbound	1420	210	160	0.3	0.8	0.8	0.9	0.9
Church St (north of M4 off-ramp)								
Northbound	800	120	740	0.8	0.9	1.0	1.0	1.2
Southbound	580	90	300	0.5	0.6	0.6	0.6	0.7
Marsden St (north of GWH)								
Northbound	150	130	280	1.2	1.3	1.4	1.5	1.7
Southbound	220	60	320	0.1	0.2	0.2	0.2	0.4
Great Western Hwy (west of Church St)								
Eastbound	530	160	520	0.5	0.6	0.6	0.7	0.8
Westbound	430	110	440	0.4	0.5	0.5	0.6	0.6
O'Connell St (north of Macquarie St)								
Northbound	-830	-50	-110	0.8	0.7	0.7	0.7	0.7
Southbound	1330	320	530	0.6	0.8	0.9	0.9	1.0
Outer Ring Roads								
James Ruse Drive (north of Hassall St)								
Northbound	690	140	200	0.6	0.7	0.7	0.8	0.9
Southbound	1080	30	150	0.6	0.8	0.8	0.9	0.9

4.4.2 PM Peak Period

Table 16 shows the changes in the 2-hour link flows for the evening peak period for the considered scenarios. The change in traffic volumes across all of the gateway locations due to the implementation of the current LEP is almost double that would be experienced under the full planning proposal in 2036. Under the full PP, the largest impacts would occur in Church St north of M4, Cambridge Avenue at the rail crossing and Great Western Highway west of Church Street. Both O'Connell and Pitt streets would also experience increase in traffic north of the Great Western Highway under the full PP. The largest impact on the outer ring road occurs in 2026 when the current LEP is assumed to be fully in place. The full PP appears to result in minor increase in traffic volumes when compared to their carrying capacity.

Table 27 below shows the volume capacity ratios. Major increases in volume capacity ratios across all locations occurs between 2016 and 2026 when the current LEP is realised. The main congested links are Marsden Street, O'Connell Street north of Great Western Highway and Church Street near M4 ramp where the volume-capacity ratios progressively increase across the scenarios to 2036.

Due to the full planning proposal, the highest impact is on Church Street (north of M4 ramp) in the AM peak period and on O'Connell Street (north of Great Western Highway) in the PM peak period.

Table 16: Volume Differences and Volume Capacity Ratios 4-6pm (Source: STFM)

Location	2026 Base – 2016	2026 Partial – 2026 Base	2036 Full – 2036 Partial	2016	2026 Base	2026 Partial PP	2036 Partial PP	2036 Full PP
	Volume Difference			Volume Capacity Ratios				
Inner Ring Roads								
Cambridge St (at rail crossing)								
Eastbound	270	90	420	0.5	0.6	0.6	0.7	0.9
Westbound	470	-30	270	0.5	0.7	0.7	0.8	0.9
Church St (north of M4 off-ramp)								
Northbound	520	100	620	0.6	0.7	0.7	0.8	0.9
Southbound	790	130	740	0.7	0.9	0.9	1.0	1.1
Great Western Hwy (west of Church St)								
Eastbound	460	190	500	0.6	0.6	0.7	0.7	0.9
Westbound	690	160	190	0.5	0.7	0.7	0.7	0.8
O'Connell St (north of GWH)								
Northbound	NA	NA	NA	NA	NA	NA	NA	NA
Southbound	800	220	870	0.9	1.0	1.1	1.1	1.3
Pitt St (north of GWH)								
Northbound	800	110	540	0.4	0.6	0.6	0.6	0.7
Southbound	NA	NA	NA	NA	NA	NA	NA	NA
Marsden St (north of GWH)								
Northbound	310	90	160	1.0	1.2	1.2	1.3	1.4
Southbound	310	120	190	0.4	0.6	0.6	0.7	0.8
O'Connell St (north of GWH)								
Northbound	NA	NA	NA	NA	NA	NA	NA	NA
Southbound	800	220	870	0.9	1.0	1.1	1.1	1.3

4.5 Mesoscopic Analysis

The Greater Parramatta and Olympic Model (GPOP) Aimsun model developed for Parramatta Light Rail was used to cordon off a subarea covering the Parramatta ITP study area. The model has been used to identify the travel route of vehicles based on the level of congestion and delay in the network for the near term 2026 future year scenario to test the impact of the partial planning proposal on travel pattern and changes to Council’s off-street parking rates.

The 2016 Base Case model was developed from the existing Aimsun model used for *Stage 1 Parramatta Light Rail (PLR)*, which covers a wider geographical and temporal scope. The model covers a region bordered by the outer ring road around the Parramatta CBD, which includes James Ruse Drive, the M4 Motorway and Cumberland Highway. It covers the morning (7-9am) and evening (4-6pm) weekday peak periods.

The future year 2026 model was developed from the base year Parramatta CBD Aimsun model, using STM/STFM growth, committed infrastructure projects, and associated public transport service changes. The most significant difference between the 2016 base and 2026 Aimsun networks is Stage 1 of the Parramatta Light Rail (PLR) preferred network, with its enabling works along George Street, O’Connell Street and key intersections on Church Street.

This model represents full development of the existing Parramatta Local Environmental Plan, permanent adoption of the current interim parking controls, and known site-specific planning proposals under the Planning Proposal (“Partial PP”).

4.5.1 Demand adjustment for parking supply constraints

For some years, the City of Parramatta endorsed interim parking rates from the City of Sydney LEP controls. It is anticipated that these rates will be formally adopted as part of the Planning Proposal (PP). As such, they are included in the 2026 base Aimsun modelling. The relatively small amount of additional trip reductions due to parking constraints could be considered to shift to public transport modes. These constraints are not reflected in the demands from the STM/STFM.

The impact on forecast growth has been calculated based on the change in parking rates for office/commercial developments, the percentage contribution of office/commercial employment to total employment in the Planning Proposal area, and the contribution of trips to STFM totals.

The resulting factors are shown in Table 17. These factors are applied to the new trips, added since the base year, travelling to or from the Planning Proposal area.

Table 17: Growth adjustment factors for parking controls

To/From	AM Peak	PM Peak
To Planning Proposal Area Zones	73%	58%
From Planning Proposal Area Zones	52%	86%

4.5.2 Future Year Demands

Future year demand matrices are based on cordon matrices from the STM and STFM modelling. In addition to the parking supply constraints, demand adjustments include the following:

- **Active Transport:** Car traffic making short trips within the model has been reduced to reflect the attractiveness of active transport modes (walking and cycling). For origin to destination distances 2km or less, 30% of car trips have been assigned to active modes. The proportion then declines linearly by distance, reaching 0% at 5km.
- **Public Transport:** Parramatta transport strategy target a 40% car mode share for work related trips in the area. To scale car trips down (which is currently 43%) to the target, the additional shift of trips from car demands is considered to be taken up by public transport.
- **Peak Spreading:** Peak spreading has been applied resulting in a flat profile across both modelled two hour periods and 5% diversion of PM peak traffic to shoulder periods.

4.5.3 2026 Future Base Case Network Performance

The overall performance of the network in the 2026 base case is summarised by the graphs in Figure 61 and Figure 62. Figure 61 shows the number of vehicles travelling within the model area (in blue) and the number which have attempted to start their journey but have not been able to enter the network (in orange). Figure 62 shows the average speed within the modelled network (in blue) and the average density in vehicles per lane kilometre (in orange).

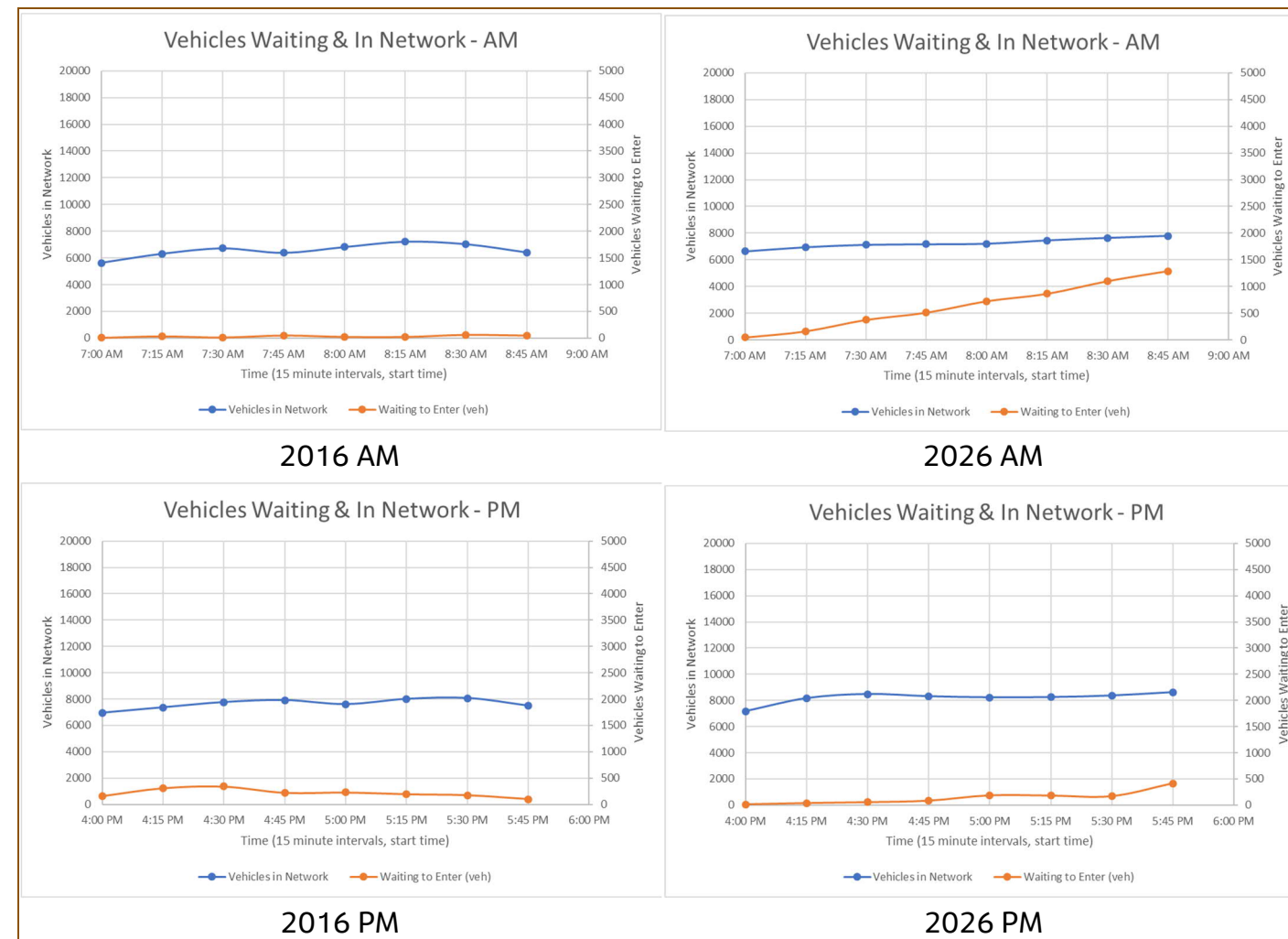


Figure 61: Overall Network Performance – Waiting and Travelling Vehicles

The plots show that in the 2026 AM peak, there is an increased number of vehicles which have attempted to start their journey, but have not been able to enter the network, also known as 'unreleased demand'. This excess demand is queued outside the model and only released when sufficient road space is available. At this stage, the traffic throughput for a road section would be constrained by road capacity. During the AM, these capacity constraints are predominantly located at the M4 eastbound entry. In the 2026 PM peak, the number of vehicles waiting to enter the network is relatively low. This suggests the road network has sufficient capacity to cater for the number of vehicles in the network. The numbers of vehicles in the network are reasonably stable in both peaks with the 2026 results slightly higher than the 2016 figures, as expected.

The network density and speed graphs in Figure 62 echo the waiting and travelling vehicle results. The 2026 performance in both peaks is similar to the base year, with only slightly lower average speeds and slightly higher densities. Both show similar declines in average speed during the modelled period in 2016 and 2026, and reasonably stable average speeds. By the end of the modelled period, average travel speeds across the network in 2026 are approximately 2% lower in 2026 than in 2016, in both peaks.

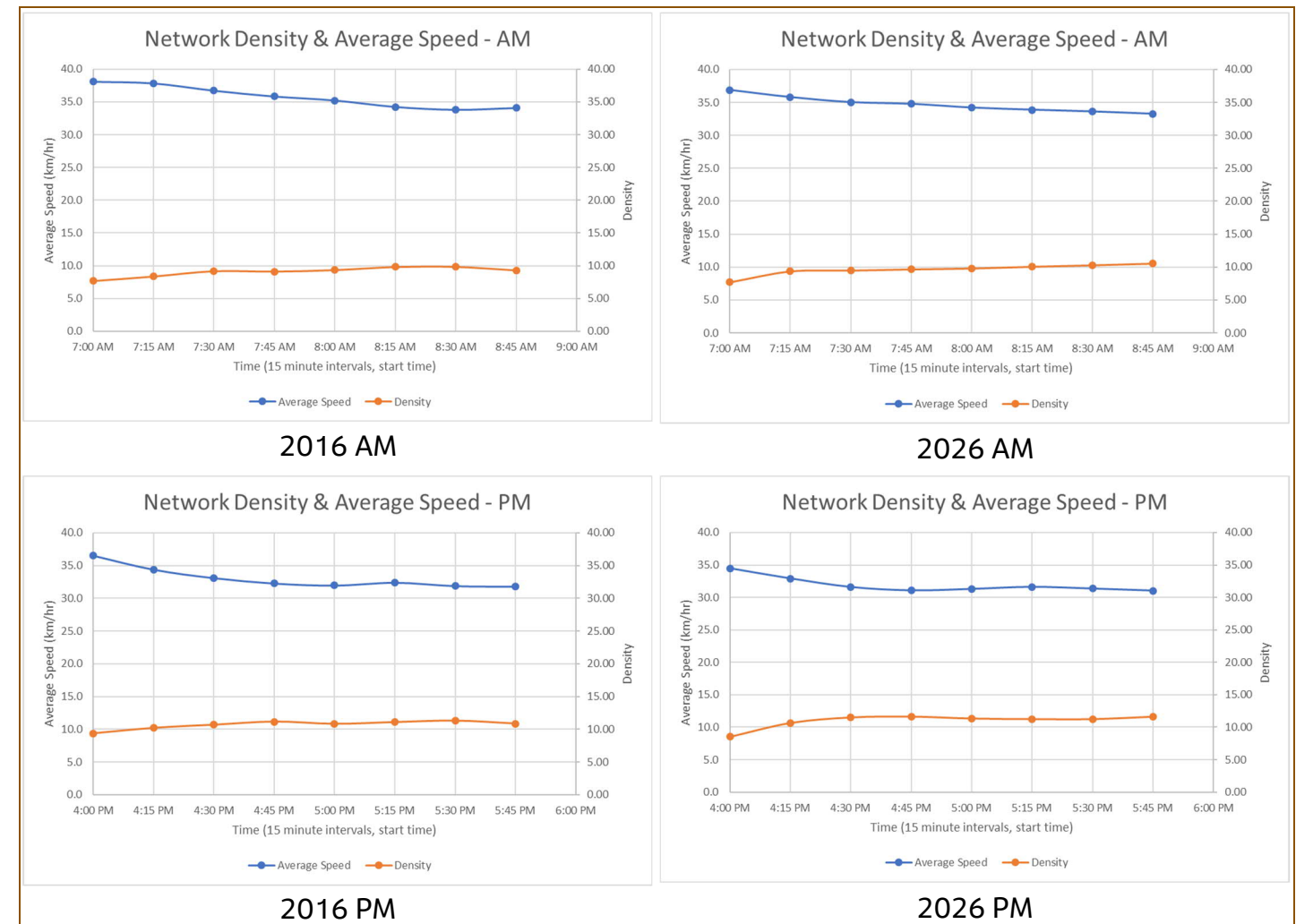


Figure 62: Overall network performance – network density and speed

4.5.4 2026 Future Base Congestion

The geographic distribution of congestion is shown by density, simulated delay and simulated speed plots. The maximum AM and PM peak densities are shown in Figure 63 and Figure 64. Other density, simulated delay and simulated speed plots are outlined in Appendix B.

The density plots reinforce the findings of the vehicle number and speed graphs, showing similar overall performance in the two years, with congestion in 2026 being slightly higher than 2016 and with some differences in distribution.

In the 2026 AM peak, increased congestion is observed on Cumberland Highway, M4 eastbound at the western boundary of the model, and on several side streets along the north side of the Great Western Highway east of Pitt Street and along the north side of Parkes Street. Increased delays and slower speeds are observed at these locations. Increased delays are also observed to the north of Parramatta along Church Street. Compared to 2016 AM, capacity increases have removed congestion on the eastern section of the M4, while Jersey Road northbound has also improved.

In the 2026 PM peak, increased congestion is observed on James Ruse Drive and Windsor Road approaching the Cumberland Highway, on the Great Western Highway around Mays Hill, on the M4 eastbound model entry and westbound Parramatta Road on ramp, and at scattered locations around the CBD. Increased delays and slower speeds are observed at these locations. Increased delays are also observed to the north of Parramatta along Church Street. Similar to the AM peak, the eastern M4 has improved, as has the area around the Church Street interchange (except for the Parramatta Road on ramp itself), due to the planned works there.

Total two-hour peak demand increases by 4% in the AM peak period, and remains very similar in the PM peak, in this scenario. The results indicate that the final 2026 base case model accommodates the demand with a reasonable degree of congestion, higher than the base year but without widespread queue propagation cutting off throughput.

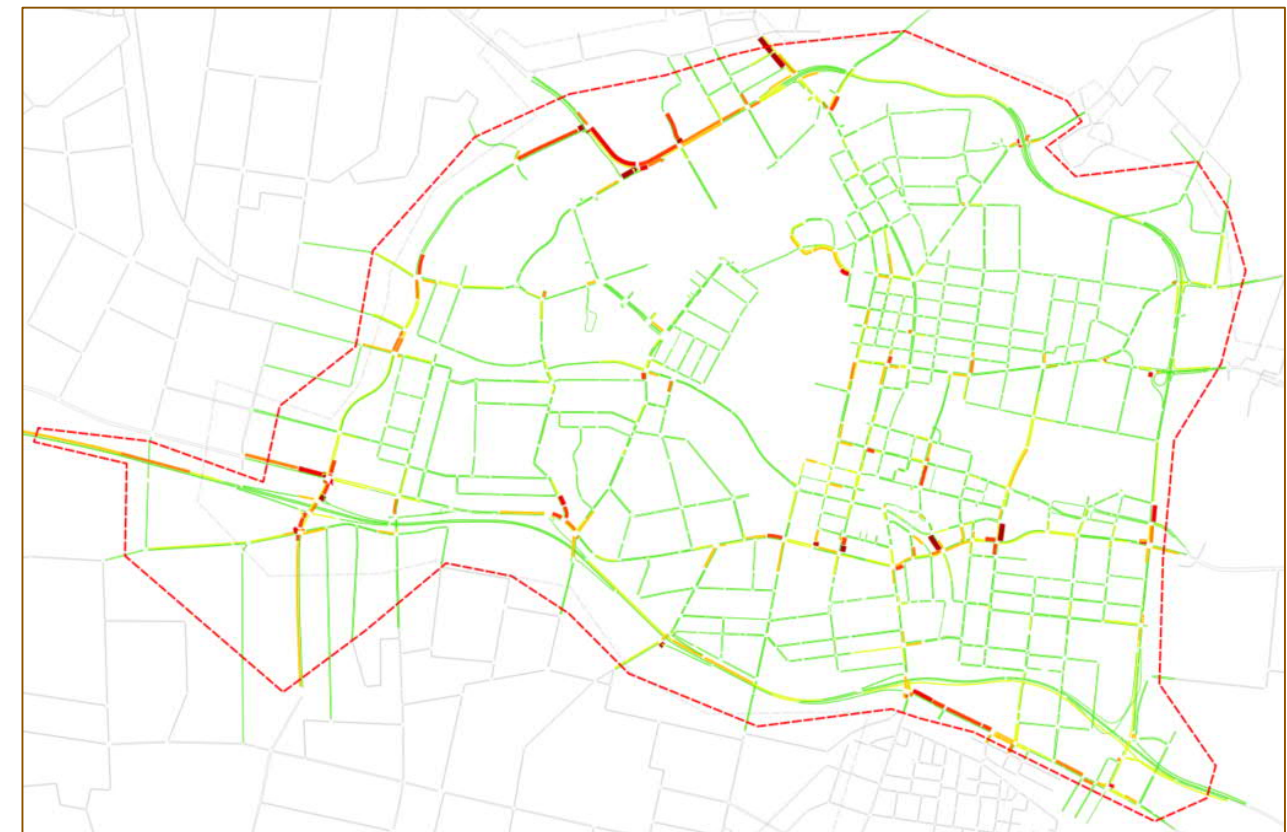


Figure 63: 2026 Density plot, AM 2 hour peak maximum

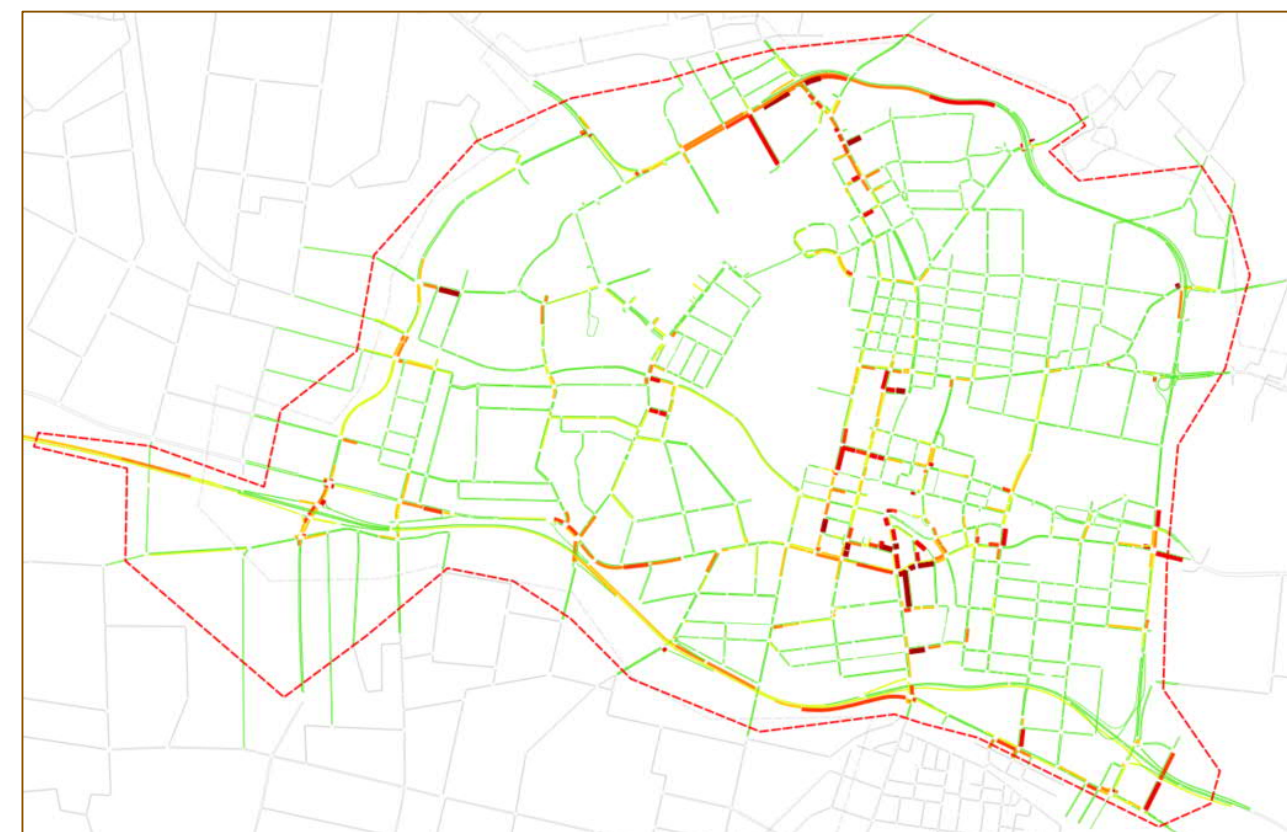


Figure 64: 2026 Density plot, PM 2 hour peak maximum

4.6 Mode Share Sensitivity Analysis

Mode share sensitivity analysis was undertaken for Parramatta CBD to better understand the needs of Parramatta into the future. Analysis was based on the previously discussed Aimsun and STM results, with demand adjustments included. These demand adjustments account for factors which haven't been considered within the initial modelling results, and by incorporating them, provide a better reflection of the expected network performance.

4.6.1 Parking Supply Sensitivity Analysis

A sensitivity analysis to explore the implications of a reduction in parking supply has been undertaken. Demand adjustments to reduce parking supply have been applied on the initial STM results. A comparison of the JTW Car Mode Share for STM Without Adjustment, and With Parking Restriction adjustments applied are shown for AM and PM peaks, in Figure 65 and Figure 66. Within both graphs, the benchmark of 40% has been marked to indicate the 40% Journey to Work (JTW) car mode share target outlined in Parramatta CBD transport strategy,

During the 2-hour AM peak, if the reduction in parking supply is considered as per the proposed parking rates, the JTW car mode share across the scenarios are shown to reduce. Car mode share is expected to reach the 40% target by 2056 if the parking restriction is applied. Travel from the Planning Proposal in the AM peak is expected to reach the 40% target by 2036 if the Full LEP is implemented.

During the 2-hour PM peak, if the reduction in parking supply is considered as per the proposed parking rates, the JTW car mode share across the scenarios are shown to reduce. However, the reduction in car mode share is not significant enough to reach the 40% target in any of the future scenarios.

These results highlight that additional improvements to Parramatta on top of the committed projects included in the STM modelling and parking supply restrictions are needed to achieve lower car mode share.

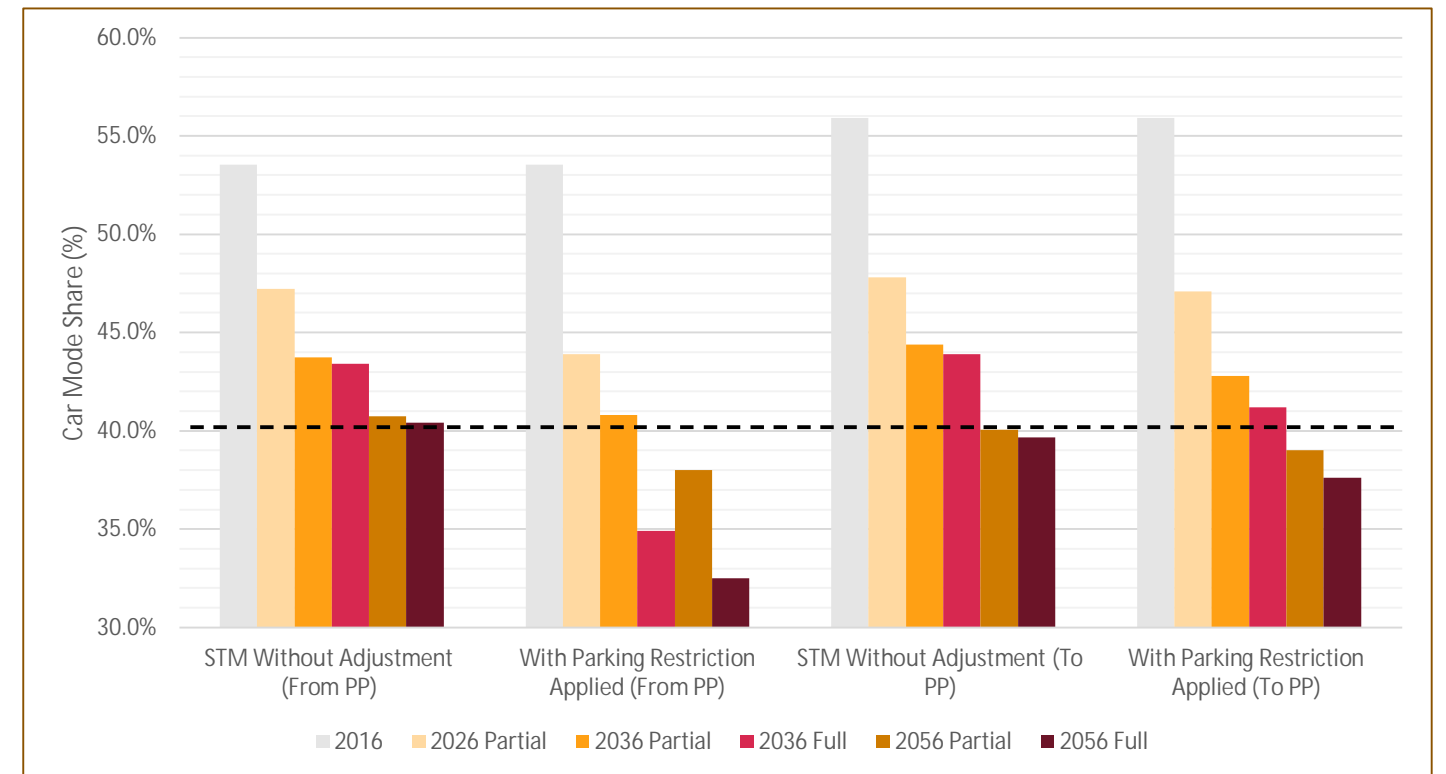


Figure 65: Car Mode Share Comparison to Account for Reduction in Parking Supply (2 hour AM Peak)

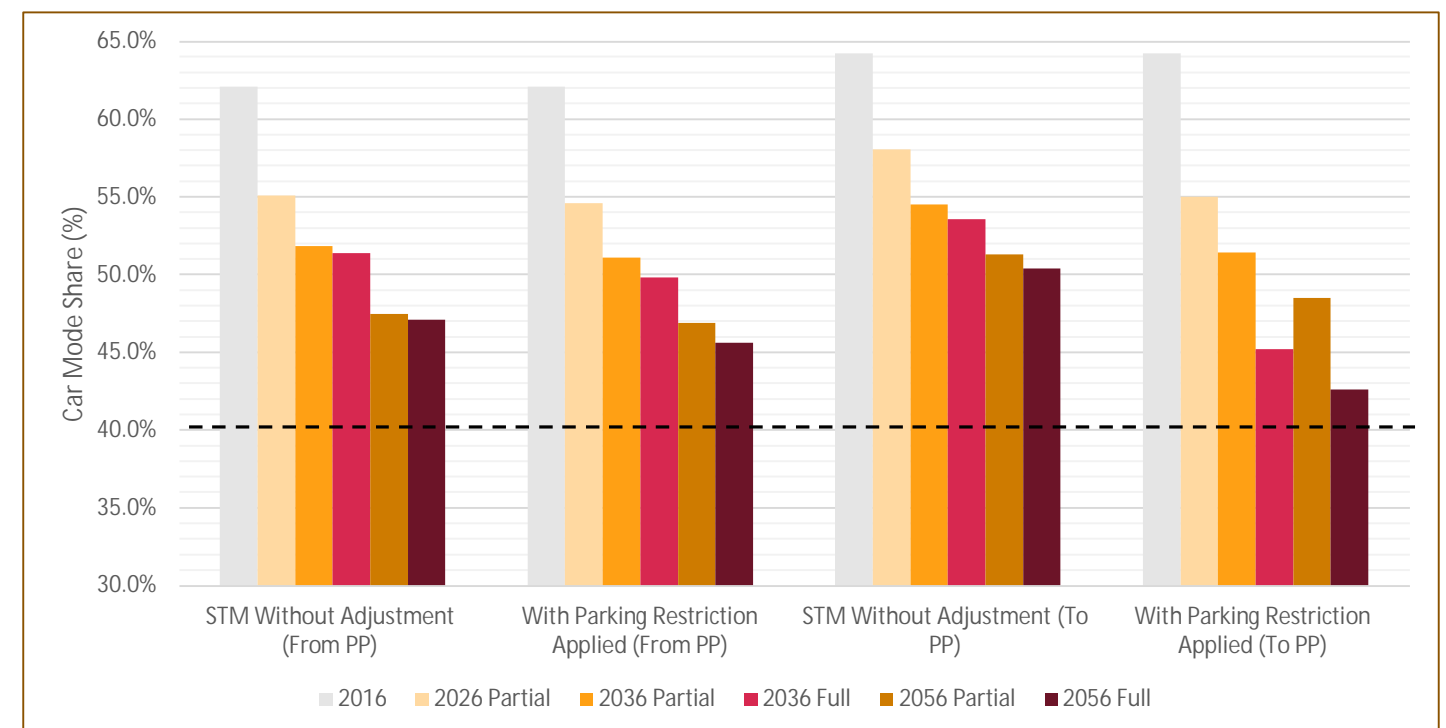


Figure 66: Car Mode Share Comparison to Account for Reduction in Parking Supply (2 hour PM Peak)

4.6.2 Implications of Transport Vision for Future Mode Share

A sensitivity test was carried out to explore the implications of the further development of the Planning Proposal area to full development in 2026 and 2036. For the purposes of this investigation, four scenarios were considered for a nominal 2036 future year:

- **2036 Partial Case** (Planning Policy Car Demands as per 2026 Partial Case)
- **2036 Full Case A** (Planning Policy Car Demands as per 2026 Partial Case)
- **2036 Full Case B** (Planning Policy Car Demands 20% higher than Case A)
- **2036 Full Case C** (Planning Policy Car Demands 20% lower than Case A)

Demand adjustments made as part of the sensitivity testing include:

- **Walk/Cycle Mode Shift:** 30% of car trips were removed for areas with a distance less than or equal to 2km and converted to walk trips. A further decreasing proportion of car trips were removed as cycle trips up to 5km. No trips longer than 5km were removed. This demand adjustment was applied across the entire model for internal trips only.
- **Planning Area Parking Policy Changes:** Adjustments were made to the original trip rates for the planning area zones (i.e. not additive to the walking and cycling reductions). Where the reduced trip rates resulted in less trips than the previously calculated walking and cycling adjustment, the origins or destinations from the walk/cycle mode shift adjustment were reduced (factored) to the new total. These additional reductions in car trips were assumed to shift to public transport as the walk/cycle shifts had already been taken.
- **Additional shift to match Parramatta CBD planned mode share:** After demand adjustments were made as described above, a further shift of car trips was made to reduce the work car mode share to the vision target of 40%. This small remaining shift is considered to be influenced by the vast improvement in public transport and an active mode connectivity that is required to support the vision and the increase in road congestion that would occur in parallel.
- **Flatten flow profile over 2 hour peak periods:** This demand adjustment flattens the flow profile over 2 hour peak periods, where all 15 minute periods in each 2 hour assignment period were changed to the average 15 minute flow for the 2 hour period
- **Split demand into WestConnex (M4) Toll and non-Toll Vehicles**
- **Spread demands outside two-hour peak periods:** The demand matrices from the steps above resulted in revised demand matrices for assignment within Aimsun. While the models were close to performing adequately, a minor amount of peak spreading was required, implemented by factoring the entire demand by the AM factor in the AM peak and PM factor in the PM peak.

The resulting planning area peaks (combined AM and PM) trip demands are tabulated in Table 18.

Scenario	Total Peak Demands	Base 2016	Base 2036	Adj 1	Adj 2	Adj 3	Relative to 2016
2026 Partial Case	Walk/Cycle	16,700	33,600	52,400	52,400	52,400	315%
	Public Transport	26,000	55,400	55,400	59,100	66,600	256%
	Car Mode Share	65%	59%	50%	48%	45%	
	Car Mode Share - Work	59%	52%	45%	43%	40%	
	Cars	57,800	90,800	77,400	74,700	69,400	120%
	Trucks	10	120	120	120	120	
	Heavy Trucks	10	10	10	10	10	
2036 Partial Case	Walk/Cycle	16,700	38,700	65,300	65,300	65,300	392%
	Public Transport	26,000	63,000	63,000	65,200	71,000	273%
	Car Mode Share	65%	56%	45%	44%	42%	
	Car Mode Share - Work	59%	48%	40%	39%	37%	
	Cars	57,800	94,100	75,100	73,500	69,400	120%
	Trucks	10	120	120	120	120	
	Heavy Trucks	10	40	40	40	40	
2036 Full Case A	Walk/Cycle	16,700	45,300	77,800	77,800	77,800	467%
	Public Transport	26,000	73,400	73,400	77,300	98,200	377%
	Car Mode Share	65%	57%	45%	43%	36%	
	Car Mode Share - Work	59%	48%	40%	39%	32%	
	Cars	57,800	110,300	87,100	84,300	69,400	120%
	Trucks	10	260	260	260	260	
	Heavy Trucks	10	30	30	30	30	
2036 Full Case B	Walk/Cycle	16,700	45,300	77,800	77,800	77,800	467%
	Public Transport	26,000	73,400	73,400	77,300	77,300	297%
	Car Mode Share	65%	57%	45%	43%	43%	
	Car Mode Share - Work	59%	48%	40%	39%	39%	
	Cars	57,800	110,300	87,100	84,300	84,300	146%
	Trucks	10	260	260	260	260	
	Heavy Trucks	10	30	30	30	30	
2036 Full Case C	Walk/Cycle	16,700	45,300	77,800	77,800	77,800	467%
	Public Transport	26,000	73,400	73,400	77,300	117,700	452%
	Car Mode Share	65%	57%	45%	43%	28%	
	Car Mode Share - Work	59%	48%	40%	39%	25%	
	Cars	57,800	110,300	87,100	84,300	55,500	96%
	Trucks	10	260	260	260	260	
	Heavy Trucks	10	30	30	30	30	

Notes: Rounded to nearest 10 and 100 trips

Table 18: 2026 and 2036 Partial Case Transport Demand

The performance of the model for the 2026 Partial scenario indicates that the Parramatta CBD road network is close to its practical carrying capacity. The Partial case modelled in Aimsun assumes that other transport modes would carry the increased future transport demand. This will result in walking and cycling demands increasing by 3.2 fold 2016 level and public transport demands to 2.6 times 2016 level by 2026

Observations that can be made from the sensitivity testing of transport demands in the Planning Proposal area in 2036 include:

- Even if the land use in the planning area was only to allow increases that are within the current LEP and the 2036 Partial Case, this will result in significant further increases in the walking/cycling and public transport demands.
- If the full Planning Proposal were to occur walking and cycling demands would increase to 4.7 times 2016 levels and public transport demands to 3.8 times 2016 levels by 2036.
- Even if an additional 20% capacity could be squeezed from the road network, the walking/cycling demands would remain at 4.7 times 2016 levels but public transport demands would be 3.0 times 2016 levels by 2036.
- The implication of this level of demand increase due to walking/cycling and public transport demands would necessitate taking away road space from the road network and, therefore reducing car capacity. Assuming a 20% drop in car demand, public transport demands would be required to be 4.5 times 2016 levels by 2036 to accommodate for the demand. Walking/cycling demands would remain at 4.7 times 2016 levels. The scenario described has been illustrated in Figure 67.

The observations demonstrate that with the additional land use within Parramatta CBD, the road network will not be able to cope with the traffic demand. Further traffic could be accommodated only through significant road infrastructure projects which is not consistent with the transport vision for Parramatta. To accommodate the increase in personal travel to Parramatta CBD, the active and public transport facilities will need to carry the travel demand over and above that which can practically be catered for as road traffic.

Additionally, some existing road space will need to be reallocated to cater for buses and walking/cycling modes such as footpath widenings and bus priority lanes. This will result in a drop in maximum road capacity. Large investment in public transport and walking/cycling improvements within Parramatta will be required to cater for the increased demands as the population shifts away from car mode share as the dominant transport mode.

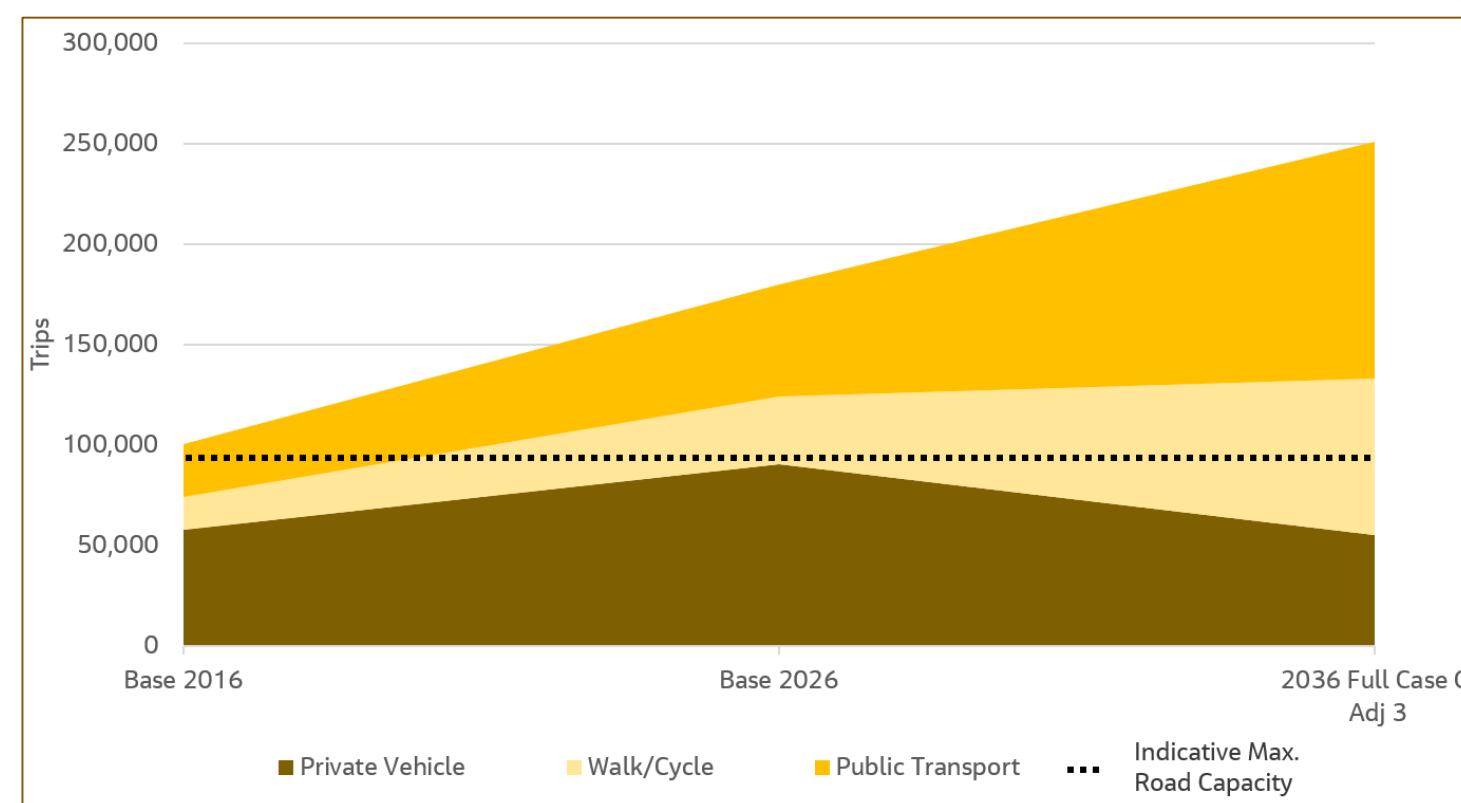


Figure 67: Mode share shift observed for 2036 Full Case C – Adjustment 3.

5.0 Parramatta Future

There are significant challenges ahead for Parramatta to maintain and enhance its transport system, including meeting the increasing demand for services, as well as new trips from a growing population.

This chapter identifies the principles that will guide future plans and committed projects, then summarises future transport networks for each mode and the context within which they will operate. It has been informed from the transport modelling undertaken as part of preparing this ITP.

5.1 Forecast Travel Trends

This ITP explores forecast travel trends of Parramatta's future across a 40 year period from 2016-2056 in terms of population growth, origin and destination patterns, land use, and mode share.

5.1.1 Resident and Worker Population Growth

The City of Parramatta is one of Australia's leading regions, with population growing at twice the pace of broader Australia. Land use forecasts are shown in Figure 68. As shown, employment and population are expected to more than double in the next 40 years. This will result in more journey to work and leisure trips in and out of Parramatta CBD.

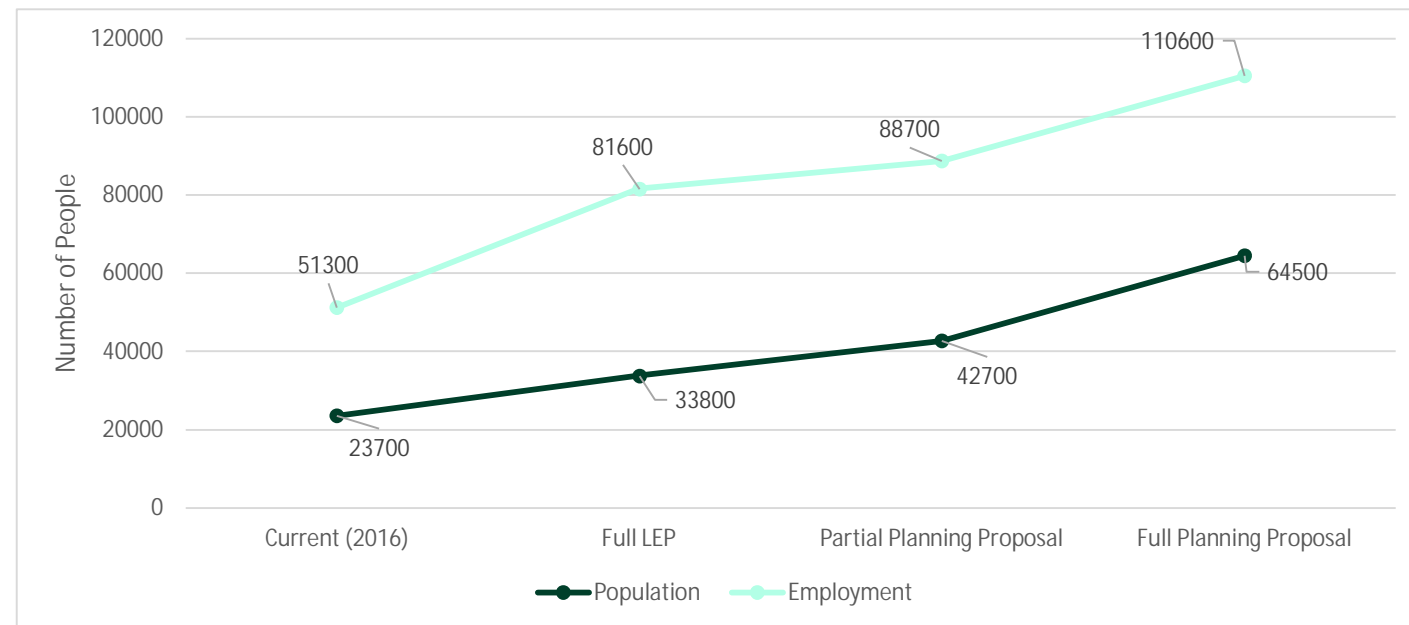


Figure 68: Parramatta CBD Land Use Forecasts (Source: City of Parramatta)

The Greater Parramatta and Olympic Peninsula Place-based Infrastructure Compact Pilot (GPOP PIC) forecast that over the next 20 years and with the right city-shaping infrastructure, GPOP could potentially generate around 100,000 jobs to add to the 150,000 jobs it has today. GPOP's capacity for further employment and dwelling growth both influences and is influenced by transport capacity in the region.

5.1.2 Origin and destination patterns

The forecast changes in the spatial distribution of trips accessing Parramatta CBD from 2016 to 2056 were assessed in the *Parramatta CBD Strategic Transport Study* and are outlined in Figure 69 and Figure 70. The changes are based on forecast land use changes.

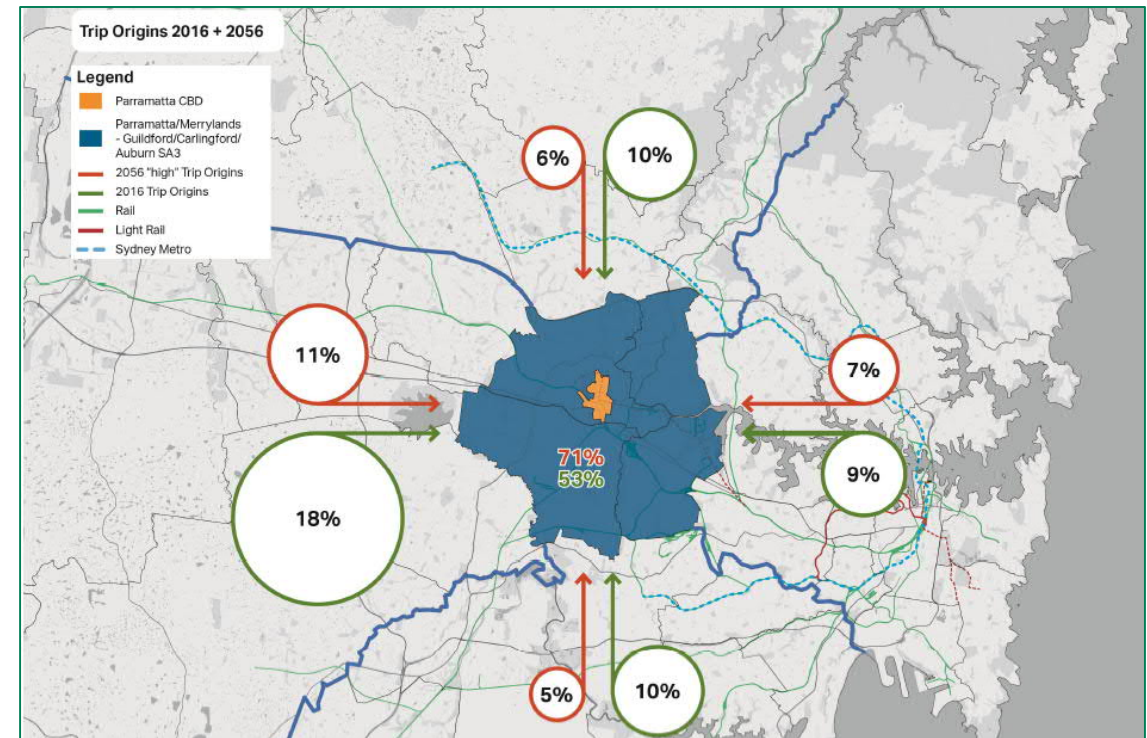


Figure 69: Forecast trip origin distribution patterns – AM Peak (Source: Parramatta CBD STS)

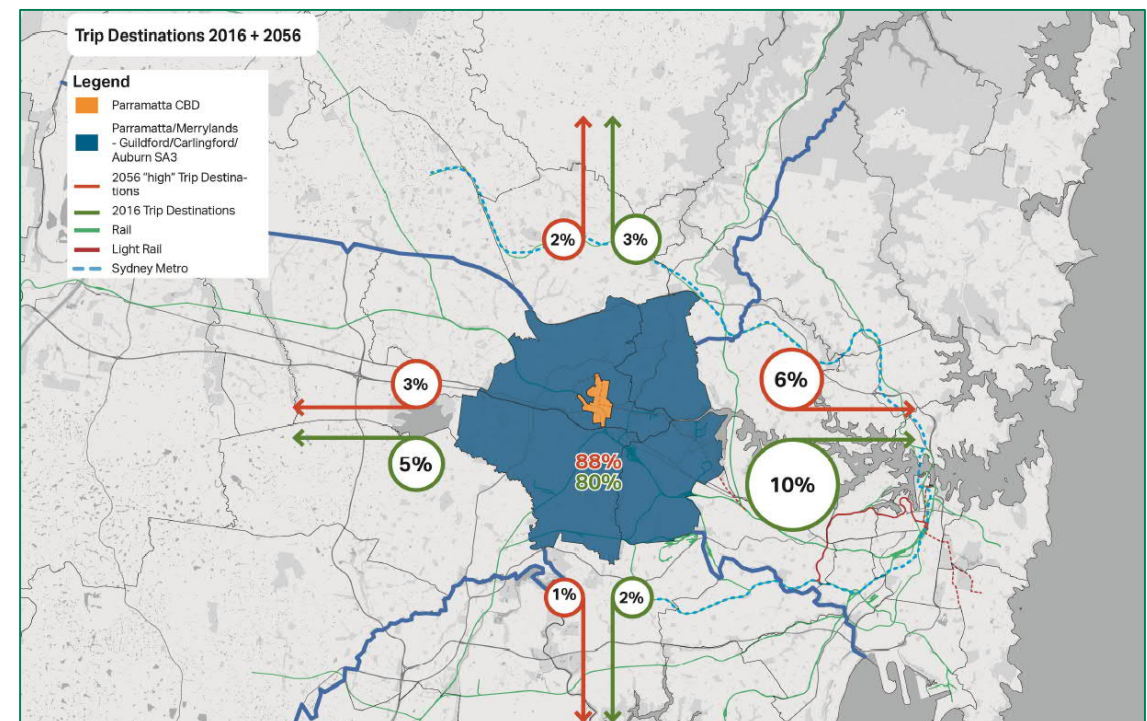


Figure 70: Forecast trip destination patterns – AM two hour peak (Source: Parramatta CBD STS)

The trends indicate that the proportion of shorter trips within Parramatta will increase significantly between 2016 and 2056. This is an outcome of the proposed significant residential development of the Parramatta CBD, and proposed densification of nearby precincts such as Parramatta North and Camelia as homes are provided closer to jobs. The increase in short distance trips create opportunities for shift from using private vehicle to active transport. In both 2016 and 2056, areas to the west of Parramatta are expected to continue to be the main external origin of trips, while areas to the east are forecast to provide the main destinations.

The transformation of Parramatta will provide new challenges in the associated transport task, driven by planned large increases in both residential population and jobs.

5.1.3 Land Use Forecasts

The Parramatta CBD Planning Proposal has a strong focus to increase the size and density of the commercial core, continuing to generate demand to the CBD. It aims to create non-residential floor space in mixed use developments on the margins of the CBD that could serve as both trip origin and demand generators, potentially altering the existing travel patterns around the CBD.

The proposed changes in Parramatta CBD land uses are shown in Figure 71. When compared to Parramatta CBD's existing land use, it becomes clear that the commercial core of Parramatta CBD has expanded significantly to the south of the Parramatta rail line, along Church Street and Valentine Avenue. With the updated CBD boundaries, there is no residential land use within the Parramatta CBD. Most areas within Parramatta CBD are mixed use (B4) offering a combination of business, office, residential, and retail spaces. The expansion and consequent increases in both commercial and residential floor space would allow Parramatta CBD to accommodate more jobs and residents.

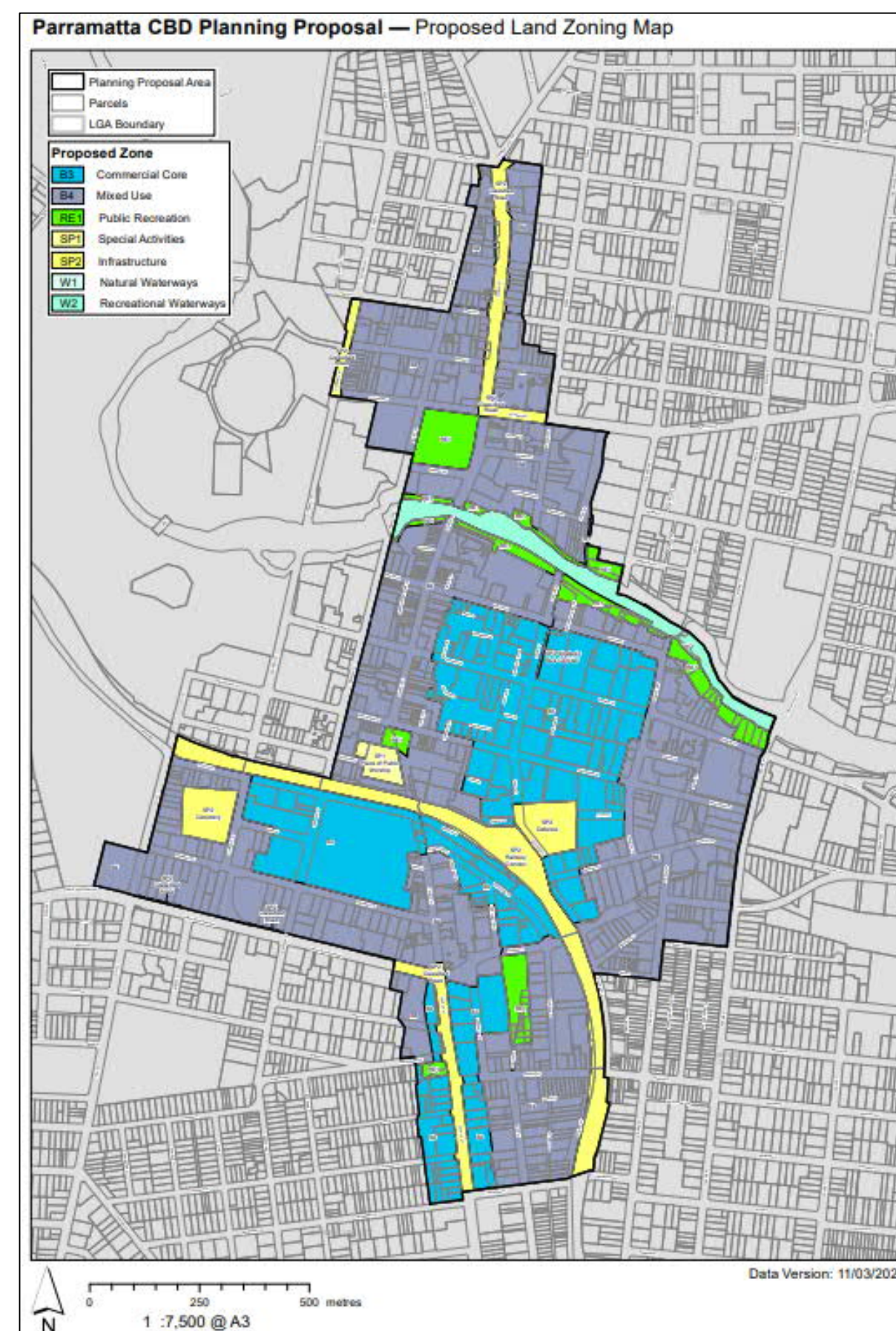


Figure 71: Proposed Parramatta CBD Land Use

5.2 Strategic Direction

The Integrated Transport Plan strategic direction is framed by the three geographic settings which provide the context for consideration of Parramatta CBD's transport future at different scales. The main themes of the Parramatta CBD ITP are described below.

The city's 'second CBD'

In the context of Greater Sydney, Parramatta CBD is the city's 'second CBD'. Increasing jobs and other measures of local economic activity within Parramatta CBD requires the scale of urban development across Parramatta CBD to keep pace with the level of investment in Parramatta Light Rail and Sydney Metro West. This means that when a business is making a locational decision, they should consider Parramatta CBD as a place able to offer amenities and infrastructure as attractive as Sydney CBD, for their workers, clients and suppliers to travel to and move around.

Greater Parramatta: the core of the Central River City

Those living midway between Parramatta CBD and Sydney CBD should have the option of looking westwards for jobs, entertainment, shopping, tertiary education and all personal and business services expected of a city centre. Moreover, the Central River City should be positioned to enjoy the added advantage of its own growing catchment to the north, south and west. Maximising Parramatta CBD's attraction of workers and visitors from across this catchment means upgrading and creating new transit links that minimise the burden of travel time and unreliable road-based access for personal travel. As each sustainable transport improvement is put in place, measures need to be introduced to reduce the provision of parking and competition with public transport, while protecting and enhancing service access to businesses.

An interconnected Parramatta

Parramatta CBD strives to be a place where people want to live and work. Parramatta CBD should be strongly interconnected with its surrounding precincts that people can move around the area as one vibrant urban quarter. The light rail is one important step in achieving this but does not end there. To enjoy interesting streets, build exercise into their daily routines or simply make short trips not served by transit, the build environment of Parramatta needs to aim to offer its residents and workers the same opportunities to be able to walk or ride at the same level as those in eastern Sydney. To make space for this, and for the constant flow of goods and services moving between the Regional Ring Roads and Parramatta CBD, the private car needs to gradually play a subsidiary role to free up space for public and active transport and commercial vehicles.

5.2.1 Mobility as a Service

Central to all three themes is the idea of the 'MaaS opportunity'. Mobility as a Service (MaaS) refers to a service model that enables customers to plan and pay for their journeys using a range of services via a single customer interface. It has the potential to enable customers to access integrated, easy-to-understand journeys in a broad market of transport services. As technology improves, it is expected that its business model will play greater role in integrating services into fewer journeys for travellers making trips at every scale to and from Parramatta CBD.

5.2.2 Movement and Place Framework

Transport for NSW (TfNSW) and the Government Architect NSW have collaboratively developed the Movement and Place Framework to provide a cohesive approach to balancing the movement of people and goods with the amenity and quality of places, contributing to the aim of providing more attractive, sustainable and successful cities and places. The concept aims to improve the liveability of places through an integrated land use and transport planning tool, that sets customer focused outcomes and delivers wider benefits for the health and wellbeing of the community.

Figure 72 shows how place intensity and movement help to classify roads and street into different types of street environments. The guide offers four types of street environments, shown in Figure 72 and described below:

- **Civic spaces** are streets at the heart of communities and have significant places for street life and transport. They are often in major centres, tourist and leisure destinations and community hubs. These streets are often pedestrian priority, shared spaces.
- **Local streets** often have important local place qualities. Activity levels are less intense; however, these streets can have significant meaning for local people.
- **Main streets** have both significant movement functions and place qualities.
- **Main roads** are routes central to the efficient movement of people and freight. They include motorways, primary freight corridors, major public transport routes, the principal bicycle network and key urban pedestrian corridors. Place activity levels are less intense; however, these roads and routes can have significant meaning to local people.



Figure 72: Street Environments, Movement and Place (Source: Future Transport Strategy 2056)

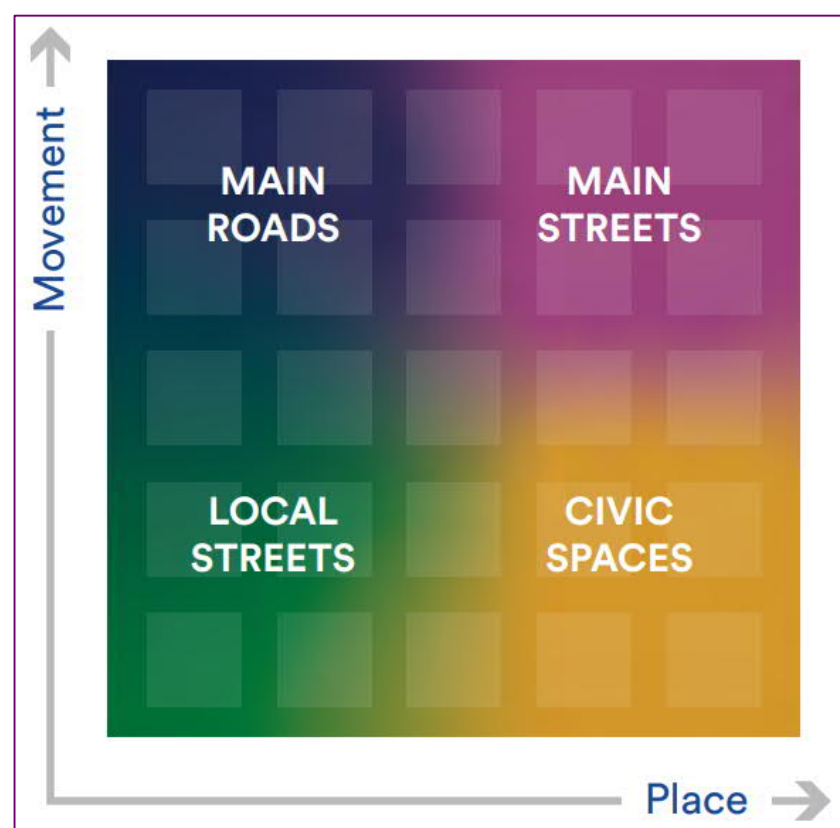


Figure 73: Analysing combinations of Movement and Place (Source: Practitioners Guide to Movement and Place 2020)

As the transformation of Greater Parramatta to become the heart of Central River City continues, invariably there will be changes to the function of some streets that would necessitate to create more places for people and support vibrant streets whilst retaining movement corridors to support the economic growth of the city. The network within Parramatta CBD will need to gradually evolve to support streets of Parramatta CBD as places for people that should increasingly rely on sustainable transport modes for growth and not building more roads to support its growth. The Framework has been used to inform the directions outlined in this chapter.

5.2.3 Mode Share

A set of mode share targets were developed in the *Parramatta CBD Strategy Transport Study*, that transition along with the planned intensification of the Parramatta CBD and transport response and interventions. One of the key mode share targets outlined is to decrease journey to work car mode share to 40% by 2036 under the full Planning Proposal.

Strategic level modelling indicates that future land use and transport changes will result in a general trend of re-moding of travel away from the car as the city becomes more compact. To achieve the 40% work car mode share target by 2036, a gradual shift would not be sufficient to achieve this target and greater intervention would be required to shift car trips to public transport and active modes.

The STM sensitivity testing of transport demands in the Planning Proposal area for 2036 showed that if the full Planning Proposal were to occur, there will be 4.7 times more walking and cycling compared to 2016 level and public transport usage will increase to 3.8 times for the same period.

To cater for such large-scale increases in walking/cycling and public transport demands, it would require taking away space that is currently used by road traffic, which would result in an increase in road congestion. To avoid complete saturation of the road network under future conditions, a reduction in the role of the private vehicle, increased uptake of sustainable transport and optimised use of space will be necessary. There will be a need to ensure public transport and walking/cycling improvements are able to cater for the increased demands as the population shifts away from car mode share as the dominant transport mode.

5.2.4 Multi-modal Network

Future transport network planning would need to be considered in a multimodal sense. For example, the bus interchange on Argyle Street adjacent to the Parramatta Rail Station facilitates transfer between bus and heavy rail as well as pedestrian access to the rest of the CBD. However, due to competition for space the interchange and its surrounding experiences congestion for both pedestrians and bus users.

Further growth expected in Parramatta will place greater pressure on both the public transport and surrounding road network. Figure 74 provides an illustration to show the number of people that can travel down one lane within a one-hour period if different modes of transport are used. It is clear that modes such as walking, cycling and public transport can carry many times more people than the private vehicle which occupies the equivalent amount of space.

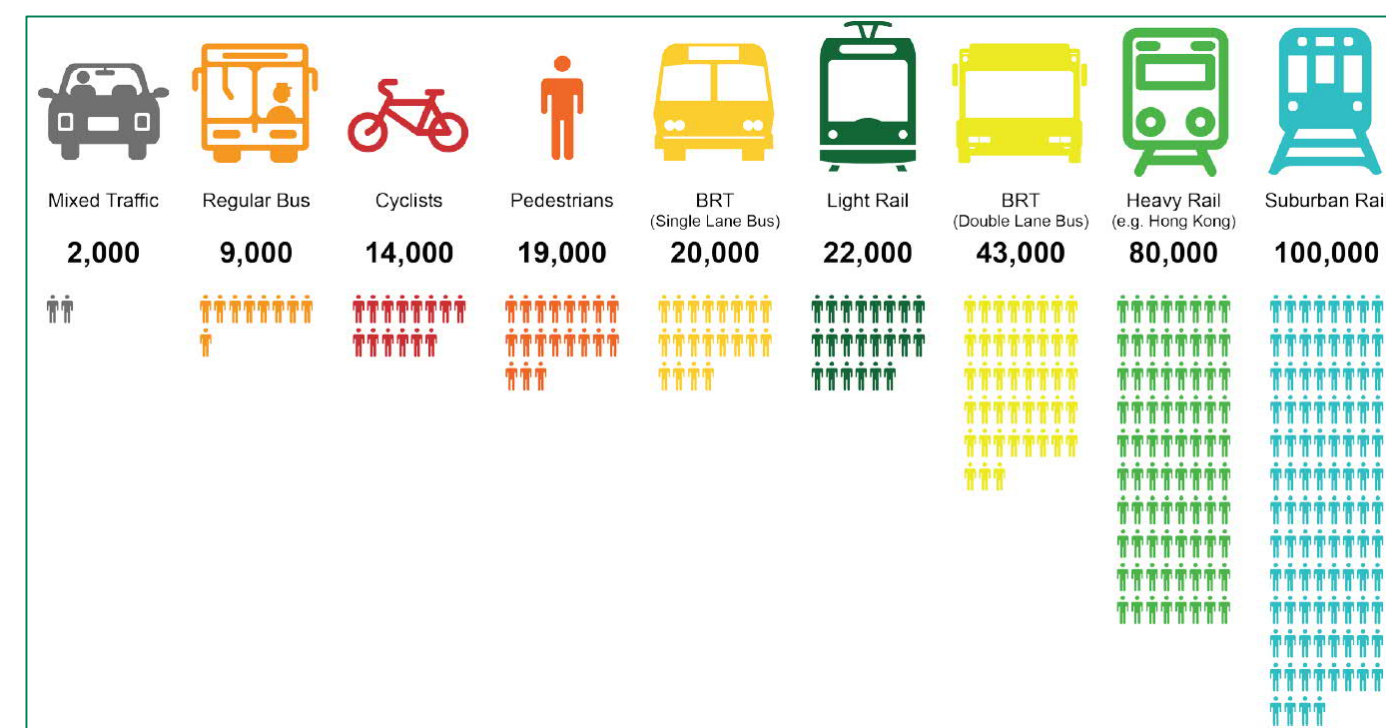


Figure 74: Carrying Capacity of Different Modes, for one 3.5m lane per hour (Source: Parramatta Bike Plan 2017, United Nations)

Despite being one of the least space efficient modes, private vehicles continue to be a major mode of travel for work and other purposes in Parramatta. Increase in car traffic with its associated noise and safety impacts would adversely affect the walking and cycling amenity of Parramatta's streets. Added congestion on the road network would further slow buses, reduce their reliability and attractiveness of public transport. It is therefore crucial to manage the roads to discourage increases in traffic so to allow alternative modes of travel to be promoted. With the predicted increase in population and employment, the efficient use of road space becomes ever more critical.

The construction of the Parramatta Light Rail once completed will improve connectivity both from outside but also within the CBD by providing easy and fast access to light rail stops in Macquarie Street, the Parramatta Square development and the proposed Civic Link giving access to the future Museum of Applied Arts and Sciences on the river. Parramatta Light Rail also provides opportunities to implement a multi-modal transport system with interchange opportunities with rail and bus services near the Parramatta station. This will also facilitate mobility and movements of people between the inner and the outer core of Parramatta, significantly changing how travellers choose to travel in Parramatta.

To this end there needs to be more people than today walking and bike-riding within the 5km catchment that takes in precincts within the Parramatta Outer Ring Road boundary. Beyond this distance, bike-riders can take advantage of the river and creek-based green corridors that cross the Parramatta catchment. Demand-responsive bus, minibus and point-to-point services are able to fill in network gaps. Freeing up the road space would allow goods delivery and servicing operations to run more efficiently around the clock as it fits into the major city.

5.2.5 Land Reservation Acquisition

The draft Land Reservation Acquisition (LRA) Maps, shown in Figure 75 and Figure 76, have been proposed to be amended to reflect road widening to identify the following:

- Strategic opportunities to improve capacity and capability of the existing road network, having regard to the significant growth within the Parramatta CBD as well as inherent existing constraints such as heritage and existing significant development
- Opportunities to improve public transport capability through localised intersection improvements and augmentation of existing bus lanes
- Opportunities for a regional cycleway network within the Parramatta CBD
- Opportunities to improve pedestrian safety and capacity

Consistent with the actions in the adopted Parramatta CBD Planning Strategy, new streets and lanes through large blocks are proposed. These will deliver a more permeable road and pedestrian network in the precinct.

It is noted that constraints of land ownership, heritage and incremental redevelopment patterns within the city centre can impact the delivery timeframes and quality of public domain. LRAs can have significant implications for the built form as the city develops, so are best utilised where consolidated outcomes can be achieved. All LRAs are to be tested to ensure that it is only retained where required.

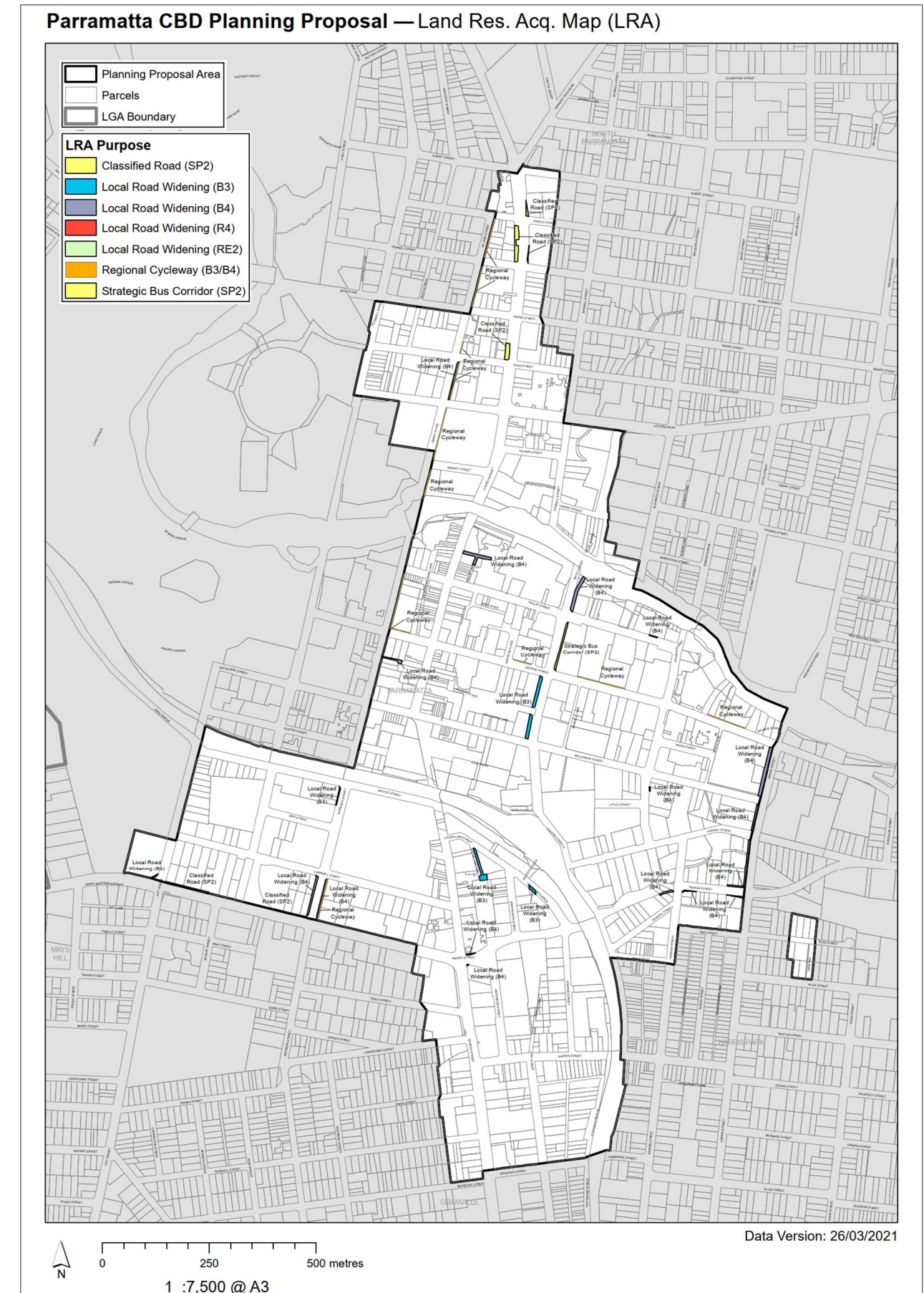


Figure 75: Planning Proposal – Land Reservation Acquisition Purpose Map (Source: CoP Planning Proposal)

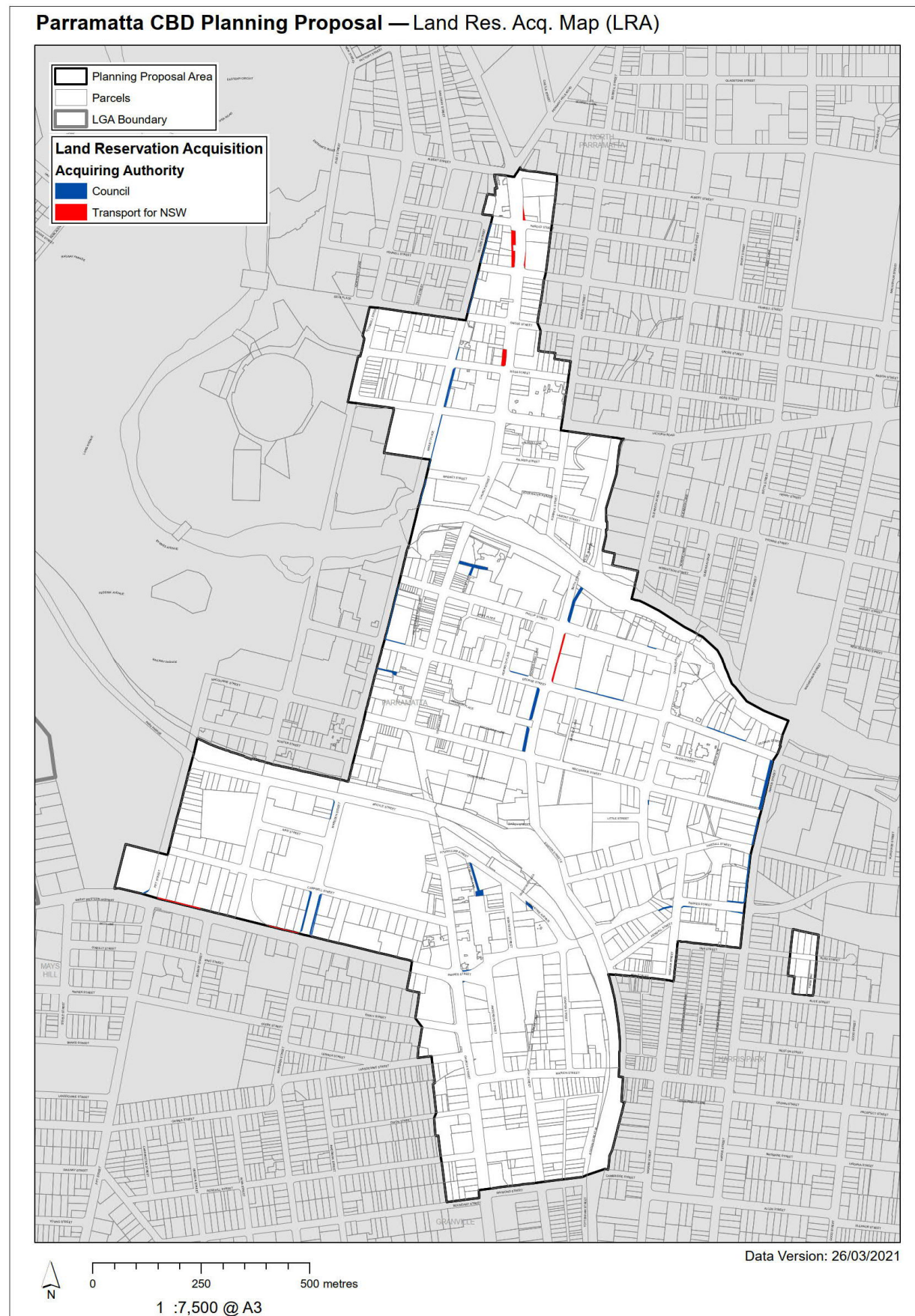


Figure 76: Planning Proposal – Land Reservation Acquisition Acquiring Authority (Source: CoP Planning Proposal)

LRA testing was conducted on a number of locations as shown in Figure 77, and the results are summarised in Table 19.

High level concept plans have been developed by Council to test the LRA for the Marsden Street Cycleway and George Street Cycleway. These plans are for discussion purposes only and can be found in Appendix C and D. All setting out of facilities and measurements are indicative only and subject to confirmation, further design testing and consultation.

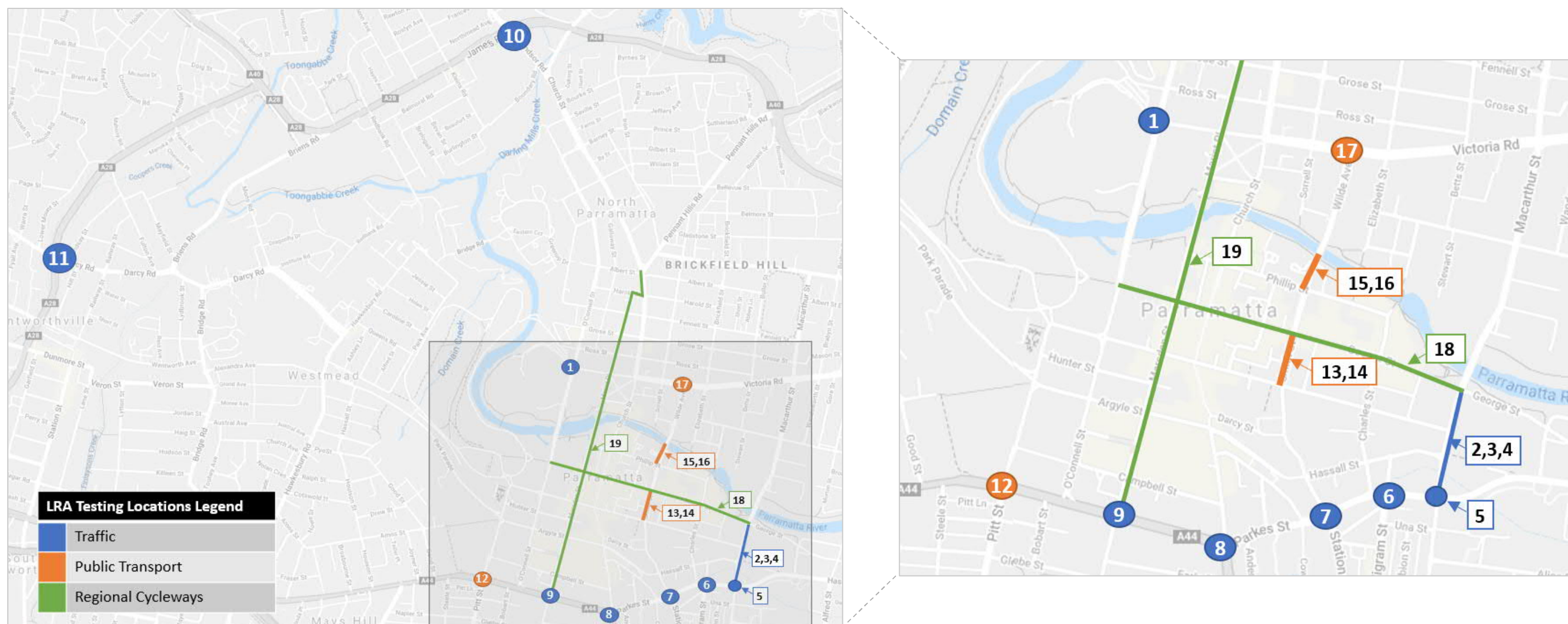


Figure 77: LRA testing locations

Table 19: Results of LRA testing

No	Location	Proposal	Action	Notes
Traffic				
1	O'Connell St / Victoria Rd	O'Connell Street southern approach, dual northbound right turn lanes into Victoria Road.	Remove LRA	Widening into Government owned land could be done in future if traffic conditions warrant. Concerns there is not enough available space on Victoria Road to receive dual right turn due to heritage and schools.
2	Harris St between George St and Parkes St	Harris Street southern approach, additional through and left turn lane on southern approach for duplication of Gasworks Bridge to the west.	Retain LRA	Significant improvement to performance of George Street intersection with bridge duplication. Widening between Macquarie Street and Hassall Street allows for two clear southbound lanes. Widening between Hassall Street and Parkes Street allows
3		Harris Street northern approach, southbound right turn bay into Hassall.	Retain LRA	

No	Location	Proposal	Action	Notes
4		Harris Street northern approach, southbound right turn bay, combined right turn and through, through and left into Parkes Street.	Retain LRA	for additional lane that can be allocated to right, through or left as traffic volumes increase.
5	Parkes St at Harris St	Eastbound left or right turn bay, westbound left turn bay.	Retain LRA	Turn bays in Parkes Street on approach to Harris Street improve performance by allowing for two through lanes, so turning traffic or pedestrians do not hold up through movement.
6	Parkes St / Wigram St	Parkes Street western approach, eastbound right turn bay into Wigram Street.	Retain LRA	Improvement to performance through removing right turn from through lanes.
7	Parkes St / Station St E	Initial test of potential one-way pair of Station Street East northbound and Wigram Street/Charles Street southbound	Continue investigation	Does not require LRA but does require ongoing testing of circulation through the AIMSUN model. Other one-way systems could also be tested to improve efficiency of circulation and at targeted intersections.
8	Great Western Hwy / Parkes St / Church St	Parkes eastern approach, westbound left turn bay into Church.	Retain LRA	Westbound left turn has a dedicated left turn, ensuring through movement is not held up by pedestrians crossing southern leg of intersection.
9	Great Western Hwy / Marsden St	Marsden northern approach, southbound left turn into GWH, northbound left turn bay into Westfield, widening for pedestrians and cyclists.	Retain LRA	Southbound left turn bay configuration makes greatest improvement to intersection performance. Northbound additional lane reduces weaving on approach to Campbell Street, improving safety.
10	James Ruse Dr / Windsor Rd	Eastbound offramp, additional lane.	No LRA required (in CBD boundary)	Improvement in intersection performance warrants the additional lane that is currently being captured in a Site Specific Planning Proposal at that site.
11	Cumberland Hwy (Hart Dr) / Darcy Rd	Darcy Road eastern approach, westbound left turn bay into Cumberland Highway.	Propose LRA southern side of Darcy St (was outside of PP boundary)	Improves intersection performance therefore proposing an LRA in that location is supported as part of future work.
Public Transport				
12	Great Western Hwy / Pitt St	GWH western approach, splay to allow eastbound buses to turn left into Pitt alongside general traffic left turn.	Retain LRA	Increases "green time" available to eastbound buses tenfold.
13	Smith between George and Macquarie (west)	Bus pull in bays with increased pedestrian space	Retain LRA	Proposed LRA allows for increased pedestrian space and indented bus bays to facilitate interchange between new Metro West stop and buses. Future design for facilities in this location must take into consideration impacts and appropriate treatment to heritage items including the underground Convict Drain which passes through the site.
14	Smith between George and Macquarie (east)	Bus pull in bays with increased pedestrian space	Remove LRA	Proposed LRA does not have enough space, and future LRA would need to be wider and proposed along with any future bus planning.
15	Smith north of Phillip (west)	Bus pull in bays with increased pedestrian space	Remove LRA	MAAS development precludes any future widening.
16	Smith north of Phillip (east)	Additional structure for northern approach, southbound extended right turn bay, through lanes traffic and bus, left turn bay.	Retain LRA	Has potential to improve intersection performance and requires additional testing including a clear direction from TfNSW on bus requirements.
17	Wilde Ave / Victoria Rd	Widening for additional southbound bus lane or dual northbound right turn into Victoria	Remove LRA	Recent upgrades of bus lane have improved public transport performance, traffic upgrade not needed as intersection performs well and in the future.
Regional Cycleways				
18	George St	To test fit cycle path on either northern, southern, or both sides.	Remove LRA southern side Retain LRA in 4 locations northern side	Cycle path on northern side only is the most space efficient. LRA only required on northern side to provide adequate space for pedestrians at bus stops (if cycle path is delivered in the future).

No	Location	Proposal	Action	Notes
				Future design for facilities in this location must take into consideration impacts and appropriate treatment to heritage items including the underground Convict Drain which passes through the site.
19	Marsden St	To test fit cycle path on either eastern or western side.	Remove LRA on east side of Marsden St between George St and Campbell St Retain all other areas	LRA north of River allows parking to be retained both sides. Adequate space within road reserve in CBD to fit cycle path with targeted shifting of kerbs (kerbs can be retained "as is" if traffic circulation can be reviewed). LRA allows for cycle path to cross over Great Western Highway (two potential scenarios dependant on development patterns).

5.3 Committed Projects

At the core of Parramatta's transformation are the following committed projects which influence Parramatta's transport network. This section describes the key projects that are expected to shape Parramatta and how we travel.

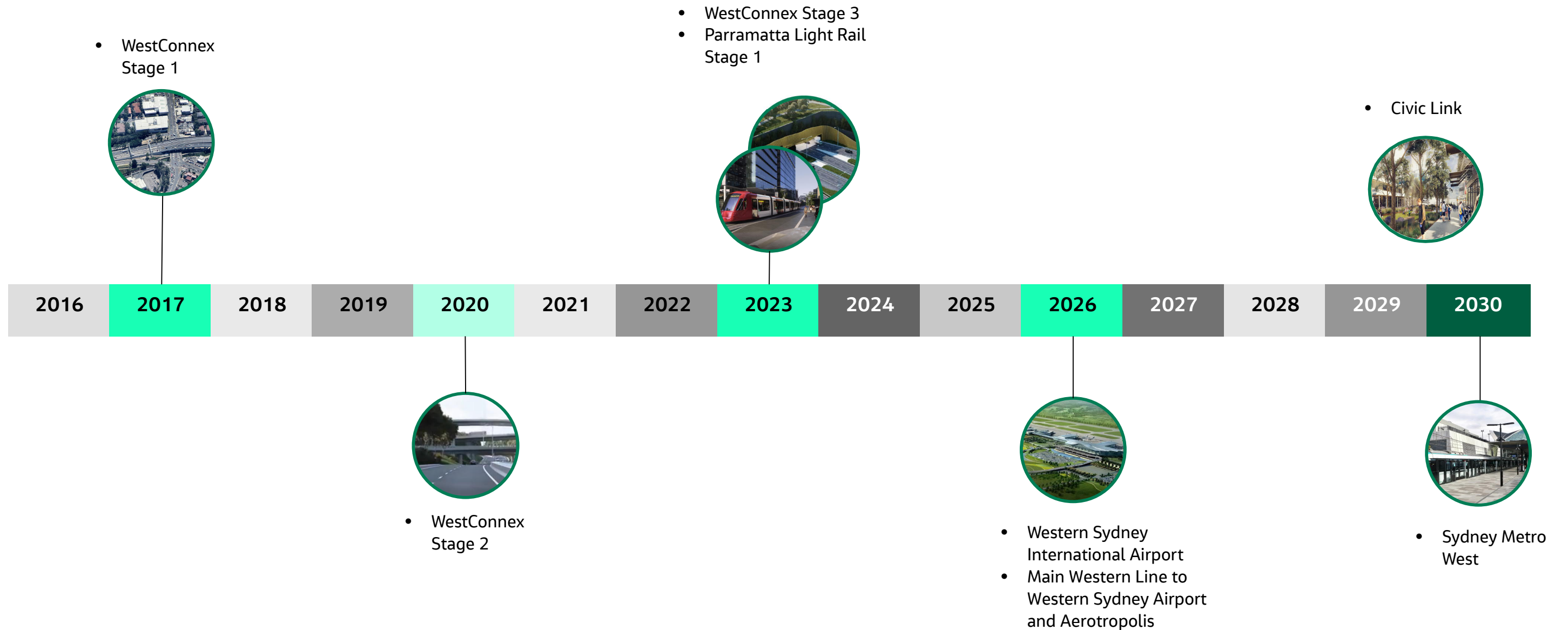


Figure 78: Expected Completion Dates for Committed Projects

5.3.1 WestConnex

WestConnex is a 33-kilometre motorway linking Parramatta and Sydney's south west with the Sydney CBD, Sydney Airport and Port Botany. It is comprised of three stages:

- Stage 1 consists of the New M4 Tunnels and M4 Widening, which included 5.5km tunnels and around 7.5km of surface roads. The WestConnex M4 links to the M4 at Parramatta in the west, and Wattle Street and Parramatta Road at Haberfield to the east. It reduces travel time and improves reliability of the M4 near Greater Parramatta and access across Sydney for commercial traffic.
- Stage 2 consists of constructing the M8, which provides motorists with a 9km traffic-light free link between Kingsgrove and St Peters.
- Stage 3 consists of constructing the M4-M5 Link Tunnels which connect the New M4 at Haberfield and the new M5 at St Peters.

All three stages are programmed to be operational by 2023. Figure 79 shows the stages and how they complete Sydney's orbital network.



Figure 79: WestConnex Route Map

When the WestConnex is completed, it will remove bottlenecks, relieve congestion and improve the speed, reliability and safety of travel across Sydney.

5.3.2 Parramatta Light Rail – Stage 1

Parramatta Light Rail Stage 1 is currently under construction, with services scheduled to start in 2023. The 12km two-way track being installed in Stage 1 connects Westmead to Carlingford via the Parramatta CBD, with an estimated 130,000 people living within walking distance of one of the 16 stops by 2026. Stops include Westmead Health Precinct, Parramatta North Precinct, Bank West Stadium, The new Powerhouse Museum (MAAS) and Riverside Theatres Cultural Hub, Private and social housing redevelopment at Telopea, Rosehill Gardens Racecourse and three western Sydney University campuses.

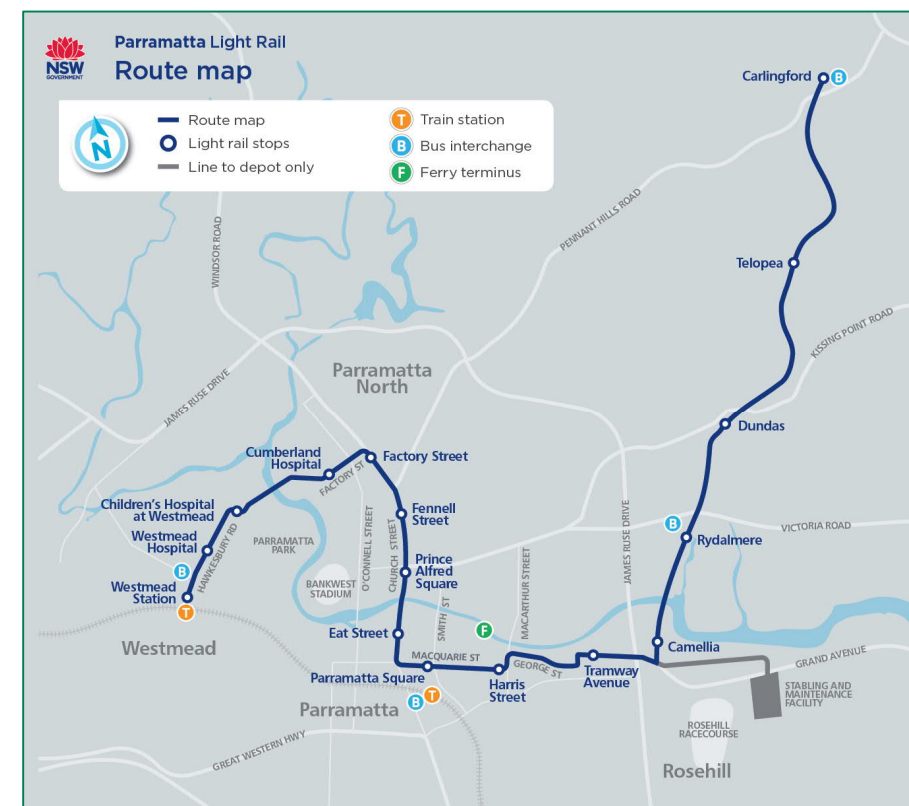


Figure 80: Parramatta Light Rail Stage 1 (Source: Parramatta Light Rail)

5.3.3 Western Sydney International Airport

Western Sydney International (Nancy-Bird Walton) Airport, located in Badgerys Creek, has been committed by the Australian Government. The airport is expected to be open by 2026.

5.3.4 Sydney Metro West

Sydney Metro West provides a turn-up-and-go metro rail service that would support Greater Parramatta, Sydney Olympic Park, the Bays and the Eastern Harbour City. Currently in detailed planning, this new rail link will relieve pressure on the T1 Western Link by creating a service separate from the network.



Figure 81: Proposed route for Sydney Metro West (Source: Sydney Metro)

5.3.5 Civic Link

The Civic Link will be a green, pedestrianised public space and cultural spine that connects public life from the heart of Parramatta CBD to the River.

The proposed Civic Link extends across four city blocks through the heart of the Parramatta CBD, connecting Parramatta Square and the transport interchange to River Square, the Museum of Applied Arts and Sciences (MAAS), and the broader foreshore precinct.

5.3.6 Other Committed Transport Projects

Other committed transport projects that are expected to influence Parramatta’s transport network are described in Table 20.

Table 20: Committed Transport Projects

Projects	Mode	Description
Bus Priority Infrastructure Program	Bus	The Bus Priority Infrastructure Program is a 10 year rolling program of targeted initiatives that will invest in bus priority infrastructure in key transport corridors through the program.
Sydney Clearway Strategy	Road	The NSW Government is acting to reduce congestion and delays on Sydney’s roads by installing new and extended clearways
Parramatta Congestion Improvement Program	Road	A \$30 million program of road works to reduce congestion around the area, by upgrading key intersections to improve access to Parramatta CBD, for example: <ul style="list-style-type: none"> ▪ The intersections of Pitt Street and Marsden Street along the Great Western Highway ▪ The Woodville Road, Parramatta Road and Church Street intersection at Granville
M4 Smart Motorway	Road	The M4 Smart Motorway project will use the latest technology to monitor traffic conditions and smooth the flow of traffic on the M4 corridor by making the most of available road space. Scheduled for operation by 2020, this will be the first Smart Motorway in NSW
Road Network Planning areas	Road	Road Network Plans outline the Government’s 20-year plan to manage development of road corridors to improve safety, efficiency and sustainability. Planning is expected to include state roads in and around Parramatta, particularly along the inner and outer ring roads.
SCATS Congestion Improvement Program	Road	The NSW Government is investing \$90 million in the Sydney Coordinated Adaptive Traffic System (SCATS) Congestion Improvement Program to make Sydney’s traffic signals smarter to reduce unnecessary stopping. Several intersections around Parramatta CBD have been included for investigation.
Pinch Point Program	Road	The NSW Government has committed over \$825 million to fixing pinch points across Sydney’s road network, aiming to reduce traffic delays, manage congestion and improve travel times on major roads, particularly during weekday peak periods. For example, proposed intersection improvements at the Great Western Highway, Church Street and Parkes Street have been through community and stakeholder consultation and work on site is expected to commence early to mid-2019.
Parramatta City River Strategy	Ferry	The Parramatta City River Strategy provides a framework for the City of Parramatta’s program of public domain works along the river foreshore. Revitalisation of Parramatta Quay is being realised through several landmark projects, including the Parramatta Ferry Wharf Upgrade (completed), the Escarpment Boardwalk (construction 2020), and the Charles Street Square Upgrade (design 2020).

5.4 Travel Demand Management

Maintaining Parramatta CBD’s liveability and accessibility needs whilst accommodating its growth aspirations requires private car mode use to decline as a percentage of overall trips so existing road space can be freed for commercial vehicles, public transport and active modes to take greater roles in meeting the travel needs of a future Parramatta CBD. Transportation demand management is a tool that includes a variety of strategies that either individually or in integrated programs act to encourage travellers to use the more sustainable travel option for each trip. When in place they can help to achieve:

- Reduction congestion and infrastructure savings
- Improved mobility options for non-drivers
- Increasing traffic safety and public health
- Conserve energy and reduce pollution
- Creating more compact communities to support local economic activity

Based on a review of potential TDM strategies, five TDM strategies are recommended for implementation for Parramatta CBD as outlined below:

- **Establish a Transport Management Delivery team**—A transportation management delivery team for Parramatta CBD would be able to provide institutional support for transportation and parking management measures such as commute trip reductions, efficient car park utilisation and parking sharing and TDM marketing for new developments.
- **Commute Trip Reduction Programs** – As Parramatta CBD’s residents population increases programs can be developed to target giving residents and commuters resources and incentives to reduce their car trips. Commute trip reduction programs can include combination of commuter financial incentive to use, public transport, parking pricing management, rideshare matching, cycle facility storage and pathway improvements and information. They are effective at reducing traffic and parking congestion in employment centres.
- **Freight Transport Management** – includes various strategies for increasing the efficiency of freight transport. These include improvements to resource-efficient modes, such as rail and water transport, improved logistics so fewer vehicle-kilometres are needed to deliver goods, and various incentives to encourage efficiency. It also includes measures such as delivery hubs and out-of-hour delivery schemes to reduce the impact of loading and servicing parking on the city and transport network. Improved freight logistics has the potential to reduce freight travel by 10-30%, although impacts may vary widely depending on conditions.
- **Transit-Orientated Development** –Transit-orientated developments are a key element of creating vibrant, liveable and sustainable communities that align with direction of the Parramatta CBD Planning Proposal. A typical transit-orientated development has a rail or bus station at its centre, surrounded by relatively high-density development progressively spreading outwards to lower-density development commonly to within 800m or 10 minutes walking distance of a rail stop. Evidence shows that residents of high quality transit-orientated developments tend to own about half as many cars and generate about half as many trips as they would if they were located in a typical suburban neighbourhood.

- **Efficient Parking Management** – Parking Management includes various strategies that encourage more efficient use of parking facilities. As a travel demand management strategy, parking management need to emphasise strategies which reduce total vehicle travel. For commercial developments this may include shared use of common parking spaces that do not have their peak parking demands coinciding whilst for residential development it could involve unbundling of parking spaces from the units so that residents that do not require a car are not allocated a car space that they do not need nor should have to pay for.

In order to achieve Parramatta CBD’s vision, Council should consider establishing TDM programs that provide an institutional framework for implementing specific TDM strategies. Existing TDM strategies such as Council’s requirement for green travel plans for new developments would work with and support these recommendations. A successful outcome would require council, TfNSW and the community working together to determine how best to identify and implement strategies into Parramatta CBD successfully.

An indicative TDM program implementation staging timeline is shown in Table 21.

Table 21: Indicative TDM Program Implementation Staging

Staging	Strategies
Short Term	<ul style="list-style-type: none"> ▪ Transport Management Delivery Agency ▪ Commute Trip Reduction Programs ▪ Freight Transport Management ▪ Efficient Parking Management
Medium Term	<ul style="list-style-type: none"> ▪ Active Transport Improvements ▪ Taxi and Ridehailing ▪ Transit Service Improvements ▪ Ridesharing ▪ Car- and Bikesharing ▪ Mobility Marketing
Long Term	<ul style="list-style-type: none"> ▪ Efficient Parking Pricing

Implementation of one or more of the above demand management strategies on a large scale that includes businesses, employees and residents will allow Parramatta to gradually shift from a car-orientated community to a more compact and multimodal community, where parking is efficiently priced, and businesses, commuters and residents find incentives to use the most resource-efficient mode for trips they make. The strategies will also contribute to moving towards a Mobility as a Service (MaaS) model that enables greater integration of services and fewer journeys for travellers making trips at every scale to and from Parramatta CBD, reducing the demand for private car usage and parking needs.

Travel demand actions should be cognisant of potential long term changes to future work patterns both for workers coming to Parramatta and residents of Parramatta CBD leaving to work elsewhere as a result of COVID-19 learnings. A return to business as usual may not therefore be a given or the right approach.

5.5 Walking and Cycling

Due to the mixed residential and commercial land use uplift identified in the Planning Proposal for the CBD and immediate surrounds, the number of short distance trips to and within the Parramatta CBD is expected to increase in both quantity and mode share. As a result, cycling and walking will become a more important part of the transport mix.

If the car mode share for work trip purpose to Parramatta CBD reduces from its current 56% to 40% as envisioned by 2036, the walking and cycling demands would need to increase to accommodate the shift from car. Under such scenario, walking and cycling demand could increase four-fold compared to base year. This will necessitate the development and implementation of a wide range of infrastructure to cater for pedestrians and cyclists.

5.5.1 Pedestrians

Parramatta CBD is currently experiencing a significant level of public and private investment that is transforming the buildings and streets of the city. The construction of new buildings, civic infrastructure, Parramatta light rail and planned Sydney Metro West would result in ongoing disruption to pedestrian movements in the CBD that needs to be managed continuously to maintain the safety and accessibility of the pedestrian network.

The *Parramatta CBD Pedestrian Strategy* undertaken in 2017 provides an indication of the volume of pedestrians during the busiest pedestrian activity time of lunchtime peak for 2056. It predicts a significant increase in foot traffic within the CBD. The vast majority of streets south of the river would be carrying over 1000 pedestrians per hour with greater concentrations around Parramatta station and future transport nodes that would be expected in the AM and PM peak periods placing significant strain on the current footpath network.

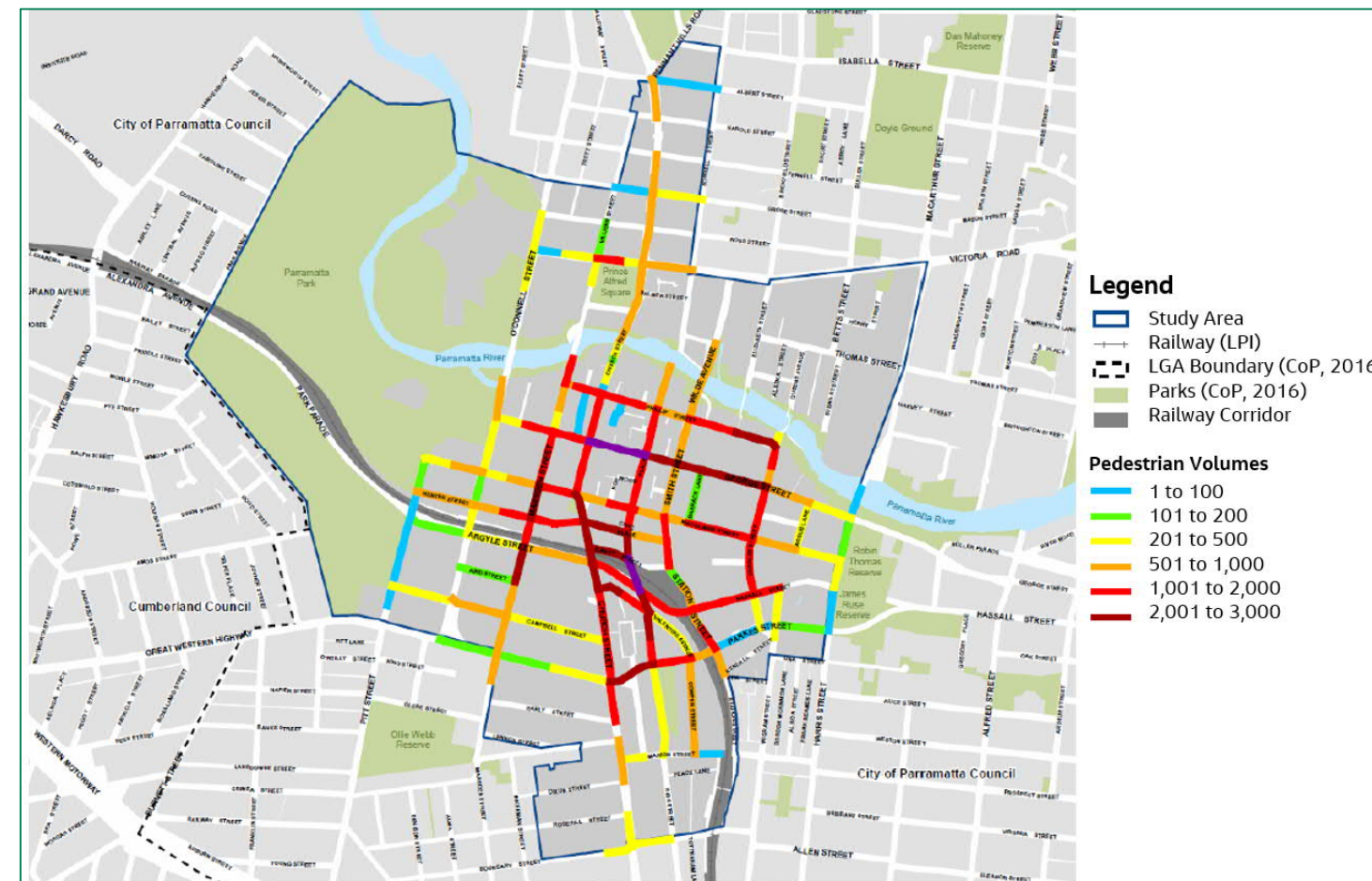


Figure 82: Future (2056) pedestrian peak hour volumes by street (Source: Cardno)

To address the pedestrian opportunities and issues and to meet the future pedestrian demand, a range of actions are identified as below:

- **Infrastructure and operation actions** – Traffic calming, pedestrian priority, improved perceptions of safety and direct paths of travel
- **Policy and development actions** – New development contribution toward pedestrian improvements
- **Behavioural change actions** – Providing residents, workers and general public with the right information, and knowledge to choose to walk on foot or use a mobility aid for short trips

Parramatta CBD Pedestrian Strategy identified five actions prioritised to provide greatest impact on pedestrian amenity, priority and safety in the CBD:

1
Implementation of a 40 km/hr speed zone throughout CBD.

2
Audit of all footpaths and upgrade or provide new infrastructure accessible by all users

3
Application of movement and place functions to the CBD with consideration of all transport modes

4
Amendment to DCP to provide permeable city blocks, active street frontages and provision for pedestrian infrastructure

5
Require developers to submit Green Travel Plans with their applications that demonstrates clear objectives and actions for pedestrian

In *Parramatta Ways – Implementing Sydney’s Green Grid* (2017), the plan identifies opportunities to connect green spaces across Greater Parramatta with community facilities, transport nodes and neighbourhood destinations via safe and enjoyable walking routes as part of Sydney’s Green Grid. The stated aim to reshape Parramatta as a liveable, walkable city is primarily focussed outside of the CBD boundary, but identifies the future high amenity pedestrian network to connect the dense growth precincts on the walkable fringe of the CBD.

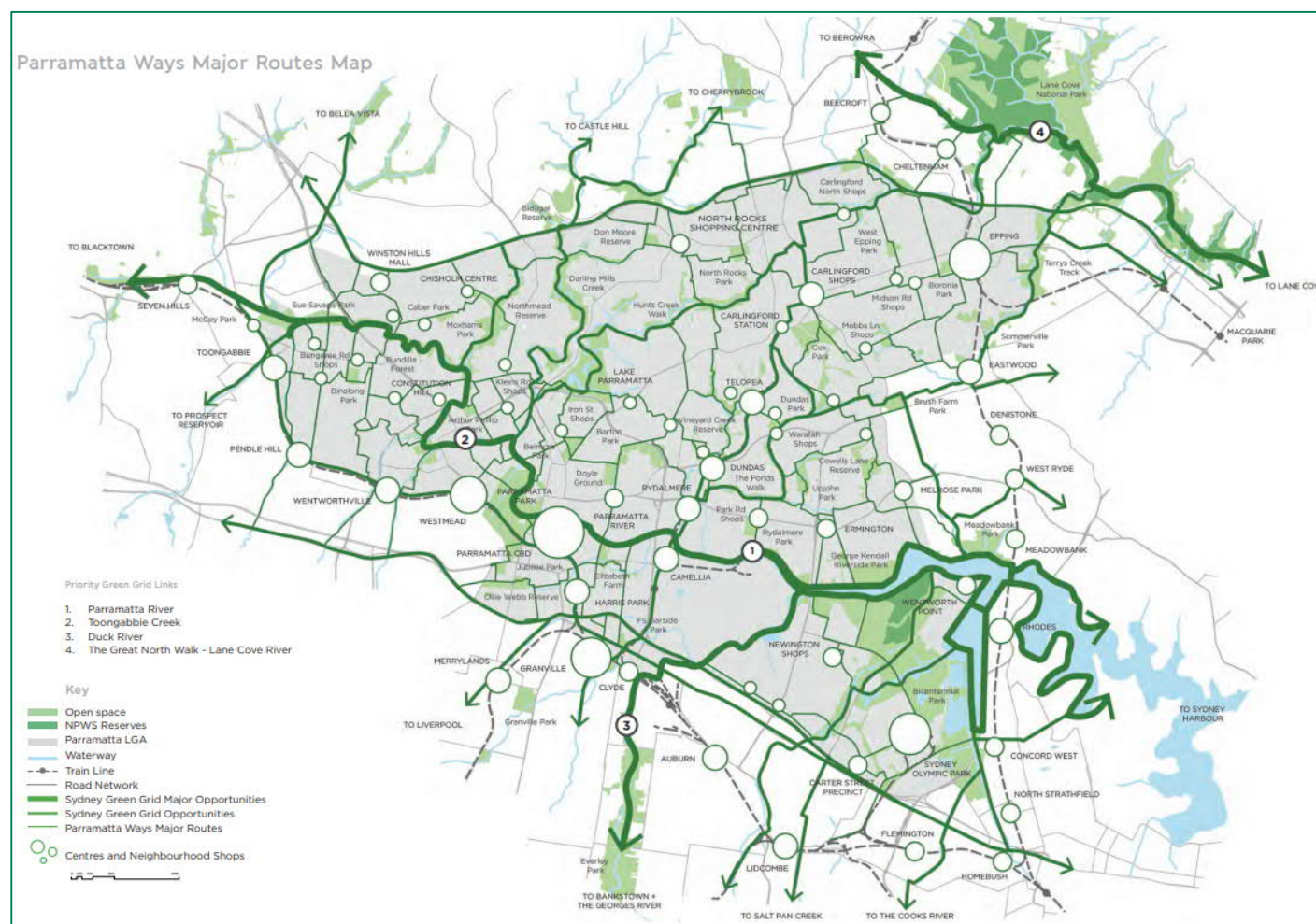


Figure 83: Parramatta Ways map (Source: Parramatta Ways)

As part of the Parramatta Light Rail project, the following streets are identified to be pedestrianised:

- Macquarie Street between Horwood Place and Smith Street,
- Church Street between Market Street and Macquarie Street.

The introduction of the Civic Link, a planned pedestrian boulevard, will support liveability by connecting major Parramatta CBD destinations to each other, to the Transport Interchange and to the River through a pedestrian and cycle-friendly avenue, fit for the growing population of Parramatta. The link is approximately 490 metres long and 20 metres wide, extending from Parramatta Square to River Square and the broader foreshore precinct.

Current plans to transform Parramatta Quay into a public space and better access will support walking and cycling along the river foreshore. The Escarpment Boardwalk will be a river-level path

that will allow cyclists and pedestrians to access the CBD foreshore on the northern bank. The boardwalk will complete the off-road walking and cycling path along the northern bank of the Parramatta River, connecting Parramatta Park to Melrose Park. The Charles Street Square upgrade, adjacent to the Ferry Wharf at Parramatta Quay, includes an improved riverfront walk, ramped walkways, providing a more accessible entry point to Parramatta from the River.

Through improving the pedestrian network within Parramatta, it would provide a more variety of local walking opportunities, as well as supporting the environment and community. High quality and safe walking facilities will also ensure that active transport trips are maximised, and car reliance is reduced for residents and visitors of Parramatta CBD.

5.5.2 Cyclists

The *Parramatta CBD Strategic Transport Plan* has identified a series of measures including cycling infrastructure to be provided within the CBD to ensure cycling will have a greater role as the city grows. Figure 84, shows *Future Transport’s* vision for a connected 10km cycling network around Greater Parramatta by 2026. Delivering a completed cycling network is aimed at improving the safety and appeal of cycling as a transport option to a wider range of customers who currently may not be cyclists.

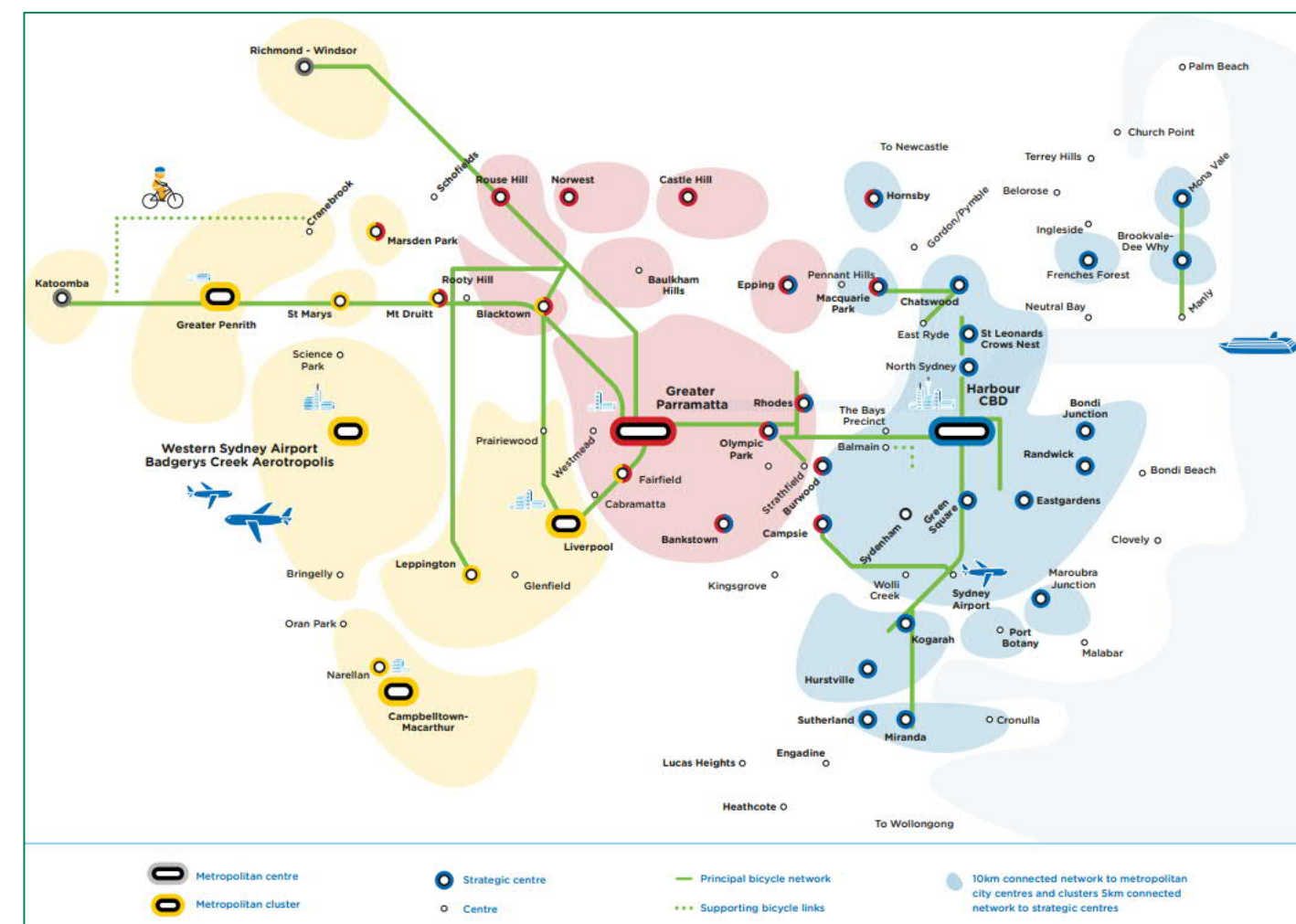


Figure 84: 2056 Greater Sydney Principal Bicycle Network vision (Source: Future Transport)

Parramatta Bike Plan (2017) sets out a 20-year plan that lays out a set of routes that will transform the safety and attractiveness of cycling in Greater Parramatta. The aspiration of the *Parramatta Bike Plan* is:

- To enhance the productivity and liveability of Parramatta through an increase in cycling, helping foster healthy and connected residents, workers and visitors
- For cycling to be safe, and perceived as a safe and attractive option for all members of the community, for those aged 8 through to 80
- To increase the proportion of people cycling in Parramatta to 5% of all trips to work, and 10% for those ending in the CBD

The Plan lays out a set of bike routes to transform the safety and attractiveness of cycling in Parramatta by connecting future dense precincts with the CBD, train stations and key destinations. Figure 85 shows the proposed Parramatta Cycling network.

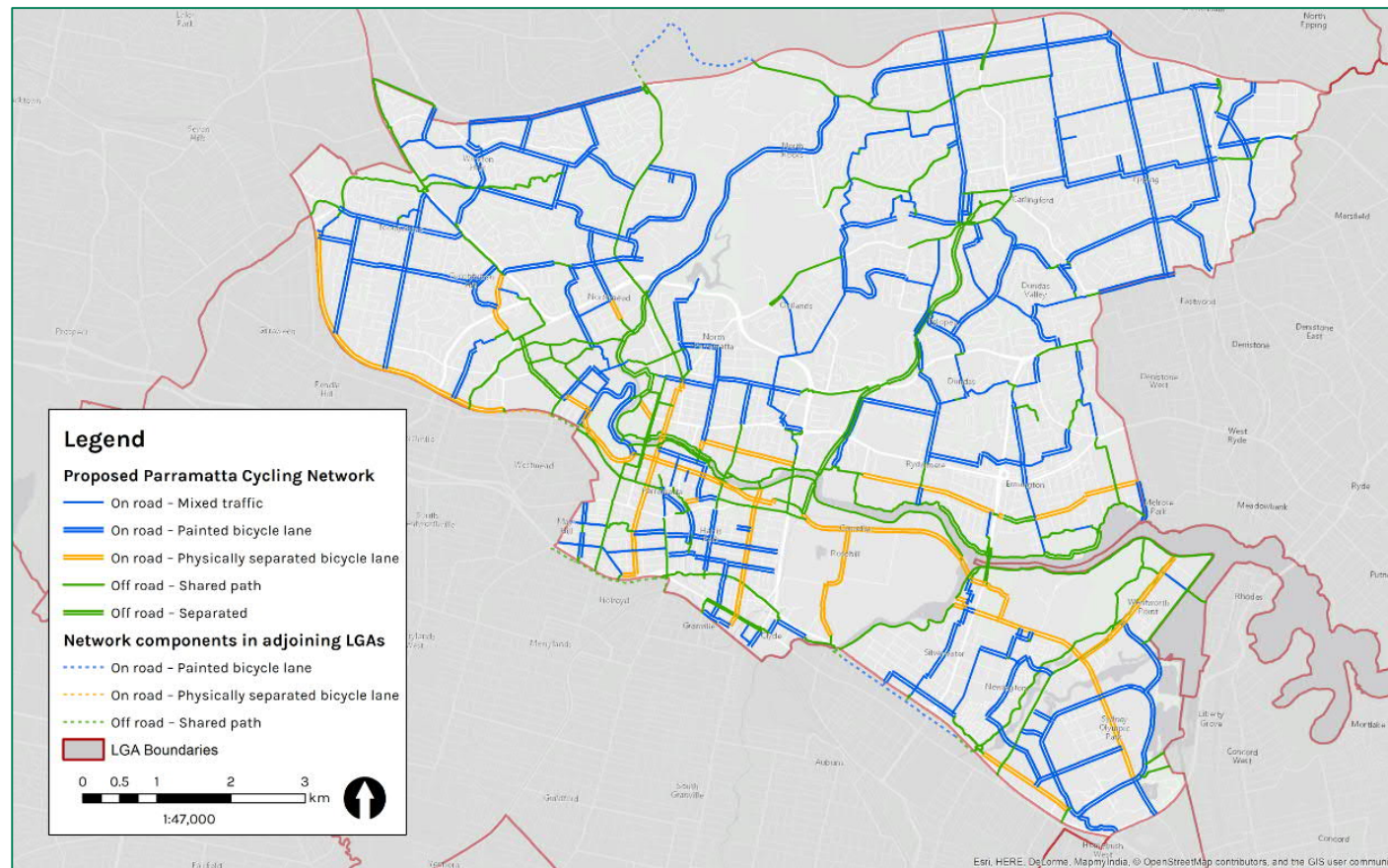


Figure 85: Proposed Parramatta Cycling network (Source: Parramatta Bike Plan 2017)

Through the implementation of these plans, cycling has the potential to relieve congestion or at the very least reduce the rate of growth of car demand as population and employment increases in the CBD.

Based on mode share analysis undertaken as part of this work, future travel demand could result in a three-fold increase in walking and cycling trips to/from the Planning Proposal area. Key routes to

and within the CBD that would be utilised and will be needed to support the CBD Planning Proposal include:

- Completing the river foreshore paths on the northern and southern banks,
- A north-south physically separated bike path aligned with Marsden Street, Marist Place and Villiers Street,
- An east-west physically separated bike path along George Street.
- Civic Link: a shared pedestrian cyclist spine from the river to Parramatta interchange

In particular, the north-south cycling connections through Parramatta CBD seek to overcome key CBD access severance of the river, the M4 and the Great Western Highway. These connections will enable local and regional cycling trips to CBD destinations from north and south of the CBD via contested city centre streets.

There is currently limited bicycle parking available within Parramatta CBD. The potential increase in cycling trips will need to be accommodated by appropriate bicycle parking provisions.

5.6 Public Transport

The objective of the Planning Proposal for the Parramatta CBD is to strengthen Parramatta's position as the Central CBD for Greater Sydney. This in turn will generate a large increase in trips that will require reliable access into and out of the CBD. As the city shifts away from car dependency, the implementation and upgrade of public transport is vital to the success of the vision. This section offers a range of public transport initiatives and how they will impact and shape the future network of Parramatta.

5.6.1 Trains

Without increased rail capacity and additional services to address long term increases in travel demand, rail customers will shift to other car-dependent modes of transport, which would increase congestion on the local and State road network. Reduced rail accessibility and increased car dependency and congestion would invariably lead to decreased urban amenity and land devaluation in the CBD.

The current train services stopping at Parramatta and Harris Park stations are forecast to experience increase in passenger demands with the introduction of the Planning Proposal. Modelling undertaken assuming the full implementation of Planning Proposal by 2056 indicates increase passenger demand along the northbound direction on the T5 line between Merrylands and Harris Park reaching 15,400 passengers during the two-hour AM peak. Assuming a train capacity of 1,200 for the existing 8-car trains, this would necessitate a train service every 10 minutes at a minimum to accommodate the demand.

Future Transport 2056 and the *Western Sydney Rail Needs Scoping Study* both outline development of a series of new rail projects to improve access and reach of mass public transport across the greater Sydney. Three of these elements of the preferred network pass through Parramatta, and are described below:

- **East-West Link Rail (potential future initiative)** – A visionary future line that extends the future Sydney Metro West at Westmead to connect to the Western Sydney Airport at Badgery's Creek. The East-West Link will establish a critical connection between the new airport and Aerotropolis to Parramatta and further east to City of Sydney.
- **Sydney Metro West from Greater Parramatta to Eastern Harbour City supporting growth** – Sydney Metro West provide a new, turn-up-and-go metro rail service to support Greater Parramatta, Sydney Olympic Park, the Bays and the Eastern Harbour City. Sydney Metro West would also relieve pressure on the busy T1 Western Link which is reaching its capacity by creating a new service separate from the network. This project is currently in the detailed planning stage and is described in more detail below.
- **Upgrades to the T1 North Shore, Northern and Western Line to increase capacity** - The upgrading of the lines with automated systems would increase the number of services possible on the line by approximately 20 percent creating capacity for an additional 4000-5000 passengers every hour per line.

The Sydney Metro West has progressed to the detailed planning stage. It is a metro rail service mostly underground running from Westmead/Parramatta to the City via Sydney Olympic Park, the Bays Precinct and Pyrmont. It intends to improve connections between Central River City and Eastern Harbour City, doubling rail capacity between these two areas. Based on the potential for metro services to run at 5-minute headways in each direction and assuming half a train capacity of 600 (1,200 full capacity) people either boarding or alighting each service at Parramatta, there could be in the order of 14,400 passenger movements to or from the metro station in the AM and PM peak periods.

In Parramatta, the new Sydney Metro West station will be strategically located to the north of the existing Parramatta train station and within the commercial core of Parramatta CBD, taking pressure off the existing station and giving customers a second rail option. It would also provide an easy, efficient and accessible interchange with buses and Parramatta Light Rail, aligning with Parramatta's multi-modal transport strategic direction. Detailed planning and environmental assessment documents for further public exhibition and community consultation are being developed. The metro station at Westmead and connection with the East-West Rail Link to the airport at Badgery's Creek will increase the reach of mass between Parramatta and the emerging land uses around the new airport.

Other *Future Transport 2056* initiatives identified for investigation for 10-20+ years include the following:

- **Parramatta to Epping high capacity train/mass transit links** – connecting Parramatta to knowledge jobs in the Global Economic Arc
- **Parramatta to Kogarah high capacity train/mass transit links** – connecting the Central River City to South Sydney, a corridor with high opportunity for urban renewal
- **Parramatta to Norwest mass transit/train link** – connecting two fast growing major centres with several innovation assets in between. The Parramatta-Norwest mass transit/train link will support longer-term population growth on this corridor, currently served by bus services. This will help to maintain 30-minute access to Parramatta from Norwest.

These new north-south mass transit/train links to Greater Parramatta will be able to increase the number of people that can access the Central River City within 30 minutes supporting jobs growth in Parramatta by improving rail accessibility from other parts of Sydney currently not within reasonable travel distance as well as help to manage pressure on existing transport links such as buses by shifting the demand to rail.

The impact of the three visionary metro lines on mode shares of private vehicle and public transport for people travelling to and from Parramatta CBD had been assessed using STM. The analysis revealed that the three metro lines increase the proportion of users taking public transport, by up to 5%. With the greatest difference observed for trips into Parramatta during the AM peak, and out from Parramatta in the PM peak supporting Parramatta CBD as a major employment and cultural hub.

The *Central City Rail: Economic Impact Study* proposes strategy for the implementation of the Central City Rail Network. The overarching principles for the strategy are:

- Establishing the Central River City as a second, connected transport hub for Sydney by providing comprehensive connections to the Eastern Harbour City via the Epping and Kogarah rail corridors as a priority
- Extending the rail to growth areas in the Western Parkland City and Norwest. Complete planning, and preserve corridors and provide intermediate mode connections to support initial growth
- Full integration and completion of all rail corridors and integrate networks extending Sydney Metro West to Western Sydney Airport.

These initiatives will significantly contribute to Parramatta CBD's future prosperity by being able to increase public transport capacity for people coming to Parramatta and provide vital connections to other parts of Sydney.

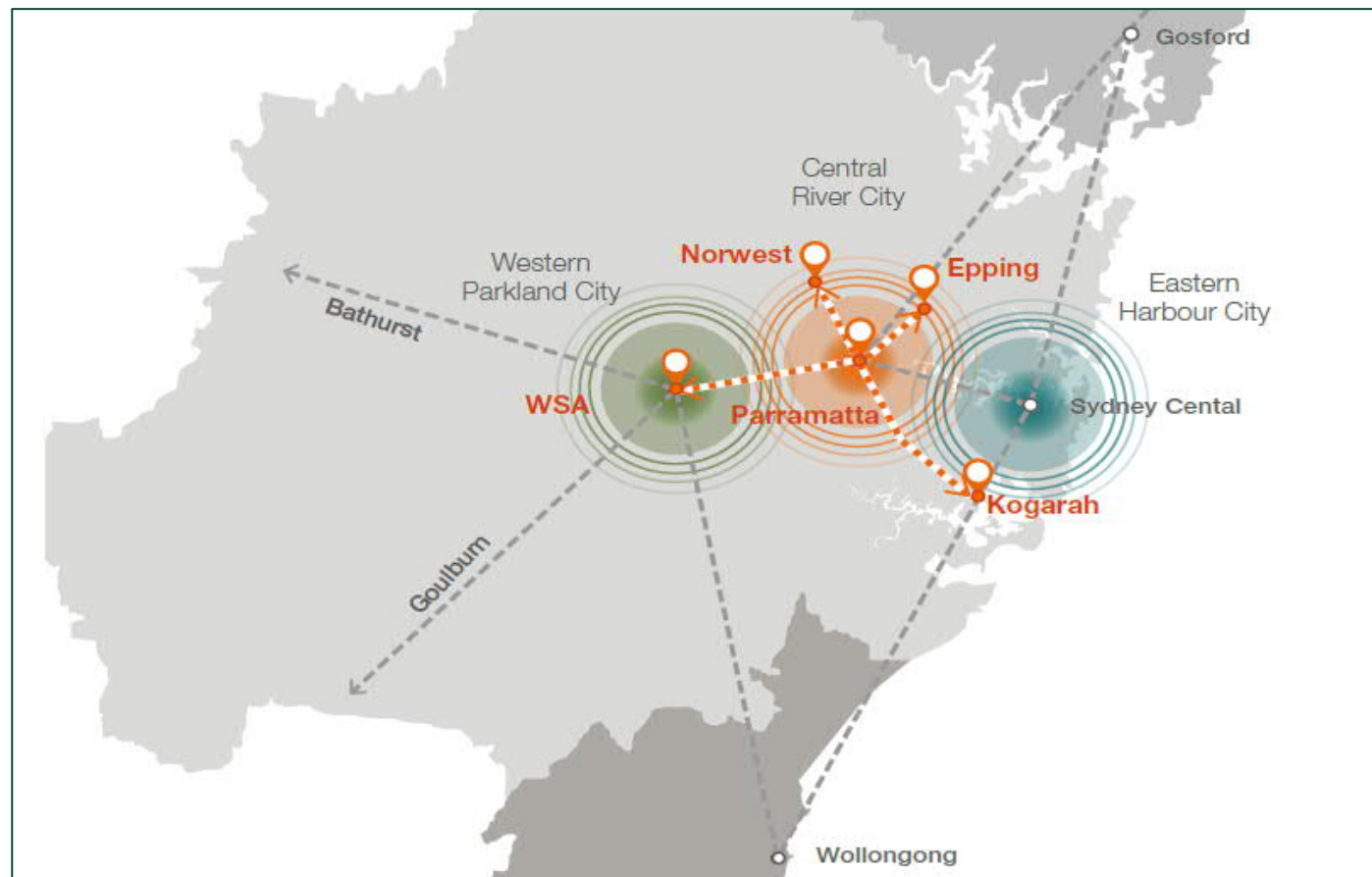


Figure 86: The potential future rail network connecting five cities (Source: Central City Rail Report)

5.6.2 Light Rail

Construction of a Parramatta Light Rail (PLR) has already commenced with services scheduled to start in 2023. Stage 1 of the light rail will connect Westmead to Carlingford via the Parramatta CBD and Camellia with a two-way track spanning 12 kilometres. It will link with existing public transport options, including train, bus and ferry, to form an integrated network capable to serve existing and future population. As well as providing additional capacity on the public transport network, PLR is aimed at driving economic growth by creating pedestrianised precincts that would encourage visitors and residents to visit local businesses.

The preferred route for stage 2 of PLR announced in October 2017, will link Sydney Olympic Park to the Parramatta CBD through Ermington, Melrose Park and Meadowbank, before crossing the Parramatta River south into Wentworth Point, passing through Silverwater and terminating at Sydney Olympic Park. Stage 2 is proposed to have 10-12 stops with travel times of around 25 minutes from Olympic Park to Camellia and a further eight minutes to the Parramatta CBD. It will connect with Sydney Metro West, Parramatta and Olympic Park heavy rail stations and Sydney Ferry services at Rydalmere and Sydney Olympic Park. Planning for Stage 2 is being developed in collaboration with the Sydney Metro West project with a Final Business Case currently being considered by the NSW Government following which an investment decision and the timing of construction to follow. The Greater Sydney Services and Infrastructure Plan suggests that in the medium to long term further Parramatta Light Rail extensions will be investigated.

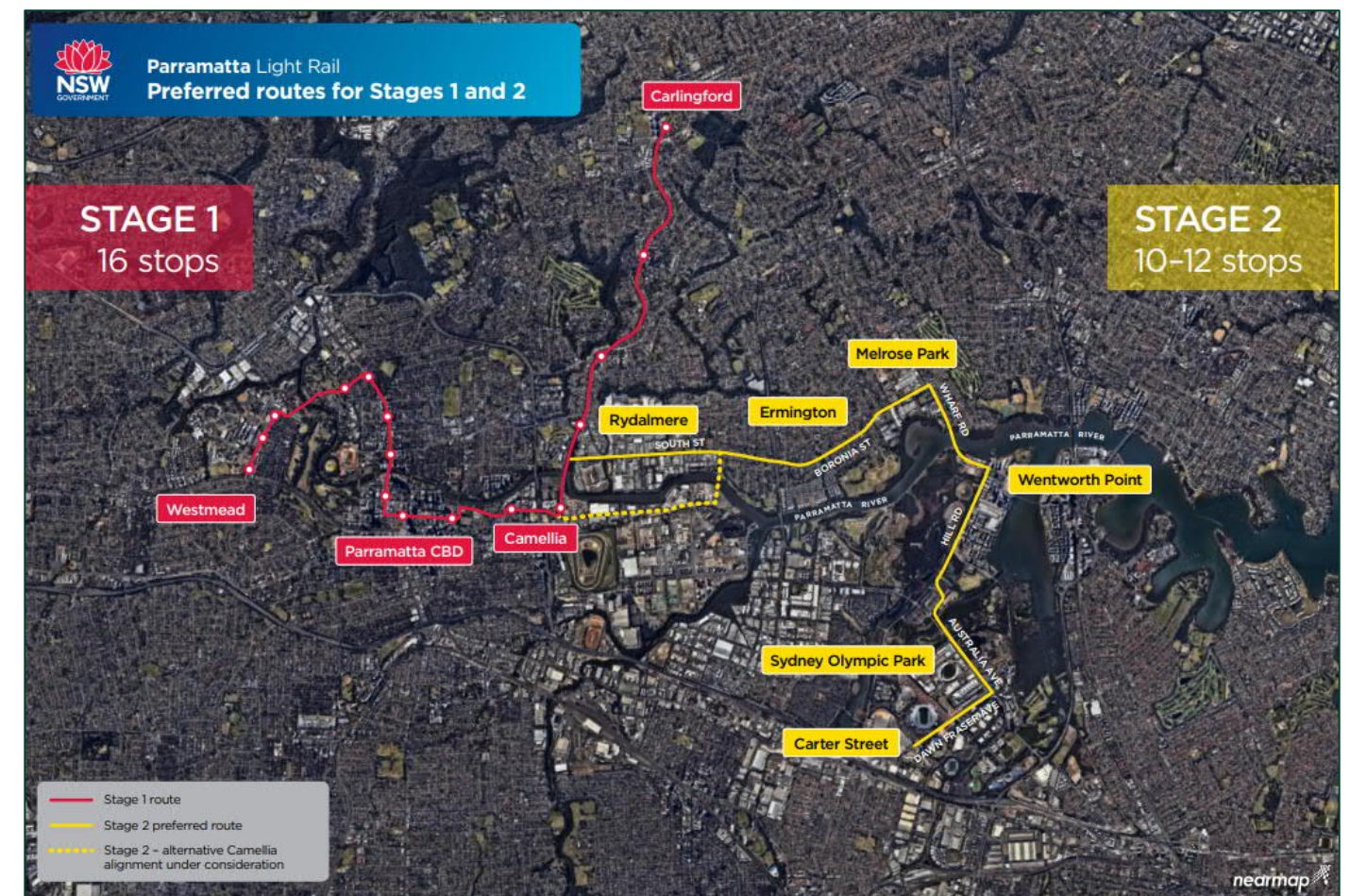


Figure 87: Parramatta Light Route preferred routes for Stages 1 and 2 (Source: NSW Government, 2017)

The Parramatta CBD Planning Proposal will increase the number of trips between the Parramatta CBD and the Olympic Park which currently would involve car trips but also within the Greater Parramatta area encouraging residents to make more shorter trips both within and to Parramatta CBD due to ease of use and improved public transport accessibility to areas that currently do not have direct or frequent public transport access.

5.6.3 Bus

The function of bus transit in accommodating Parramatta CBD's long-term transport task is subject to potentially significant evolution depending on the development of higher order modes - light rail, heavy rail, and metro - in line with growth of the CBD. The bus network would need to be restructured accordingly, identifying major corridors to maintain, reinforce or develop.

The *Parramatta CBD Strategic Transport Study* modelled bus passenger demands crossing ten cordons around the Parramatta CBD to understand the future demand for bus trips and its appropriateness as a mode along these corridors in the future. Key findings include total bus patronage crossing the Parramatta CBD cordon is expected to increase by approximately 10,000 and 20,000 inbound passengers in the 2036 and 2056 two-hour peak respectively. This includes demand for the equivalent of 45 and 90 additional services on each of the busiest T-way corridors.

Using Sydney Strategic Travel Model (STM), passenger numbers in all corridors are expected to increase, with largest increases along corridors in the southeast and southwest of Parramatta CBD. Figure 88 shows five bus corridors with greater than 5,000 passengers (total two-way) across the two-hour AM peak period in 2056: North-West Transitway, Parramatta Road, Bridge Street, Pitt Street and Centenary Road.

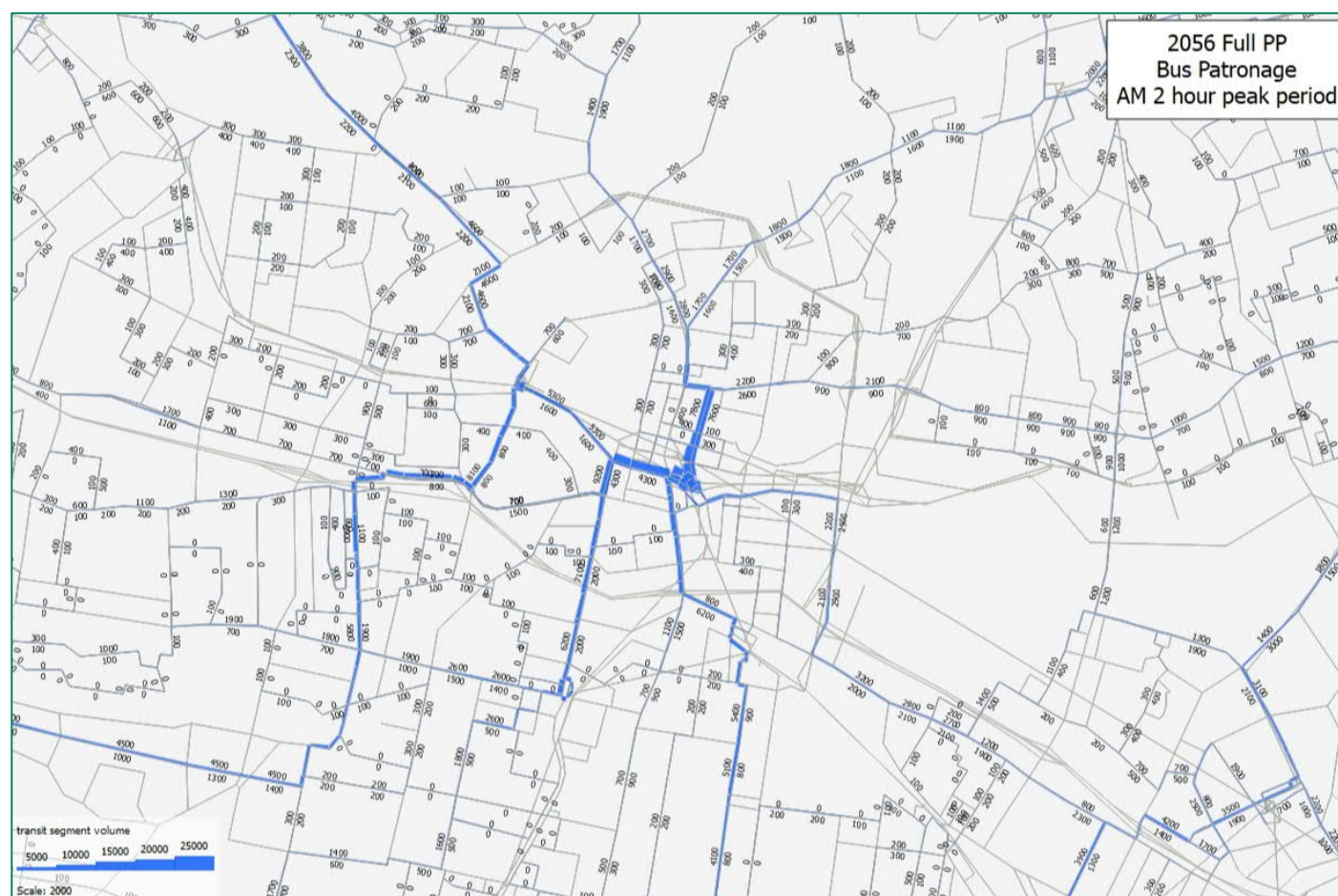


Figure 88: Forecasted 2056 Full Planning Proposal Bus Patronage – AM 2 hour peak (Source: STM)

Based on an analysis of the modelled bus patronage, the following three bus route services are forecast to have the highest increase in patronage due to the planning proposal:

- M91: Hurstville to Parramatta – travels to/from the Parramatta CBD via Church Street
- 907: Bankstown to Parramatta
- T80: Liverpool to Parramatta – travels to/from the Parramatta CBD via Argyle Street

Assuming a total capacity of 70 passengers per bus, the above results indicate that these three services would require an extra 20 services (M91), 6 services (907) and 4 services (T80) to cater for the additional bus patronage in 2056. Other services not mentioned above may also require some additional services to accommodate the additional forecast passenger demand.

Within and around Parramatta CBD, there are several pinch points and corridors where growth has been occurring or expected to occur, including:

- Windsor Rd, Church St and Smith St/Wilde Ave
- Pennant Hills Rd, Church St and Smith St/Wilde Ave
- Victoria Rd, Smith St/Wilde Ave
- North-West Transitway, Park Parade
- Hassall Street, Parkes Street
- Church Street South
- Liverpool-Parramatta Transitway, Great Western Hwy, Pitt St
- Pitt St

For the medium term, initiatives for consideration and further testing in Parramatta include:

- Some services to use the reopened Darcy Street to alleviate pressure on the existing interchange, although the design of the new street limits bus capacity
- Services accessing Parramatta CBD from Smith St – there is some potential to review the network, stopping patterns and termination points with the new Metro West station proposed between Macquarie Street and George Street.
- Changes to circulation of general traffic within the CBD to alleviate key congestion points around Parramatta Interchange such as the western approach along Pitt Street and the east on Station Street East / Smith Street.
- Improving the dual left turn from Great Western Hwy into Pitt St so buses no longer need to use the bus jump start and would receive more green time.

TfNSW recently published the 2036 Future Rapid Bus Network vision, shown in Figure 89, which will complement rail, metro and light rail services across Sydney Metropolitan Area. The rapid bus network will offer customers fast, frequent and reliable travel options with a legible train-like experience and turn-up-and-go services every 5-10 minutes across the day.

As illustrated below, the rapid bus network will support Parramatta CBD by offering customers a fast, frequent, and reliable travel options to the metropolitan centres of Liverpool, Hurstville,

Burwood, Ryde, Macquarie Park, Epping, Rouse Hill and Bankstown. The rapid bus lines will be supported by dedicated bus lanes, bus priority technology and high-quality bus stop infrastructure.

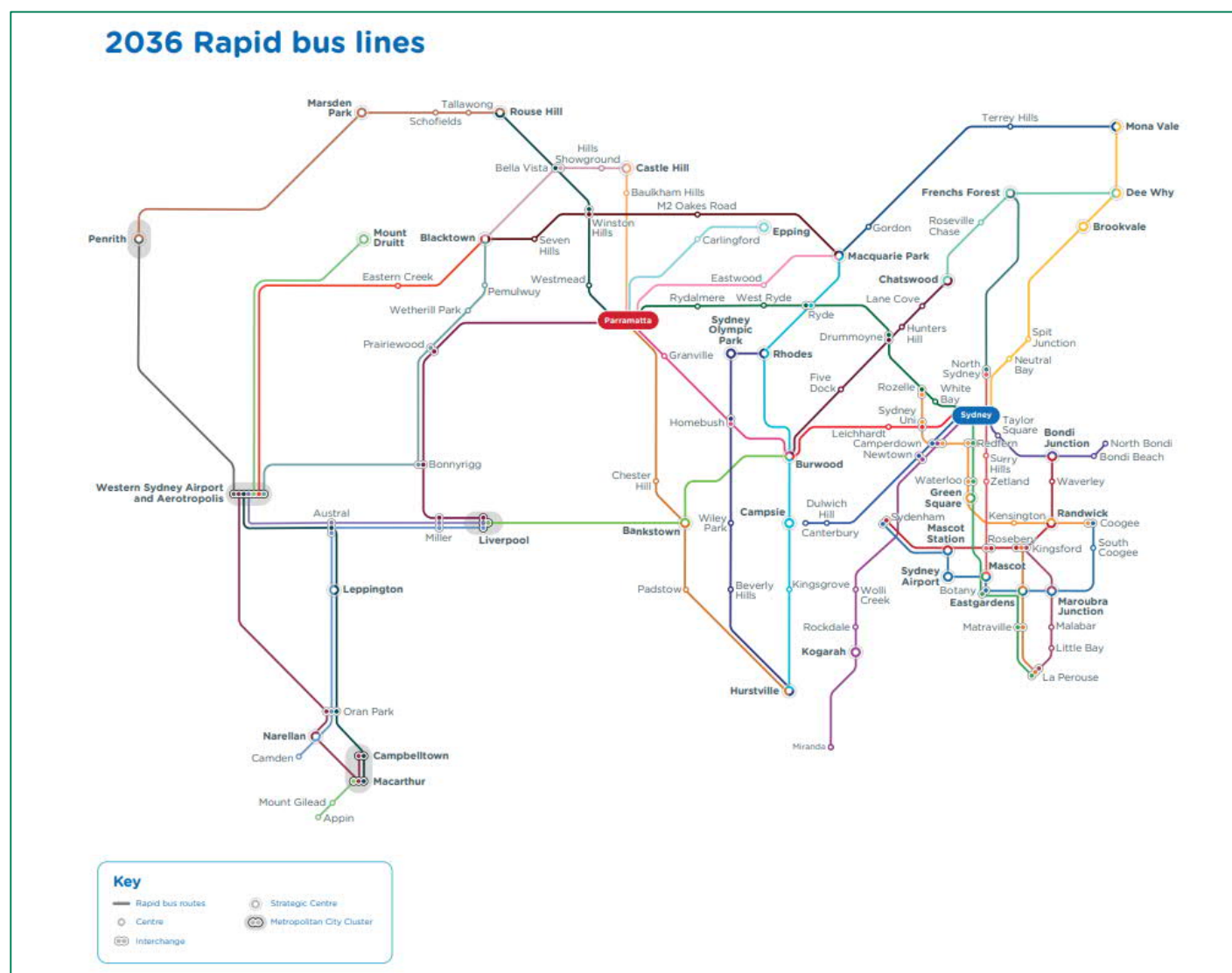


Figure 89: 2036 Future Rapid Bus Network vision (Source: Future Transport Strategy)

Some of the key actions for these proposed rapid bus routes as part of the plan are shown in Table 22. Many of these actions include addressing pinch points in the route, which are traffic congestion points, intersections or short lengths of road at which a traffic bottleneck exists, slowing down the network and causing travel delays.

Table 22: Key Actions for Rapid Bus Routes serving Parramatta CBD

Rapid Bus Route	Key Actions
Castle Hill – Liverpool via Parramatta and T-Way	Address bus pinch points with bus priority treatments on: <ul style="list-style-type: none"> Old Northern Road Windsor Road between Baulkham Hills and North Parramatta
Parramatta – CBD via Ryde	Address bus pinch points with bus priority treatments on: <ul style="list-style-type: none"> Victoria Road between Parramatta and Kissing Point Road Victoria Road between Top Ryde and Anzac Bridge In the longer term, complete investigation of Bus Rapid Transit on the Victoria Road corridor
Parramatta – Macquarie Park via Carlingford and Epping	Address bus pinch points with bus priority treatments on: <ul style="list-style-type: none"> Pennant Hills Road between North Parramatta and Carlingford Carlingford Road and Epping Road between Carlingford and Macquarie Park
Rouse Hill – Hurstville via T-way, Parramatta and Bankstown	Address bus pinch points with bus priority treatments on: <ul style="list-style-type: none"> Church Street, south of Parramatta Bus priority route between Granville and Chester Hill in conjunction with Parramatta and Bankstown councils Hume Highway between Bass Hill and Bankstown

From these actions, one priority is the delivery of route improvements on Old Northern Road and Windsor Road to speed up Rapid services between Castle Hill and Parramatta, saving customers journey time. South of Parramatta, these services will run directly to Wetherill Park, Prairiewood and Liverpool via the existing T-way.

The *Bus Priority Infrastructure Program* supports the 2036 Future Rapid Bus Network vision by delivering projects that make bus services faster and more reliable. Whilst currently identified projects are not of direct relevance to the Parramatta CBD, it is likely some of the shortlisted projects may result in additional changes to bus routes that also service Parramatta CBD. An example is the future light rail corridors shortlisted by Transport for NSW. In order to accommodate a transition between the two modes, changes to bus routes that service Parramatta CBD may be required. Intensified growth in travel demand resulting from development uplift in urban renewal areas / precincts (for example Greater Parramatta to Olympic Peninsula and Parramatta North Urban Transformation) will also require additional bus services.

Other key corridors in consideration for the medium to long term include:

- Norwest/Showground to Parramatta future rail route** – this route was identified as a future rail route in *Future Transport*. In the interim, investigating the potential for upgraded bus product along this route through Windsor Road or the North West Transitway is recommended.

- **Parramatta Road bus corridor** – this corridor has the potential for new frequent bus services along Parramatta Road connecting to Parramatta CBD. The recommended approach to Parramatta CBD could be via Church St or James Ruse Drive and Hassall Street.

Any major increase in bus patronage will require additional bus services, which will add to operational issues at bus stops, on the road network and critically at Parramatta Interchange. For Parramatta Interchange, this will include layover, an essential function to ensure efficient and reliable bus operations which can be space consuming. In order to optimise the use of high value land, exploring new options to integrate bus layovers within the new CBD development would be desired. These could include arrangements such as basement or hidden designs that reduce visual and noise amenity impacts of bus operations and/or enable alternate use of road space.

5.6.4 Ferry

Whilst ferry services do not represent a large proportion of trips in and out of Parramatta, there are aspirations to continue improving its accessibility and efficiency to attract future customers.

The Parramatta City River Strategy is a comprehensive plan to transform the City River Foreshore into a vibrant public space that connects the city, enhances the history of the Parramatta River and its resilient to flooding. Following the upgrade of Parramatta Wharf in 2019, the transformation of Parramatta Quay is underway, with the start of construction on the Escarpment Boardwalk and new plans to redevelop Charles Street Square. These projects will improve equitable access to the ferry terminal.

Transport for NSW plans to modernise the ferry fleet and develop a new style ferry for the Parramatta River. These proposals will make ferry services more accessible, efficient and attractive and may result in some increased patronage at Parramatta. However, it is not anticipated these works will result in significant change in the currently minor role ferries have in accommodating trips accessing the Parramatta CBD, unless the timing and frequency of ferry trips change to service peak hour needs.

Improvements for ferry services including later and express services, as well as faster, lighter vessels offering more frequent service could attract future customers. Additional ferry wharves, services by smaller, more frequent vessels would also be beneficial in increasing transport options for residents of new developments in the Parramatta LGA.

5.7 Roads

While the road network has catered for the needs of Parramatta over the past decades, there will be increasing challenges as more residents and workers travel on the network. To support the integrated and efficient movement of people and goods, continued investment in better roads and addressing pinch points is important to improve traffic flows and reduce congestion. Roads and streets beyond their movement function can contribute to the network of public space and better deliver social, environmental and economic improvements for the wider community. Understanding desired movement patterns can allow roads and streets to be enhanced by transport and have the appropriate space allocation to move people and goods safely and efficiently and connect places together.

A Road User Space Allocation Policy has been developed by TfNSW, to ensure that the allocation of road user space is a deliberate exercise that considers the place, function and movement requirements of roads. A key principle is to realise a balance between place and the movement of people and goods by first establishing a network vision and primary road functions based on strategies and plans. When allocating road user space based on the network vision and road functions, all road users in the order of walking, cycling, public transport, freight and deliveries, and point to point transport ahead of general traffic and on-street parking for private motorised vehicles should be considered.

There will continue to be investment in roads with a shift in focus on major roads to provide movement corridors between strategic centres to support key centre to centre journeys. Local roads will move towards providing opportunities for access and connections with the local community and businesses. Utilising movement and place analysis to understand the needs of road links that comprise Parramatta CBD could be key to supporting this shift.

Some future road projects that are considered include:

- Upgrading key intersections to improve access to Parramatta CBD, including Pitt Street/Marsden Street intersection along Great Western Highway, and the Woodville Road, Parramatta Road and Church Street intersection at Granville
- Increase capacity on mass movement corridors such as James Ruse Drive, Victoria Road, Great Western Highway

Many road infrastructures projects have been planned around Parramatta and are completed or currently in progress. From the completed projects, Parramatta has already seen a shift in travel behaviours, with the WestConnex M4 Widening significantly improving the reliability of the M4 near Greater Parramatta and access across Sydney from commercial traffic. With the introduction of WestConnex, travel patterns have changed with reductions along parts of Parramatta Road and increases on other key links such as the Great Western Highway due to toll avoidance.

Within Parramatta CBD, many changes are also expected to occur regarding how roads are used and prioritised for each mode. While the introduction of Parramatta Light Rail and other initiatives outlined in this Plan will offer greater choice to travellers, the road network will require adaptation to accommodate this. The introduction of light rail has required changes to some local streets in response. They include:

- Macquarie Street’s traffic direction will be reversed to run west-to-east with a pedestrianised zone between Horwood Place and Smith Street.
- George Street to become two-way between Macarthur Street and O’Connell Street. This will reduce the eastbound traffic capacity from two lanes down to one, however increase accessibility to the CBD from the east.
- Church Street to be pedestrianised between Market Street and Macquarie Street to accommodate the light rail and to support pedestrian activities within the CBD. Traffic will be diverted away from Church Street to surrounding inner ring roads of Marsden Street, O’Connell Street and Wilde and Macarthur Streets.
- O’Connell Street will be upgraded to accommodate more traffic due to diversion of general traffic away from Church Street due to Parramatta Light Rail.
- Targeted intersection upgrades to support re-routed traffic.

These changes on local streets in Parramatta are likely to change the travel behaviours observed within and around the CBD. As the shift towards sustainable and active modes progresses, the remaining roads catering for motor vehicles will experience less capacity, that would lead to more congestion unless the growth in car usage is managed.

5.8 Freight and Servicing

Dedicated and shared freight corridors and connections that will enable the efficient and reliable movement of goods is critical to enhancing Greater Sydney’s overall transport system. As shown in Figure 90, the Greater Sydney strategic freight vision outlines a number of strategic roads for investigation that can improve freight access to connect Greater Parramatta to the freight network. The M4 motorway, located to the south of Parramatta CBD serves as a key freight route for Parramatta, connecting directly to Sydney CBD. The motorway network has a particularly important function in supporting road freight travelling in and around Sydney and also minimises amenity and safety impacts on places on local roads.

The Parramatta CBD Planning Proposal includes a directive on integrating land use and transport to ensure that urban structures, building forms, land use locations and development designs provide for the efficient movement of freight. Freight must not negatively impact the core development goals of increasing the amenity of the CBD. Last kilometre freight refers to the last leg of the journey of goods into shops, cafes, restaurants, offices and homes. As Parramatta grows, changes to the way everyone moves into the CBD will occur, including how freight is delivered. Potential directions include:

- Exploring methods to quiet out of hours deliveries in the CBD
- Investigating opportunities for gathering and using freight data to improve freight efficiency, and ensuring new buildings are equipped to meet the freight requirements for receiving and dispensing goods and services.
- Investigate the provision of minimum loading space requirements for new developments
- Investigate opportunities for the implementation of Courier Hubs. By establishing a hub, deliveries can be completed on foot, by bicycle or carted.

A joint effort from Council, NSW government, industry and the community is required to overcome barriers that the freight task may entail.

Customer Outcome 8 of the *Services and Infrastructure Plan 2056* states 'Efficient and reliable freight journeys supported by 24/7 rail access between key freight precincts with convenient access to centres. Initiatives for investigation (subject to business case development) are scheduled for either the next 10 or 20 years.

Initiatives for investigation in the next 10 years include the development and implementation of the Last Mile Freight Policy in collaboration with industry to encourage more freight movements in centres to take place outside of normal business hours. Transport corridors will be protected to reduce the cost of future delivery such as the following selected initiatives:

- Train improvements on T1, T2 and T5 train lines, including implementation of Advanced Train Control System (planning in-progress).
- Western Sydney Airport - Parramatta train link (for priority planning in collaboration with the Commonwealth).

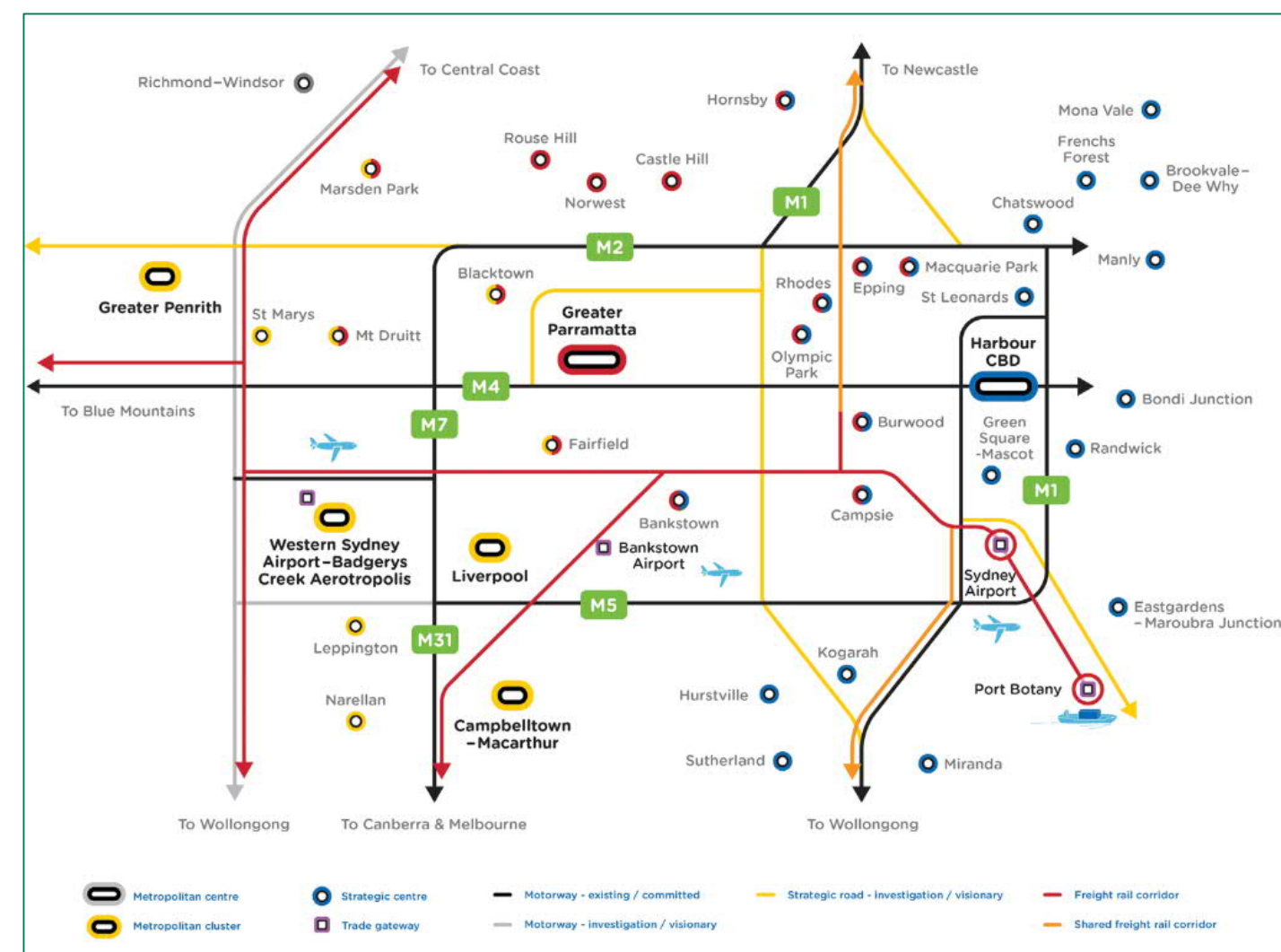


Figure 90: Greater Sydney Future Freight Vision (Source: Future Transport)

5.9 Private Vehicles and Parking

The Parramatta CBD Planning Proposal will increase the commercial floor space within the CBD and result in an increase in the number of work related trips into the CBD. Under a business as usual approach where car is the dominant mode of travel to Parramatta, the additional trips would lead to significantly higher volumes of private vehicle traffic on the surrounding road network if effective parking measures, greater public transport infrastructure and active transport connectivity aren't made available.

An increase in private vehicle volumes would lead to increased congestion which in turn will:

- Impact on all road-based travel modes including commercial vehicles and bus
- Decrease urban amenity and 'place' function of Parramatta CBD, regardless of proportional investment in road infrastructure
- Decrease economic productivity
- Impact on community health
- Devalue the land that comprises Parramatta CBD

Modelling conducted for the Parramatta CBD predicted that many travellers would continue to use private cars over the period to 2056. This indicates that without intervention that provides alternatives, the road network will be severely congested. It would also be difficult to achieve the aspirational mode share target of 40% for work trips by 2036. Car users value the comfort, flexibility and convenience of using their own vehicle, however if parking is made scarce and/or expensive, car users will switch to public transport if it is readily made available.

5.9.1 Interim Parking Rate

In response to these challenges, Council adopted an interim parking policy for Parramatta CBD to address the parking supply issue. The new parking policy shown in simplified form in Table 23 is based on the City of Sydney LEP parking rates applicable to Category A for Residential, and Category D for Commercial developments. The full parking rates are detailed in Appendix A. The implementation of the interim policy further reduces the maximum permissible number of parking spaces within the Parramatta CBD for new developments that are assessed using the new parking rates.

Table 23: Interim parking rate shown in simplified form (based on City of Sydney parking rates)

Land Use	Maximum Parking Rate
Residential	0.1 space per studio dwelling 0.3 space per 1-bedroom dwelling 0.7 space per 2-bedroom dwelling 1 space per 3-bedroom dwelling
Commercial	<p>If the Floor Space Ratio (FSR) > 3.5:1 $M = (G * A) / (50 * T)$ <i>where:</i> M = maximum number of parking spaces; G = GFA of all office/business premises in the building (m²); A = Site Area (m²); T = Total GFA of all buildings on the site (m²)</p> <p>If the FSR <= 3.5:1 Office/Business: 1 space / 175 sqm GFA Retail: 1 space / 90 sqm GFA</p>

5.9.2 Parking Supply Comparison of Parking Rate Scenario

To gauge the impact of the new parking rates a comparison against the original parking rates has been made to better understand the scale of the change. As it is not possible to predict the mix and location of specific commercial use types that will be delivered within the CBD, therefore a generic commercial floorspace has been adopted across the CBD for the purposes of testing the increase in commercial land use. Similarly, the residential dwellings have adopted existing dwelling structure (no. of bedrooms) proportions within Parramatta for the purposes of testing the increase in residential land use. These are shown in Table 24 for 2026, 2036 and 2056.

Table 24: Future Commercial and Residential Forecast Increases from 2016

Land Use		2026	2036	2056
Residential (dwellings)	0-1 Bedroom	930	1,750	3,740
	2 Bedrooms	3,050	5,730	12,250
	3+ Bedrooms	450	850	1,830
Commercial (area)		703,000m ²	978,300m ²	1,767,600m ²

Notes: Residential dwellings rounded to the nearest 10 and calculated based on existing dwelling structure proportions in Parramatta, information supplied by City of Parramatta (March 2020). Increase calculated based on GIS files supplied by City of Parramatta (March 2018). Commercial area rounded to the nearest 100m² and increase calculated based on GIS files supplied by City of Parramatta (March 2018)

Using the forecast growth in commercial and residential dwellings, the parking rate scenarios have been used to identify the scale of additional parking supply forecasts. These are illustrated in Figure 91.

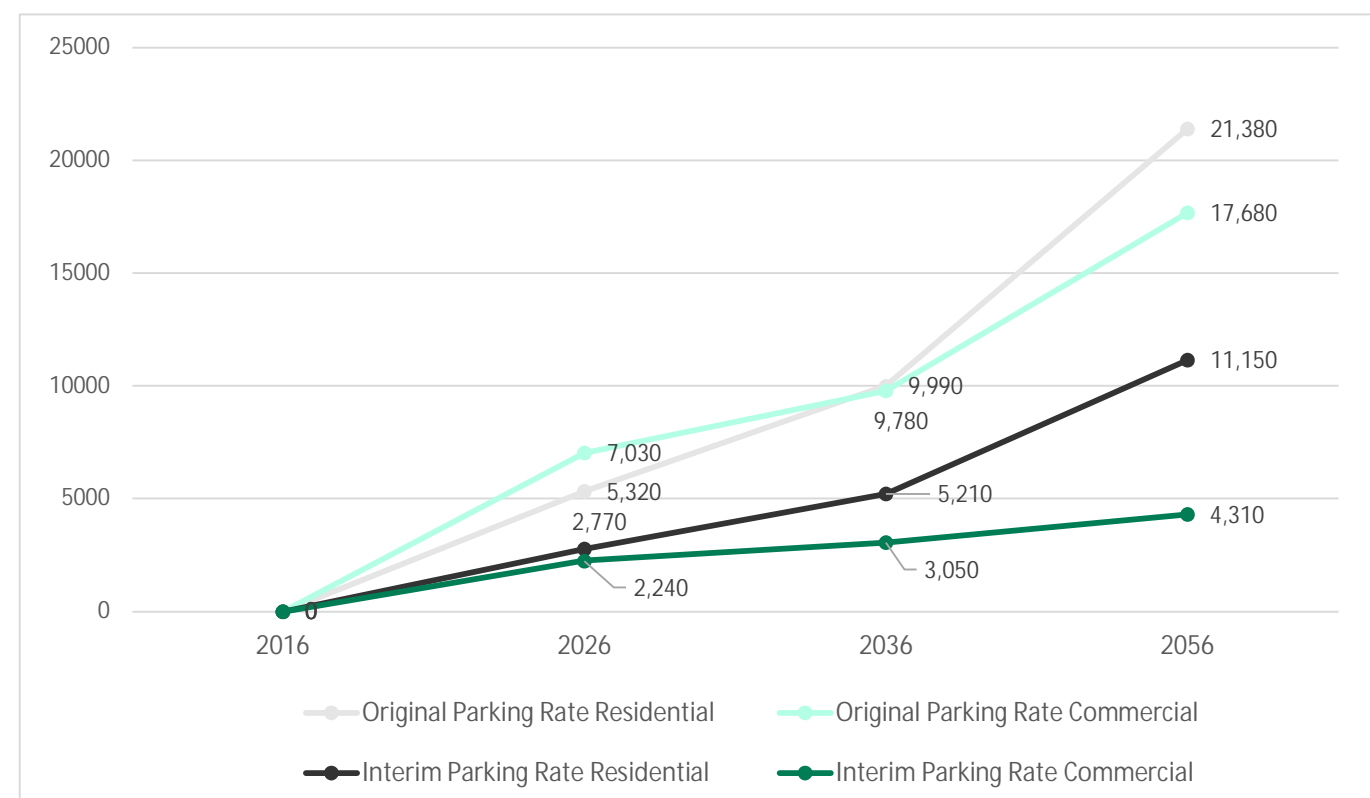


Figure 91: Additional Parking Supply Comparison

Considering population and employment growth, the scenario with the new parking rates for future residential and commercial developments has the potential to a total of 15,460 additional parking spaces comprising 11,150 residential and 4,310 new commercial parking spaces by 2056 i.e. full implementation of Planning Proposal. Using the previous City of Parramatta parking rates would add a further 10,230 residential spaces and 13,370 commercial spaces by 2056 within Parramatta CBD. That would result in a total of 39,060 parking spaces by 2056. This would be a significant increase in additional parking spaces compared to if the interim parking rate is adopted.

The implementation of the interim policy has the effect of restricting the maximum number of development-related parking spaces in Parramatta CBD. By 2056, the maximum number of additional commercial parking spaces could be four times lower than if the original Parramatta CBD policy rates were retained. The carpark allowance for residential dwellings would also drop significantly, reducing the total residential parking spaces allowed to half the original parking policy rate.

5.9.3 Parramatta CBD Forecasted Demand Comparison

The STM modelling undertaken to support the analysis of the Parramatta CBD Planning Proposal was employed to compare the impact of changes to the parking policies on the road network. The

impact on forecast growth has been calculated based on the change in parking rates for office/commercial developments and the percentage contribution of office/commercial employment to total employment in the Planning Proposal area to the Strategic Transport Model totals. A comparison of the additional projected peak period demand for both 2026, 2036 and 2056 is illustrated in Figure 92. The volumes show the additional car trips when compared to the 2026 LEP (Base) Scenario, which forecasts 59,400 trips in the AM and 96,200 in the PM peak. These include all additional trips which travel in/out of the Parramatta CBD area.

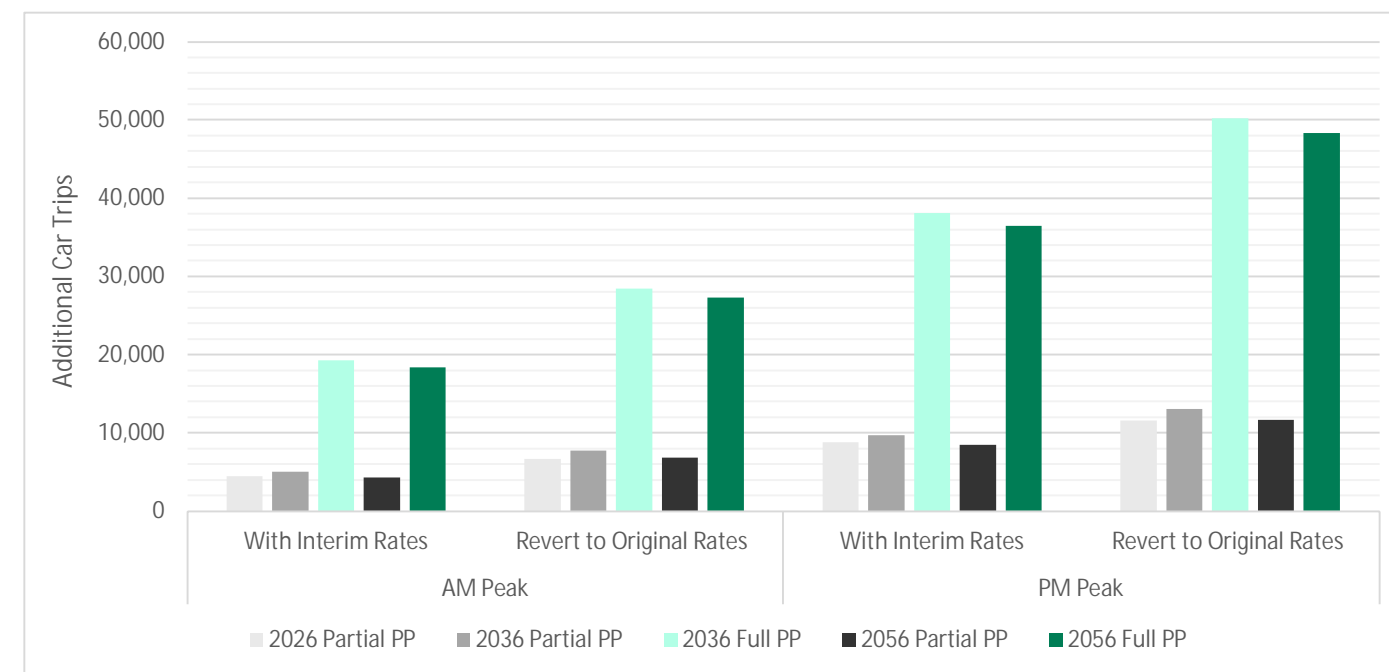


Figure 92: Peak Period Demand Totals – Parking Rate Comparison

When comparing the 2026 Partial Planning Proposal Model to the 2026 Base Model, and taking into consideration the interim parking rate as well as population and employment growth, Parramatta CBD has the potential to add approximately 4,500 trips in the AM peak period, and 8,800 trips in the PM. This results in a total of approximately 63,900 trips during the AM peak and 105,000 trips in the PM peak. This increase does not account for the implementation of other travel demand measures to encourage mode shift. The implementation of the new parking rates has removed 2,200 trips in the AM peak, and 2,800 trips in the PM peak period. This represents approximately 3% of the overall demand forecasted.

As more commercial buildings and residential dwellings are developed, the difference in additional vehicles seen across the two parking rates would become more substantial going forward. When analysing the additional trips expected for 2056 (Full Planning Proposal) with the interim parking rate in place, it is expected there could be an additional 18,400 trips in the AM peak and 36,500 trips in the PM peak period. This results in a forecasted vehicle trip rate of approximately 77,700 trips in the AM peak and 132,700 trips in the PM peak. Reverting to the original parking rates would add a further 9,000 trips in the AM peak and 11,800 trips in the PM peak. This represents 8-10% of the overall demand forecasted, and significant additional trips, compared to if the interim parking rate is adopted.

5.9.4 Interim Parking Rate Considerations

Whilst the new policy is effective in reducing the supply of car spaces in new developments, a disadvantage to the policy is its lack of consideration for a residential building's location in relation to its walking distance to the train station, light rail and major bus stops. Even though the aspiration is to move the city toward a less-car dependent future, there will still be users who would be dependent on their cars to perform daily activities for tasks that public transport could not reasonably be considered as an alternative mode. As a result, residents may still want or need to own a car. A blanket parking policy that does not take into account location and distance of the development from transit stops would disproportionately impact such sites making them less attractive to develop at these rates with the likelihood of developers regularly challenging and seeking to provide additional spaces on these sites.

The City of Sydney's parking policy specifies different parking rates for different locations, separated into Categories A, B and C. These have been categorised based on accessibility and transit convenience and defined in their *Land Use and Transport Integration Map*. A similar approach would be considered sensible to fine tune the interim parking rate for the City of Parramatta so that developments on the fringes of the CBD would be allowed to provide more parking spaces compared with those that are located closer to public transport nodes.

5.9.5 Permanent Implication of Interim Parking Rate

The Interim Parking Rate with adjustments for residential and commercial developments and the other land uses detailed in Table A.1 in Appendix A in the City of Parramatta aims to limit the supply of parking spaces within Parramatta CBD, as commercial and high-density residential land use continues to increase. The interim parking policy adopts a similar approach to the City of Sydney parking applying different rates for different locations, separated into Category A and Category B. The allocation of categories is based on proximity to train stations within the vicinity of Parramatta CBD.

Category A includes locations which are:

- Within 800m or a 10-minute walk approximately from Parramatta train station
- Within 800m or a 10-minute walk approximately from the future Metro Station
- Within 400 m or a 5-minute walk approximately from Harris Park train station (no express services)

Other locations at the CBD fringes considered remote from public transport are allocated Category B. These category allocations are shown in Figure 93.



Figure 93: Parramatta Residential Parking Rate Categories

Category A areas adopts a more restrictive maximum parking rate applicable to residential dwellings that are close to train stations and within the proximity of Parramatta CBD. By reducing the maximum parking supply for dwellings within certain walking distance of the train station, residents who live within the walking catchment would be able to get to the station by walking or cycling instead. With the implementation of Sydney Metro West, the future metro station and Parramatta light rail stops, more of the CBD will become accessible by public transport lessening the need to provide parking spaces within residential dwellings that are close to these stations.

Outside of Category A i.e. Category B areas permit a higher rate of on-site parking for residential dwellings. This is due to their greater distances of these sites from the rail station and the commercial core necessitating need for residents to own a car for their daily needs.

The proposed permanent parking rates are shown in Table 25.

Table 25: Proposed Permanent Parramatta Parking Rate

Land Use	Category	Maximum Parking Rate
Residential	Category A	0.1 spaces per studio dwelling 0.3 spaces per 1-bedroom dwelling 0.7 spaces per 2-bedroom dwelling 1 spaces per 3 or more-bedroom dwelling
	Category B	0.2 spaces per studio dwelling 0.4 spaces per 1 bedroom dwelling 0.8 spaces per 2 bedroom dwelling 1.1 spaces per 3 or more bedroom dwelling For each dwelling up to 30 dwellings – 0.167 spaces For each dwelling more than 30 and up to 70 dwellings – 0.1 spaces For each dwelling more than 70 dwellings – 0.05 spaces
Commercial		<p><u>If the Floor Space Ratio (FSR) > 3.5:1</u> $M = (G * A) / (50 * T)$ <i>where:</i> M = maximum number of parking spaces; G = GFA of all office/business premises in the building (m²); A = Site Area (m²); T = Total GFA of all buildings on the site (m²)</p> <p><u>If the FSR <= 3.5:1</u> Office/Business: 1 space / 175 sqm GFA Retail: 1 space / 90 sqm GFA</p>

The permanent implementation of the adjusted interim parking rate policy has the effect of reducing the supply of parking spaces in new developments in the CBD. As population and employment increases over time, this will become increasingly critical to reduce utilisation of private vehicles to lessen the impact on the road network and the need for large scale investment in road infrastructure. The new parking rates would also serve as a driver to encourage greater shift towards sustainable and active transport modes and investment in infrastructure that would support and facilitate the use of these modes providing environmental and amenity benefits key to success of the city going forward.

5.9.6 Parking Price

Higher parking prices can naturally be expected as parking supply decreases in line with adoption of the adjusted interim parking rate. An increase in parking prices is one of the most effective demand management mechanisms to discourage users particularly commuters from driving into the CBD. Drivers are sensitive to pricing and parking fees are found to have a significant impact on vehicle trips. When parking fees increase, vehicle trips generally decrease by the same factor providing an efficient mechanism to reduce congestion and encourage mode shift.

Short stay parking with a high turnover is important to the existing and proposed business and retail developments within the inner core of Parramatta CBD. Parking pricing can prioritise users, encourage turnover of these spaces and encourage non-auto modes as alternative modes of travel the CBD.

The effect of parking pricing and demand response has been well researched. For example, where parking price increases by 20% (TRACE, 1999), there is expected to be a 1.6% reduction in commuting as drivers, and a 0.4% shift to other modes for same commuting trips.

STM modelling suggests an increase of approximately 77,900 daily trips by car by 2026, and 145,200 daily trips by 2036. An increase of 20% in parking fees would have the effect of reducing the growth by 7,200 in 2026 and 9,400 in 2036. By 2036, current projections expect car driver trips to make up 48% of all daily trips. A further 0.9% decrease can be expected if parking price is increased reducing car driver trips to 47.1% of daily trips to/from Parramatta CBD. Increases in car passenger, rail, bus and active transport trips will also be anticipated.

5.9.7 Other Parking and Transport Management Strategies

As parking becomes more stringent and costly, the transit network supporting Parramatta CBD needs to be prioritised in terms of serviceability and capacity. A list of additional strategies suitable for Parramatta CBD have been shown in Table 26.

A key benefit of implementing the new parking policy is that it would reduce the supply of parking within the CBD as residents and workers opt for other modes of transport. Increasing parking fees would also reduce daily vehicle trips and encourage increased mode share of public transport and active transport. Changes are more effective when done in conjunction with other parking and transport management strategies that collectively help to incentivise car users to switch to alternative modes.

Table 26: Parking Management Strategy Implementation

Strategy	Implementation
Parking Regulations	Review parking regulations to prioritize uses, encourage turnover, and encourage mode shifting, particularly for the most convenient spaces.
Improve Enforcement	Improve parking enforcement, so it is effective and customer-focussed in order to reduce parking management problems and build community support. Examples include in-ground parking sensors, using license plate recognition technology etc.
Carpark and Shared Parking	Encourage sharing by limiting on-site supply and relying on public parking facilities provided by the municipal government and commercial operators. Support sharing with a comprehensive parking supply inventory and development of parking brokerage services. Increase car share supply and options in Parramatta CBD. Examples include GoGet, Flexicar and Popcar.
Satellite Parking	Satellite parking refers to parking offers on the edge of the CBD and along public transport routes. Council's 2011 CBD parking strategy identified the need to develop satellite parking stations around the CBD. By encouraging this strategy, it aims to shift long-term parking away from the inner core of the CBD to the periphery.
Smart Parking Systems	Implement smart parking systems in the CBD to help users easily identify where available parking is located and how full the parking stations area. These systems can help mitigate impacts from any parking losses.
Ridesharing and ride-hailing	Continue to improve ridesharing and ride-hailing services into Parramatta CBD. Where demand for services increases, these can convert convenient parking to passenger pickup areas. Examples include general taxi, Uber, Lyft, Ola, Didi etc.
Repurposing Existing Carparks	Repurpose existing parking spaces within Parramatta CBD to reduce carparking supply in existing developments approved under the previous Parking rate.
Transport Demand Strategies	Implement transport demand strategies such as transportation management delivery agencies, commute trip reduction programs and transit-orientated development that encourage travellers to use the most efficient travel option for each trip, considering all impacts.
Active transport	Continue to improve active transport infrastructure, such as footpaths and cycling routes. Improved active transport solutions within the Parramatta CBD will aid in the reduction of congestion within and around Parramatta CBD, leading to enhancement in liveability.
Public Transport	Continue to improve public transit coverage and frequency, particularly serving areas with parking problems. Current projects such as the Sydney Metro West and Parramatta Light Rail will move toward creating a dense, frequent public transport network accessible to the entire CBD. This will allow a reduced time spent on travelling, and encourage users to change to trains, buses and light rail, bringing commuters to work and students to school.
Park and Ride Facilities	Park and ride facilities allow patrons to park their vehicle and ride public transport to complete their journey. Adding park and ride facilities closer to trip origins for Parramatta commuters is likely to encourage patrons to take public transport to reach the CBD, aiding to the reduction of congestion and car use within the CBD.

5.10 CAV Technology

The *Future Transport Technology Roadmap* and *Future Transport Strategy* identify a range of new forms of mobility that may emerge over the next 40 years including Connected and Automated Vehicles (CAVs) and alternatively fuelled vehicles. The roadmap and strategy ensuring that all forms of mobility work together as part of a single transport system by prioritising different forms of mobility based on the function they perform. For example, in busy centres, public transport and walking will be prioritised over CAVs to ensure that customers have efficient and reliable journeys

The emergence of CAV technology has the potential to produce both positive and negative consequences. CAV's are more likely to avoid crashes, significantly improving road safety. Autonomous vehicles could be for private use only or potentially as hire for ride services. This has the potential to increase the efficiency of the road network, with vehicle trips optimised to reduce road network demands. A risk of private ownership is that, to avoid parking fees, vehicles will be sent to other locations or back to the home point to park for free. This could potentially double demands on the road network, reducing pedestrian amenity. Road user pricing reforms are anticipated to mitigate some of this impact. In the context of Parramatta, there is potential that congestion charging could be required in the long term to regulate vehicle demands in the CBD and maintain an amenable environment for pedestrian.

6.0 Applying the Vision – How Do We Get There?

The Parramatta CBD Planning Proposal should be supported by transport measures that aim to ensure as population and employment increases, the transport system will keep up and continue to support and service the community efficiently. As shown in the modelling analysis, the growth in trips to/from Parramatta from the LEP cannot be accommodated in private vehicle trips. As users are encouraged to shift away from car mode share to walking/cycling and public transport, demand for these modes increases and will require additional infrastructure and improvements to cater for this demand.

It is important to integrate Parramatta’s transport network and provide the appropriate level of transport service for all who want to travel to, from or within Parramatta. This will ensure its growth from the planning proposal is enabled and activated by transport options, rather than constrained by it.

This section will explore the transport planning thinking and alignment of the NSW Government’s and Council’s vision to be Sydney’s Central City, sustainable, liveable, and productive. For each mode of transport, the overall objectives are outlined and the short, medium and long-term projects that are essential to shape the desired Parramatta of the future.

The key transport goals and associated benefits from addressing the transport issues that will face Future Parramatta are listed below:



Productive Economy

An improved transport network enables economic activity, trains and buses bring commuters to work and students to school, and trade vehicles deliver services to households and businesses.



Liveable Community

Transport is a ‘placemaker’. It can transform the public domain, activate centres and unlock new activity.
Transport can also generate new commercial and housing developments and renew existing neighbourhoods and spaces.



Sustainable Society

Long term planning will ensure we deliver more with less, maximise the benefits of planned investment, and improve the emissions intensity and environmental costs imposed by the transport system.

6.1 General Solutions

This ITP is a strategic document, developed to support consideration of the CBD Planning Proposal. While the ITP shows how active, public and road transport can support planned development in the CBD, as a strategic document, it does not go into the detail of how and when transport improvements will be developed. Council and the State have joint responsibilities for transport in the CBD. Council and Transport for NSW should work together to refine the improvements identified in the ITP and identify the future transport provision for the CBD. An early output of this collaboration should be a Parramatta CBD Access Strategy which guides the planning, design, and implementation of transport infrastructure and services in Parramatta CBD.

Table 27: Recommended general actions

Timeframe	Recommended Action	Responsibility
Short	G1 Council and State Government will coordinate and collaborate on implementation of the ITP and other plans for transport improvements serving Parramatta CBD.	City of Parramatta, TfNSW
Short	G2 Council and the State Government will collaborate to prepare an Access Strategy for the Parramatta CBD.	City of Parramatta, TfNSW

6.2 Travel Demand Management Solutions

Travel demand management solutions can better utilise existing infrastructure, either using advanced technology, or by modifying travel decisions and driver behaviour. The range of applications for technology-enabled solutions is broad, spanning from optimising available capacity and making more efficient use to better network flows. The implementation of localised travel demand management strategies is vital to successfully ensure that Parramatta can accommodate the growing demand.

The recommended travel demand management actions for Parramatta CBD are provided in Table 28. Mode-specific travel demand management actions are discussed in their associated mode section.

Table 28: Recommended actions to improve travel demand management

Timeframe	Recommended Action	Responsibility
Short	TD1 Establish Travel Choices for Parramatta CBD to manage transport and parking and encourage reduction in car trips contingent upon identification of funding, resourcing, governance and delivery arrangements	TfNSW

6.3 Walking and Cycling Solutions

Improved walking and cycling within the Parramatta CBD will lead to a more sustainable society through improved public health outcomes, prioritise emissions and reducing environmental costs. In addition, it will aid in the reduction of congestion within and around Parramatta CBD leading to enhancement in liveability. To achieve this, several strategies have been identified to improve active transport:

- Promote cycling as a means of accessing the CBD,
- Improve the walking experience to help achieve a mind shift towards walking in the city,
- Promote active transport trips within a 10km radius of the CBD.

To implement the active transport strategies, recommended actions have been outlined in Table 29.

Table 29: Recommended actions to improve active transport

Timeframe	Recommended Action	Responsibility
Short	WC1 Update requirements in DCP for end of trip facilities and bike parking in all new buildings	City of Parramatta
	WC2 Encourage bike share and micro mobility schemes for residents, employees and visitors for short trips	City of Parramatta
	WC3 Deliver pedestrian prioritisation, safety and amenity measures such as street trees, lighting, additional crossing locations, shared zones and signal priority	City of Parramatta, TfNSW
	WC4 Deliver dedicated cycling infrastructure within the Parramatta CBD that connects to the Principal Bicycle Network	City of Parramatta, TfNSW
	WC5 Prioritise high quality pedestrian infrastructure that aligns with Parramatta Ways and other key walking routes within 2km of CBD	City of Parramatta, TfNSW
	WC6 Pedestrian modelling of demand in the CBD needs to consider Civic Link, Light Rail and Metro West	TfNSW
Medium	WC7 Develop the Principal Bicycle Network to fill existing gaps, focusing on dedicated infrastructure to and within the CBD	City of Parramatta, TfNSW
	WC8 Provide sufficient footpaths to accommodate forecast increased pedestrian movements as density increases	City of Parramatta
	WC9 Implement infrastructure that supports, and investigate means to further improve and widen coverage of 40km/h zones within and surrounding the CBD.	City of Parramatta

6.4 Public Transport Solutions

Public transport improvements will form the foundation of a successful transport outcome for Parramatta CBD. An efficient public transport network enables economic growth, with trains and buses bringing commuters to work and students to school. Reduced time spent on travelling,

particularly for their commute to work, will increase people’s access to jobs and business’ access to workers. Options for 24-hour transport, on-demand technology and fleet roll out can contribute to an improved public transport network.

To achieve this, strategies identified to improve public transport:

- Work with NSW and Federal Government to plan a rail network for the future of Western Sydney, including the ‘Central City’, to support a growing distribution of jobs and services and move from a radial system to a connected system.
- Create a dense, frequent public transport network accessible to the entire CBD.

To implement the strategies, a list of recommended public transport solutions is described in Table 30.

Table 30: Recommended actions to improve public transport

Timeframe	Recommended Action	Responsibility
Short	PT1 Address existing and forecast capacity issues along the T1 Western Line and improve service along the T5 Cumberland Line	TfNSW
	PT2 Consider the need for, and plan for additional railway stations in the CBD to offer additional travel options from broader areas to the CBD and address future level of demand	TfNSW
	PT3 Investigate feasibility of prioritizing the potential for travel by rail to the CBD from other existing or new demand market include: <ul style="list-style-type: none"> ▪ Planned growth areas to the east such as the Greater Parramatta to Olympic Peninsula and the Bays Precincts, including via the Sydney Metro West ▪ Western Sydney Airport ▪ North West and South West Growth Centres ▪ Parramatta to Epping mass transit ▪ Parramatta to Kogarah mass transit ▪ Parramatta to Norwest 	TfNSW
	PT4 Work with NSW government to investigate the prioritization of on-street public transport services and to investigate new bus layover areas	TfNSW
	PT5 Secure surface and underground corridor protection for future public transport services	TfNSW
	PT6 Improve the coverage, frequency and accessibility of the public transport network	TfNSW
	PT7 Upgrade Parramatta Interchange to ensure a streamlined multi-modal network	TfNSW
	PT8 Improve intermodal transfers by linking up bus, train and light rail services with pedestrian and cycling infrastructure at key points.	TfNSW
	PT9 Include more buses along road corridors that have roads with VC > 1	TfNSW

Timeframe	Recommended Action	Responsibility
Long	PT10 Implement initiatives as indicated in the Western Sydney Rail Needs Scoping Study and Future Transport 2056, as well as future stages of the Parramatta Light Rail.	TfNSW

6.5 Road Solutions

Road infrastructure solutions involve adding, improving or changing current road infrastructure. The road network within Parramatta CBD needs to support the use of alternative transport modes, prioritise the safety of users, allow for future growth and use existing infrastructure efficiently to reduce peak congestion. Peak congestion periods on the road network should be addressed through a demand management approach, to better utilise the existing network. Implementation of the movement and place typology as discussed in *Future Transport Strategy* for Parramatta CBD will also aid in the CBD becoming a space for people. The setting of speed limits should consider safety of the most vulnerable road users in the first instance, then the road hierarchy and its purpose.

Recommended actions to improve the road network are outlined in Table 31.

Table 31: Recommended actions to improve road network

Timeframe	Recommended Action	Responsibility
Short	RN1 Utilise movement and place analysis to understand the needs of road links that comprise Parramatta CBD	City of Parramatta, TfNSW
	RN2 Maintain working mesoscopic and/or microsimulation models of the CBD network for ongoing evaluation and testing of the road network as it evolves	City of Parramatta, TfNSW
Medium	RN3 Upgrade key intersections to improve access to Parramatta CBD, including key intersections along Great Western Highway, and Woodville Road/Parramatta Road/Church Street	TfNSW
	RN4 Investigate increasing capacity and targeted improvements on key corridors such as James Ruse Drive, Victoria Road and Great Western Highway	TfNSW
	RN5 Undertake periodic optimisation of traffic signals, providing modal priority in line with the M&P aspiration	TfNSW
	RN6 Inform motorist of real time travel information including traffic conditions and travel time to a range of destinations through dynamic signage	TfNSW
	RN7 Implement Local Area Traffic Management measures in the local road networks within and around Parramatta CBD	TfNSW

6.6 Freight and Servicing Solutions

Freight and servicing solutions that allow trade vehicles to deliver services to households and businesses in shorter, more direct lines allow for a productive economy and liveable community. As

Parramatta CBD grows, there will be increasing daily challenges and inefficiencies for freight delivery. Therefore, implementation of a last kilometre freight plan, as well as upgrades for freight access to the CBD are crucial for the success of Parramatta.

Recommended actions to improve the freight and servicing are outlined in Table 32.

Table 32: Recommended actions to improve freight and servicing

Timeframe	Recommended Action	Responsibility
Short	FS1 Investigate freight transport management strategies to increase efficiency in and to Parramatta CBD, and the suitability of loading zones for 24-hour freight and logistics	City of Parramatta, TfNSW
	FS2 Develop a last kilometre freight plan to identify the actions to ensure last kilometre freight is considered as Parramatta CBD grows and changes	City of Parramatta, TfNSW
	FS3 Update controls in DCP to ensure new developments within the CBD consider loading/service facilities.	City of Parramatta

6.7 Private Vehicles and Parking Solutions

Combined with the promotion and support of walking, cycling and public transport, private vehicle use will need to be appropriately discouraged to ensure the CBD and surrounding road network can function as the city densifies. In this ITP, parking has been optimised as an area that requires management strategies that can aid in the reduction of private vehicle use. Such measures encourage a more attractive and vibrant public domain. Strategies identified to improve parking in Parramatta CBD include:

- Encourage behaviours that optimize the use of existing infrastructure, such as promoting car sharing initiatives,
- Promote modal shift towards public transport,
- Implement measures to reduce the number of cars travelling through Parramatta and the surrounding districts,
- Manage parking to meet community goals without increasing traffic

The City of Parramatta has reduced its parking rate requirements as an effective instrument to reduce the traffic impact on the network. Additional parking provisions and management strategies should be implemented to continue the development and support of sustainable transport.

Recommended actions to reduce private vehicle use are outlined in Table 33.

Table 33: Parking Vehicle and Parking Actions

Timeframe	Recommended Action	Responsibility
Short	PV1 Promote car sharing initiatives	City of Parramatta

Timeframe	Recommended Action		Responsibility
	PV2	Implement efficient parking management strategies that encourage more efficient use of parking facilities	City of Parramatta
	PV3	Investigate feasibility of additional park and ride facilities at appropriate existing and future public transport stops and stations outside of CBD with an attractive fare policy	City of Parramatta, TfNSW
	PV4	Permanently adopt the parking rates proposed in the ITP, and review public car parking fees, including early bird rates and evening rates	City of Parramatta
Medium	PV5	Continue to increase parking space provisions dedicated to electric vehicles and car share schemes	City of Parramatta

6.7 Alignment with Objectives

Each action and strategy align with objectives set out for this ITP. They can be found in Table 35.

Table 34: ITP Objectives

Objectives	
1	Deliver Parramatta Light Rail and Sydney Metro West, and planning for the future transport network
2	Improve existing train and bus links to extend the 30-minute catchment for transport access to Parramatta CBD
3	Adopt forward-looking policies, demand responsive services and innovative technologies that deliver transport solutions faster, and/or lower cost
4	Prioritise delivering walking and cycling improvements and supporting access within a 30-minute walk and ride of the CBD.
5	Align transport improvements with land use change to maximise the use of new services and sustainable transport mode share among new workers and residents
6	Identify and deliver targeted improvements to the road network to improve network capacity, and where necessary manage private vehicle trips to maximise the efficiency of the surface road
7	Leverage transport demand management techniques proven in the Sydney context, to maximise the efficiency of all transport modes in the network.

Table 35: Actions and objectives matching matrix – greater Parramatta level

	Alignment with Objectives						
	1	2	3	4	5	6	7
G1							
G2							
TD1							
WC1							
WC2							
WC3							
WC4							
WC5							
WC6							
WC7							
WC8							
WC9							
PT1							
PT2							
PT3							
PT4							
PT5							
PT6							
PT7							
PT8							
PT9							
PT10							
RN1							
RN2							
RN3							
RN4							
RN5							
RN6							
RN7							
FS1							
FS2							
FS3							
PV1							
PV2							
PV3							
PV4							
PV5							

6.8 Summary of Actions

Table 36 brings together the recommended projects and initiatives across modes.

Table 36: Summary of Actions across Modes

Recommended Action	Timeframe	Responsibility
G1 Council and State Government will coordinate and collaborate on implementation of the ITP and other plans for transport improvements serving Parramatta CBD.	Short	City of Parramatta, TfNSW
G2 Council and the State Government will collaborate to prepare an Access Strategy for the Parramatta CBD.		
TD1 Establish Travel Choices for Parramatta CBD to manage transport and parking and encourage reduction in car trips contingent upon identification of funding, resourcing, governance and delivery arrangements	Short	TfNSW
WC1 Update requirements in DCP for end of trip facilities and bike parking in all new buildings	Short	City of Parramatta
WC2 Encourage bike share and micro mobility schemes for residents, employees and visitors for short trips		
WC3 Deliver pedestrian prioritisation, safety and amenity measures such as street trees, lighting, additional crossing locations, shared zones and signal priority		City of Parramatta, TfNSW
WC4 Deliver dedicated cycling infrastructure within the Parramatta CBD that connects to the Principal Bicycle Network		
WC5 Prioritise high quality pedestrian infrastructure that aligns with Parramatta Ways and other key walking routes within 2km of CBD		
WC6 Pedestrian modelling of demand in the CBD needs to consider Civic Link, Light Rail and Metro West		TfNSW
WC7 Develop the Principal Bicycle Network to fill existing gaps, focusing on dedicated infrastructure to and within the CBD	Medium	City of Parramatta, TfNSW
WC8 Provide sufficient footpaths to accommodate forecast increased pedestrian movements as density increases		City of Parramatta
WC9 Implement infrastructure that supports and investigate means to further improve and widen coverage of 40km/h zones within and surrounding the CBD.		
PT1 Address existing and forecast capacity issues along the T1 Western Line and improve service along the T5 Cumberland Line	Short	TfNSW
PT2 Consider the need for, and plan for additional railway stations in the CBD to offer additional travel options from broader areas to the CBD and address future level of demand		
PT3 Investigate feasibility of prioritizing the potential for travel by rail to the CBD from other existing or new demand market include: <ul style="list-style-type: none"> Planned growth areas to the east such as the Greater Parramatta to Olympic Peninsula and the Bays Precincts, including via the Sydney Metro West Western Sydney Airport North West and South West Growth Centres Parramatta to Epping mass transit Parramatta to Kogarah mass transit Parramatta to Norwest 		
PT4 Work with NSW government to investigate the prioritization of on-street public transport services and to investigate new bus layover areas		
PT5 Secure surface and underground corridor protection for future public transport services		
PT6 Improve the coverage, frequency and accessibility of the public transport network	Medium	TfNSW
PT7 Upgrade Parramatta Interchange to ensure a streamlined multi-modal network		
PT8 Improve intermodal transfers by linking up bus, train and light rail services with pedestrian and cycling infrastructure at key points.		
PT9 Include more buses along road corridors that have roads with VC > 1		
PT10 Implement initiatives as indicated in the <i>Western Sydney Rail Needs Scoping Study</i> and <i>Future Transport 2056</i> , as well as future stages of the Parramatta Light Rail.	Long	TfNSW
RN1 Utilise movement and place analysis to understand the needs of road links that comprise Parramatta CBD	Short	City of Parramatta, TfNSW

Recommended Action		Timeframe	Responsibility
RN2	Maintain working mesoscopic and/or microsimulation models of the CBD network for ongoing evaluation and testing of the road network as it evolves		
RN3	Upgrade key intersections to improve access to Parramatta CBD, including key intersections along Great Western Highway, and Woodville Road/Parramatta Road/Church Street	Medium	TfNSW
RN4	Investigate increasing capacity and targeted improvements on key corridors such as James Ruse Drive, Victoria Road and Great Western Highway		
RN5	Undertake periodic optimisation of traffic signals, providing modal priority in line with the M&P aspiration		
RN6	Inform motorist of real time travel information including traffic conditions and travel time to a range of destinations through dynamic signage		
RN7	Implement Local Area Traffic Management measures in the local road networks within and around Parramatta CBD		
FS1	Investigate freight transport management strategies to increase efficiency in and to Parramatta CBD, and the suitability of loading zones for 24-hour freight and logistics	Short	City of Parramatta, TfNSW
FS2	Develop a last kilometre freight plan to identify the actions to ensure last kilometre freight is considered as Parramatta CBD grows and changes		City of Parramatta
FS3	Update controls in DCP to ensure new developments within the CBD consider loading/service facilities.		
PV1	Promote car sharing initiatives	Short	City of Parramatta
PV2	Implement efficient parking management strategies that encourage more efficient use of parking facilities		City of Parramatta, TfNSW
PV3	Investigate feasibility of additional park and ride facilities at appropriate existing and future public transport stops and stations outside of CBD with an attractive fare policy		City of Parramatta
PV4	Permanently adopt the parking rates proposed in the ITP, and review public car parking fees, including early bird rates and evening rates		
PV5	Continue to increase parking space provisions dedicated to electric vehicles and car share schemes	Medium	City of Parramatta

6.9 Taking the Vision Forward

The development and actions outlined in this ITP responds to major transport and parking challenges, driven by substantial growth forecast in the residential population and jobs within the Parramatta CBD by 2056. When taking the vision forward, consideration for how the whole network functions needs to be accounted for. The transport network objectives are designed to protect and enhance the characteristics of Parramatta CBD and build on these as the city continues to grow and develop in the future. Strong transport capacity and connections will be crucial for the success of Parramatta CBD in its role as the Metropolitan Centre for the Central City.

The direction outlined in this ITP supports the Parramatta CBD Planning Proposal, by providing a strategic plan to manage the existing and future sustainable transportation needs of Parramatta CBD. The planned growth on the network can be accommodated by:

- Improvements to the public transport network on high trip corridors
- Delivery of walking and cycling infrastructure to cost-effectively shift trips within 30 minutes of the CBD
- Targeted upgrades of the road network to ensure maximized use of the existing road network
- Application of proven TDM to ensure the most efficient use of resources and road space allocation

Monitoring the success of the ITP is critical to supporting the development of Parramatta CBD. In this regard, the following measures are proposed to ensure that progress against the vision of the ITP is tracked:

- **ITP Review:** Ongoing review of the recommendations is important to ensure that they accurately reflect the latest population and development projections, and adjustments are made as necessary to ensure they remain relevant
- **Project delivery and coordination:** Ongoing monitoring of the delivering of ITP actions is required to measure progress against the vision and ensure consistency of purpose across the range of Council planning and policy documents and objectives
- **Monitoring impacts of projects:** Regular monitoring of mode share, travel behaviour and assessment of how the ITS strategies will be achieved is necessary to understand the impact and relevance of the ITP, and make changes or adjustments as necessary,

In addition to these measures, the following should be considered by the City of Parramatta:

- Continue to engage with TfNSW and other NSW Government partners to progress the actions
- Continue to monitor development approvals and activity in the Parramatta CBD study area, to capitalise on any opportunities that may arise through private sector development.

Appendix A. Parking Rates

Table A.1: Full parking rates (Source: Clause 7.3 (5) – Maximum parking rates, CoP Potential Draft LEP Provisions – Guide Only)

Proposed Use	Maximum number of parking spaces
Business premises and office premises	(a) A maximum of 1 car parking space to be provided for every 175 square metres of gross floor area where the building is on land which has a floor space ratio of no more than 3.5:1, or (b) For buildings on land where the floor space ratio is greater than 3.5:1, the following formula is to be used: $M = (G \times A) \div (50 \times T)$ where: M is the maximum number of car parking spaces, and G is the gross floor area of all business premises and office premises in the building in square metres, and A is the site area in square metres, and T is the total gross floor area of all buildings on the site in square metres.
Centre-based childcare facilities	A maximum of 1 car parking space plus 1 space per 100 square metres of gross floor area.
Dwelling houses, attached dwellings and semi-detached dwellings	A maximum of 1 car parking space for each dwelling.
Health consulting rooms and medical centres	A maximum of 2 car parking spaces to be provided per consulting room.
Hotel or motel accommodation and serviced apartments	A maximum of: (a) 1 car parking space for every 4 bedrooms up to 100 bedrooms, and (b) 1 car parking space for every 5 bedrooms above 100 bedrooms.
Information and education facilities	A maximum of 1 car parking space for every 200 square metres of gross floor area
Light industries	A maximum of 1 parking space to be provided for every 150 square metres of gross floor area.
Places of public worship and entertainment facilities	A maximum of: (a) 1 space for every 10 seats, or (b) 1 space for every 30 square metres of the gross floor area, whichever is the greater
Residential flat buildings, dual occupancies and multi dwelling housing	A maximum of: (a) 0.1 car parking spaces for each studio dwelling, and (b) 0.3 car parking spaces for each 1 bedroom dwelling, and (c) 0.7 car parking spaces for each 2 bedroom dwelling, and (d) 1 car parking space for 3 or more bedroom dwelling.
Retail premises	In the case of a building that has less than 2000 square of retail premises: (a) A maximum of 1 car parking space to be provided for every 90 square metres of gross floor area where the building is on land which has a floor space ratio of no more than 3.5:1, or (b) For buildings on land where the floor space ratio is greater than 3.5:1, the following formula is to be used: $M = (G \times A) \div (50 \times T)$ where: M is the maximum number of car parking spaces, and G is the gross floor area of all retail premises in the building in square metres, and A is the site area in square metres, and T is the total gross floor area of all buildings on the site in square metres.

Note. For any land uses that are not specified in the table above, a Parking and Access Report is to be supplied in accordance with the requirements in the Parramatta Development Control Plan.

Appendix B. Aimsun Modelling

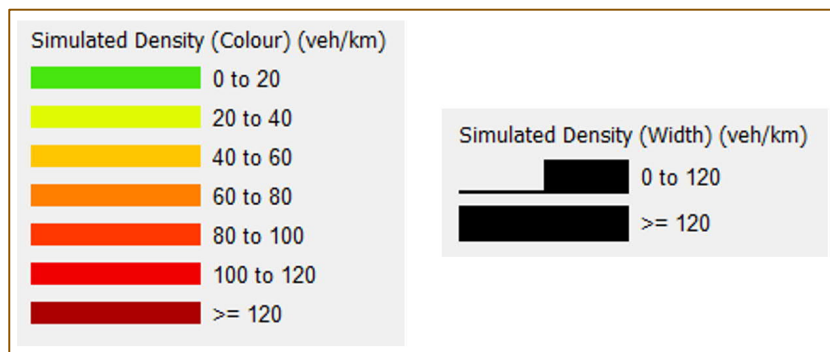


Figure B.1: Key for Density plots

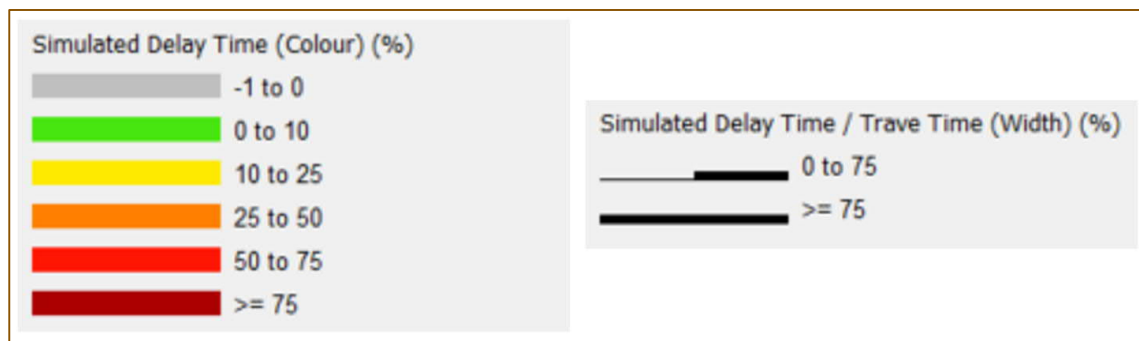


Figure B.2: Key for Simulated Delay Time plots

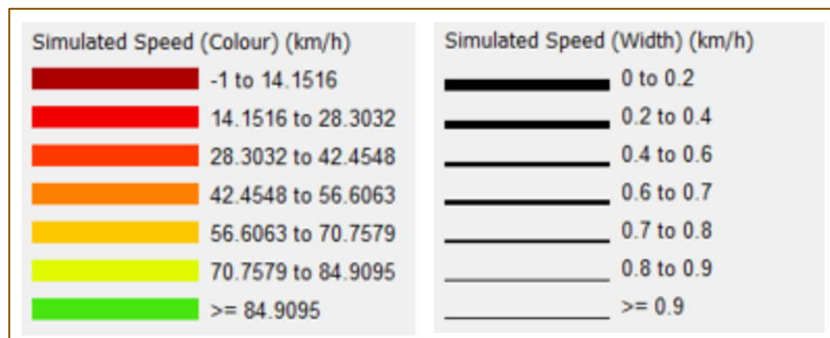


Figure B.3: Key for Simulated Speed plots

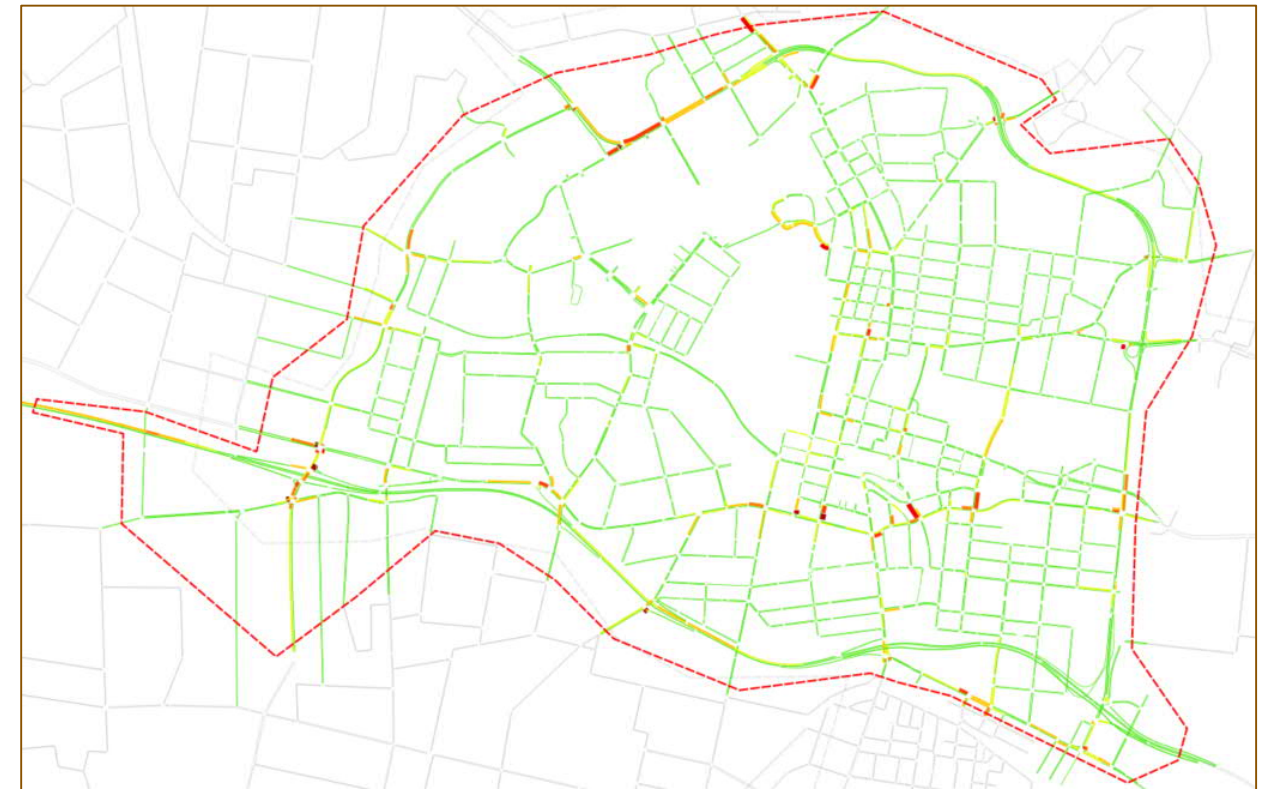


Figure B.4: 2026 Density plot, 7:45-8:00 AM

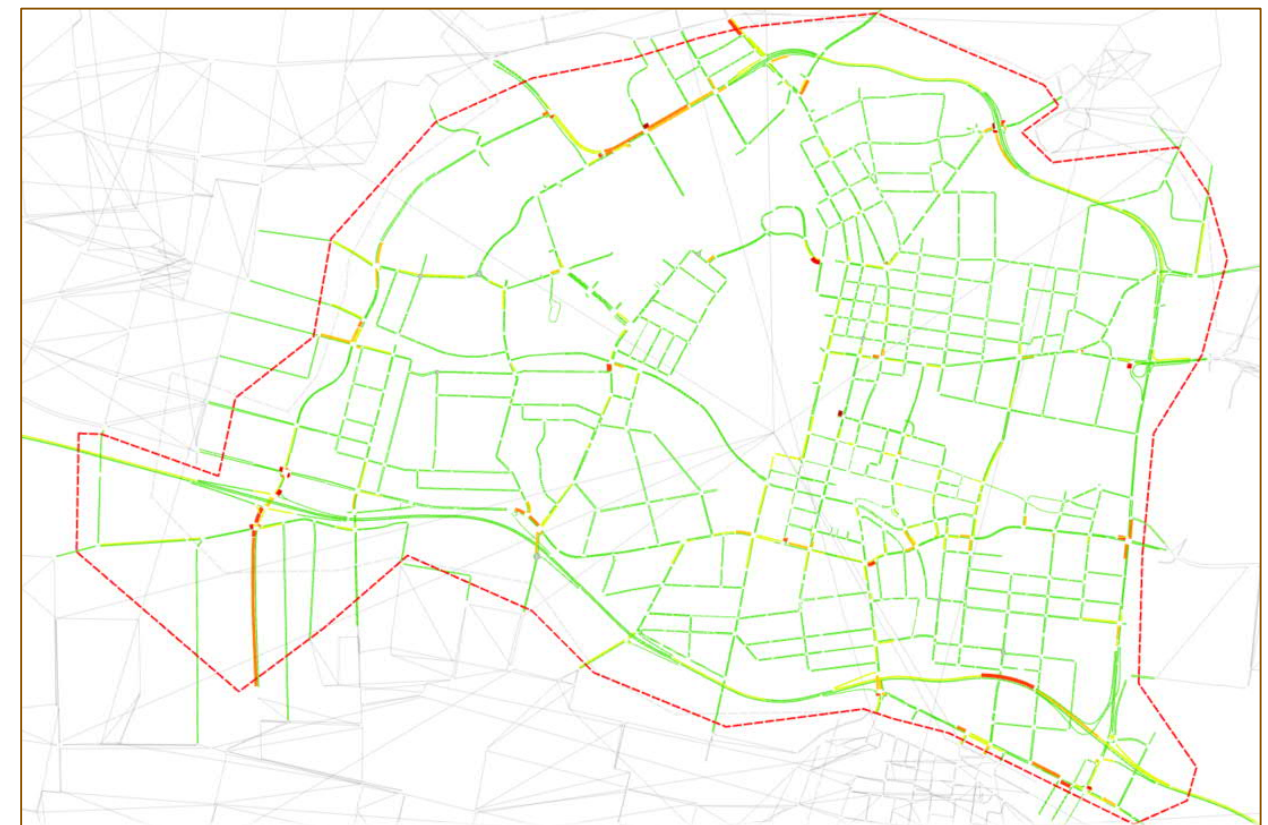


Figure B.5: 2016 Density plot, 7:45-8:00 AM

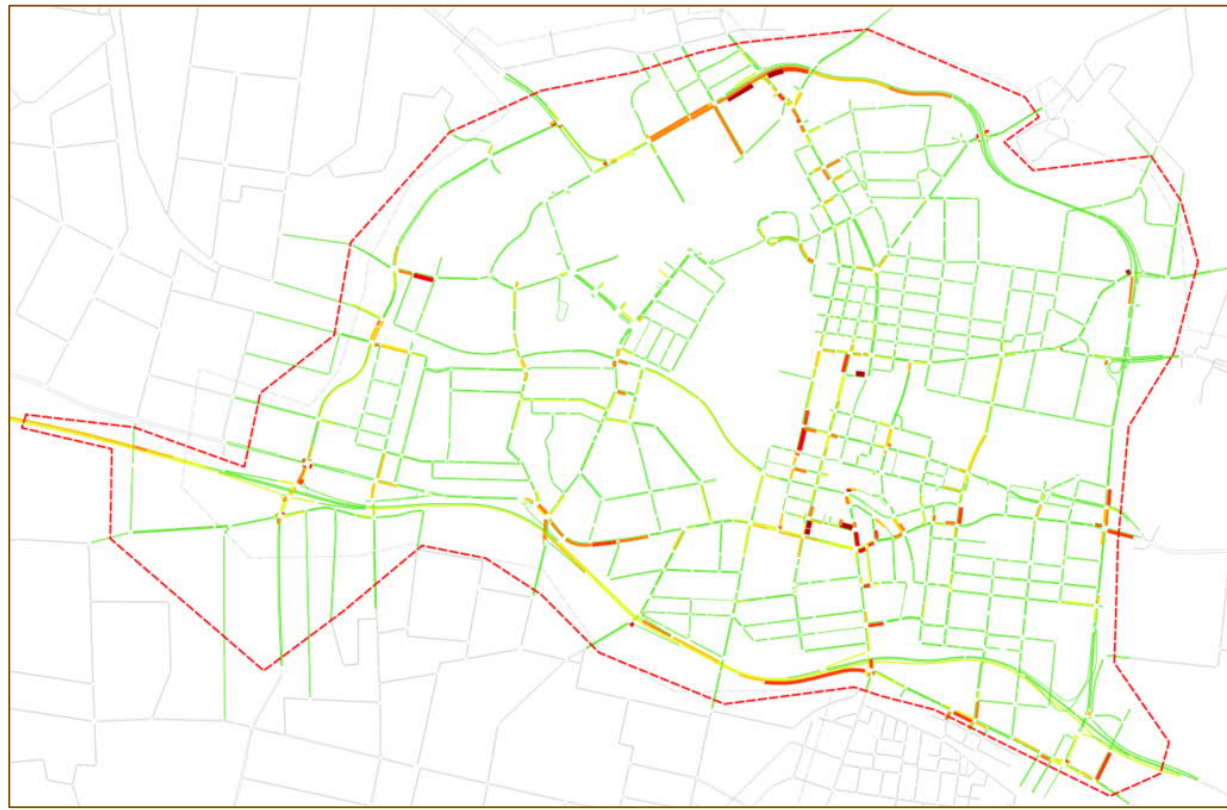


Figure B.6: 2026 Density plot, 4:45-5:00 PM

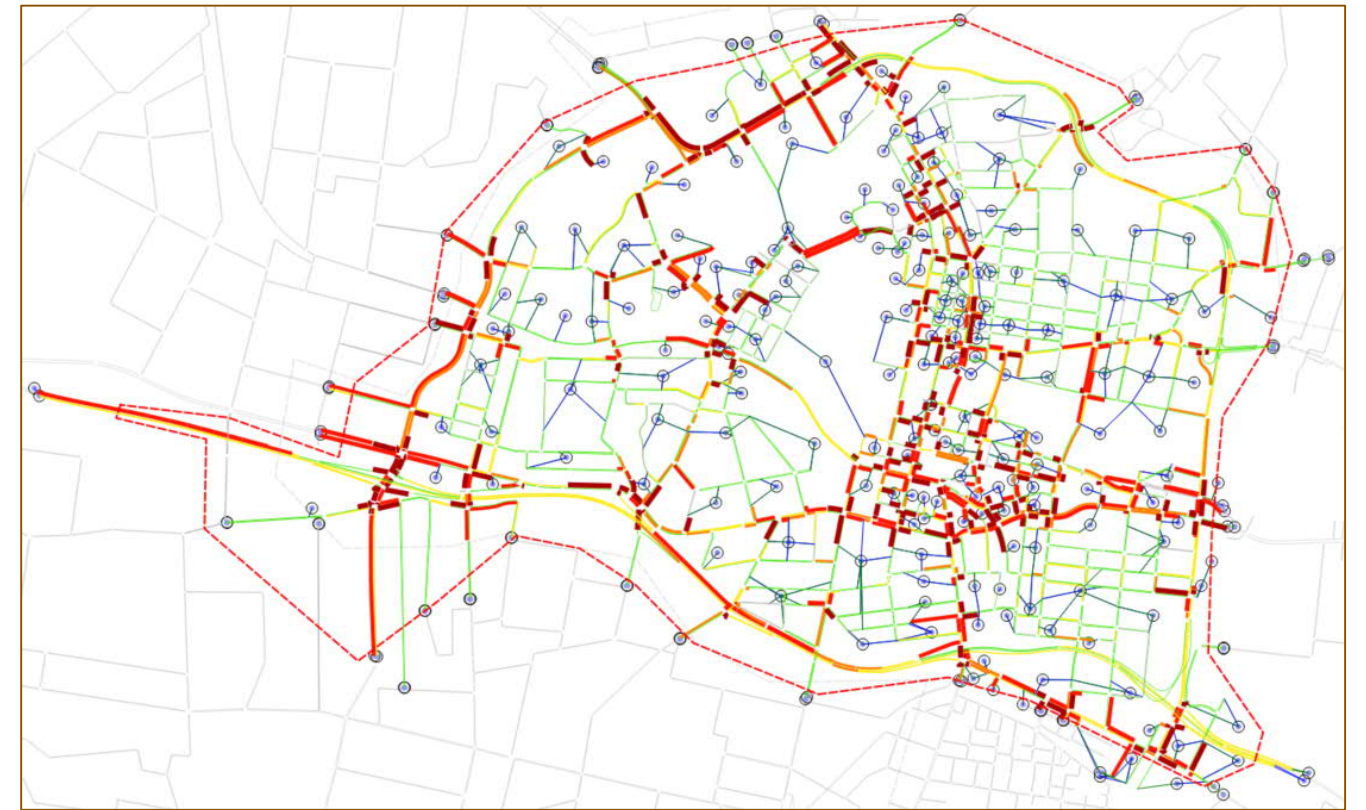


Figure B.8: 2026 Simulated Delay Time plot, 8:00-9:00 AM

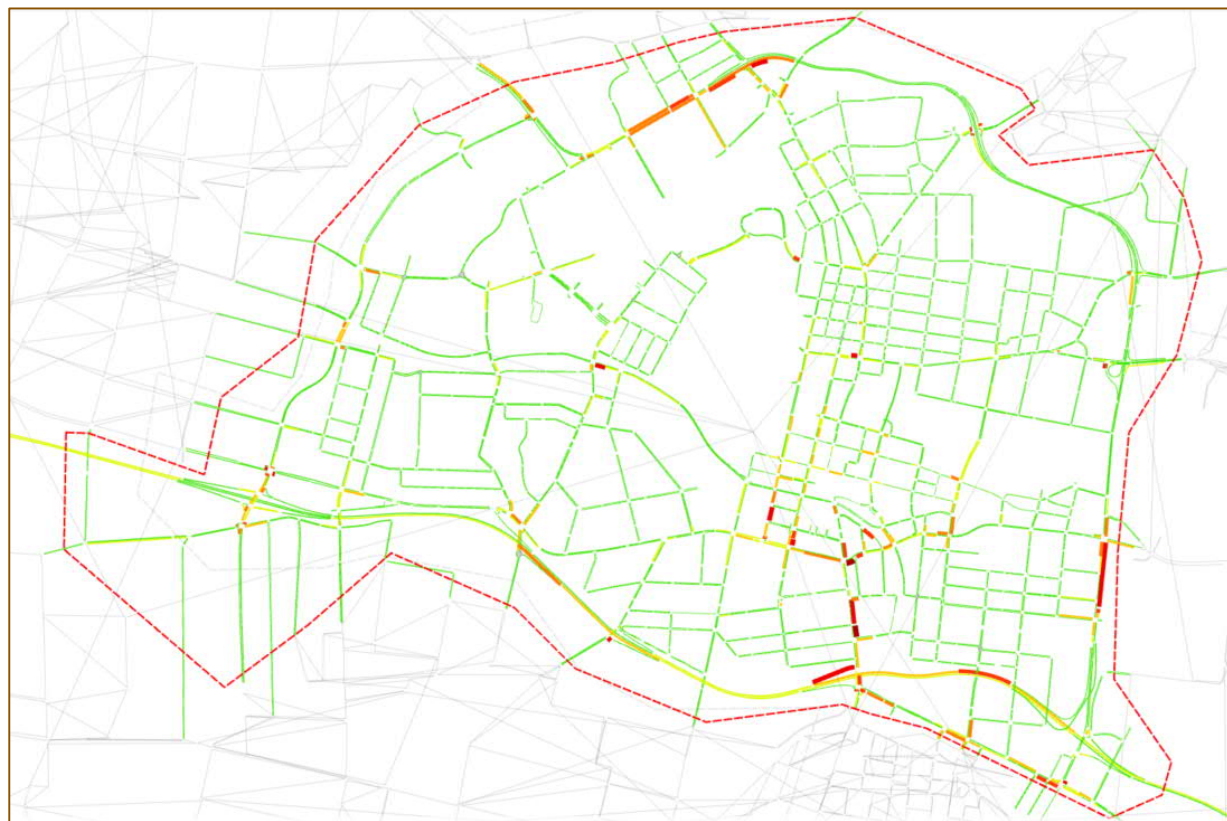


Figure B.7: 2016 Density plot, 4:45-5:00 PM

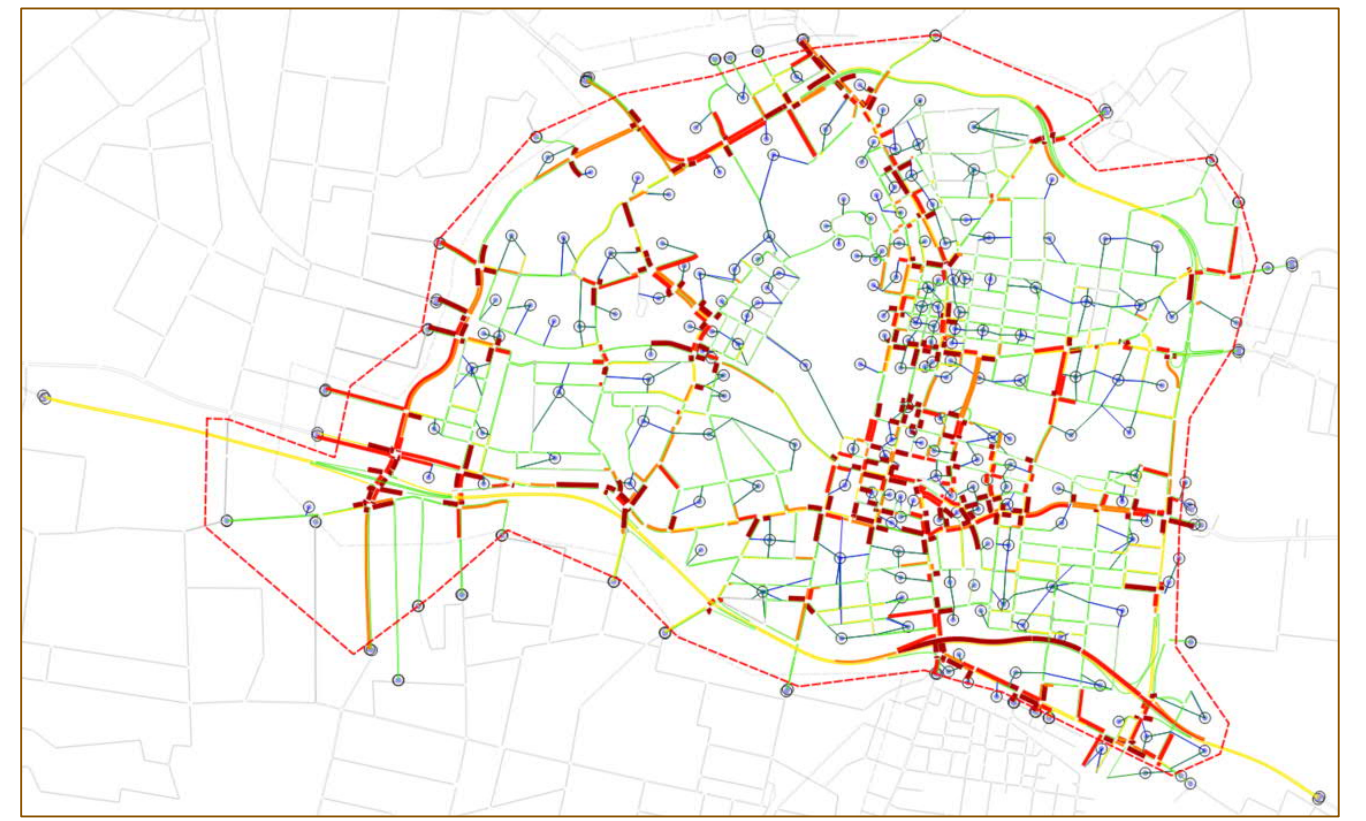


Figure B.9: 2016 Simulated Delay Time plot, 8:00-9:00 AM

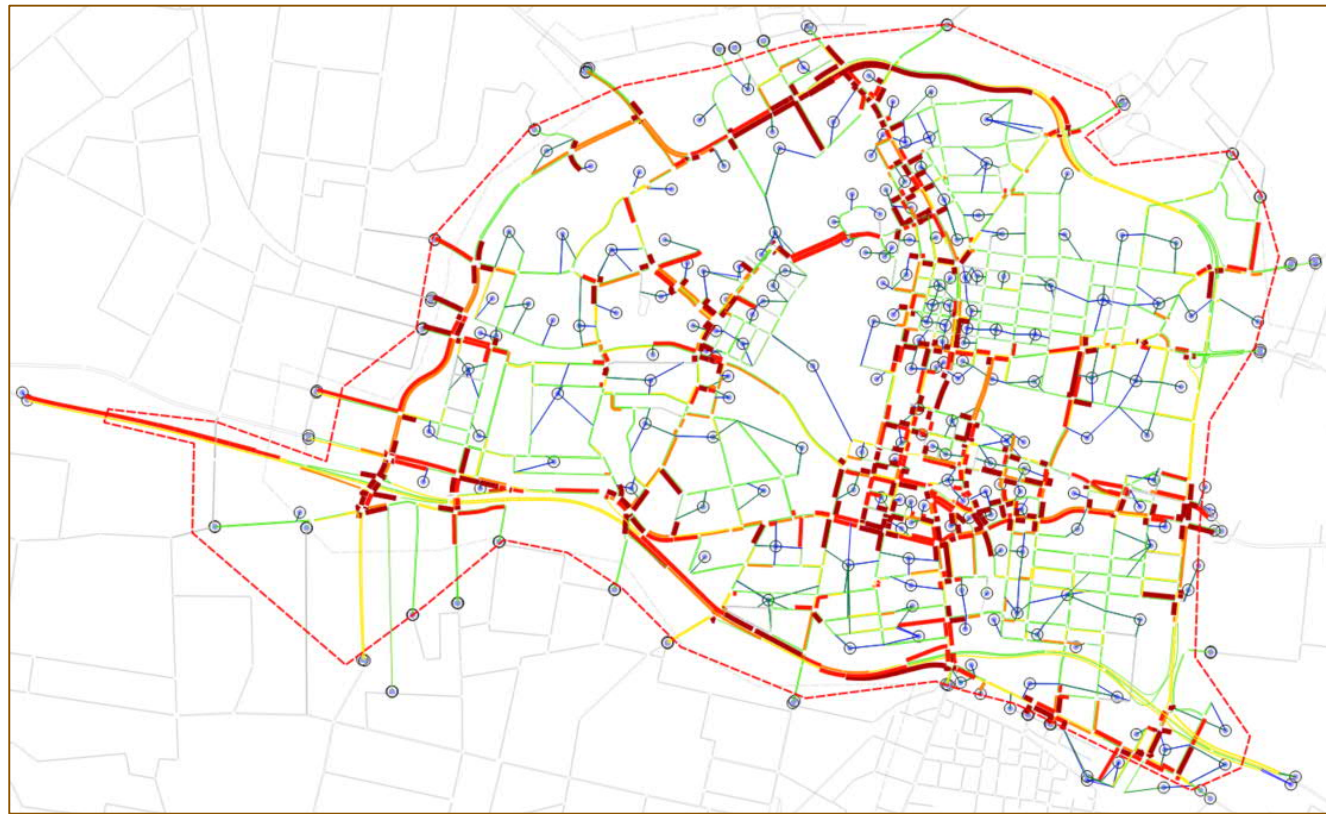


Figure B.10: 2026 Simulated Delay Time plot, 5:00-6:00 PM

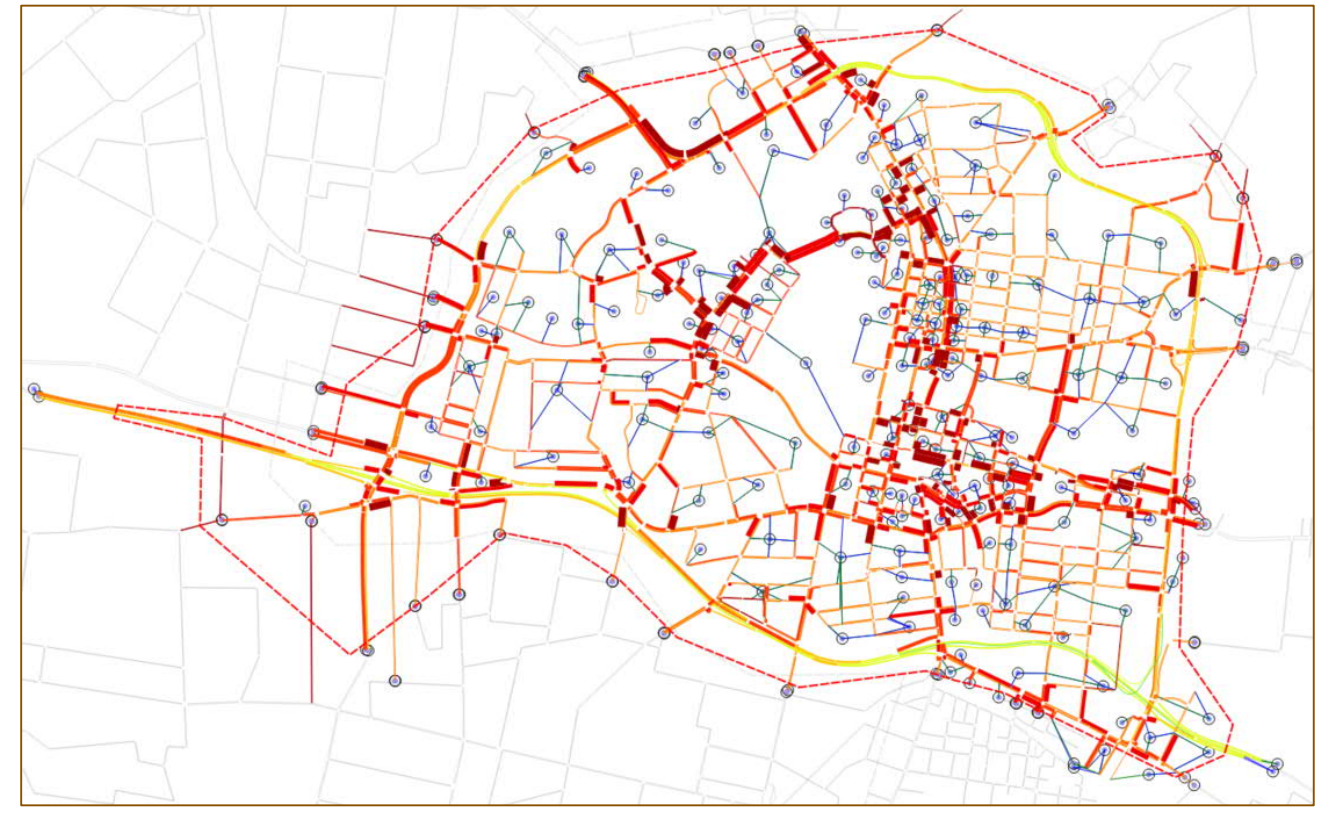


Figure B.12: 2026 Simulated Speed plot, 8:00-9:00 AM

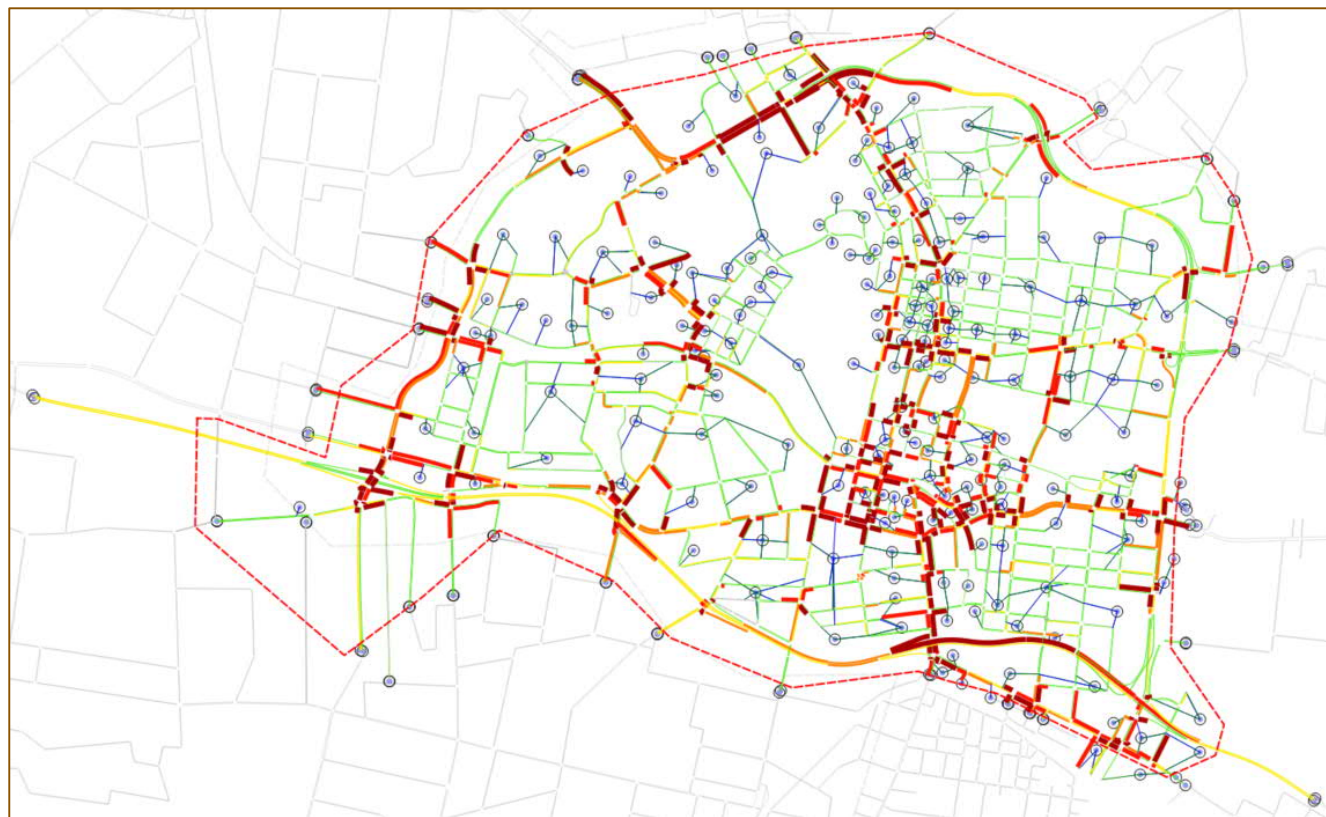


Figure B.11: 2016 Simulated Delay Time plot, 5:00-6:00 PM

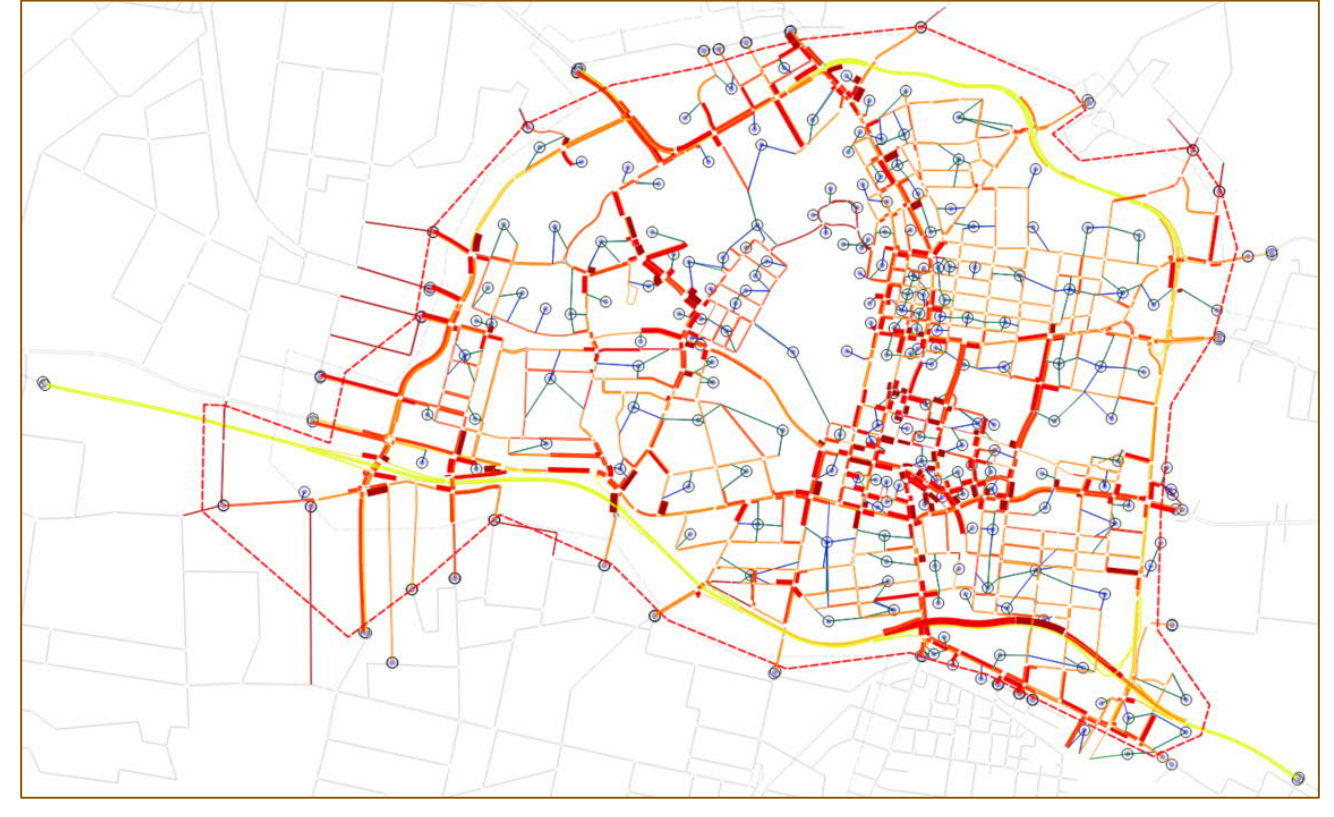


Figure B.13: 2016 Simulated Speed plot, 8:00-9:00 AM

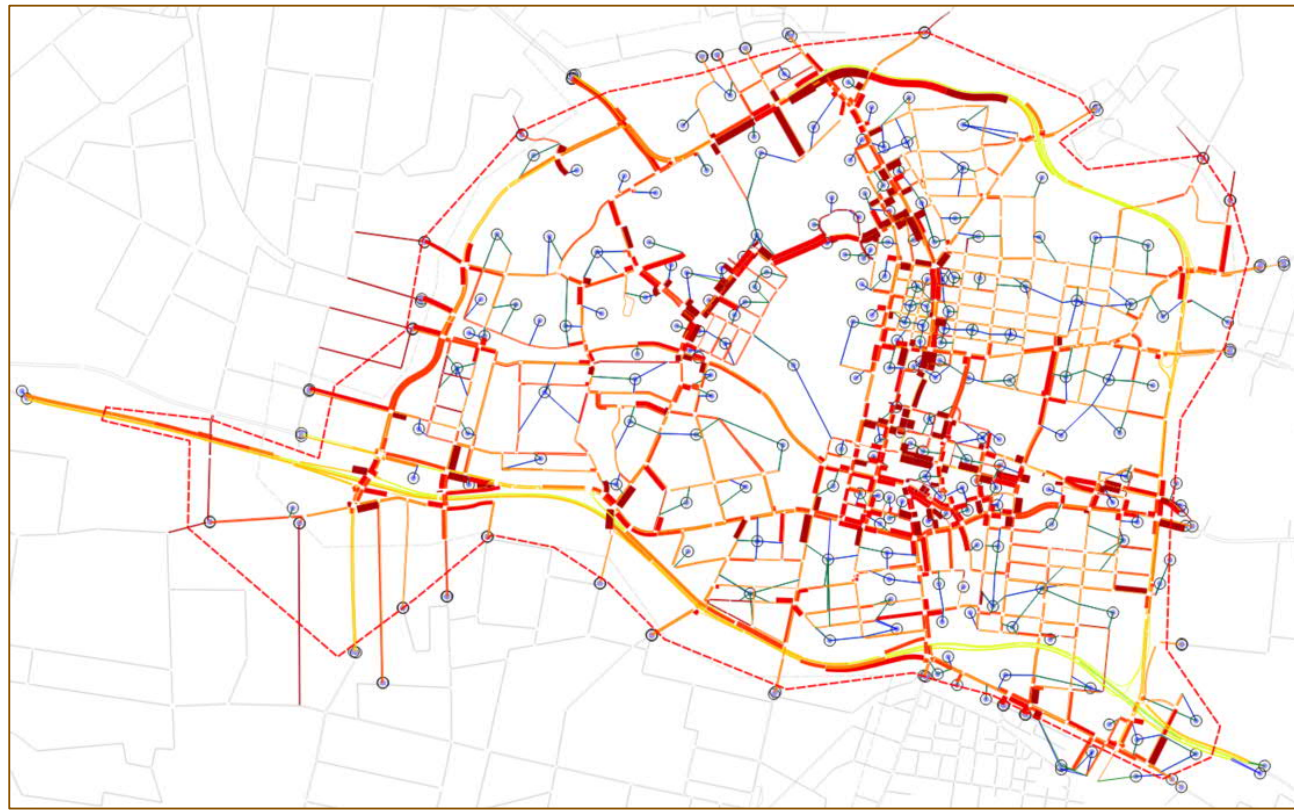


Figure B.14: 2026 Simulated Speed plot, 5:00-6:00 PM

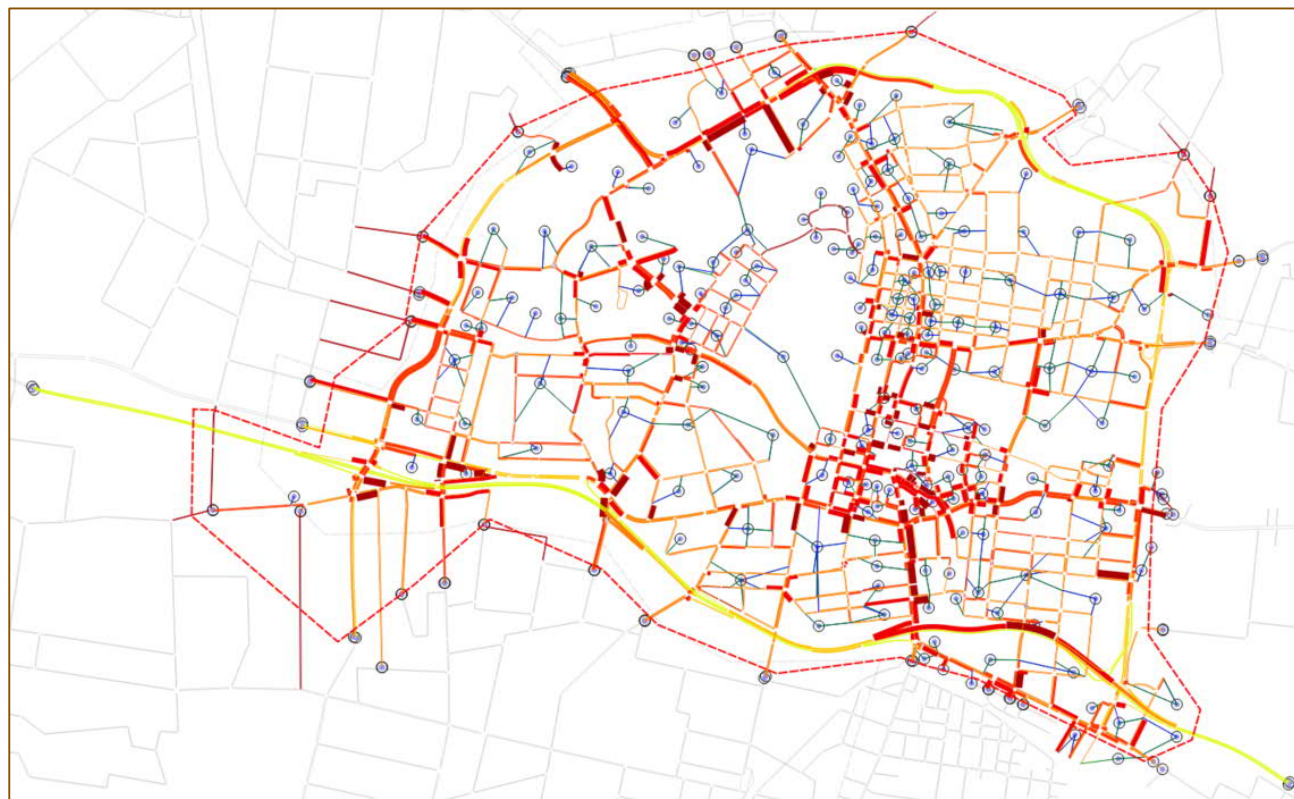


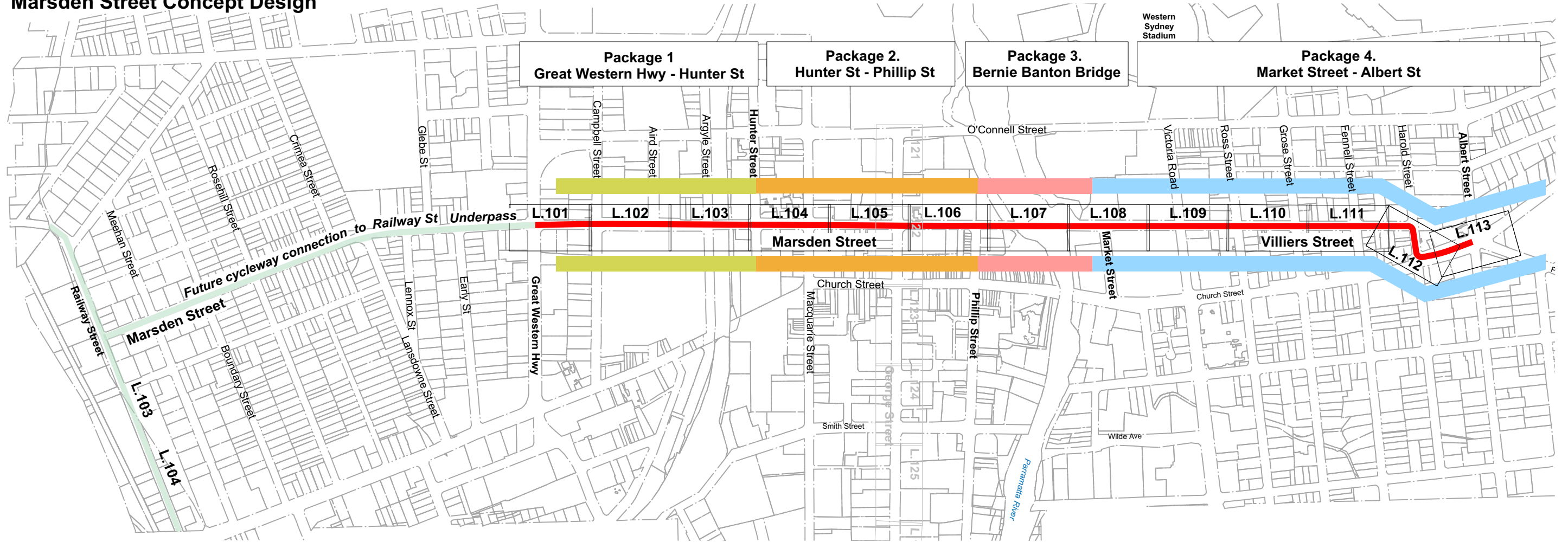
Figure B.15: 2016 Simulated Speed plot, 5:00-6:00 PM

Appendix C. CBD Cycleways – Marsden Street Concept Design

Council has developed high level concept plans to test the LRA and what would fit spatially within the Marsden Street corridor. The concept designs are subject to further design and community feedback. The Marsden Street Cycleway is a short term priority.

Parramatta CBD Cycleways

Marsden Street Concept Design

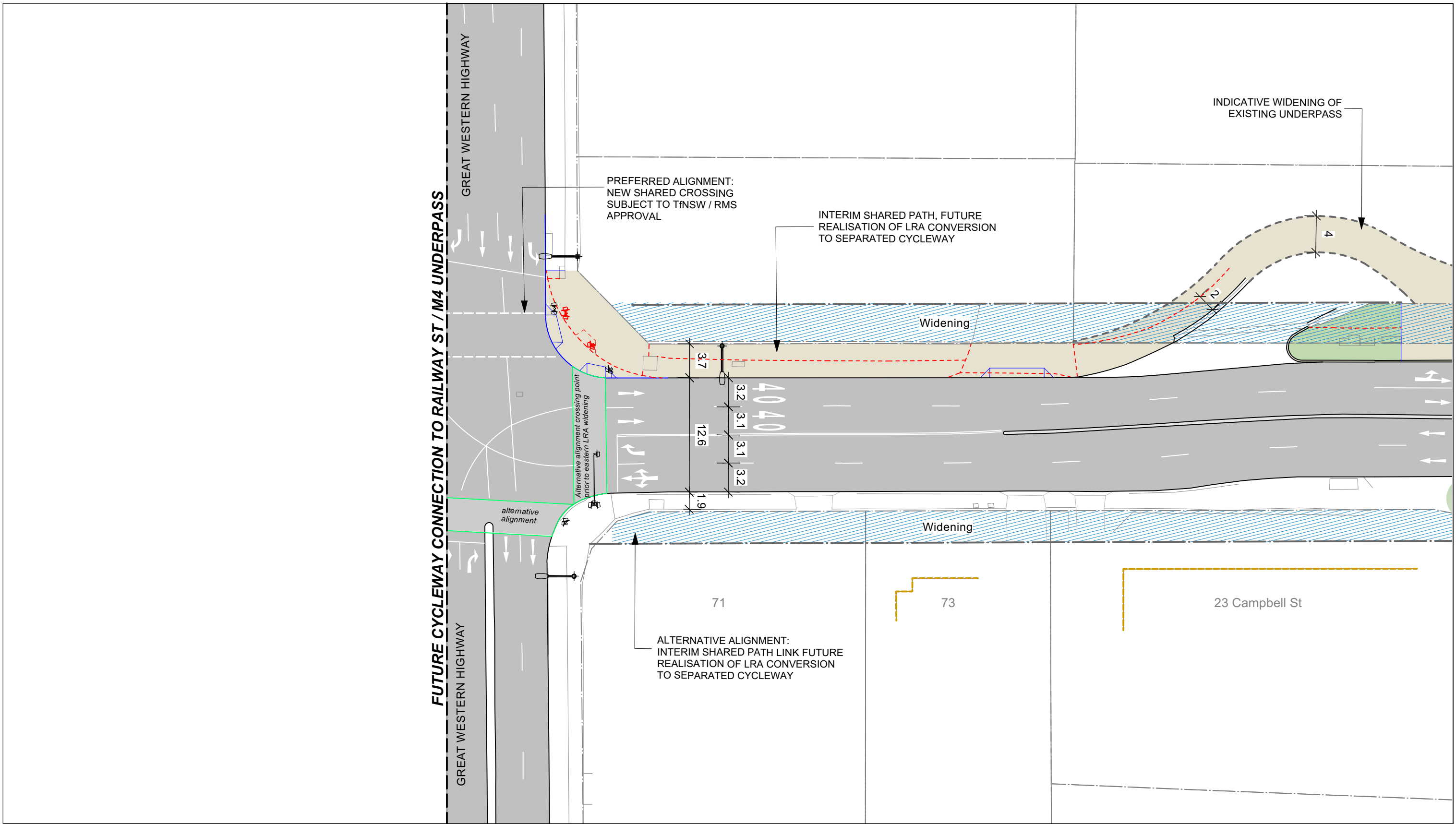


1 Sheet Layout
1 : 8000

DRAWING REGISTER

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MARSDEN STREET CYCLEWAY			
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L.102	MARSDEN STREET	1:400 @ A3	J
L.103	MARSDEN STREET	1:400 @ A3	J
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L.105	MARSDEN STREET	1:400 @ A3	J
L.106	MARSDEN STREET	1:400 @ A3	J
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L.111	MARSDEN STREET	1:400 @ A3	J
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L.113	MARSDEN STREET	1:400 @ A3	J

FOR DISCUSSION			NORTH	NOTES: THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.	TRAFFIC ENGINEER BITZIOS Flourmill Studios, Studio 203, 3 Gladstone Street, Newtown, NSW 2042 (02) 9557 6202	HEAD CONSULTANT spackman mossop michaels LANDSCAPE ARCHITECTS 115 Flinders Street Surry Hills, NSW 2010 (02) 9361 4549 info@sm2group.com.au www.spackmanmossopmichaels.com	CLIENT CITY OF PARRAMATTA	TITLE MARSDEN STREET CYCLEWAY Incl. Marist Pl, Villiers St & Harold St DRAWING Concept Design Plan	SHEET L.000 REV J
J	PRELIMINARY CONCEPT PLAN	MD/FM	07/04/21	SCALE 1:400 @ A3					
REV	DESCRIPTION	INITIAL	DATE						



KEY

- Existing kerb
- Existing building line
- ⌬ Existing/relocated parking
- ⊕ Existing traffic signal pole
- ⚡ Existing power/ light post
- ⊕ Existing street tree retained
- ⊖ Existing street tree removed
- ⊕ New street tree
- ▭ New kerbs / kerb ramps
- 🚲 New cycleway
- ▭ New pavement
- ▭ New threshold
- ▭ New planting / turf
- ▨ Land Reservation (LRA)
- ▨ Active planning proposal
- ▨ Heritage

FOR DISCUSSION		
NORTH		
SCALE		
J	PRELIMINARY CONCEPT PLAN	MD/FM 07/04/21
REV	DESCRIPTION	INITIAL DATE

NOTES:
 THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.

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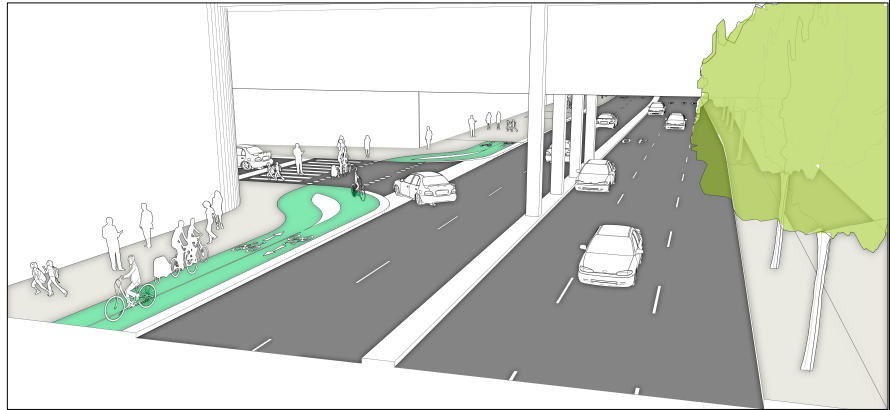
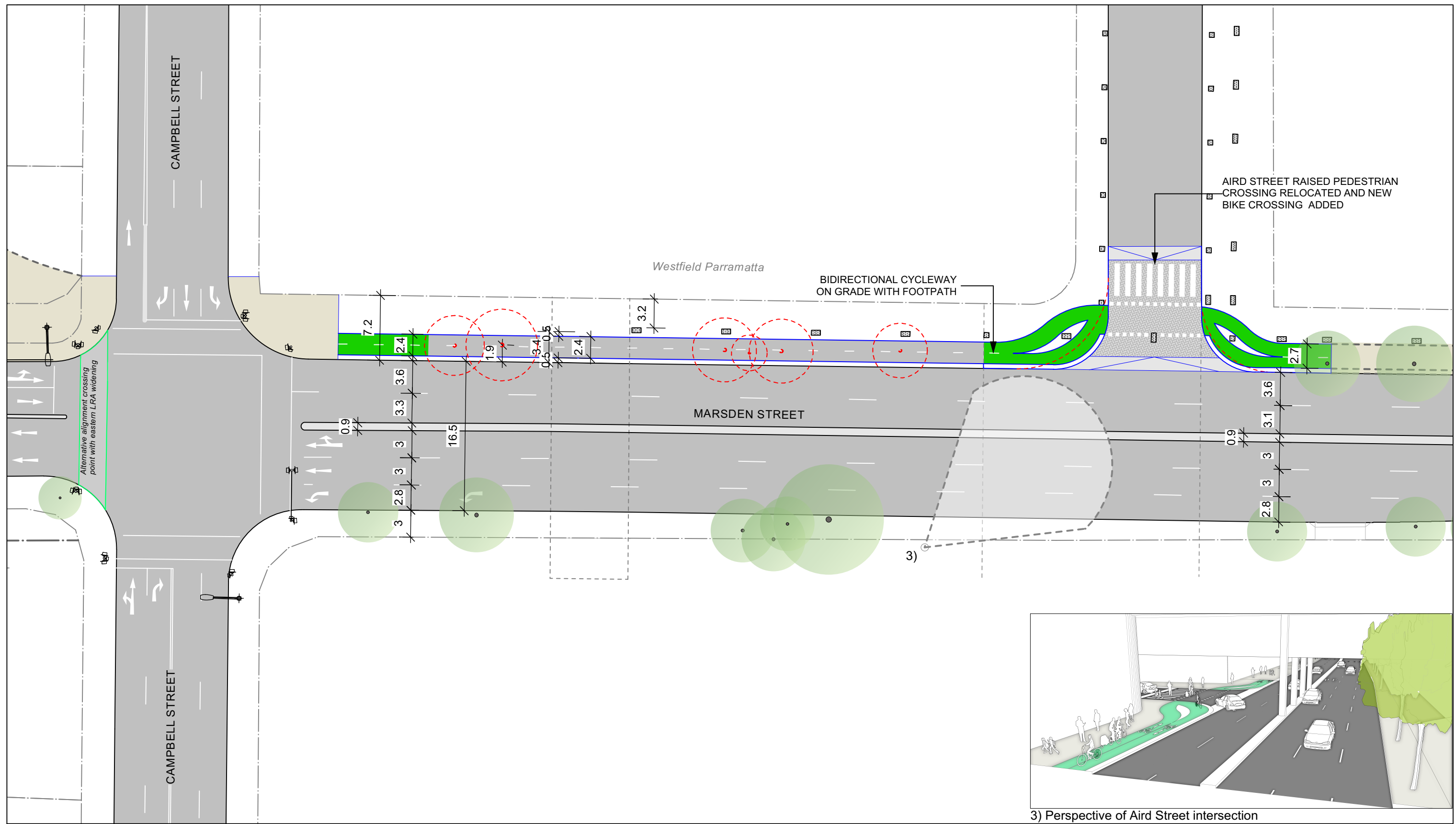
CLIENT

TITLE
 MARSDEN STREET CYCLEWAY
 Incl. Marist Pl, Villiers St & Harold St

DRAWING
 Concept Design Plan

SHEET
 L. 101

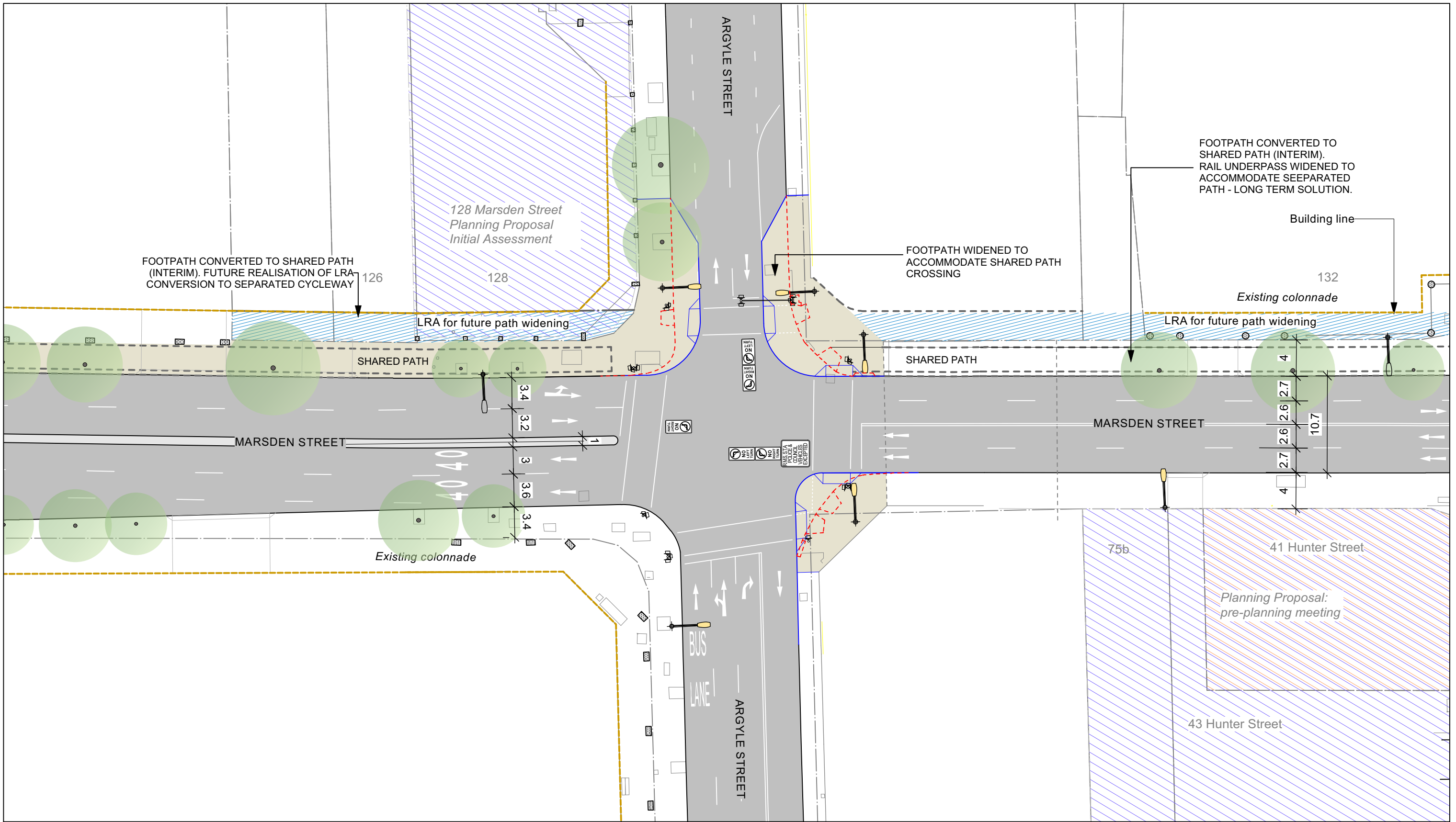
REV
 J



3) Perspective of Aird Street intersection

KEY					
— Existing kerb	Existing traffic signal pole	□ New kerbs / kerb ramps	● Existing street tree retained	■ New pavement	▨ Land Reservation (LRA)
- - - Existing building line	Existing power/ light post	▨ New cycleway	● Existing street tree removed	■ New threshold	▨ Active planning proposal
Existing/relocated parking	Item removed		● New street tree	■ New planting / turf	▨ Heritage

FOR DISCUSSION		NORTH	NOTES:	TRAFFIC ENGINEER	HEAD CONSULTANT	CLIENT	TITLE	SHEET
			THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.	Flourmill Studios, Studio 203, 3 Gladstone Street, Newtown, NSW 2042 (02) 9557 6202	115 Flinders Street, Surry Hills, NSW 2010 (02) 9361 4549 info@sm2group.com.au www.spackmanmossopmichaels.com		MARSDEN STREET CYCLEWAY Incl. Marist Pl, Villiers St & Harold St	L. 102
J	PRELIMINARY CONCEPT PLAN	MD/FM	07/04/21				DRAWING	REV
REV	DESCRIPTION	INITIAL	DATE				Concept Design Plan	J



KEY			
	Existing kerb		Existing traffic signal pole
	Existing building line		Existing street tree removed
	Existing/relocated parking		New street tree
	Existing power/ light post		New cycleway
	Item removed		New kerbs / kerb ramps
	Existing street tree retained		New threshold
	Existing street tree removed		New planting / turf
	New street tree		Land Reservation (LRA)
	Land Reservation (LRA)		Active planning proposal
	Active planning proposal		Heritage

FOR DISCUSSION		NORTH	
		SCALE	
J	PRELIMINARY CONCEPT PLAN	MD/FM	07/04/21
REV	DESCRIPTION	INITIAL	DATE

NOTES:
 THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.

TRAFFIC ENGINEER

Flourmill Studios,
 Studio 203,
 3 Gladstone Street,
 Newtown, NSW 2042
 (02) 9557 6202

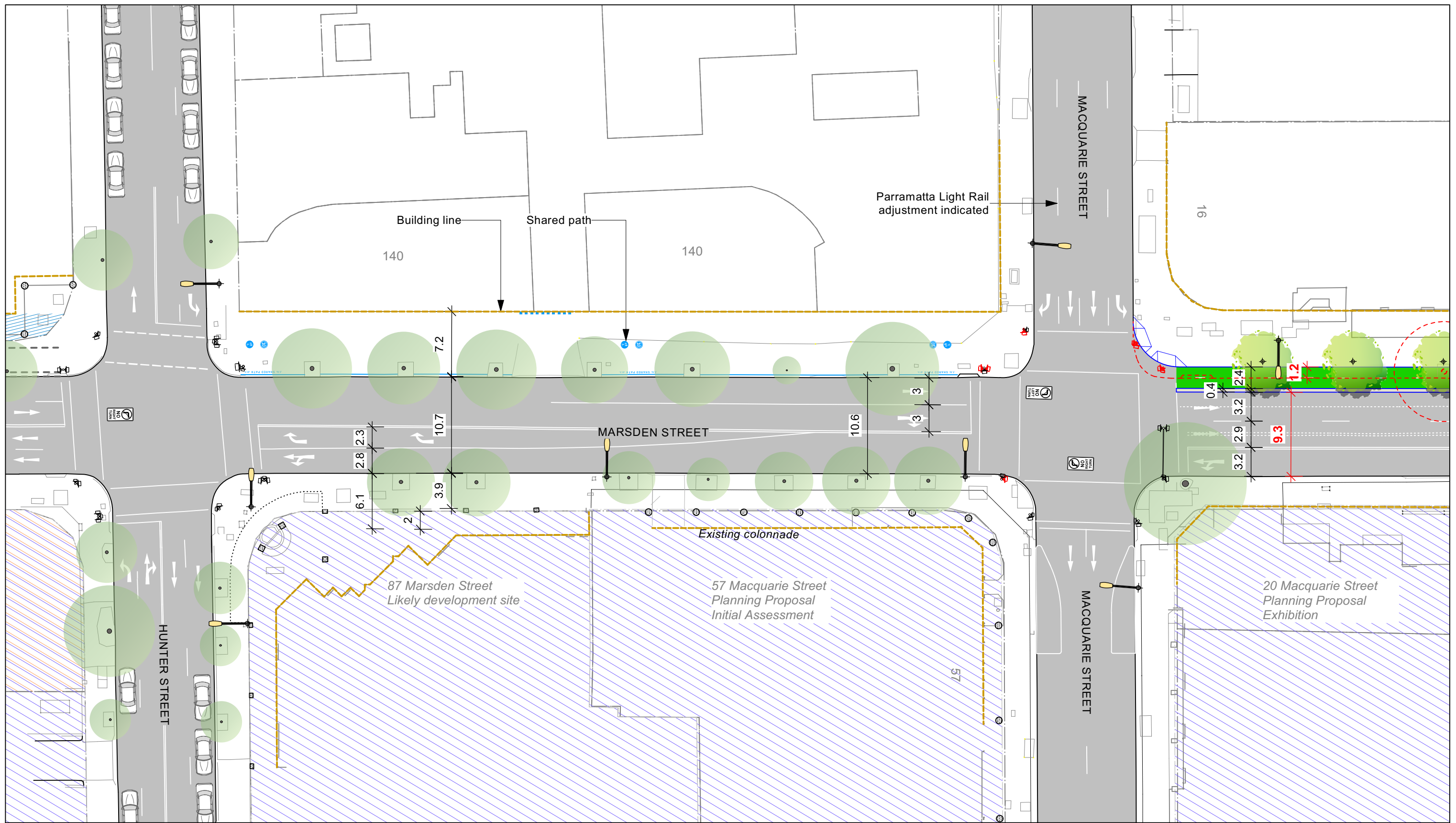
HEAD CONSULTANT

spackman
 mossop
 michaels

LANDSCAPE ARCHITECTS
 115 Flinders Street
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 info@sm2group.com.au
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CLIENT

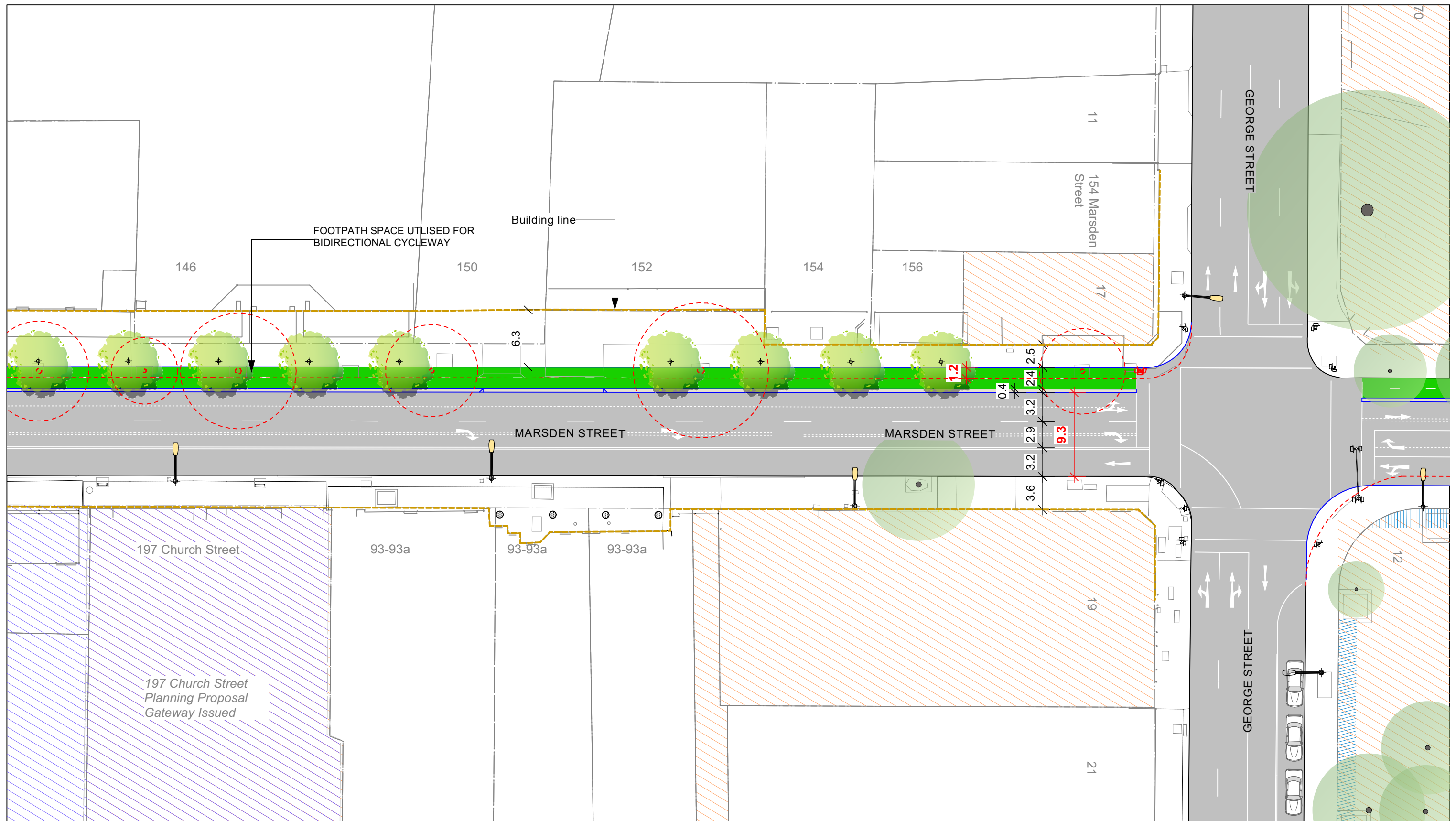
TITLE	MARSDEN STREET CYCLEWAY Incl. Marist Pl, Villiers St & Harold St	SHEET	L. 103
DRAWING	Concept Design Plan	REV	J



KEY

- Existing kerb
- Existing traffic signal pole
- Existing building line
- Existing power/ light post
- Existing/rellocated parking
- Item removed
- New kerbs / kerb ramps
- New cycleway
- Existing street tree retained
- Existing street tree removed
- New street tree
- New pavement
- New threshold
- New planting / turf
- Land Reservation (LRA)
- Active planning proposal
- Heritage

FOR DISCUSSION		NORTH 	NOTES: THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.	TRAFFIC ENGINEER Flourmill Studios, Studio 203, 3 Gladstone Street, Newtown, NSW 2042 (02) 9557 6202	HEAD CONSULTANT spackman mossop michaels LANDSCAPE ARCHITECTS 115 Flinders Street Surry Hills, NSW 2010 (02) 9361 4549 info@sm2group.com.au www.spackmanmossopmichaels.com	CLIENT 	TITLE MARSDEN STREET CYCLEWAY Incl. Marist Pl, Villiers St & Harold St DRAWING Concept Design Plan	SHEET L.104 REV J
REV	DESCRIPTION	INITIAL	DATE					



KEY

- Existing kerb
- Existing traffic signal pole
- Existing building line
- Existing power/ light post
- Existing/relocated parking
- Item removed
- New kerbs / kerb ramps
- New cycleway
- Existing street tree retained
- Existing street tree removed
- New street tree
- New pavement
- New threshold
- New planting / turf
- Land Reservation (LRA)
- Active planning proposal
- Heritage

FOR DISCUSSION		NORTH
SCALE 0 3 6 9 m		
REV	DESCRIPTION	INITIAL DATE
J	PRELIMINARY CONCEPT PLAN	MD/FM 07/04/21

NOTES:
 THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.

TRAFFIC ENGINEER

 Flourmill Studios,
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 Newtown, NSW 2042
 (02) 9557 6202

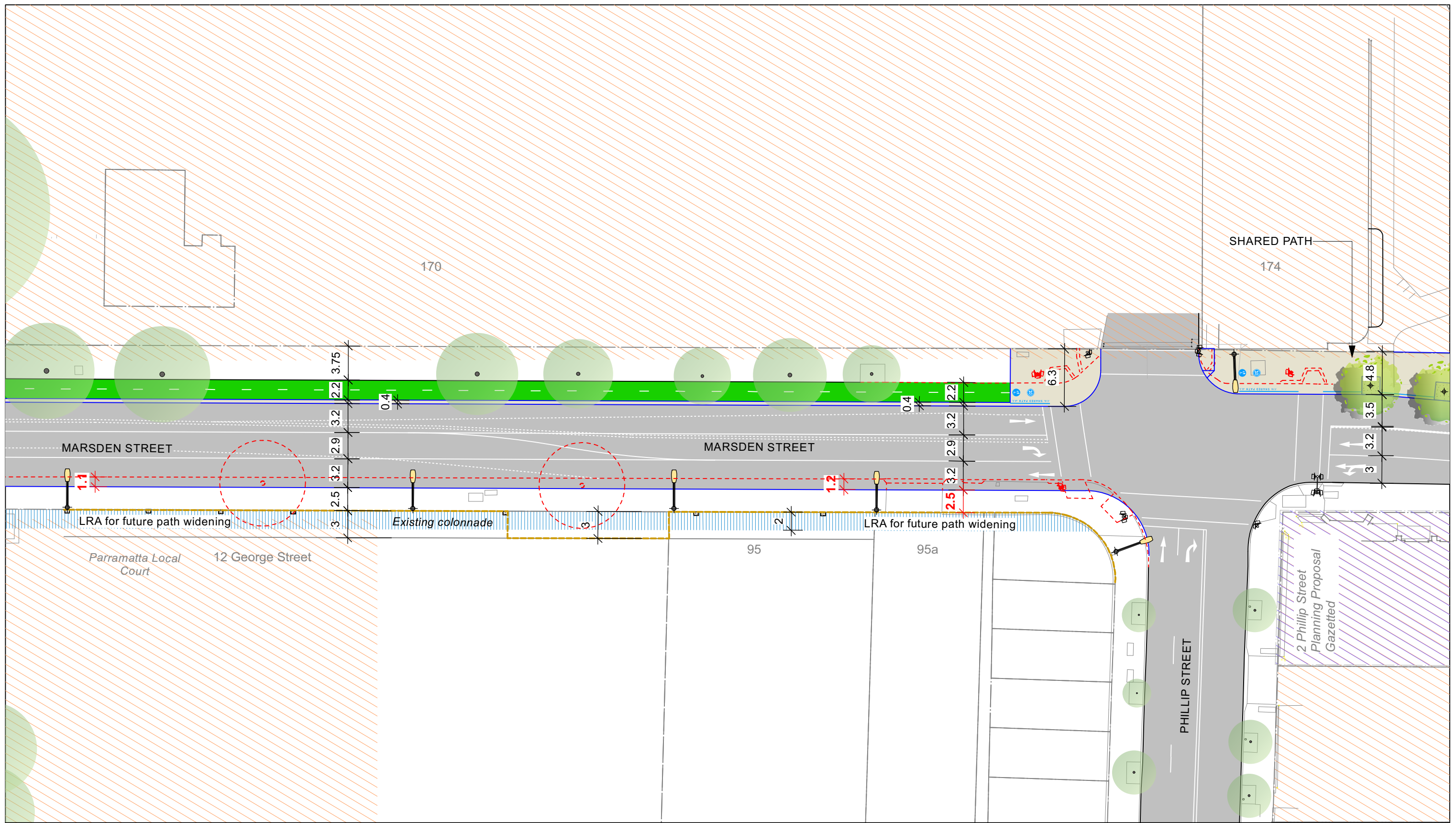
HEAD CONSULTANT
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CLIENT

 CITY OF PARRAMATTA

TITLE
 MARSDEN STREET CYCLEWAY
 Incl. Marist Pl, Villiers St & Harold St
DRAWING
 Concept Design Plan

SHEET	L.105
REV	J



KEY

- Existing kerb
- Existing traffic signal pole
- Existing building line
- Existing power/ light post
- Existing/relocated parking
- Item removed
- Existing street tree retained
- Existing street tree removed
- New street tree
- New kerbs / kerb ramps
- New cycleway
- New pavement
- New threshold
- New planting / turf
- Land Reservation (LRA)
- Active planning proposal
- Heritage

FOR DISCUSSION		NORTH
		SCALE
REV	DESCRIPTION	INITIAL DATE
J	PRELIMINARY CONCEPT PLAN	MD/FM 07/04/21

NOTES:
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TRAFFIC ENGINEER

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 (02) 9557 6202

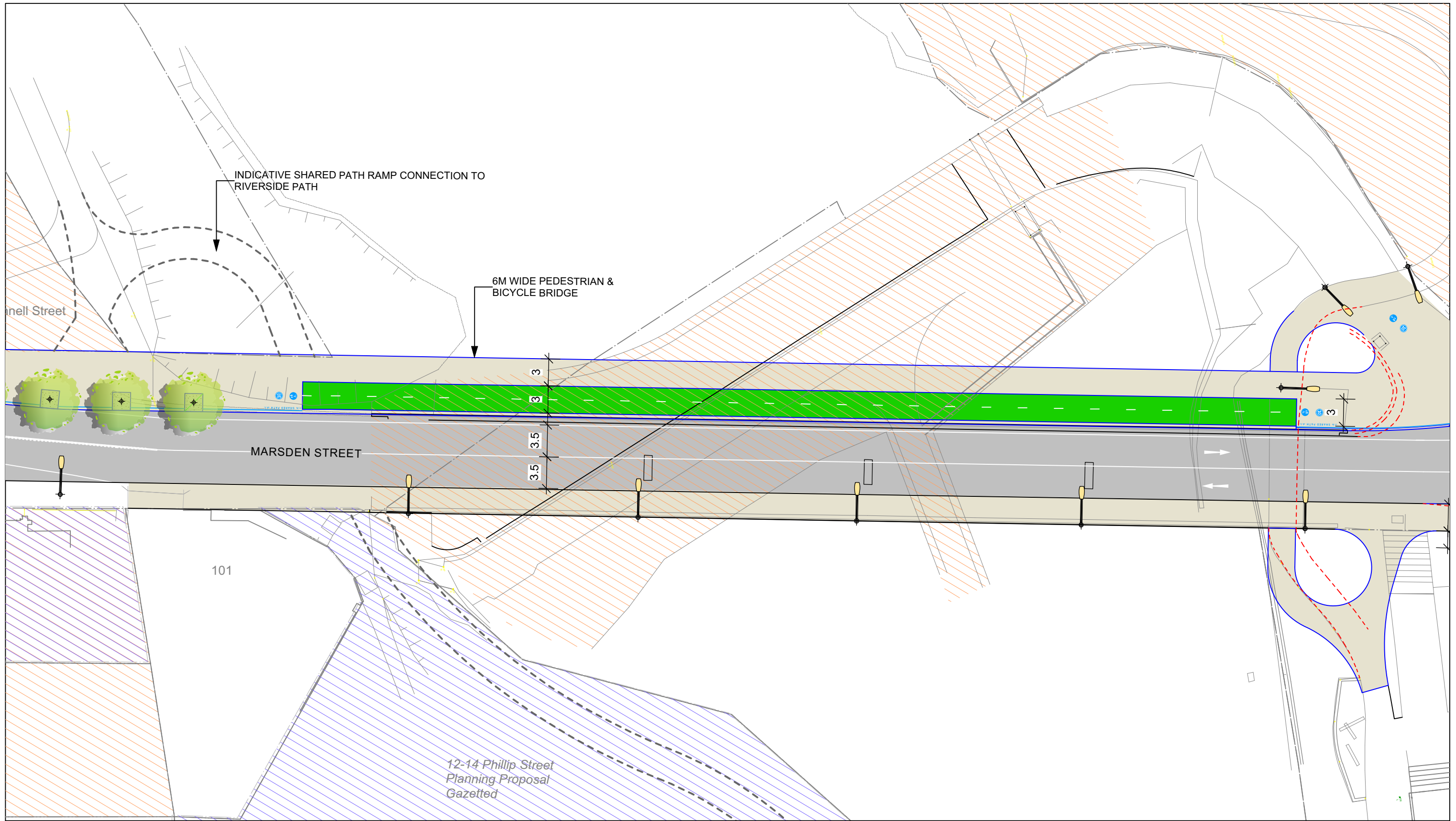
HEAD CONSULTANT
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CLIENT

 CITY OF PARRAMATTA

TITLE
 MARDEN STREET CYCLEWAY
 Incl. Marist Pl, Villiers St & Harold St
DRAWING
 Concept Design Plan

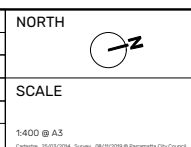
SHEET
 L.106
REV
 J



KEY

- Existing kerb
- Existing traffic signal pole
- Existing building line
- Existing power/ light post
- Existing/relocated parking
- Item removed
- New kerbs / kerb ramps
- New cycleway
- Existing street tree retained
- Existing street tree removed
- New street tree
- New pavement
- New threshold
- New planting / turf
- Land Reservation (LRA)
- Active planning proposal
- Heritage

FOR DISCUSSION		NORTH	SCALE
J	PRELIMINARY CONCEPT PLAN	MD/FM	07/04/21
REV	DESCRIPTION	INITIAL	DATE



NOTES:
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TRAFFIC ENGINEER

 Flourmill Studios,
 Studio 203,
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 Newtown, NSW 2042
 (02) 9557 6202

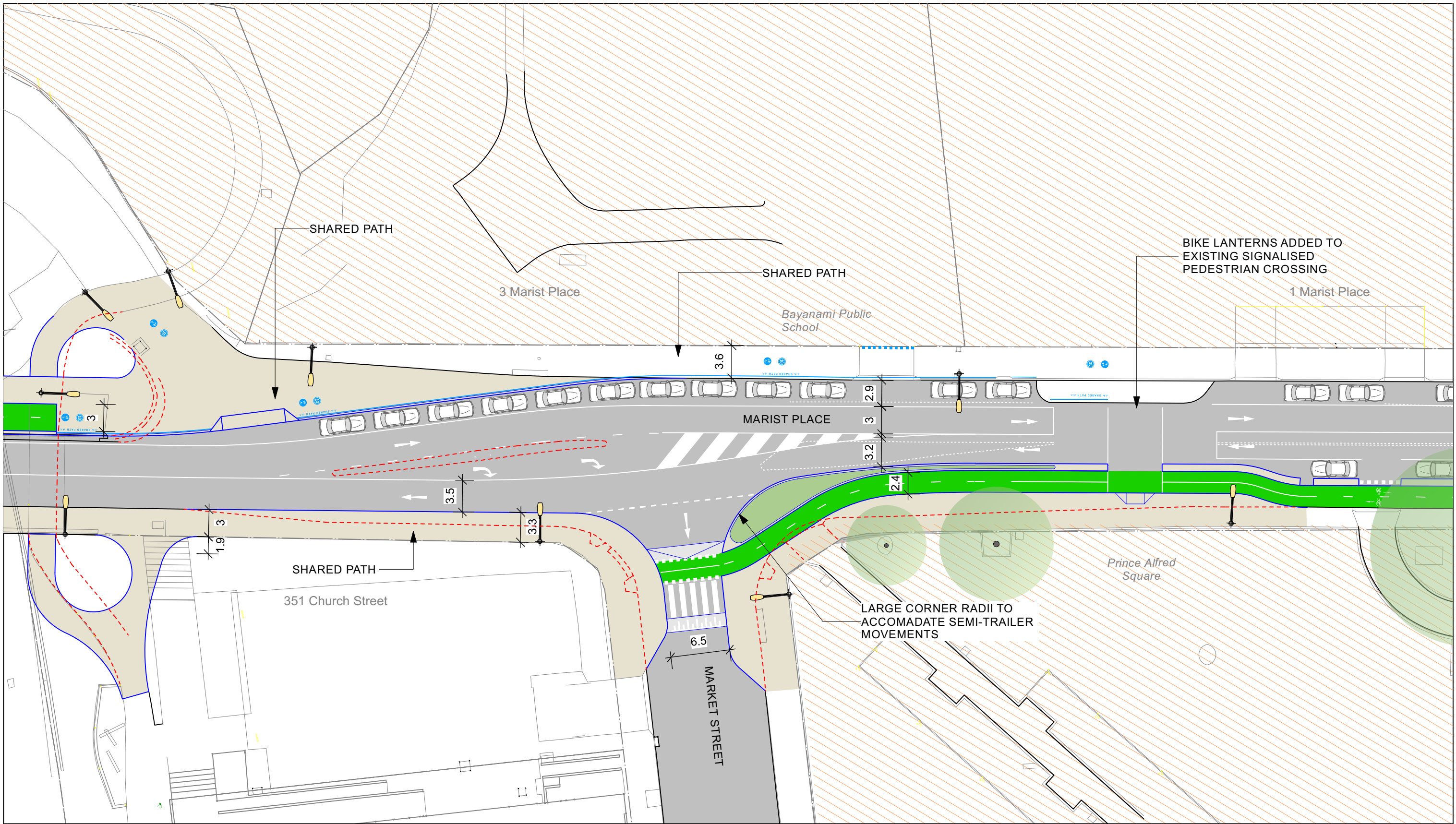
HEAD CONSULTANT
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 CITY OF PARRAMATTA

TITLE
 MARSDEN STREET CYCLEWAY
 Incl. Marist Pl, Villiers St & Harold St
DRAWING
 Concept Design Plan

SHEET	L. 107
REV	J



KEY

- Existing kerb
- Existing building line
- ⊞ Existing/relocated parking
- ⊞ Existing traffic signal pole
- ⊞ Existing power/ light post
- ⊞ Item removed
- ▭ New kerbs / kerb ramps
- ▭ New cycleway
- Existing street tree retained
- ⊞ Existing street tree removed
- New street tree
- ▭ New pavement
- ▭ New threshold
- ▭ New planting / turf
- ▭ Land Reservation (LRA)
- ▭ Active planning proposal
- ▭ Heritage

FOR DISCUSSION		NORTH
SCALE	0 3 6 9 m	
1:400 @ A3	© City of Parramatta 2021. All rights reserved.	

NOTES:
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TRAFFIC ENGINEER

 Flourmill Studios,
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 Newtown, NSW 2042
 (02) 9557 6202

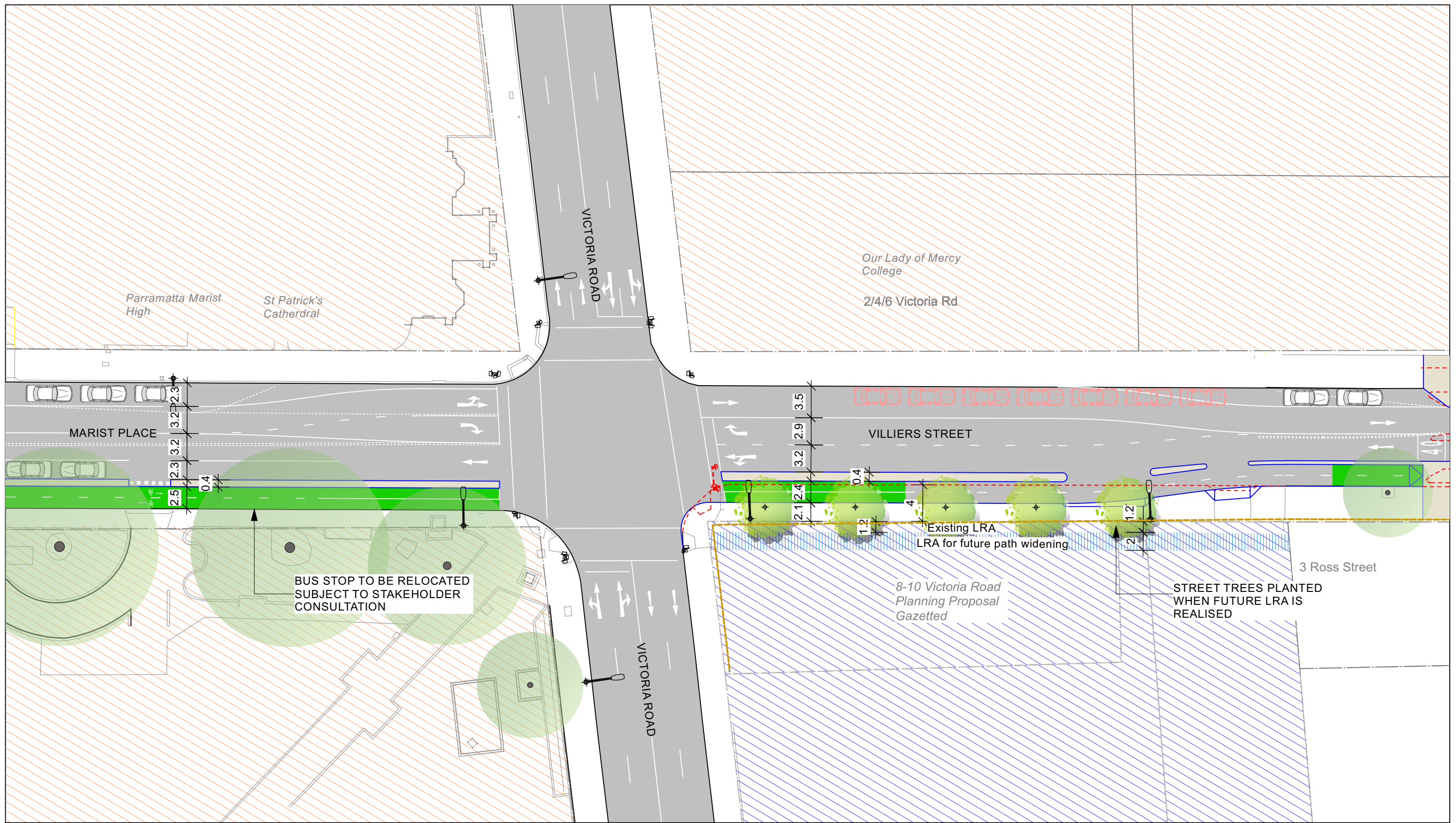
HEAD CONSULTANT
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CITY OF PARRAMATTA

TITLE
 MARSDEN STREET CYCLEWAY
 Incl. Marist Pl, Villiers St & Harold St
DRAWING
 Concept Design Plan

SHEET
 L.108
REV
 J



KEY

- Existing kerb
- Existing traffic signal pole
- Existing building line
- Existing power/ light post
- Existing/relocated parking
- Item removed
- New kerbs / kerb ramps
- New cycleway
- Existing street tree retained
- Existing street tree removed
- New street tree
- New pavement
- New threshold
- New planting / turf
- Land Reservation (LRA)
- Active planning proposal
- Heritage

FOR DISCUSSION		NORTH
		SCALE
J	PRELIMINARY CONCEPT PLAN	MD/FM 07/04/21
REV	DESCRIPTION	INITIAL DATE

NOTES:
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 Flourmill Studios,
 Studio 203,
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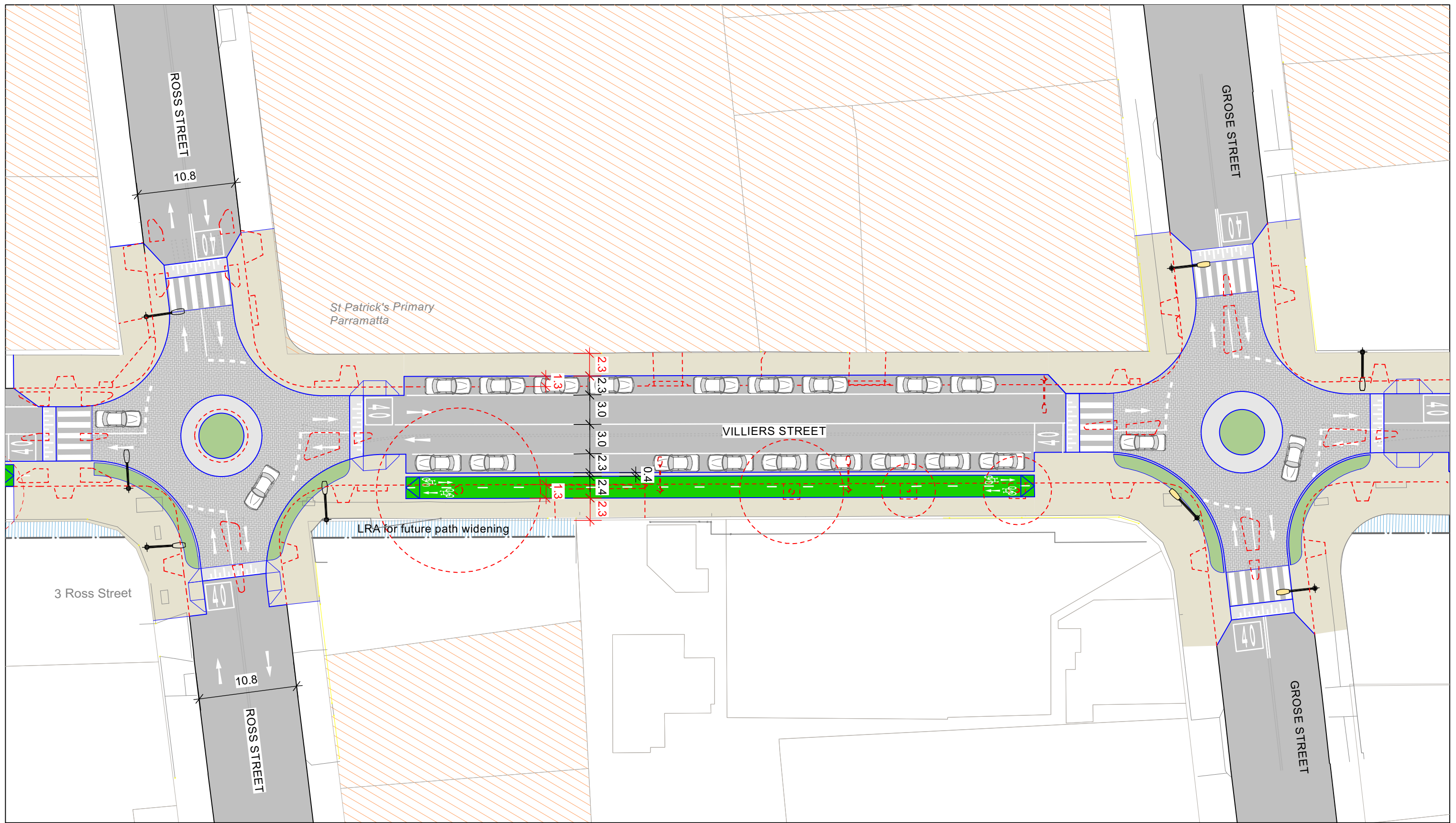
HEAD CONSULTANT
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 CITY OF PARRAMATTA

TITLE
 MARSDEN STREET CYCLEWAY
 Incl. Marist Pl, Villiers St & Harold St
DRAWING
 Concept Design Plan

SHEET	L.109
REV	J



KEY

- Existing kerb
- Existing trees
- Existing/relocated parking
- Existing light post
- Existing traffic signal pole
- Item removed
- New kerbs / kerb ramps / medians
- New street tree
- New cycleway
- New pavement
- New threshold
- New planting / turf
- Land Reservation (LRA)
- Active planning proposal
- Heritage

ALTERNATIVE CONCEPT DESIGN

FOR DISCUSSION		
NORTH		
SCALE		
J	PRELIMINARY CONCEPT PLAN	MD/FM 07/04/21
REV	DESCRIPTION	INITIAL DATE

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TRAFFIC ENGINEER

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CLIENT

 CITY OF
 PARRAMATTA

TITLE MARSDEN STREET CYCLEWAY Incl. Marist Pl, Villiers St & Harold St		SHEET L. 110-A
DRAWING Concept Design Plan		REV J

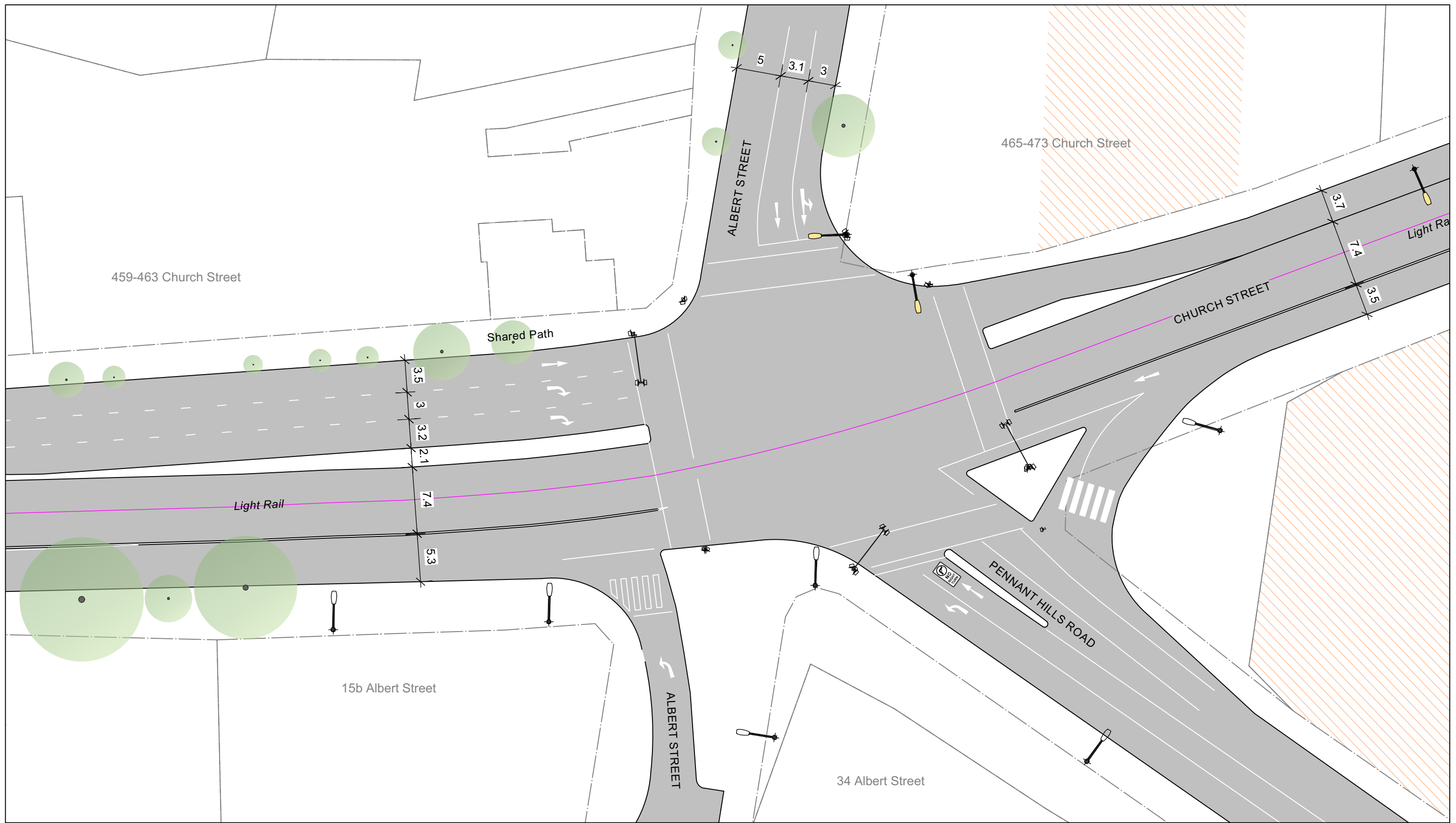


KEY

- Existing kerb
- Existing light post
- Existing trees
- Existing/relocated parking
- Existing traffic signal pole
- Item removed
- New kerbs / kerb ramps / medians
- New street tree
- New cycleway
- New pavement
- New threshold
- New planting / turf
- Land Reservation (LRA)
- Active planning proposal
- Heritage

ALTERNATIVE CONCEPT DESIGN

FOR DISCUSSION		NORTH 	NOTES: THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.	TRAFFIC ENGINEER Flourmill Studios, Studio 203, 3 Gladstone Street, Newtown, NSW 2042 (02) 9557 6202	HEAD CONSULTANT spackman mossop michaelis LANDSCAPE ARCHITECTS 115 Flinders Street Surry Hills, NSW 2010 (02) 9361 4549 info@sm2group.com.au www.spackmanmossopmichaels.com	CLIENT 	TITLE MARSDEN STREET CYCLEWAY Incl. Marist Pl, Villiers St & Harold St	SHEET L. 112-A
J	PRELIMINARY CONCEPT PLAN	MD/FM 07/04/21		SCALE 0 3 6 9m 1:400 @ A3	DRAWING Concept Design Plan	REV J		



KEY

- Existing kerb
- Existing building line
- ⌂ Existing/relocated parking
- ⌂ Existing traffic signal pole
- ⌂ Existing power/ light post
- ⌂ Item removed
- ▭ New kerbs / kerb ramps
- 🚲 New cycleway
- 🌳 Existing street tree retained
- 🌳 Existing street tree removed
- 🌳 New street tree
- 🟫 New pavement
- 🟫 New threshold
- 🟫 New planting / turf
- ▨ Land Reservation (LRA)
- ▨ Active planning proposal
- ▨ Heritage

FOR DISCUSSION		NORTH ↑
		SCALE 0 3 6 9 m 1:400 @ A3
REV	DESCRIPTION	INITIAL DATE
J	PRELIMINARY CONCEPT PLAN	MD/FM 07/04/21

NOTES:
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TRAFFIC ENGINEER
 Flourmill Studios, Studio 203, 3 Gladstone Street, Newtown, NSW 2042 (02) 9557 6202

HEAD CONSULTANT
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 115 Flinders Street, Surry Hills, NSW 2010 (02) 9361 4549 info@sm2group.com.au www.spackmanmossopmichaels.com

CLIENT
 CITY OF PARRAMATTA

TITLE
 MARSDEN STREET CYCLEWAY
 Incl. Marist Pl, Villiers St & Harold St
DRAWING
 Concept Design Plan

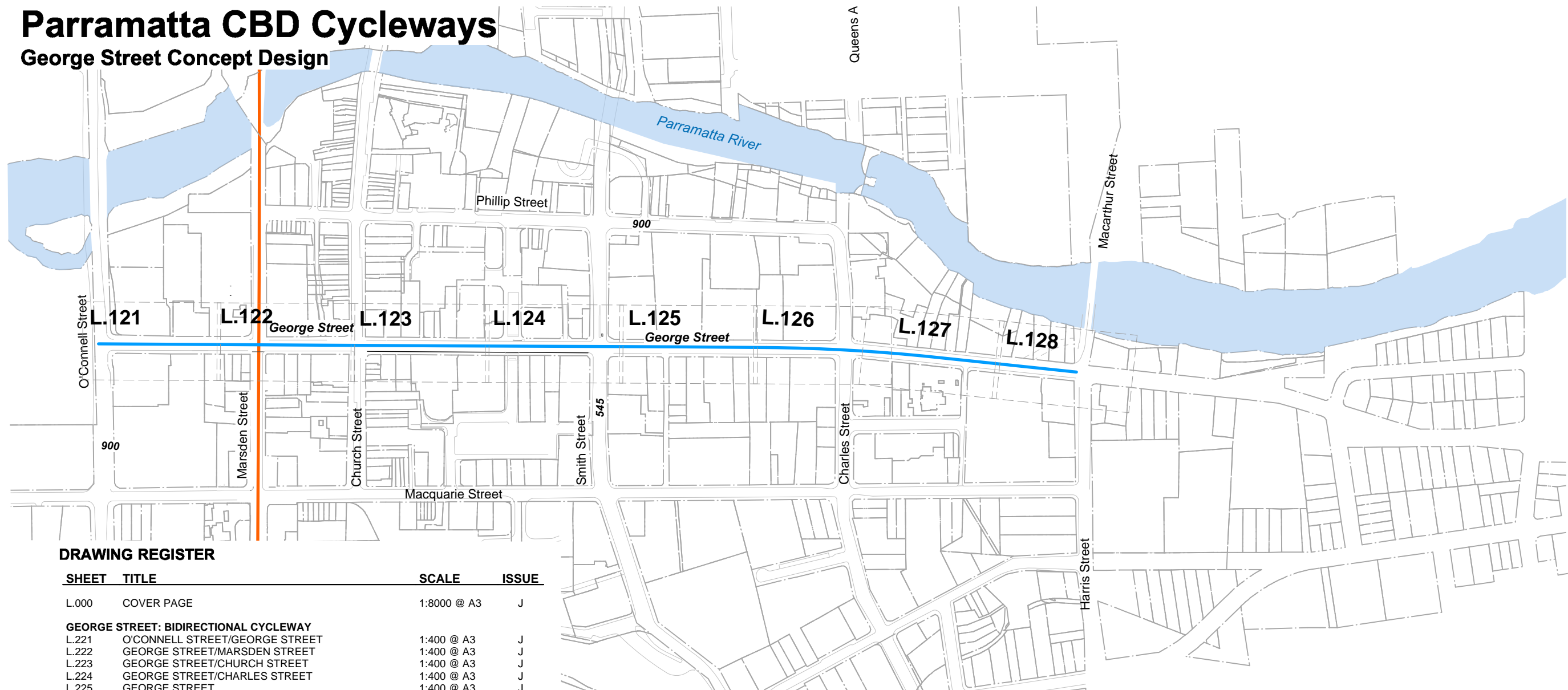
SHEET	L. 113
REV	J

Appendix D. CBD Cycleways – George Street Concept Design

Council has developed high level concept plans to test the LRA and what would fit spatially within the George Street corridor. The concept designs are subject to further design and community feedback. The George Street Cycleway can be delivered in the medium or long term.

Parramatta CBD Cycleways

George Street Concept Design

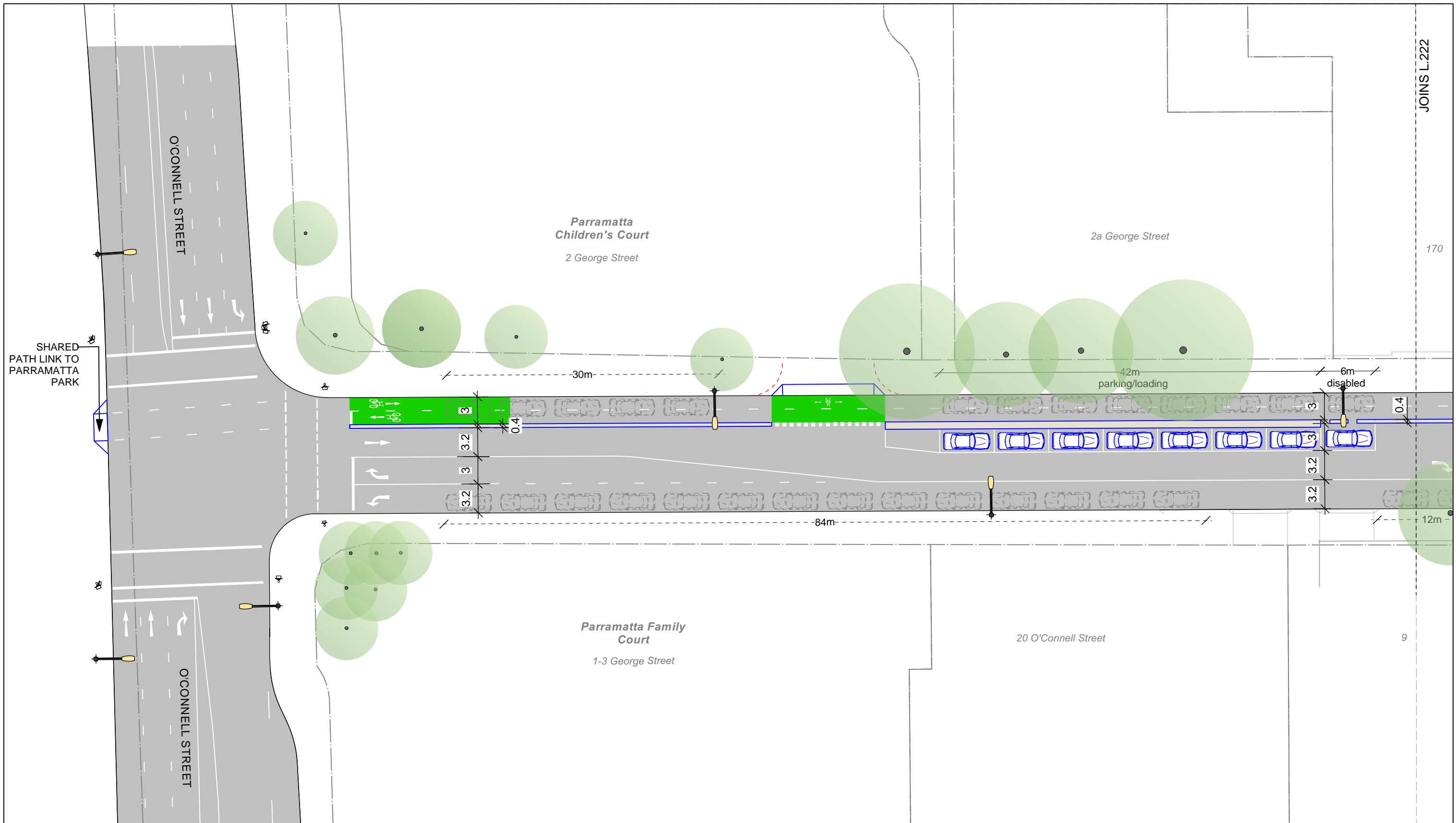


DRAWING REGISTER

SHEET	TITLE	SCALE	ISSUE
L.000	COVER PAGE	1:8000 @ A3	J
GEORGE STREET: BIDIRECTIONAL CYCLEWAY			
L.221	O'CONNELL STREET/GEORGE STREET	1:400 @ A3	J
L.222	GEORGE STREET/MARSDEN STREET	1:400 @ A3	J
L.223	GEORGE STREET/CHURCH STREET	1:400 @ A3	J
L.224	GEORGE STREET/CHARLES STREET	1:400 @ A3	J
L.225	GEORGE STREET	1:400 @ A3	J
L.226	GEORGE STREET/SMITH STREET	1:400 @ A3	J
L.227	GEORGE STREET	1:400 @ A3	J
L.228	GEORGE STREET/MACARTHUR STREET	1:400 @ A3	J

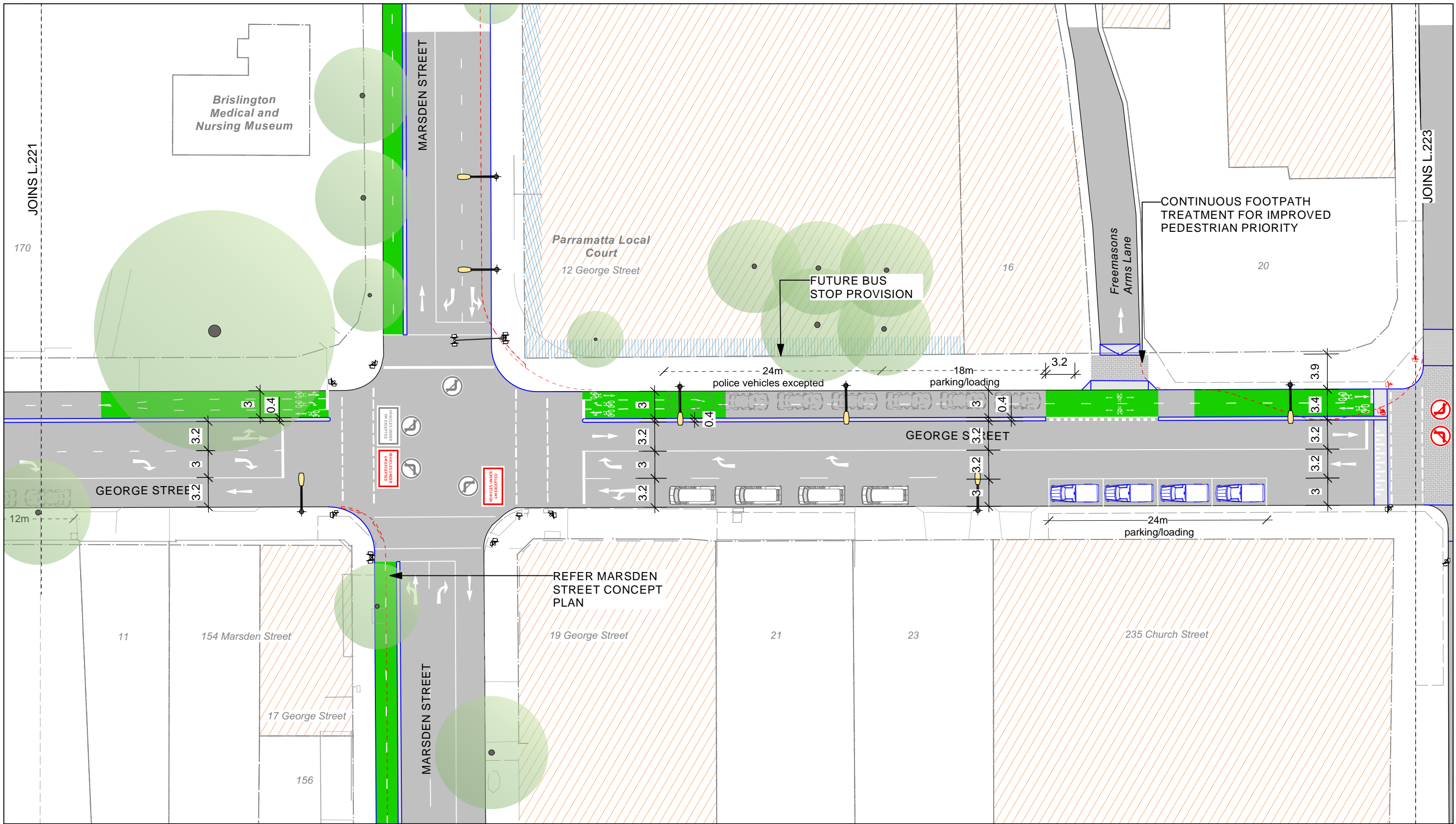
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FOR DISCUSSION		NORTH	NOTES: THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.	TRAFFIC ENGINEER Flourmill Studios, Studio 203, 3 Gladstone Street, Newtown, NSW 2042 (02) 9557 6202	HEAD CONSULTANT spackman mossop michael's	LANDSCAPE ARCHITECTS 115 Flinders Street, Surry Hills, NSW 2010 (02) 9361 4549 info@sm2group.com.au www.spackmanmossopmichaels.com	CLIENT CITY OF PARRAMATTA	TITLE George Street	SHEET L.000
J	PRELIMINARY CONCEPT PLAN	MD/FM	08/04/21					DRAWING Preliminary Concept Plan	REV J
REV	DESCRIPTION	INITIAL	DATE	1:400 @ A3 <small>Copyright © 2021/2024 City of Parramatta</small>					



KEY						
Parking Retained	Bidirectional Cycleway	Existing Light Post	Existing Kerb & Gutter	Proposed Street Trees	Existing Turn Ban	Sydney Metro
New/Relocated Parking	New kerb and gutter	Existing Awning	Existing Street Trees	LRA	Proposed Turn Ban	Shared Path Markings
Parking Removed	New Pavement	Existing Traffic Signal Pole	Item To Be Removed	Heritage General	Planning Proposal	

FOR DISCUSSION		NORTH SCALE <small>1:400 @ A3 Copyright © 2020/2021 by Parramatta City Council</small>	NOTES: THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.	TRAFFIC ENGINEER Flourmill Studios, Studio 203, 3 Gladstone Street, Newtown, NSW 2042 (02) 9557 6202	HEAD CONSULTANT spackman mossop michael's LANDSCAPE ARCHITECTS 115 Flinders Street Surry Hills, NSW 2010 (02) 9361 4549 info@sm2group.com.au www.spackmanmossopmichaels.com	CLIENT 	TITLE George Street	SHEET L.221
J PRELIMINARY CONCEPT PLAN MD/FM 08/04/21	INITIAL DATE MD/FM 08/04/21						DRAWING Preliminary Concept Plan	REV J



KEY

- Parking Retained
- New/Relocated Parking
- Parking Removed
- Bidirectional Cycleway
- New kerb and gutter
- New Pavement
- Existing Light Post
- Existing Awning
- Existing Traffic Signal Pole
- Existing Street Trees
- Item To Be Removed
- Proposed Street Trees
- LRA
- Heritage General
- Existing Turn Ban
- Proposed Turn Ban
- Planning Proposal
- Sydney Metro
- Shared Path Markings

FOR DISCUSSION		NORTH
J PRELIMINARY CONCEPT PLAN	MD/FM	08/04/21
REV	DESCRIPTION	INITIAL DATE

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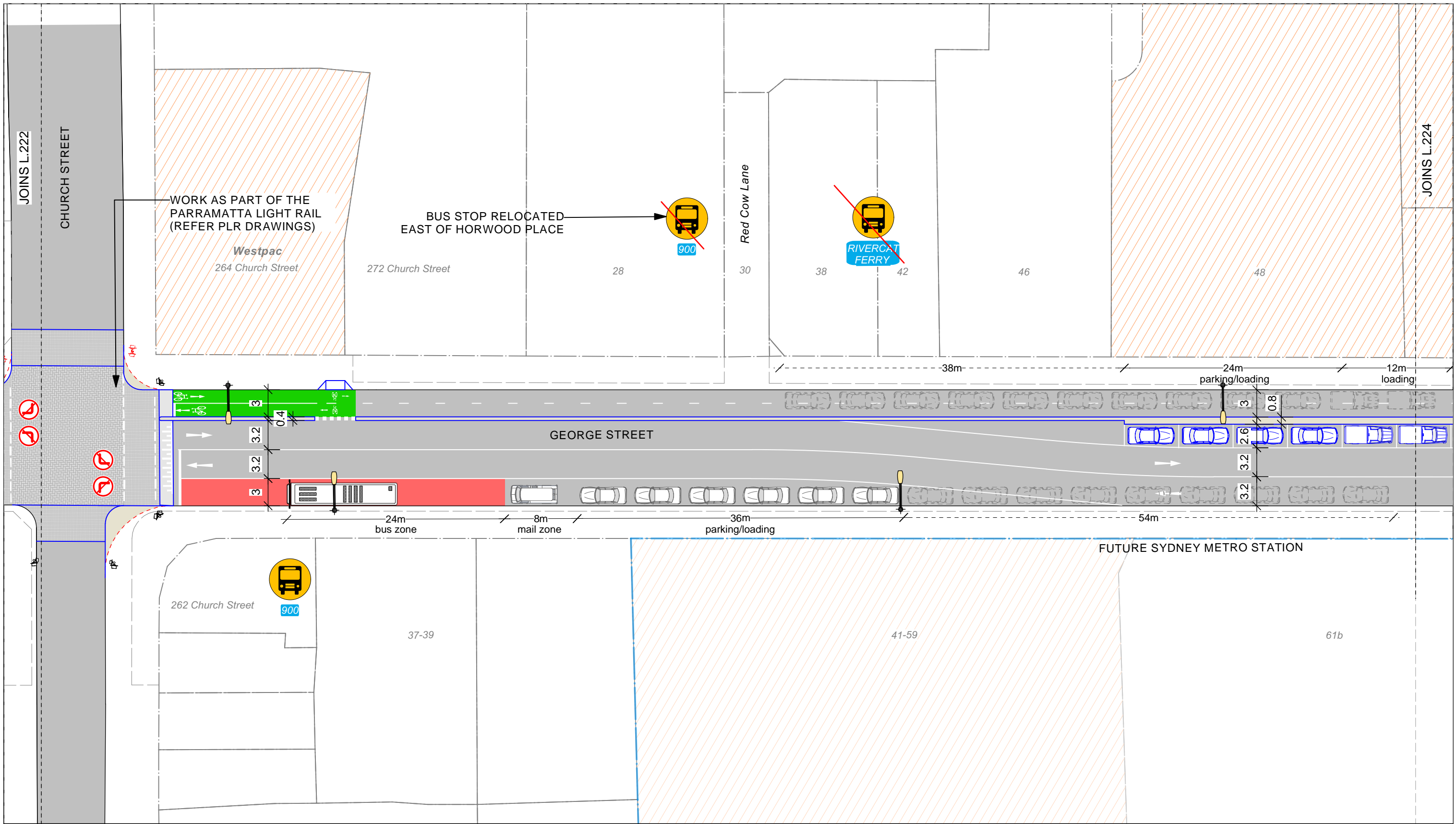
TRAFFIC ENGINEER

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HEAD CONSULTANT
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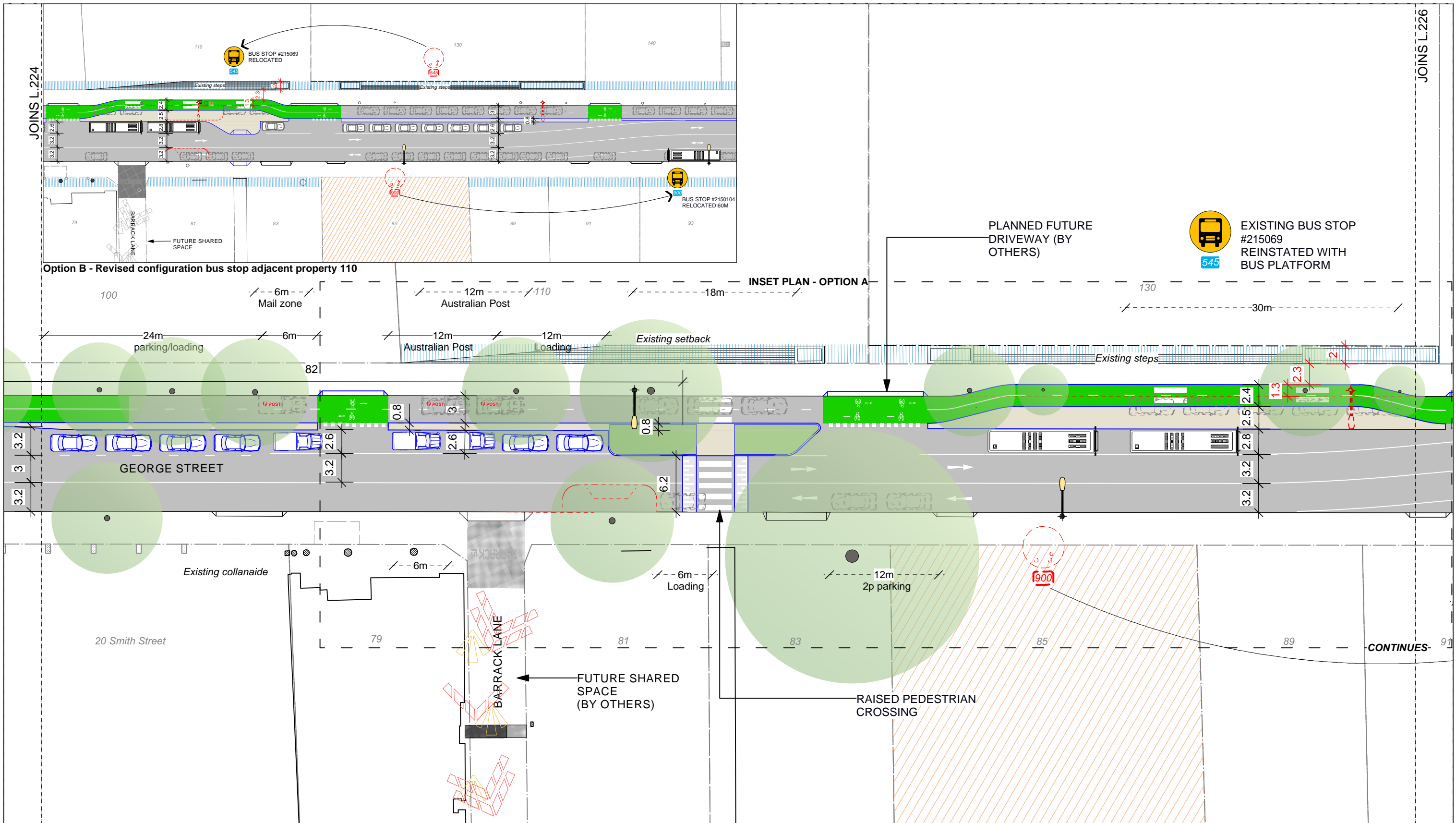
CLIENT

TITLE George Street	SHEET L.222
DRAWING Preliminary Concept Plan	REV J



KEY	
Parking Retained	Bidirectional Cycleway
New/Relocated Parking	New kerb and gutter
Parking Removed	New Pavement
Existing Light Post	Existing Awning
Existing Kerb & Gutter	Existing Street Trees
Item To Be Removed	Existing Street Trees
Proposed Street Trees	LRA
LRA	Proposed Turn Ban
Heritage General	Planning Proposal
Existing Turn Ban	Sydney Metro
Proposed Turn Ban	Shared Path Markings

FOR DISCUSSION		NORTH	NOTES: THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.	TRAFFIC ENGINEER Flourmill Studios, Studio 203, 3 Gladstone Street, Newtown, NSW 2042 (02) 9557 6202	HEAD CONSULTANT spackman mossop michael's LANDSCAPE ARCHITECTS 115 Flinders Street, Surry Hills, NSW 2010 (02) 9361 4549 info@sm2group.com.au www.spackmanmossopmichaels.com	CLIENT 	TITLE George Street DRAWING Preliminary Concept Plan	SHEET L.223 REV J
REV	DESCRIPTION	INITIAL	DATE	SCALE 0 3 5 8 m 1:400 @ A3 Copyright © 2020/2021 by Parramatta City Council				



KEY	
Parking Retained	Bidirectional Cycleway
New/Relocated Parking	New kerb and gutter
Parking Removed	New Pavement
Existing Light Post	Existing Awning
Existing Kerb & Gutter	Existing Street Trees
Existing Traffic Signal Pole	Item To Be Removed
Proposed Street Trees	LRA
Heritage General	Existing Turn Ban
Proposed Turn Ban	Sydney Metro
Shared Path Markings	Planning Proposal

FOR DISCUSSION		NORTH
J PRELIMINARY CONCEPT PLAN	MD/FM 08/04/21	SCALE 0 3 5 8 m
REV DESCRIPTION	INITIAL DATE	1:420 @ A3 Copyright © 2021/2024 Bitzios Pty Limited

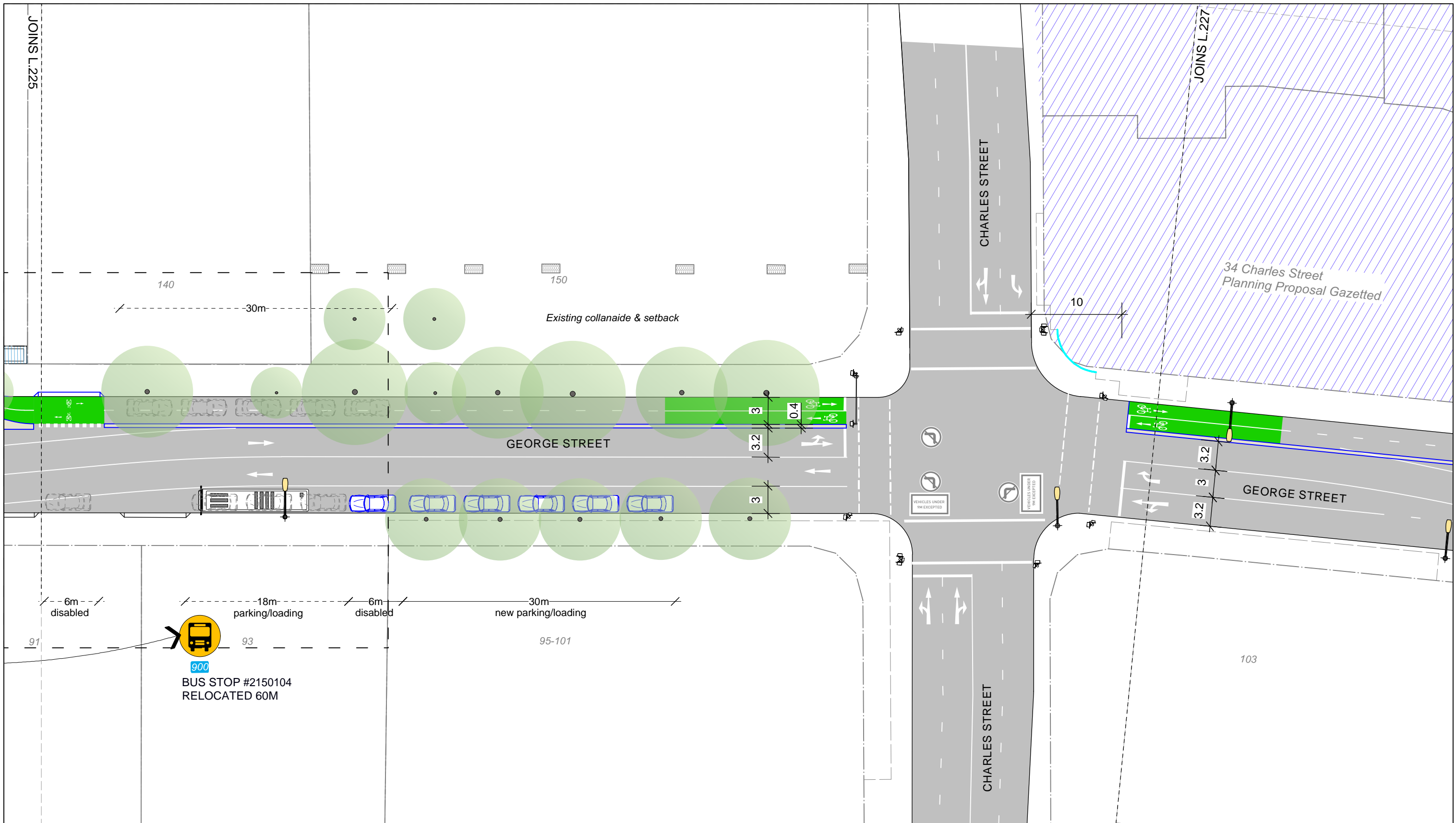
NOTES:
THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.

TRAFFIC ENGINEER
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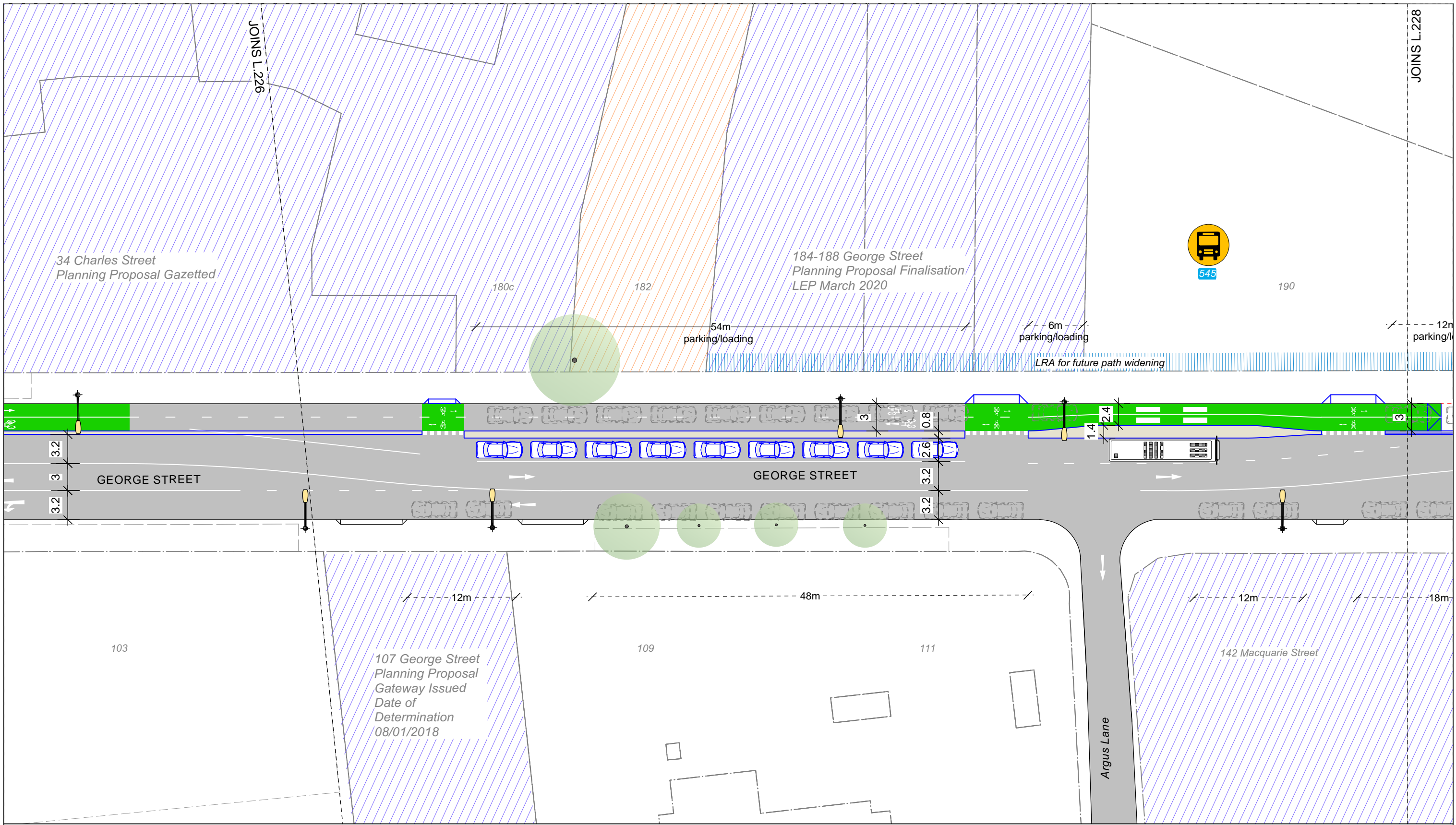
CLIENT

TITLE George Street	SHEET L. 225
DRAWING Preliminary Concept Plan	REV J



KEY	
Parking Retained	Bidirectional Cycleway
New/Relocated Parking	New kerb and gutter
Parking Removed	New Pavement
Existing Light Post	Existing Awning
Existing Kerb & Gutter	Existing Street Trees
Existing Traffic Signal Pole	Item To Be Removed
Proposed Street Trees	LRA
LRA	Proposed Turn Ban
Heritage General	Planning Proposal
Existing Turn Ban	Sydney Metro
Sydney Metro	Shared Path Markings

FOR DISCUSSION		NORTH 	NOTES: THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.	TRAFFIC ENGINEER Flourmill Studios, Studio 203, 3 Gladstone Street, Newtown, NSW 2042 (02) 9557 6202	HEAD CONSULTANT spackman mossop michael LANDSCAPE ARCHITECTS 115 Flinders Street Surry Hills, NSW 2010 (02) 9361 4549 info@sm2group.com.au www.spackmanmossopmichaels.com	CLIENT 	TITLE George Street	SHEET L.226
J PRELIMINARY CONCEPT PLAN	MD/FM 08/04/21						SCALE 0 3 5 8 m	DRAWING Preliminary Concept Plan
REV	DESCRIPTION	INITIAL	DATE					



KEY

- Parking Retained
- Bidirectional Cycleway
- Existing Light Post
- Existing Kerb & Gutter
- Proposed Street Trees
- Existing Turn Ban
- Sydney Metro
- New/Relocated Parking
- New kerb and gutter
- Existing Awning
- Existing Street Trees
- LRA
- Proposed Turn Ban
- Shared Path Markings
- Parking Removed
- New Pavement
- Existing Traffic Signal Pole
- Item To Be Removed
- Heritage General
- Planning Proposal

FOR DISCUSSION		
	<p>NORTH</p>	
<p>SCALE</p>		
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TRAFFIC ENGINEER

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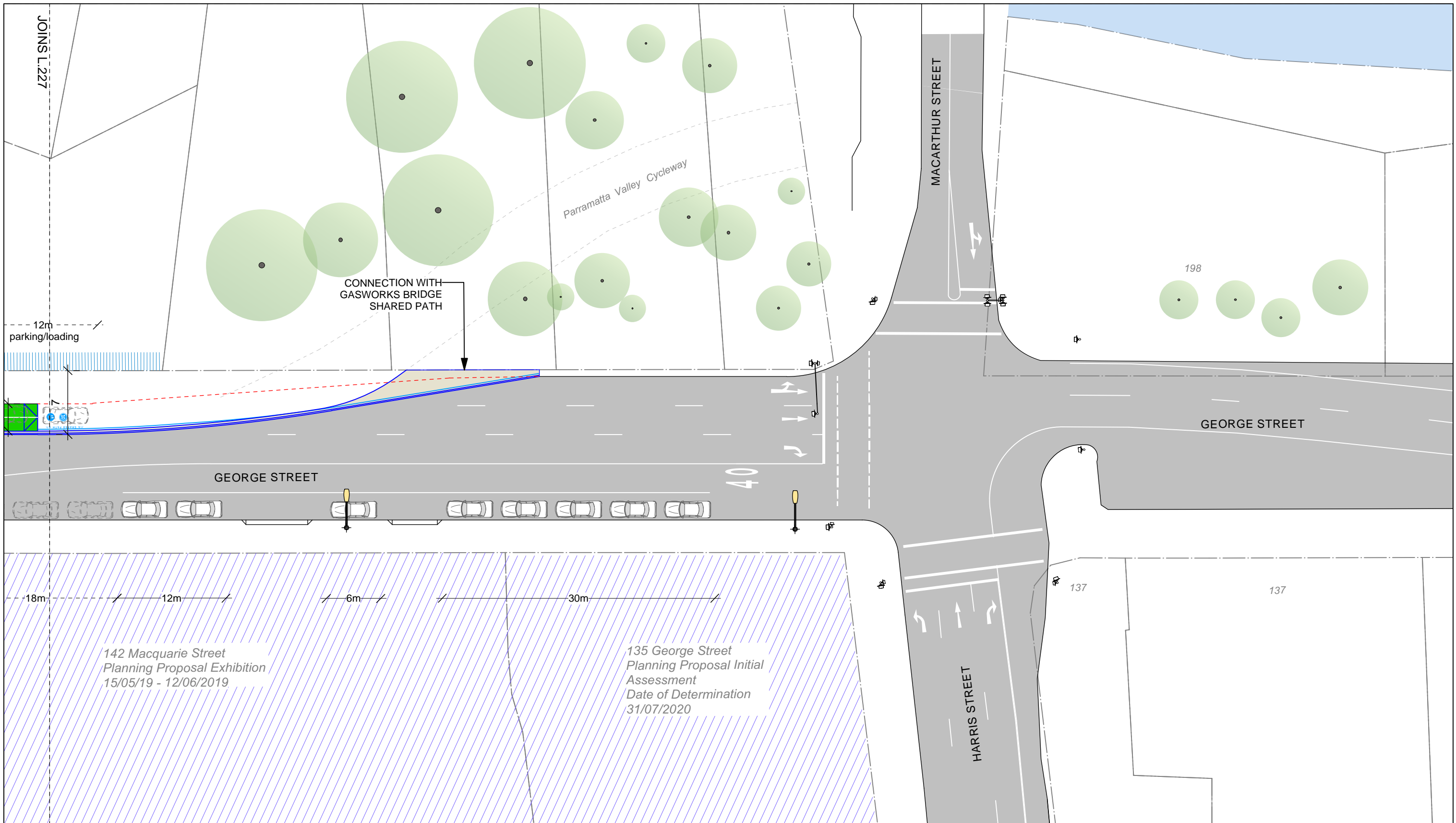
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CLIENT

TITLE George Street	SHEET L.227
DRAWING Preliminary Concept Plan	REV J



KEY	
Parking Retained	Bidirectional Cycleway
New/Relocated Parking	New kerb and gutter
Parking Removed	New Pavement
Existing Light Post	Existing Awning
Existing Kerb & Gutter	Existing Street Trees
Existing Traffic Signal Pole	Item To Be Removed
Proposed Street Trees	Existing Turn Ban
LRA	Proposed Turn Ban
Heritage General	Shared Path Markings
Planning Proposal	Sydney Metro

FOR DISCUSSION		NORTH	NOTES: THIS PLAN REPRESENTS THE OUTCOME OF PRELIMINARY INVESTIGATIONS INTO THE SPATIAL FEASIBILITY OF DELIVERING A SEPARATED CYCLEWAY ALONG THE NOMINATED STREETS. FURTHER INVESTIGATION IS REQUIRED TO DETERMINE OPERATIONAL FEASIBILITY AND TO DEVELOP THE DESIGN.	TRAFFIC ENGINEER Flourmill Studios, Studio 203, 3 Gladstone Street, Newtown, NSW 2042 (02) 9557 6202	HEAD CONSULTANT spackman mossop michael's LANDSCAPE ARCHITECTS 115 Flinders Street Surry Hills, NSW 2010 (02) 9361 4549 info@sm2group.com.au www.spackmanmossopmichaels.com	CLIENT 	TITLE George Street DRAWING Preliminary Concept Plan	SHEET L.228 REV J
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