SCT Consulting

TRANSPORT AND ACCESSIBILITY IMPACT ASSESSMENT AND GREEN TRAVEL PLAN

Royal Prince Alfred Hospital Redevelopment

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Quality Assurance

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1.0	1 October 2022	Draft Transport and Accessibility Impact Assessment and Green Travel Plan
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4.0	1 November 2022	Post ToA update for SSDA submission

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Executive Summary

Background and introduction

In March 2019, the NSW Government announced a significant $750 million investment for the redevelopment and refurbishment of the RPA Hospital campus. The Project will include the development of clinical and non-clinical services infrastructure to expand, integrate, transform and optimise current capacity within the hospital to provide contemporary patient centred care, including expanded and enhanced facilities.

The last major redevelopment of RPA Hospital was undertaken from 1998 to 2004 projected to 2006 service needs. Since then, significant growth has been experienced in the volume and complexity of patients, requiring significant investment to address projected shortfalls in capacity and to update existing services to align with leading models of care.

The redevelopment of RPA Hospital has been the top priority for the Sydney Local Health District since 2017 through the Asset Strategic Planning process, to achieve NSW Health strategic direction to develop a future focused, adaptive, resilient and sustainable health system.

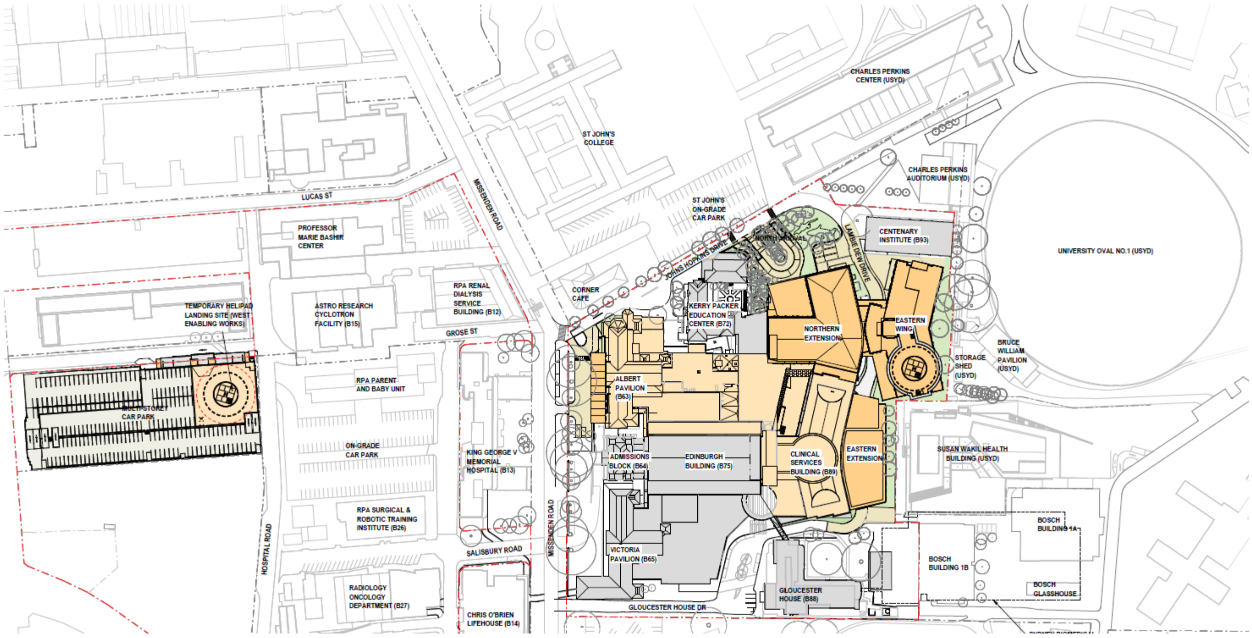
This Traffic and Accessibility Impact Assessment was prepared in support of the Development Application.

The proposal

Development consent is sought for:

- **Alterations and additions to the RPA Hospital East Campus**, comprising:
  - **Eastern wing**: A new fifteen (15) storey building with clinical space for Inpatient Units (IPU's), Medical Imaging, Delivery, Neonatal and Women's Health Services, connecting to the existing hospital building and a rooftop helicopter landing site (HLS)
  - **Eastern extension:** A three (3) storey extension to the east the existing clinical services building to accommodate new operating theatres and associated plant areas
  - **Northern expansion:** A two (2) storey vertical expansion over RPA Building 89 accommodating a new Intensive Care Unit and connected with the Eastern Wing
  - **Internal refurbishment:** Major internal refurbishment to existing services including Emergency Department and Imaging, circulation and support spaces
  - Enhanced Northern Entry/ Arrival including improved pedestrian access and public amenity
  - Demolition of affected buildings, structures and trees
  - Changes to internal road alignments and paving treatments
  - Landscaping works, including tree removal, tree pruning, and compensatory tree planting including off-site on University of Sydney land.
- **Ancillary works to the RPA Hospital West Campus**, comprising:
  - Temporary helicopter landing site above existing multi storey carpark
  - Re-routing of existing services
  - Associated tree removal along Grose Street.

Figure 1 Proposed development



Source: Jacobs, 2022

Mode share targets

Mode share targets for staff are based on the Sustainable Sydney 2030-2050 and an understanding that workers who arrive and depart the hospital at non-typical hours should not be expected to have the same travel behaviour as their colleagues who work typical hours. RPA will aim to achieve the Sustainable Sydney targets by 2050 for staff who work typical hours.

Patients and visitors arriving and departing the hospital are a relatively vulnerable user group and may arrive and depart at non-regular hours. Target mode shares in this assessment will not include patients or their visitors. This is in line with City of Sydney's mode share aspirations as their targets are intended for work journeys.

Mode share targets for RPA staff

Mode	Pre-COVID-19	Existing 2021	Launch target 2028	Long term target 2050 (Typical Hours)
Walk	9%	9%	10%	12%
Cycle	3%	2%	7%	12%
Rail	17%	13%	18%	23%
Bus	14%	11%	15%	19%
Total non-car	**43%**	**35%**	**50%**	**66%**
Car	**56%**	**64%**	**50%**	**33%**
Other	1%	1%	-	-
Total	100%	100%	100%	100%

The launch target for car mode share is 6 percentage points lower than pre-COVID-19 levels. Green Travel Plan (GTP) initiatives including adjusted parking fees and incentives to use sustainable modes of transport will decrease the dependence on car use. This is a reasonable target considering that workers at the University of Sydney had a car mode share of 35%.

Travel demand and associated impacts

The expected vehicle trips associated with the development are listed in the table below, accounting for a shift in demand as a result of target mode share.

Peak hour vehicle trip generation estimation

User group	Headcount / Volume growth	AM peak 8-9AM Additional trips, 2031		PM peak 4-5PM Additional trips, 2031	
		Inbound	Outbound	Inbound	Outbound
Staff	30%	62	31	31	62
Outpatients	33%	44	22	18	18
Inpatients and visitors	43%	37	7	15	28
Logistics	40%	4	2	2	2
Total	-	147	62	66	110

SIDRA 9 intersection modelling was conducted for the following key intersections around RPA:

– Parramatta Road / Missenden Road (Signalised), providing the connection to the closest arterial road.
– John Hopkins Drive / Missenden Road (Priority), which provides access to the ED and key hospital functions, while being a significant pedestrian crossing opportunity.
– Carillon Avenue / Missenden Road (Signalised), providing the connection to the southern collector road.
– Carillon Avenue / Hospital Road (Signalised), which provides access to the hospital's multistorey carparks.

Modelling shows that each of the above intersections are expected to perform at an adequate Level of Service (LoS) during the peak periods and no upgrades to road infrastructure is required. This is unsurprising as the increase in vehicle traffic as a result of the redevelopment is relatively small and is distributed through the network.

The mode share targets will lead to an increase in demand on the public transport network and walking and cycling infrastructure. The AM Peak public transport demand will grow by approximately 110 bus passengers and 130 rail passengers. It is expected that the regular bus and rail services will be able to accommodate this growth.

Additional provisions for bicycle parking and end of trip facilities such as showers and lockers will be critical in enabling the shift towards more sustainable modes of transport. The upgrade of RPA will provide a total of 286 bicycle parking spaces for staff. These spaces should be class 2 bike facilities, as stipulated by the Development Control Plan (DCP).

Car parking demand is expected to be 2,398 when the development is fully operational. This translates to an occupancy rate of 92%. No additional car parking facilities will be required, however, parking will need to be used efficiently while the Green Travel Plan continues to improve the attractiveness of alternative methods of travel.

Green Travel Plan

A Green Travel Plan (GTP) was developed to support the mode share targets that RPA is pursuing. The successful shift away from driving mode share is a key requirement in minimising the transport and traffic impact of the redevelopment. Initiatives proposed in the GTP were based on the current travel patterns to RPA, the mode share targets set by the City of Sydney's *Sustainable Sydney 2030-2050*, and staff sentiment towards switching to other modes. The Staff Travel Survey conducted in 2021 was instrumental in identifying potential for mode shift and the willingness of staff to take up sustainable initiatives:

– 68% of drivers, a significant majority, indicated they would consider public transport at least occasionally if the correct measures were put in place.
– 38% of staff who currently travelled up to 30 minutes said they would at least occasionally consider cycling or walking for their journey if the correct measures were put in place.

Recommended strategies and initiatives for RPA to pursue are:

– An annual travel survey of staff and visitors should be conducted to understand trends in travel patterns and monitor initiative efficacy over time.

- **OBJ1:** Increase mode share of public transport, walking, and cycling modes.
- **OBJ2:** Promoting the health benefits of cycling and walking.
- **OBJ3:** Provide staff and visitors with the support and facilities needed to choose sustainable transport modes.
- **OBJ4:** Raise awareness and encourage the use of current and future sustainable transport networks.
- **OBJ5:** Reduce the number of trips made by car to and from RPA and its demand on parking supply.

The next steps in implementing the GTP include the endorsement and ownership of this document by RPA and the SLHD, and the establishment of a governance structure to begin exploring how these initiatives can be implemented. This will be a plan that will continue to be active even after the development is complete, with strategies changing over time as travel patterns evolve.

1.0 Introduction

1.1 Site description

The Royal Prince Alfred (RPA) Hospital campus is located in Sydney's inner west suburb of Camperdown, within the City of Sydney Local Government Area. The campus is situated between the University of Sydney to the east and the residential area of Camperdown to the west. A north-south arterial road (Missenden Road) divides the campus into two distinct portions, known as the East and West Campuses. The northern boundary of the campus is defined by the Queen Elizabeth II Rehabilitation Centre and the southern extent of the campus is defined by Carillon Avenue.

The works are proposed to both the East and West Campuses, as well as some off-site works occurring within the University of Sydney.

The site comprises the following land titles, as shown in **Figure 1-1**:

East campus:

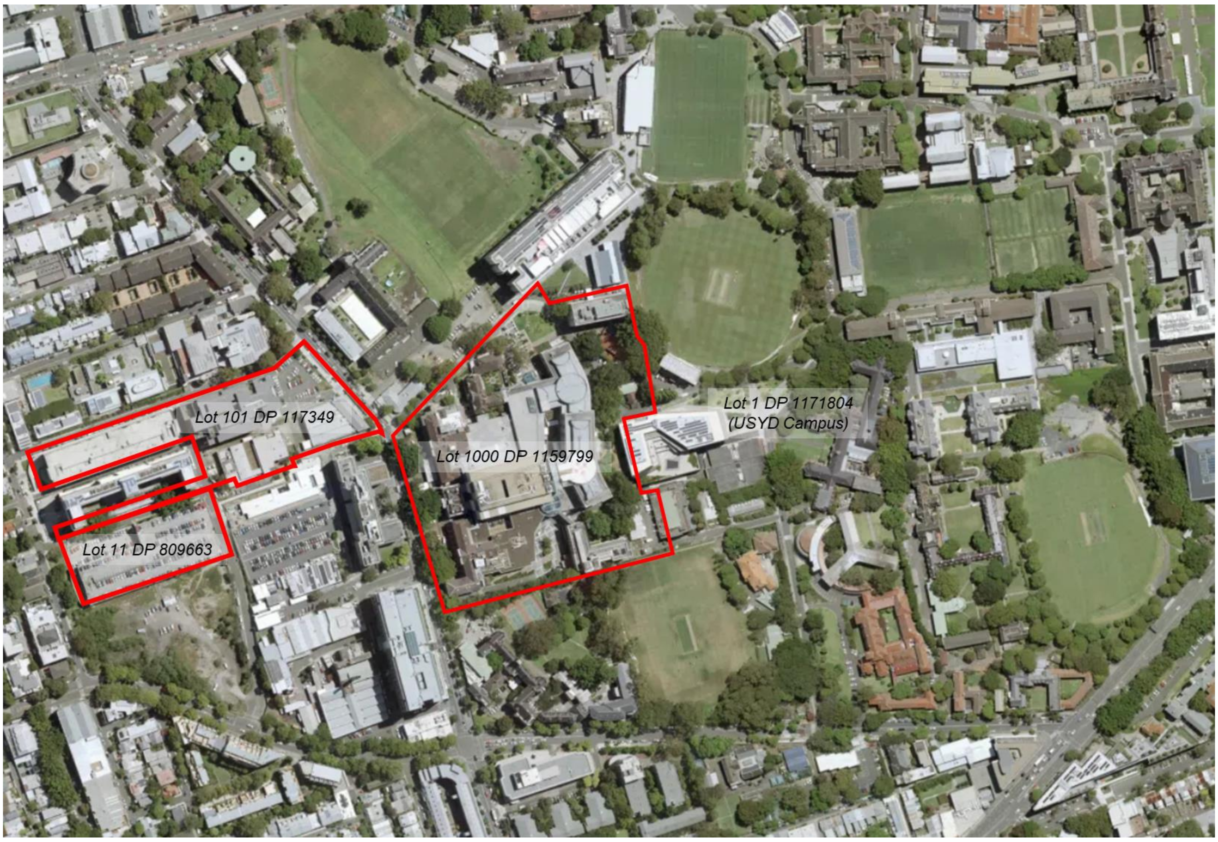
– Lot 1000 DP 1159799 (12 Missenden Road, Camperdown, 2050).

West campus:

– Lot 11 DP 809663 (114 Church Street, Camperdown, 2050); and

– Lot 101 DP 1179349 (68-81 Missenden Road, Camperdown 2050).

Figure 1-1 Site boundary



Off-site works are proposed on University of Sydney land, known as Lot 1 DP 1171804 (3 Parramatta Road, Camperdown, 2050) and Lot 1001 DP 1159799 (12A Missenden Road, Camperdown, 2050).

1.2 Project background

In March 2019, the NSW Government announced a significant $750 million investment for the redevelopment and refurbishment of the RPA Hospital campus. The Project will include the development of clinical and non-clinical services infrastructure to expand, integrate, transform and optimise current capacity within the hospital to provide contemporary patient centred care, including expanded and enhanced facilities.

The last major redevelopment of RPA Hospital was undertaken from 1998 to 2004 projected to 2006 service needs. Since then, significant growth has been experienced in the volume and complexity of patients, requiring significant investment to address projected shortfalls in capacity and to update existing services to align with leading models of care.

The redevelopment of RPA Hospital has been the top priority for the Sydney Local Health District since 2017 through the Asset Strategic Planning process, to achieve NSW Health strategic direction to develop a future focused, adaptive, resilient and sustainable health system.

1.3 Description of development

Alterations and additions to the RPA Hospital East Campus, comprising:

– Eastern wing: A new fifteen (15) storey building with clinical space for Inpatient Units (IPU's), Medical Imaging, Delivery, Neonatal and Women's Health Services, connecting to the existing hospital building and a rooftop helicopter landing site (HLS)
– Eastern extension: A three (3) storey extension to the east the existing clinical services building to accommodate new operating theatres and associated plant areas
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Ancillary works to the RPA Hospital West Campus, comprising:

– Temporary helicopter landing site above existing multi storey carpark
– Re-routing of existing services
– Associated tree removal along Grose Street.

1.4 Purpose of this study

This Traffic and Accessibility Impact Assessment was prepared in support of the Development Application for the Project, namely alterations and additions to the RPA Hospital East Campus and ancillary works to the RPA Hospital West Campus. This report presents the results of the assessment undertaken through the following tasks:

– Existing conditions and context – review of the transport policy and planning context and existing traffic, parking, servicing, public transport, active transport facilities and conditions.
– Proposed development – description of proposed development and associated traffic changes.
– Transport and accessibility impact assessment – review of likely impact on people who walk, ride, catch public transport, drive, park and service the hospital.
– Green travel plan (GTP) – strategies and initiatives to achieve more sustainable mode share targets
– Construction traffic management plan (CTMP) – preliminary overview of a CTMP to be used during construction works.

1.5 Report structure

This report is structured as follows:

- **Section 2** considers the relevant transport planning context
- **Section 3** describes the existing transport conditions for all modes of transport.
- **Section 4** presents the proposed development and its access strategy, as well as the parking requirements and the likely trip generation as a result of the proposed development.
- **Section 5** discusses the likely cumulative impacts for all transport modes and parking as a result of the proposed development.
- **Section 6** details the proposed GTP for the Royal Prince Alfred hospital.
- **Section 7** presents an overview of construction impacts.
- **Section 8** summarises the report content and presents the final conclusions.

2.0 Transport policy and planning context

A review of regional and local strategic documents was undertaken to identify relevant implications for the redevelopment. This section provides a summary of the key transport policy and planning context relevant for traffic and transport infrastructure and services to support the redevelopment.

The review covered:

– Key regional and district strategies

– Key precinct and local strategies, including the Camperdown Health Education and Research Precinct Plan

– Sydney Local Environmental Plan 2012 and City of Sydney Development Control Plan 2012.

Specific traffic and transport infrastructure and services discussed in the strategic documents may not service the site, and hence only relevant considerations for the redevelopment are documented.

2.1 Key regional / district strategies

The regional / district strategy documents reviewed, along with the implications for the redevelopment site, are summarised in **Table 2-1**. Some of the strategic transport objectives from these documents include:

– The development of a three-city metropolis for Greater Sydney by investing in transport infrastructure that provides high frequency and high-volume access to, and connectivity between, each of the three cities, while enhancing local amenity.

– Investment in transport infrastructure that is integrated with land use to create opportunities for agglomeration and enhance productivity, liveability and accessibility, in support of the policy goal of a '30-minute city'.

– Further development of the Sydney rail network with new rail links and system-wide upgrades.

– Development of extensive on-road rapid transit networks and active transport links to support the mass transit system.

– Encouragement of travel patterns that are tailored to the capacity of the network and help to manage congestion with mobility pricing reform and demand management initiatives.

– Upgrading the public domain with place-making initiatives and improving transport, walking and cycling connections between key hubs, particularly in response to student and job growth

– Re-allocation of road space in key commuter corridors to give priority to the most productive and sustainable transport modes, improve the integration of services across modes, remove network bottlenecks and upgrade operational systems and infrastructure.

Table 2-1 Summary of regional / district strategy implications

Regional / district strategy	Implications for the Project site
Greater Sydney Regional Plan: A Metropolis of Three Cities	The site is located within the Harbour CBD in the Eastern Harbour City. It also sits with the Eastern Economic Corridor that stretches from Macquarie Park to Sydney Airport. The corridor is the State's largest economic asset, contributing two-thirds of NSW's economic growth in the 2015-16 financial year, and has strong financial, professional, health, education and innovation sectors. The Eastern Harbour City has significant rail projects underway aimed at increasing its global competitiveness, boosting business-to-business connections and attracting skilled workers with faster commuting times. Sydney Metro City & Southwest will connect to Chatswood and Sydenham-Bankstown, while Sydney Metro West will provide faster and more frequent trips to and from Greater Parramatta.
State Infrastructure Strategy (SIS) 2018-2038	For the Eastern Harbour City, the SIS aims to improve access to international gateways, mass transit connections to the CBD (especially from the west and southeast), active transport, cultural infrastructure and provide more educational learning spaces. The SIS recognises that urban renewal will occur to the south and west of the city – in the Central to Eveleigh Precinct, just to the south of the RPAH site – and The Bays Precinct.

Regional / district strategy	Implications for the Project site
Eastern City District Plan	The Eastern City District Plan is a 20-year plan to manage growth in the context of economic, social and environmental matters to achieve the 40-year vision for Greater Sydney. It contains the planning priorities and actions for implementing the Greater Sydney Regional Plan. The Plan contains Planning Priority E8 (Growing and investing in health and education precincts and the Innovation Corridor), which delivers on Objective 21 (Internationally competitive health, education, research and innovation precincts) of the Plan. The Camperdown–Ultimo Collaboration Area is part of the Innovation Corridor and is one of the largest and most comprehensive health and education precincts in Greater Sydney, containing the RPAH site, the University of Sydney (USYD), University of Technology Sydney, University of Notre Dame Sydney Campus, TAFE Ultimo, and medical research institutions. The Plan directs the Camperdown–Ultimo Collaboration Area to upgrade the public domain with place-making initiatives, improve transport, walking and cycling connections between key hubs, particularly in response to student and job growth.
Future Transport Strategy 2056	Future Transport 2056 is a 40-year strategy, supported by plans for regional NSW and for Greater Sydney. The vision for Greater Sydney, where people can access the majority of jobs and services within 30 minutes, will require a sustained and staged investment program to protect corridors and then develop an integrated transport system that includes city-shaping, city-serving, centre-serving and strategic freight networks. The transport networks are proposed to expand to provide improved access to each metropolitan centre, including the safe and reliable movement of freight. These networks will be progressively developed through a range of infrastructure investments that will make key improvements to the city-shaping and road networks as well as upgrade local roads, walking and bicycle paths, as detailed in the Greater Sydney Services and Infrastructure Plan.
Greater Sydney Services and Infrastructure Plan	Building on the transport outcomes identified in Future Transport Strategy 2056, the Plan establishes the specific outcomes transport customers in Greater Sydney can expect and identifies the policy, service and infrastructure initiatives to achieve these. The plan defines the network required to achieve the service outcomes.
Better Placed: Aligning Movement and Place	This outline introduces the Movement and Place Framework and sets out a better approach to aligning movement and place in the design, planning, construction and operation of NSW's overall transport network. The plan aims to facilitate and encourage sustainable transport modes including walking, cycling and public transport and minimising the space dedicated to vehicle movement
Practitioners Guide to Movement and Place	This guide provides practitioners with a collaborative, iterative process that can guide consultation, analysis, decision-making, and evaluation throughout the life cycle of a plan or project. It details the importance of considering the whole street, which includes people walking and cycling, as well as people spending time in places.
Road User Allocation Policy	By implementing this Policy, Transport ensures that the allocation of road user space is a deliberate exercise that considers the place, function and movement requirements of roads to achieve the strategic intent and outcomes as set out in state-wide, metropolitan and regional strategies and plans. An action that assists in achieving these objectives is to optimise how space is allocated throughout the day, week or year, including the dynamic control of space, access, level of priority, speed and kerbside use through signage, signals, and other technology. It also notes that when allocating road user space based on the network vision and road functions, we should consider all road users in order of walking (including equitable access for people of all abilities); cycling (including larger legal micro-mobility devices); public transport; freight and deliveries; and point to point transport ahead of general traffic and on-street parking for private motorised vehicles.

2.2 Key precinct / local strategies

The precinct / local strategy documents reviewed, along with the implications for the redevelopment site, are summarised in **Table 2-2**. Some of the transport implications from these documents include:

– Within the Camperdown-Ultimo Collaboration Area, now known as Tech Central, the NSW Government has committed to creating a globally competitive innovation and technology precinct. Stretching from Central Station to Camperdown, Tech Central will house start-ups, scale-ups, and innovation ecosystem partners. Tech Central will also create great public spaces improving walking and cycling connections as part of urban renewal projects. The Tech Central Place-based Transport Strategy outlines a 20-year vision for transport in Tech Central with four strategic directions of the creating walkable streets and places, enhancing access by cycling and public transport, shaping a sustainable and resilient precinct, and fostering innovation.

– Transport for NSW is also focused on completing key missing links in the bicycle network within 10 kilometres of metropolitan centres and establishing the Principal Bicycle Network (PBN).

– The Camperdown Health Education and Research Precinct (CHERP) is supported by a planning framework that includes a Precinct Plan and Campus Plan that were developed during the pre-planning phase of the RPA Hospital Redevelopment. These plans promote a collective vision and narrative for the CHERP and include design principles that guide and promote positive outcomes across the precinct, including great accessibility, integration and strong connections, a vehicle calmed heart, and special places and wayfinding.

– The Sustainable Sydney 2030 and Community Strategic Plan has set a target of increasing trips to work using public transport by 80 per cent for both residents of the city and those travelling to the city from elsewhere.

– The Disability Action Plan aims to review the current provision of mobility parking spaces in the City of Sydney and develop strategies to maximise the access and inclusion outcomes associated with mobility parking. It also intends to continue to provide information about the locations of mobility parking spaces in the City and include additional information about their features.

– The City of Sydney Cycling Strategy and Action Plan 2018-2030 outlines actions include completing the 11 regional bike routes and the local bike network, as well as improving the safety and access within the precinct.

– Similarly, the City of Sydney Walking Strategy and Action Plan 2015-2030 sets various short-, medium- and long-term actions to improve overall walkability and pedestrian priority.

Table 2-2 Summary of precinct / local strategy implications

Precinct / local strategy	Implications for the Project site
Camperdown-Ultimo Collaboration Area Place Strategy	The site is located within the Camperdown–Ultimo Collaboration Area, which stretches from Camperdown to Ultimo and covers Darlington and Eveleigh, most of Haymarket, Ultimo and Camperdown and parts of Glebe, Forest Lodge, Newtown, Redfern and Surry Hills. The Place Strategy defines a vision for the collaboration area as Australia's innovation and technology capital by 2036. It provides accessible public transport, walking and cycling to guide growth and change. Additionally, Transport for NSW is focused on completing key missing links in the bicycle network within 10 kilometres of metropolitan centres and establishing the Principal Bicycle Network
Tech Central Place-based Transport Strategy	Tech Central, formerly known as Camperdown-Ultimo Collaboration Area, is an innovation and technology precinct that has investment from the NSW Government to provide up to 250,000 square metres of affordable space for start-ups and scale-ups to provide the building blocks for the creation of the biggest technology hub in Australia. The Tech Central Precinct encompasses the Camperdown Health Education and Research Precinct (CHERP) of which the RPAH and USYD are the two largest asset owners. Building on the Camperdown-Ultimo Place Strategy, the Tech Central Place-based Transport Strategy outlines a 20-year vision for transport in Tech Central that is connected, liveable, sustainable and productive. The four strategic directions of the Strategy are creating walkable streets and places, enhancing access by cycling and public transport, shaping a sustainable and resilient precinct and fostering innovation.

Precinct / local strategy	Implications for the Project site
Camperdown Health Education and Research Precinct Planning	The RPAH is a foundation partner of the CHERP, one of the largest and most comprehensive health and education precincts in Greater Sydney, that includes USYD, major education and research institutions and supporting local industries. The CHERP is supported by a planning framework that includes a Precinct Plan and Campus Plan that were developed during the pre-planning phase of the RPAH Redevelopment. These plans promote a collective vision and narrative for the CHERP and include design principles that guide and promote positive outcomes across the precinct, including great accessibility, integration and strong connections, a vehicle calmed heart, and special places and wayfinding.
City Plan 2036: Local Strategic Planning Statement	This Local Strategic Planning Statement reinforces the links between the NSW Government's strategic plans and the City's community strategic plan, Sustainable Sydney 2030, and the planning controls that guide development in the city. The City recognises that the CHERP is part of the Innovation Corridor and acknowledges continuing collaboration to ensure that productivity and industry cluster growth outcomes are prioritised in the CHERP. The City recognises that the ability of businesses and clusters to continue to grow and agglomerate also relies on their ability to connect, both physically and technologically. The City will continue advocating and facilitating ongoing transport and digital infrastructure investments to improve connectivity within clusters in City Fringe and to the rest of the Eastern Economic Corridor.
Sustainable Sydney 2030-2050	Sustainable Sydney 2030-2050 expresses the community's vision to plan a green, global and connected city. This strategy seeks to have people using public transport, walking or cycling to and from work, setting a 2050 target of 9 out of 10 for people working in the city centre and 2 out of 3 people working in the rest of the local area (which is applicable for RPA). The plan emphasises the importance of providing enough footpath space for people to walk comfortably and intersections that function efficiently for all users.
A City for All Inclusion (Disability) Action Plan 2017-2021 (City of Sydney)	This plan includes a series of actions designed to actively address barriers faced by people with disability in all age groups. The plan aims to review the current provision of mobility parking spaces in the City of Sydney and develop strategies to maximise the access and inclusion outcomes associated with mobility parking. It also intends to continue to provide information about the locations of mobility parking spaces iWn the City and include additional information about their features.
Central Sydney Planning Framework 2016 – 2036 (City of Sydney)	The Framework is a growth strategy that revises several previous planning controls and aims to deliver on the Sustainable Sydney 2030 program for a green, global and connected city. The Framework outlines 10 key moves and aims to balance the opportunities for development to meet the demand of population growth to 2036 and beyond with the changing needs of workers, residents and visitors. The key changes proposed seek to facilitate amendments to controls that govern additional height and density in suitable locations, and broadly opportunities to unlock additional capacity for economic and employment growth, as well as ensuring that new development achieves design excellence.
Connecting Our City: Transport Strategy and Action Plan (City of Sydney)	The Transport Strategy and Action Plan is a framework for action by the Council and Government to improve transport and access to better connect our City. Following Sustainable Sydney 2030, this plan addresses concerns related to transport and access. The plan lists actions related to encouraging active transport, integrating transport and land use, managing streets, parking and vehicles, and enhancing public transport.
City of Sydney Cycling Strategy and Action Plan 2018-2030	The City of Sydney Cycling Strategy and Action Plan proposes the next steps of integrating Sydney's cycling network. It outlines actions include completing the 11 regional bike routes and the local bike network, as well as supporting people to ride supporting business and leading by example. The City is targeting a mode share of 10% of all journeys to work to be completed on bicycles by 2030. This is paired with a target of 80% of people who ride to feel somewhat or very safe riding in inner Sydney (within 10km of city centre). This includes the RPA campus.

Precinct / local strategy	Implications for the Project site
City of Sydney Walking Strategy and Action Plan 2015-2030	The City of Sydney supports walking as a mode of transport to meet the environmental, economic and social objectives set in Sustainable Sydney 2030 and Connecting Our City. This strategy includes targets based on a review of trends and forecasts and sets various short-, medium- and long-term actions to improve overall walkability and pedestrian priority
Legible Sydney – Wayfinding Strategy	The overall objective of this Strategy is to develop a Wayfinding System that allows the delivery of a more legible public domain that encourages people to walk with comfort and confidence around the City of Sydney.
The Heathy Liveable Communities Urban Liveability Checklist	The Urban Liveability Checklist is a tool for use in established or proposed urban areas to assess liveability and opportunities to improve health and wellbeing. The major transport-related domains listed in the document include walkability and public transport.
Heart Foundation Heathy Active by Design	The Heart Foundation defines a neighbourhood on the move as one that has a network of integrated walking, cycling and public transport routes. Movement networks within a neighbourhood, and connecting to other neighbourhoods, need to be accessible, safe and cohesive.

2.3 Sydney Local Environmental Plan 2012

The Sydney Local Environmental Plan (LEP) 2012 is the primary local environmental planning instrument applying to the land with the site zoned as SP2 Infrastructure for the purpose of Health Services Facilities.

A key transport related aim of the plan is to ensure that the pattern of land use and density in the City of Sydney reflects the existing and future capacity of the transport network and facilitates walking, cycling and the use of public transport.

2.4 City of Sydney Development Control Plan 2012

The purpose of this Development Control Plan (DCP) is to supplement the Sydney LEP 2012 and provide more detailed provisions to guide development. This DCP must be read in conjunction with the provisions of Sydney LEP 2012. However, it is noted that DCPs do not apply to State Significant Development.

Section 3 of the plan addresses transport and parking components of the plan. Some of the key objectives include:

- Ensure that the demand for transport generated by development is managed in a sustainable manner.
- Ensure that bike parking is considered in all development and provided in appropriately scaled developments with facilities, such as change rooms, showers and secure areas for bike parking.
- Establish requirements for car share schemes for the benefit of people living and or working within a development.
- Design vehicle access and basement layouts and levels to maximise pedestrian safety and create high quality ground level relationships between the building and the public domain.
- Provide accessible car parking.

Schedule 7 Transport, parking and access of the DCP contains information on how to prepare reports required by the DCP, including Transport Impact Studies, Parking and Access Reports, Green Travel Plans and Transport Access Guides.

Overall, the DCP aims to provide streets that prioritise pedestrians, cycling and transit use. Footpaths are to be designed in accordance with the Sydney Streets Design code to allow pedestrians to move comfortably and safely. The provision of cycleways is to be consistent with the locations identified in the Cycle Strategy and Action Plan 2007-2017.

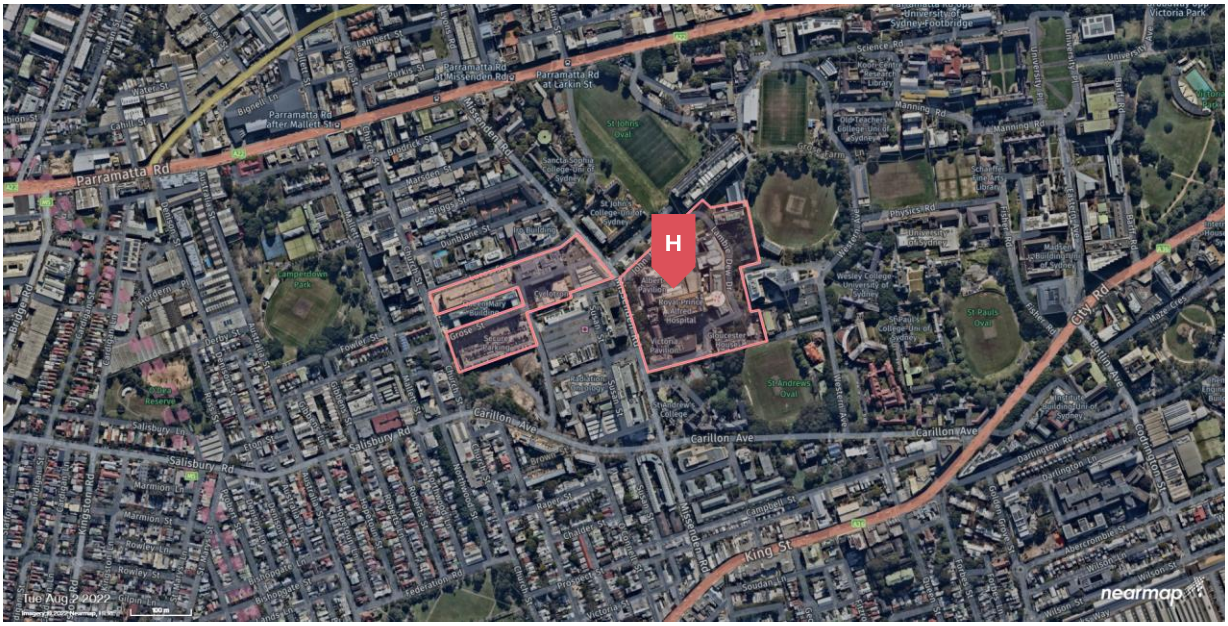
3.0 Existing conditions

This section of the report discusses the existing traffic and transport context of the network that may be impacted by the Project.

3.1 Site context

The Royal Prince Alfred (RPA) Hospital campus is located in Sydney's inner west suburb of Camperdown, within the City of Sydney Local Government Area. The campus is situated between the University of Sydney to the east and the residential area of Camperdown to the west. A north-south arterial road (Missenden Road) divides the campus into two distinct portions, known as the East and West Campuses. The northern boundary of the campus is defined by the Queen Elizabeth II Rehabilitation Centre and the southern extent of the campus is defined by Carillon Avenue, as indicated in **Figure 3-1**.

Figure 3-1 Site context and redevelopment boundary



The works are proposed to both the East and West Campuses, as well as some off-site works occurring within USYD. The site comprises the following land titles:

– East campus:
  - Lot 1000 DP 1159799 (12 Missenden Road, Camperdown, 2050
– West campus:
  - Lot 11 DP 809663 (114 Church Street, Camperdown, 2050);
  - Lot 4 DP 880430 (23-33 Carillon Avenue, Camperdown, 2050).

Off-site works are proposed on University of Sydney land, known as Lot 1 DP 1171804 (3 Parramatta Road, Camperdown, 2050) and Lot 1001 DP 1159799 (12A Missenden Road, Camperdown, 2050).

3.2 Walking

Footpath coverage is extensive in the vicinity of RPA, aside from service lanes, footpaths are provided on both sides of the road. Missenden Road has good pedestrian amenity; wide footpaths, traffic calming measures and multiple crossing opportunities, acting as the key north-south walking route that connects Parramatta Road to King Street / Newtown. However, other footpaths are less attractive, either narrow, or directly next to large traffic volumes (such as Parramatta Road or King Street). Responses to the staff travel survey also highlight a perception of poor street lighting for streets in the area, a deterrent to walking after sunset.

On the hospital campus itself, pedestrian infrastructure is available but not complete. Footpaths are provided on both sides along Missenden Road and most streets on the western side of the campus, except for Grose Street which does not have footpaths. The eastern campus loop has less pedestrian infrastructure, with footpaths on a single side only along John Hopkins Drive and Gloucester House Drive, and no connected footpaths on Lambie Dew Drive. Lambie Dew Drive is signposted as a shared zone that allows pedestrians to walk to and from the eastern exits of the main hospital building.

There are two zebra crossings joining the east and west campuses, and a signalised crossing at Salisbury Road. **Figure 3-2** show AM peak pedestrian numbers surveyed at John Hopkins Drive and Salisbury Road intersections with Missenden Road. Nearly all pedestrian groups need to cross Missenden Road. This is expected as Missenden Road runs through the middle of the precinct, and most of the parking supply is on the western part of campus while the main hospital building is located on the east. The zebra crossing north of John Hopkins Drive is heavily used by staff, patients, and visitors, as well as university students who use it to enter USYD from the entrance between the Centenary Institute and Charles Perkins Centre.

Figure 3-2 Pedestrian movement volumes, 8-9AM, Tuesday 30th August 2022

3.3 Cycling

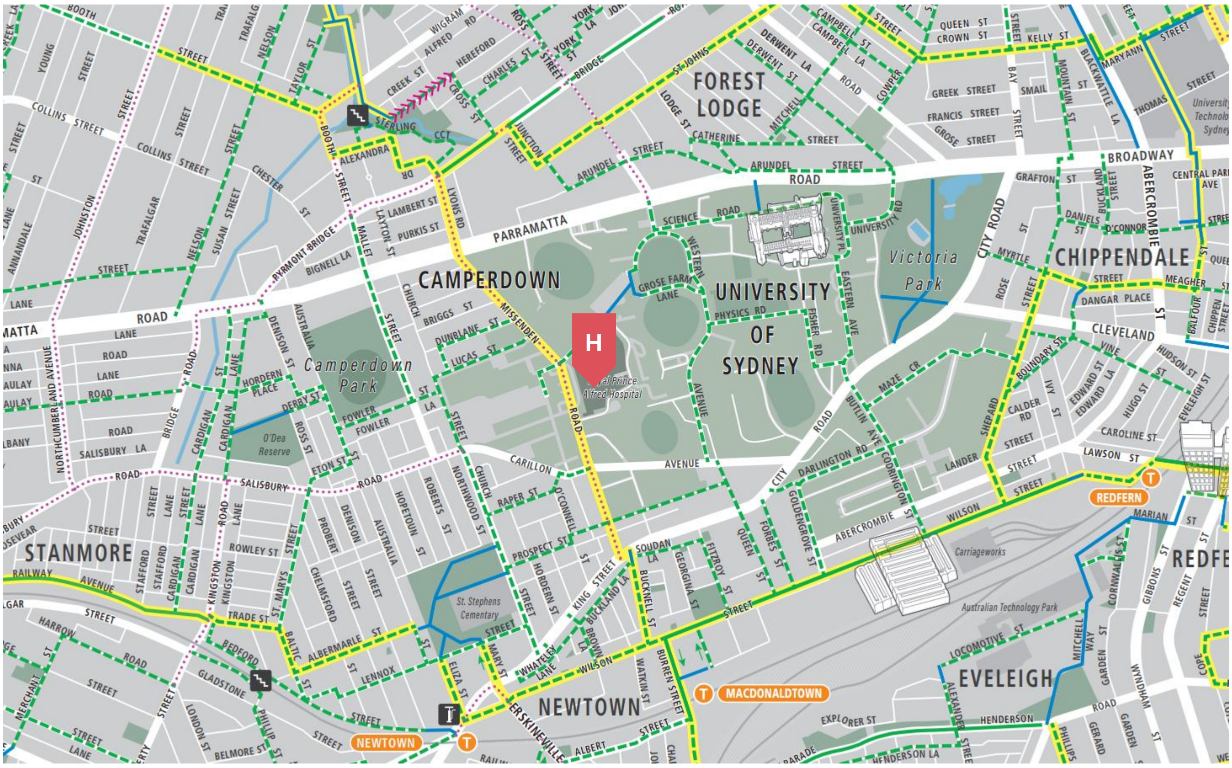
There is a poor provision of cycling infrastructure in the vicinity of the hospital as well as a low existing cycling mode share (2% of all RPA Hospital workers).

As seen in **Figure 3-3**, cyclists share the road with motorists on Missenden Road. There are a range of paths marked as “Low traffic street or bike lane” on the map, particularly to and from the USYD campus, but most of these are not continuous and do not join up with surrounding residential neighbourhoods. The primary movement corridors near the hospital, such as Parramatta Road and King Street, also have very poor provision for cyclists.

Strava activity in **Figure 3-4** shows that cyclists still use Missenden Road despite needing to share with cars, likely due to it being a more direct route. However, volumes are still much lower than routes with separated cycle routes, such as Bridge Road and Wilson Street.

The City of Sydney’s 2018-2030 Cycling Strategy Action Plan marks Missenden Road as part of a planned Regional Bike Network route, though it is unclear what infrastructure would be delivered on Missenden Road.

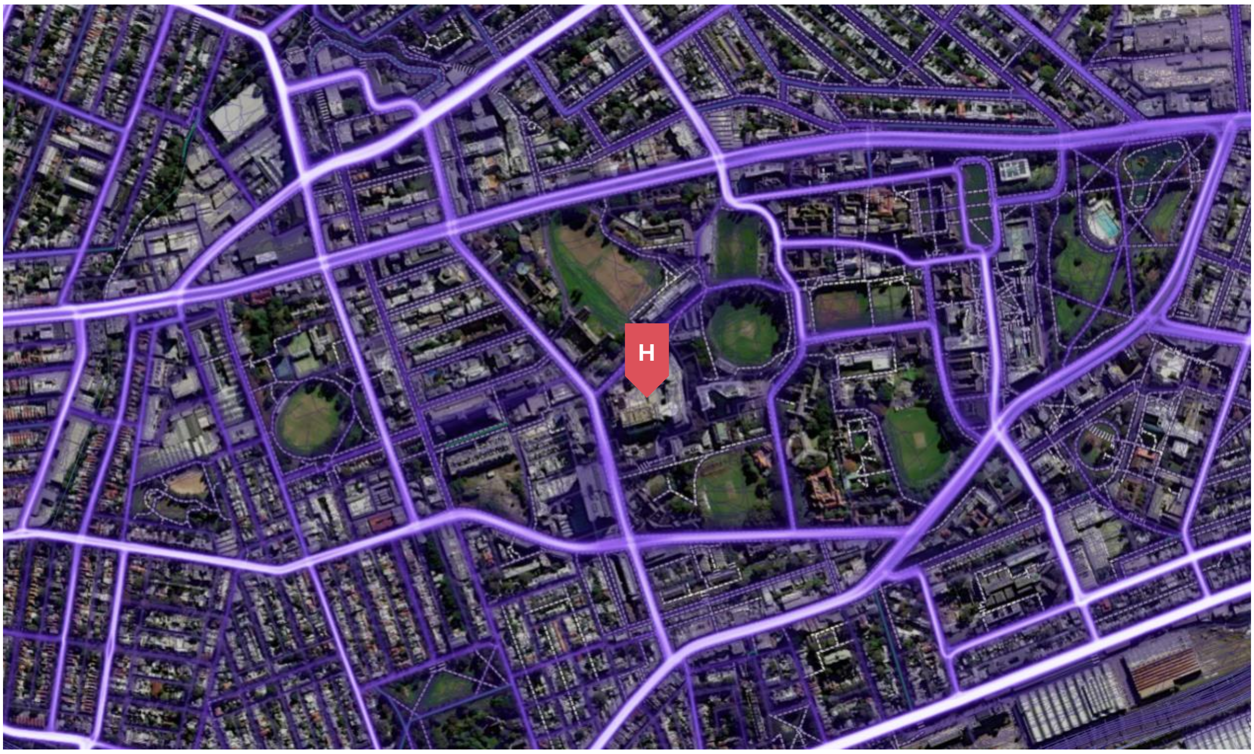
Figure 3-3 Sydney Cycling Map



Separated off-road cycleway
Low traffic street or bike lane
Off-road shared path
Direct route with higher traffic
Routes with wayfinding signage
Steep hill (arrows point uphill)

Source: City of Sydney, 2021

Figure 3-4 Strava cycling heatmap



Source: Strava, 2022

3.4 Public transport

Figure 3-5 shows the public transport services available in the study area, and the walking distance to the main hospital building. The closest available public transport are the bus stops on Missenden Road, approximately 150m north of the main hospital building. These stops are serviced by bus routes 412 (City to Campsie via Petersham and Earlwood) and 422 (City to Kogarah via St Peters). Bus routes 412 and 422 are highlighted in **Figure 3-5**.

In addition to these two bus routes, a wide range of bus services is available both on Parramatta Road to the north, and on King Street to the south. However, both major bus corridors are more than 400m, or more than 5 minutes' walk, away from the main hospital building. This is likely to deter some staff and visitors, and particularly patients, from using the bus to travel to the hospital.

The nearest train station is Macdonaldtown, which is about 1km away from the main hospital building. The distance from the hospital limits the attractiveness of the rail option; for example, from Central Station, it is usually faster to travel to the hospital by bus. Macdonaldtown Station is also only served by the all-stops services on the T2 line. Redfern Station is served by all major train lines to Central Station and the CBD, but it is a 2km walk (about 25 minutes) away from the main hospital building.

Figure 3-5 Walking distances to public transport

For an inner-city location, public transport provision to RPA Hospital is poor. Other major Sydney hospitals, such as Westmead, Royal North Shore and Prince of Wales, are all connected by mass transit in the form of train or light rail.

Although there are very frequent bus services on Parramatta Road and King Street, both are more than 400m away from the main hospital building. The two bus routes on Missenden Road run only between Sydney CBD and the south-west. As a result, large numbers of workers and patients in suburbs such as Ashfield and Earlwood cannot access the hospital within 30 minutes on public transport.

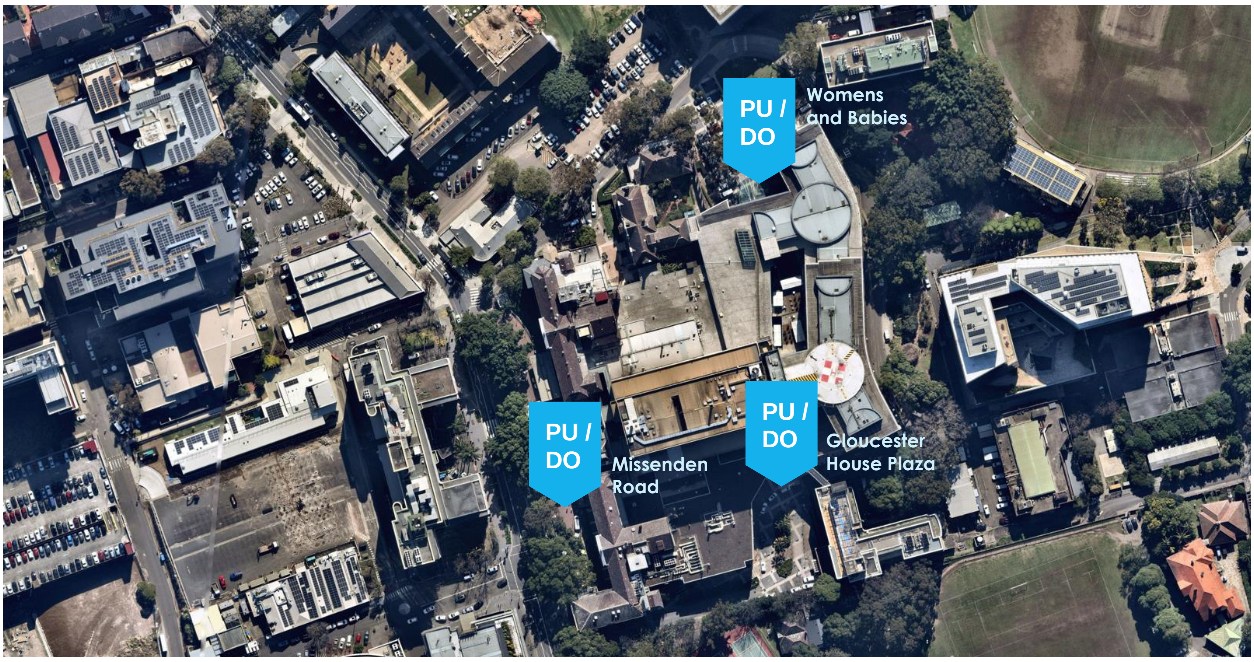
To improve public transport access, RPA Hospital has introduced a staff shuttle service to Redfern station. This mini bus runs from 3:30pm to midnight every day of the week, with an approximate frequency of once every 30 minutes. The shuttle has a full load at 20 passengers, and reportedly has less than 50% occupancy after 6:30PM.

Figure 3-6 Northbound bus stop on Missenden Road

3.5 Pick up / drop off bays

Royal Prince Alfred has 3 primary pick-up / drop-off (PU/DO) locations around the main hospital building. One along Missenden Road outside the Victoria Pavilion (level 5), one in the plaza area outside Gloucester House (Level 3) and one to service Women's and Babies on John Hopkins Drive (Level 3). Smaller PU/DO bays are also provided for other buildings on campus, such as King George V, The Professor Marie Bashir Centre, QEII, and Chris O'Brien Lifehouse.

Figure 3-7 Main pick-up / drop-off locations



Base map source: Nearmap, 2022

3.6 Emergency department and ambulance access

The Emergency Department (ED) at RPA is accessed via the Albert Pavilion through a shared drop-off/ambulance bay area. All users enter via the same driveway on John Hopkins Drive (**Figure 3-8**), including Ambulances, police vehicles, private cars, or pedestrians.

The current arrangement may lead to safety and operational concerns. The shared access between cars and ambulances, coupled with a lack of signage/markings for the public can cause congestion and confusion in the drop-off area. This is made worse with only 4 ambulance bays, leading to spill over of ambulance traffic. Ambulances sometimes have to re-circulate via Missenden Road to allow new inbounds to park in a bay and have been resorting to parking on the footpath along Missenden Road when there is not enough space, seen also in **Figure 3-8**.

In addition, people seeking to access the ED by foot have to cross over the ambulance entry route with no protection. This is a safety risk considering the urgency of ambulances and paramedics on approach to the ED.

Figure 3-8 Emergency Department access

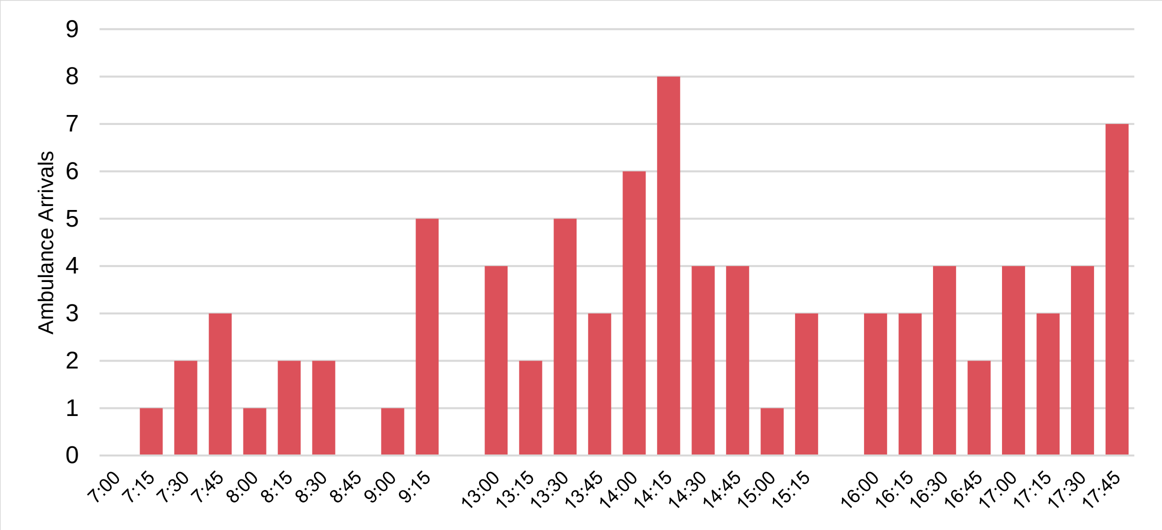
3.7 Ambulance activity

According to the BHI, the RPA Hospital had 6,405 ambulance arrivals in the July-September quarter in 2019, representing a 10.3% increase from 2018[1]. This equates to about 70 ambulances a day. Ambulance arrivals at RPA Hospital were surveyed on Thursday 14 November 2019, and are presented in **Figure 3-9**.

The ambulance bay for the ED is located in the traffic-calmed portion of Missenden Road and therefore may be blocked behind single lane congestion. The increase in expected ED presentations and the associated ambulance arrivals could therefore see more conflicts between ambulances and other traffic on the road.

[1] Bureau of Health Information (2019), Quarterly performance results for emergency departments: Apr-Jun 2019

Figure 3-9 RPA Hospital ambulance arrivals in 15-minute intervals, Thursday 14 November 2019

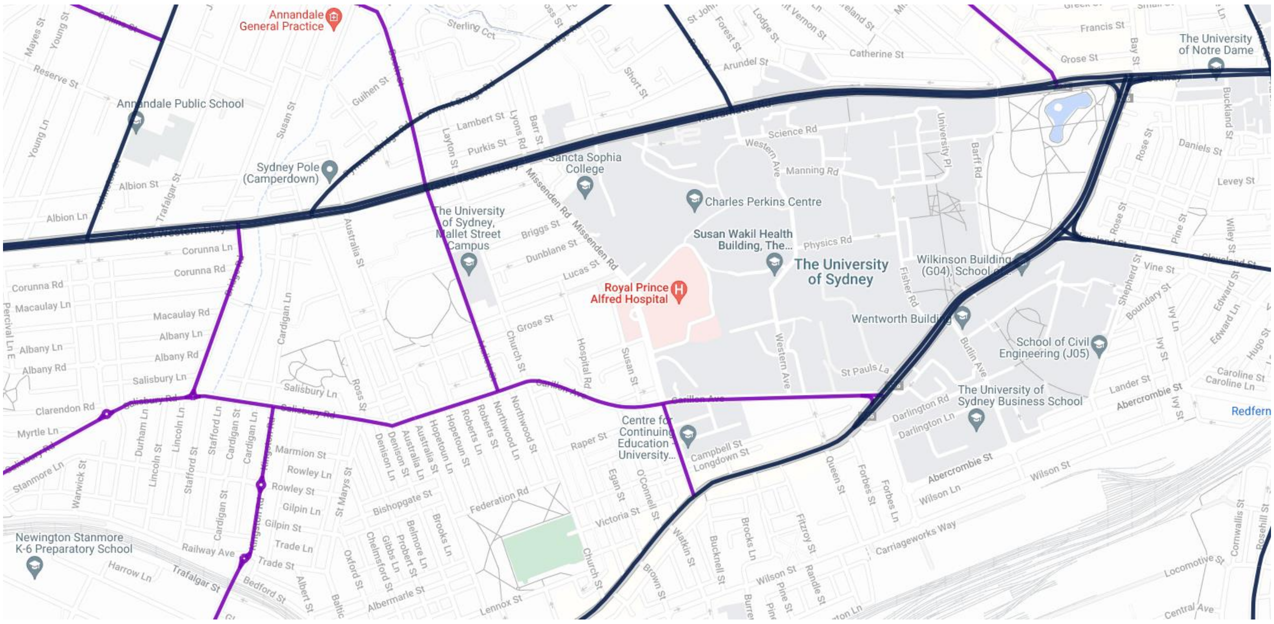


Source: Traffic counts undertaken by Matrix / SCT Consulting, 2019

3.8 Road network

A map of the hospital grounds and surrounding road network is presented in **Figure 3-10**. RPA is primarily serviced by Missenden Road, a local road. Key connections in the vicinity include state roads such as Parramatta Road and King Street.

Figure 3-10 Road network classifications



Regional Roads   State Roads

Source: TfNSW, 2022

Missenden Road is the only access route for the eastern campus, which includes the main hospital building. A loop road, consisting of John Hopkins Drive to the north, Gloucester House Drive to the south and Lambie Dew Drive on the east, services the eastern campus. This loop road provides vehicle access to critical hospital functions including the ambulance bay, women and babies, the main loading docks and patient pick-up and drop-off.

The western campus is located between Church Street and Missenden Road, which provide north-south access. The western campus has the hospital's main car parks and additional hospital facilities, such as the administrative buildings, IRO, renal dialysis, and radiation oncology. Between Church Street and Missenden Road, east-west connections are provided by Salisbury Road, Brown Street, Grose Street, Lucas Street, and the staff car park access.

3.8.1 Missenden Road

Missenden Road is the access corridor to the emergency department (ED), the maternity ward and most other hospital buildings, while also being the primary north-south link through the area. Right-turn bans are in place from Parramatta Road eastbound onto the adjacent Mallett Street and Church Street, making Missenden Road the main north-south traffic corridor through the precinct.

Missenden Road has traffic calming treatments, such as single lanes and on-street parking in both directions, wide pedestrian footpaths and multiple zebra crossings. This gives pedestrians a good level of priority along and crossing Missenden Road.

There is a relatively constant flow of traffic on Missenden Road on weekdays (about 700 to 800 vehicles an hour in both directions between 7am and 6pm). Traffic flow may be disrupted by turning movements and pedestrian crossings, especially at the single-lane sections on Missenden Road. This is particularly important as pedestrian flows are relatively constant throughout the day with only relatively small peaks in the AM, PM and mid-day shift changeover.

Figure 3-11 Missenden Road, viewed from the north

3.8.2 John Hopkins Drive

John Hopkins Drive services the north of the main hospital building including women's and babies, Kerry Packer Education Centre, the ambulance bay, and provides access to Lambie Dew Drive to the east. The road is located at the northern boundary of hospital land and cannot be widened due to St Johns College land to the north and the main hospital building and Kerry Packer Education Centre to the south.

John Hopkins Drive is critical as it serves as the only route to the loading dock for large servicing vehicles as well as fire and rescue vehicles (due to clearance limits on Gloucester House Drive).

In addition to this, John Hopkins Drive also forms a key east-west pedestrian route into USYD. This route is part of a strategy to strengthen east-west pedestrian connections from Camperdown Park to Victoria Park through the creation of a green spine.

Figure 3-12 John Hopkins Drive, viewed from the east

3.8.3 Lambie Dew Drive

Lambie Dew Drive is the eastern portion of the loop road around the main hospital building. It provides vehicle access to Centenary Building, the level 2 carpark and mortuary access, Building 94 (Tissue Pathology and Diagnostic Oncology), Ausgrid easement access, level 1, the main loading docks, and access to Cadigal Lane.

Mortuary access is currently being relocated from the level 2 carpark to level 1.

Key pinch points along the roadway are between the Centenary Building and the Main Hospital Building, and between Building 94 and the ramp up to the level 2 car park. The pinch points limit the viability of pedestrian footpaths, which are mostly absent from Lambie Dew Drive. Instead, the road is currently signposted as a 10km/h shared zone to provide for pedestrian access.

Lambie Dew Drive is relatively narrow despite serving freight vehicles up to the size of Heavy Rigid Vehicles (HRVs). Due to bends in the road, traffic is sometimes restricted to one-way movement when larger freight vehicles pass through, such as the bend outside Building 94 and the corner of Lambie Dew Drive and John Hopkins Drive. This is often exacerbated by delivery vehicles parking along Lambie Dew Drive during peak delivery hours where vehicles exiting must wait for parked vehicles to complete their delivery before further movement is possible.

Due to clearance limits on Gloucester House Drive, freight vehicles need to turn around on Lambie Dew Drive and exit via John Hopkins Drive. No turn around bays or turning heads are currently provided, with most freight vehicles using the delivery bays to complete the turnaround manoeuvre. The manoeuvre is particularly difficult for HRVs due to the length of these vehicles, especially if they are parked in Dock 2, which faces southward. Smaller vehicles such as Medium Rigid Vehicles (MRVs) often drive to the southern end of Lambie Dew Drive where they can complete the turnaround away from the loading dock.

Figure 3-13 Lambie Dew Drive, viewed from the north

3.8.4 Gloucester House Drive

Gloucester House Drive services Gloucester House and the south side of the main hospital building and joins Missenden Road to Lambie Dew Drive. It includes a plaza area that provides short term parking for patient pick-up / drop-off, and some accessible parking spaces.

A triple level pedestrian bridge joins the main hospital building to Gloucester House on the east side of Gloucester House Drive, marking the beginning of Lambie Dew Drive. At this location, the road width is 5.7m with a clearance limit of 3.3m. A survey of the bridge height and a photo are provided in **Figure 3-14**.

Figure 3-14 Photo of Gloucester House connection to Main Hospital Building from Lambie Dew Drive

The clearance available under the bridge does not permit the thoroughfare of most freight vehicles (Small Rigid Vehicles (SRVs) have a clearance height requirement of 3.5m) or fire and rescue vehicles (minimum 4.5m). The roadway width is also insufficient for two-way movement. In addition to the bridge above the roadway, a service tunnel also joins Gloucester House Drive to the Main Hospital Building below the roadway. The ceiling of the tunnel is approximately 1.1m below the surface of the road.

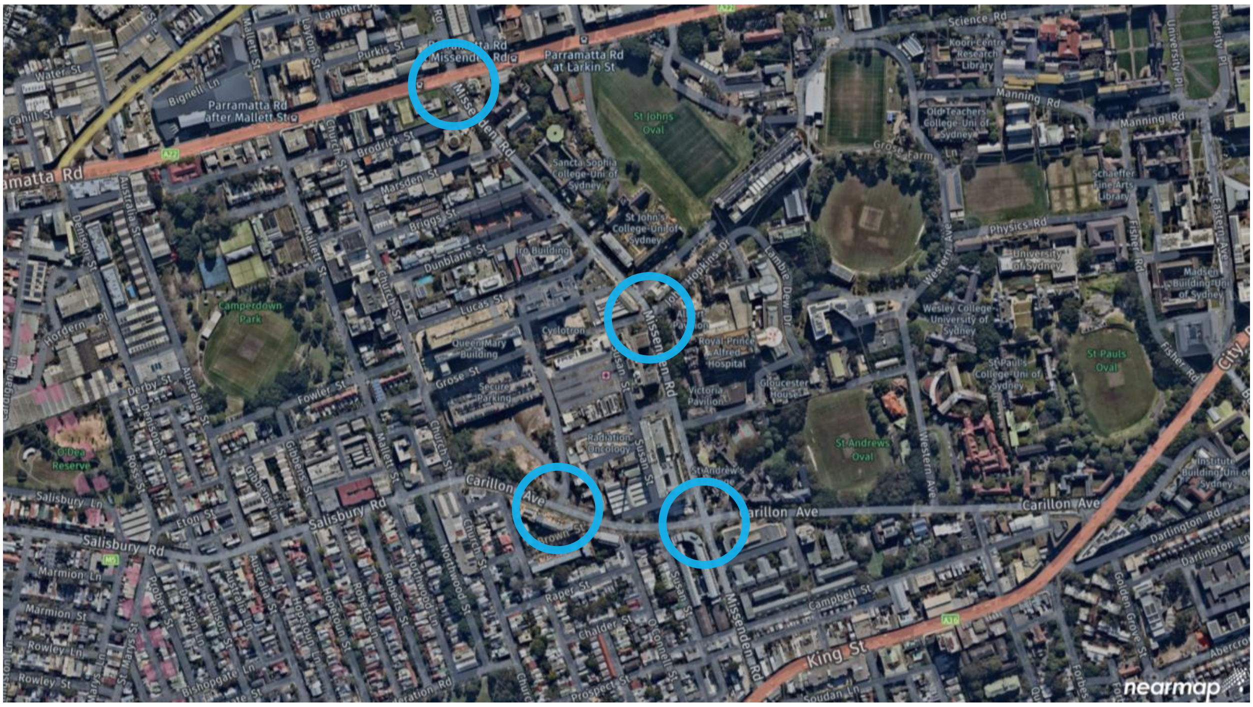
Raising of clearance under the bridge, along with a rework of the Gloucester House Plaza area is being undertaken in a separate package of works, which will allow HRVs to use this route.

3.8.5 Intersections for modelling

Four intersections were surveyed on Tuesday 30th August 2022 and modelled in SIDRA 9 as part of this assessment, illustrated in **Figure 3-15**:

- Parramatta Road / Missenden Road (Signalised), providing the connection to the closest arterial road.
- John Hopkins Drive / Missenden Road (Priority), which provides access to the ED and key hospital functions, while being a significant pedestrian crossing opportunity.
- Carillon Avenue / Missenden Road (Signalised), providing the connection to the southern collector road.
- Carillon Avenue / Hospital Road (Signalised), which provides access to the hospital's multistorey carparks.

Figure 3-15 Intersections modelled



The peak hours were determined on the overall traffic volumes at the surveyed intersections. Situated along Missenden Road, a popular north-south through link, and near Parramatta Road, a major arterial state road, the peak traffic hour for the vicinity was determined to be 8-9AM for the morning peak and 4-5PM for the afternoon.

According to shift patterns and patient data for the hospital, these network peaks are not necessarily the same as peak activity for the hospital, where most staff arrive prior to 8AM and depart in a distributed manner throughout the afternoon and into the evening. Patient movements are also larger in the afternoon when most patient discharges occur.

3.8.6 Intersection performance

Operational performance is typically measured through an assessment of the throughput of vehicles across a traffic network, with the average delay per vehicle used to assess the performance of an intersection. This is consistent with Transport for NSW best practice and is the industry standard for the assessment of intersection performance. The average delay per vehicle measure is linked to a Level of Service (LoS) index which characterises the intersection's operational performance. **Table 3-1** provides a summary of the LoS performance bands.

Table 3-1 Level of Service Index

Level of Service	Average Delay per Vehicles (sec/h)	Traffic Signals/Roundabout	Give Way/Stop Signs
A	Less than 14.5	Good operation	Good operation
B	14.5 to 28.4	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28.5 to 42.4	Satisfactory	Satisfactory, but incident study required
D	42.5 to 56.4	Operating near capacity	Near capacity and incident study required
E	56.5 to 70.4	At capacity, at signals incidents will cause excessive delays. Roundabouts require other control method.	At capacity, requires other control method
F	70.5 or greater		

Source: Guide to Traffic Generating Developments; (then) Roads and Maritime Services; 2002

Table 3-2 Base year 2022 intersection performance

Intersection	AM Peak Base year 2022 8-9AM				PM Peak Base year 2022 4-5PM			
	Vol.	DoS	Delay (sec)	LoS	Vol.	DoS	Delay (sec)	LoS
Parramatta Road / Missenden Road	3,992	0.78	17.2	B	3,580	0.98	29.1	C
Missenden Road / Johns Hopkins Drive	715	0.46	10.8	A	756	0.62	12.2	A
Missenden Road / Carillon Avenue	1,637	0.75	35.5	C	1,538	0.83	37.0	C
Carillon Avenue / Hospital Road	1,249	0.60	10.2	A	923	0.64	13.4	A

All intersections modelled are performing at an acceptable level, with LoS at C or better, and the longest delay of 37 seconds at the Missenden Road / Carillon Avenue intersection. Of the four intersections modelled, the intersection of Parramatta Road / Missenden Road had the highest degree of saturation (DoS) of 0.98 in the PM Peak, indicating that the intersection is near capacity during his peak. This is mainly due to the through movement from Missenden Road with DoS 0.96 and the right turn movement from Parramatta Road to Missenden Road with DoS 0.98. The queues are contained within their lanes, with the right turn movement accommodated within the 124m turning bay, having a 95% back of queue length of 95.7m.

Detailed SIDRA 9 movement summaries can be found in **Appendix A.**

3.9 Car parking

RPA has a total of 2,595 off-street parking spaces around the hospital. These are all paid or restricted access facilities, with the majority located on the west side of the hospital campus. This includes the multistorey staff car park and the multistorey Staff and Visitor car park on Hospital Road, which are the largest off-street car parks available near the hospital. The capacity of these car parks are shown by location in **Figure 3-16** and listed in **Table 3-3.**

Figure 3-16 Carpark capacity by location

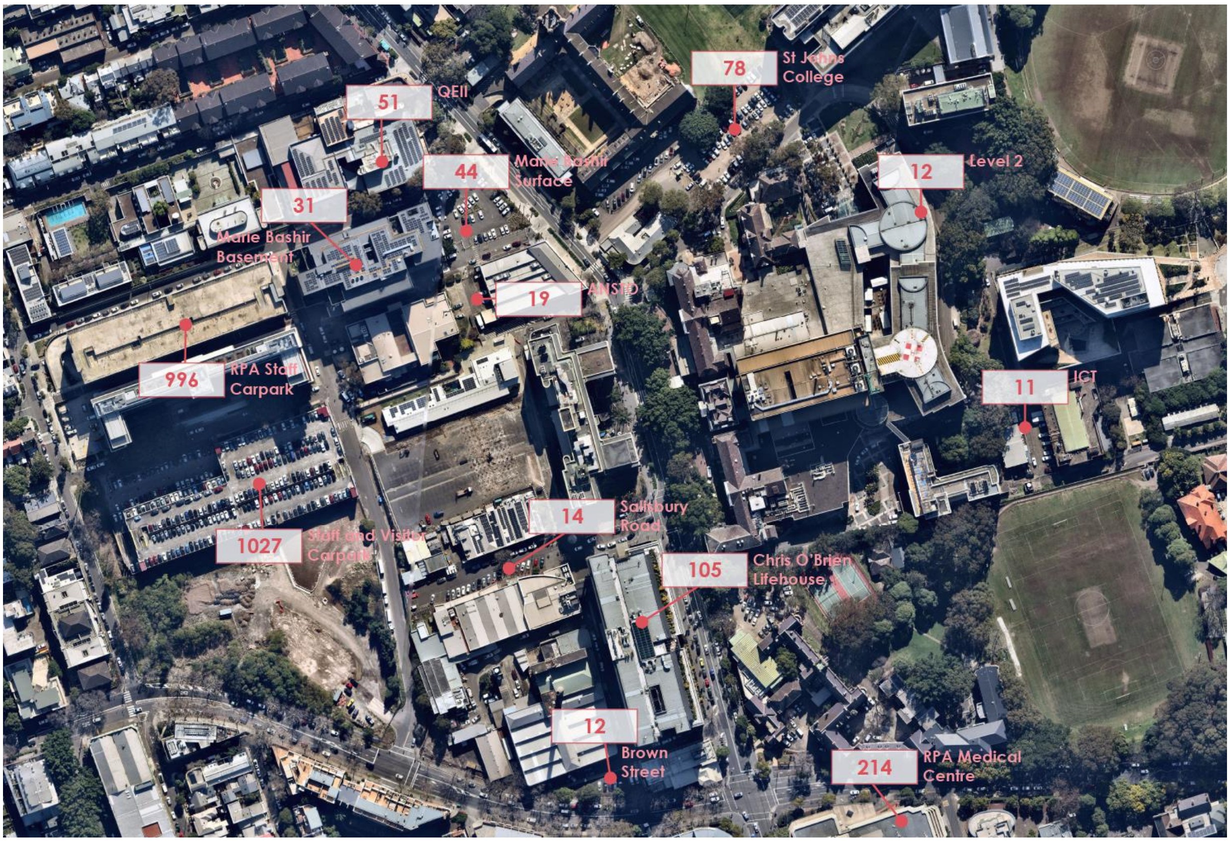


Table 3-3 Carpark user group, capacity, and occupancy Thursday 16 June 2022

Carpark name	Capacity	Occupancy	Unoccupied spaces	Access
Point Parking - St Johns College[2]	78	97%	2	Public
Queen Elizabeth II Basement Car Park	51	47%	27	Staff
Marie Bashir Centre Surface Car Park	44	93%	3	Staff
Marie Bashir Centre Basement Car Park	31	45%	17	Staff
RPAH Staff Car Park	996	68%	315	Staff
Secure Parking - Hospital Road	1027	96%	37	Public
Salisbury Road Car Park - Radiation Oncology	14	100%	0	Authorised only
Wilson Parking - Lifehouse	105	99%	1	Public
Brown St Car Park	12	50%	6	Staff
Wilson Parking - RPA Medical Centre	214	85%	33	Public
Level 2 car park	12	100%	0	Staff
ICT car park	11	55%	5	Staff
Total	**2,595**	**83%**	**457**	**-**

[2] Point Parking is on land owned by St Johns College. The provision of these spaces is not controlled by SLHD or Health Infrastructure

Staff make up the majority of parking demand at RPA, with an estimated demand of approximately 1,600, while patients and visitors make up around 500. This demand was estimated using staff and visitor mode share, staff shift patterns, presentations and calibrated using the occupancy spot checks shown above.

During the start of the COVID-19 pandemic, the hospital assisted its staff by providing free staff parking at its car parks. The City of Sydney Council also assisted by giving the hospital 100 on-street parking permits to exempt hospital staff from on-street parking restrictions. Combined with the lower risk of contracting COVID-19 while driving (compared to public transport), a significant portion of staff started to drive. While the council's parking permits were rolled back in 2020, the Ministry of Health has continued to direct hospitals to provide free parking for staff, including at RPA Hospital.

The staff travel survey conducted in June 2021 showed 7% of all hospital staff had moved away from public transport and into cars because of the pandemic. This equates to approximately 220 staff in the AM shift alone. Change to travel behaviour, along with the permanent decommissioning of the King George V (KGV) carpark (166 spaces), is leading to high occupancy in many of the hospital's car parks.

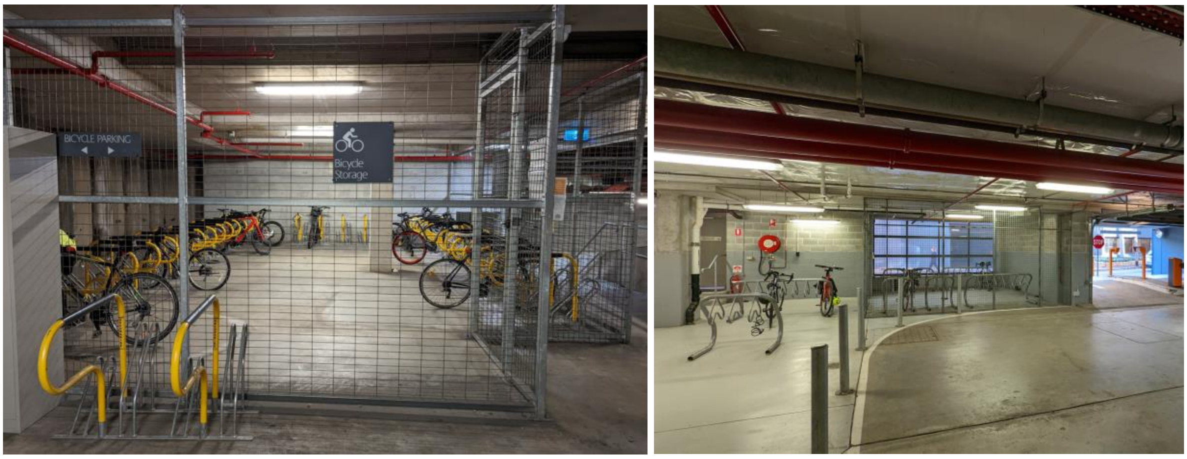
A spot check of the car parks conducted on Thursday 16th June 2022 found that the overall occupancy of the RPA off-street carparks was 84%. However, most of the spare capacity was in the Staff Multistorey carpark (which had 315 empty spaces) and is only accessible to staff with a parking permit.

On-street parking is available along most surrounding streets; however, most of these have extensive time restrictions and prioritise residents. An occupancy spot check on weekdays revealed street parking was heavily utilised, at over 90% parking capacity. For the purpose of this assessment, on-street parking was not considered for analysis, noting that it serves some purpose, but is not the main supply of parking for hospital users.

3.10 Bicycle parking

Off-street bicycle parking is largely located within car parks at RPA, such as in the Professor Marie Bashir Centre (PMBC) and Chris O'Brien Lifehouse (**Figure 3-17**), and are a mixture of secure caged parking and publicly accessible racks. Cyclists riding to these facilities do not have separated access to cars and wayfinding signage is relatively poor. Some outdoor bicycle parking is also available, such as outside the Women's and Babies entrance and the Chris O'Brien Lifehouse.

Figure 3-17 Bicycle parking in the Chris O'Brien Lifehouse carpark and PMBC carpark



3.11 End of trip facilities

There is a low provision of end of trip facilities such as change rooms, showers and lockers, and those that are provided are not well lit or relatively unattractive. Showers available to staff (apart from on-call rooms) are located in PMBC or in the Kerry Packer Education Centre (KPEC). These facilities are pictured in **Figure 3-18**.

Figure 3-18 Showers available as end of trip facilities,

3.12 Travel behaviour

The way in which people travel is largely a product of travel options available to them and their own ability to use these options. A poor cycling network, minimal end of trip facilities, long walking distances to rapid mass transit and a currently free parking arrangement for staff would tend to favour a journey by car. Aside from accessibility factors, vulnerable user groups such as patients are not likely have the ability to choose active modes of transport, or even public transport due to infection risk or the “last mile” walking distances required.

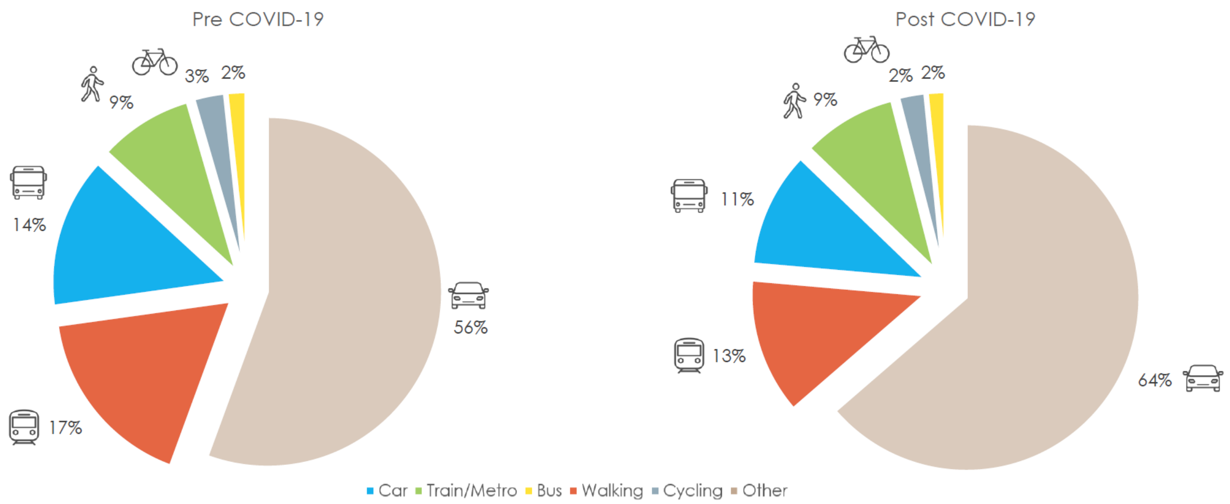
These are all factors that contribute to the travel behaviour that is observed at RPA.

3.12.1 Staff

A staff travel survey was conducted by SCT Consulting in June 2021 to determine the travel behaviour of staff and their propensity to change travel modes. The 2021 Staff Travel Survey had 1,199 respondents, which is about 25% of all staff.

As shown in **Figure 3-19**, the 2021 Survey found that 64% of staff currently drive or are driven to the hospital, showing a significant increase from 56% before COVID-19. Public transport is the next most common mode of transport, though a significant amount of these shifted to car use after the pandemic began.

Figure 3-19 Travel modes of workers in RPA Hospital, 2021 Staff Travel Survey

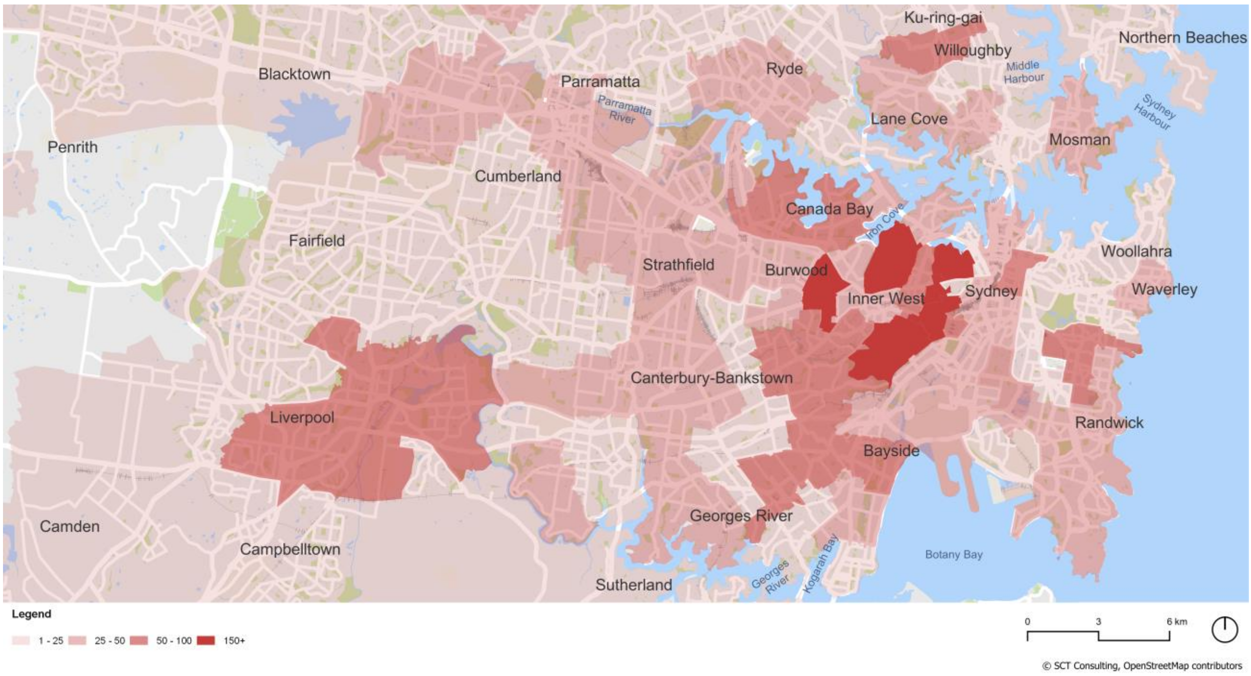


The shift to car use was likely driven by the recommendation from NSW Health to avoid taking public transport, as well as assistance provided by RPA Hospital and City of Sydney to support drivers through free parking. While the City of Sydney has since rolled back its assistance, parking remains free for staff at the hospital.

The 2021 Staff Travel Survey suggest that staff are open to shifting to more sustainable modes of transport, but this will require active guidance and encouragement from RPA through programs and incentives.

Anonymised home location by postcode was provided by Sydney Local Health District (SLHD) (**Figure 3-20**), showing that there is a concentration of staff who live within a 10km radius of RPA. However, there are also many staff that live further away, such as Liverpool, or Willoughby. Staff who live further away will be dependent on public transport or driving to get to and from the hospital. The data is aggregated by postcodes, therefore staff numbers may appear more concentrated in postcodes that cover larger areas.

Figure 3-20 Number of staff by postcode

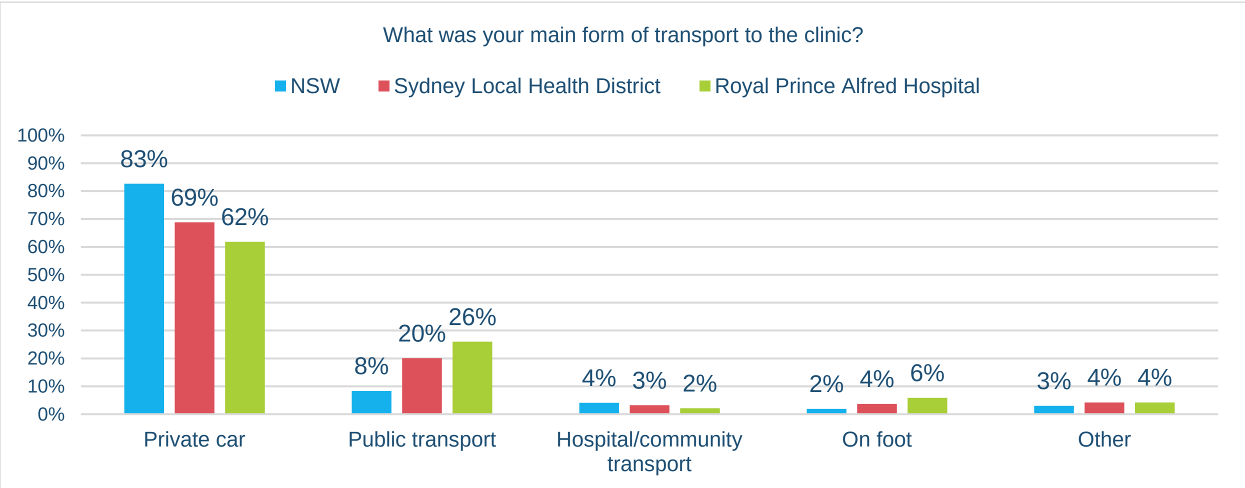


Source: SLHD, 2022

3.12.2 Patients

RPA Hospital had over 140,000 admissions in the 2017/18 financial year. While there is no formal travel survey for patients, the Bureau of Health Information (BHI) runs regular patient surveys across NSW that include questions on travel. Patients at RPA Hospital are less dependent on cars and are more likely to use public transport than the state average, as shown in **Figure 3-21**.

Figure 3-21 Mode shares of outpatients

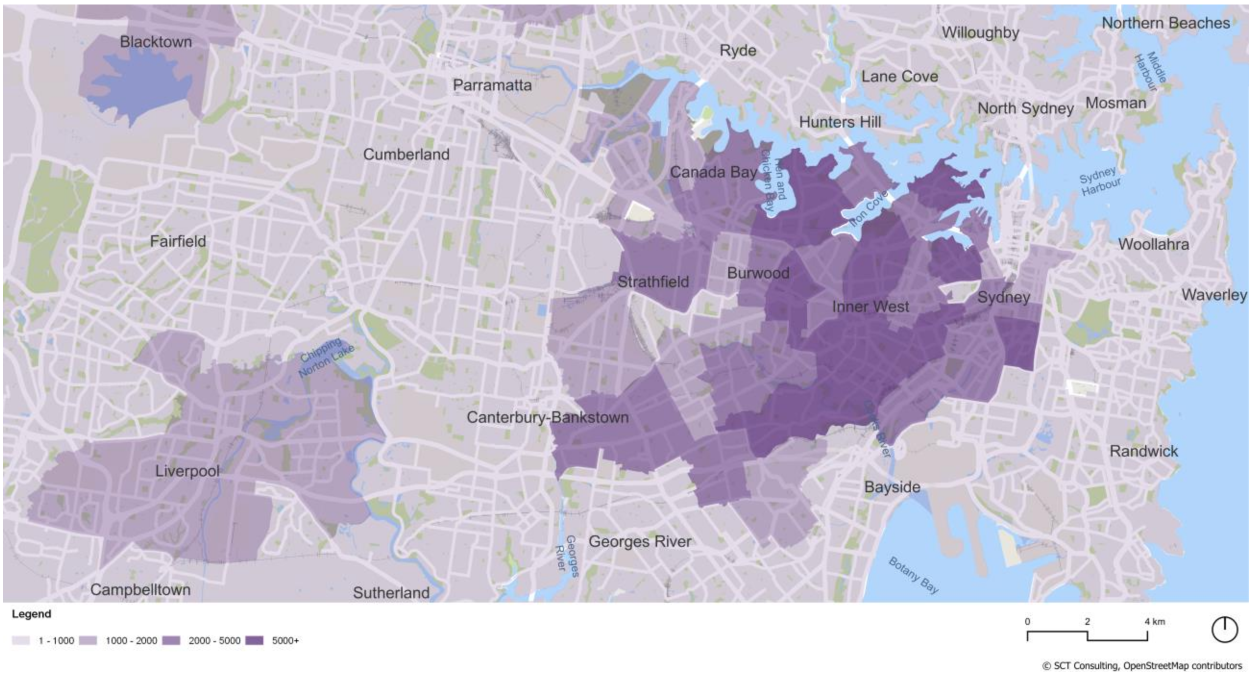


Source: Bureau of Health Information, 2016 Outpatients survey

RPA patients lead the local health district in use of sustainable modes of transport. This is a good indicator that despite a general expectation that patients will need to drive, some will still be able to take public transport, or even present on foot. Good provision of public transport to hospitals is therefore important. However, the majority of hospital users still travel by car, meaning that parking facilities are currently an important resource for patients and visitors.

RPA had over 140,000 admissions in the 2017/18 financial year. The anonymised postcode of each presentation was provided by SLHD, showing that RPA mainly services people living in the Inner West, Sydney and out to Strathfield and Canterbury and Bankstown. This is illustrated in **Figure 3-22**. The data is aggregated by postcodes, therefore presentation counts may appear more concentrated in postcodes that cover larger areas.

Figure 3-22 Home location of presentations, 2017/18



Source: SLHD, 2019

3.13 Servicing

Figure 3-23 Key servicing access

Base map source: Nearmap, 2022

3.13.1 Medical gas cylinder and bulk oxygen

The main medical gas cylinder and bulk oxygen storage are located behind the engineering building off Susan Street. The existing location requires a challenging manoeuvre for service vehicles that have to navigate narrow service lanes to deliver gas cylinders or top up the bulk oxygen.

A secondary bulk oxygen container is located at the end of Cadigal Lane at the south-eastern corner of the hospital site. Cadigal Lane is a single lane access route that connects to, a road on USYD grounds, and is currently serviced by a vehicle reversing up to the container. Servicing also occurs at the Centenary Institute

Bulk liquid nitrogen is stored in tanks outside the Centenary building and serviced from the driveway to the main entrance.

Medical gas is serviced by bulk oxygen refill trucks (12.5m length) and medical gas cylinder delivery trucks (10.1m length).

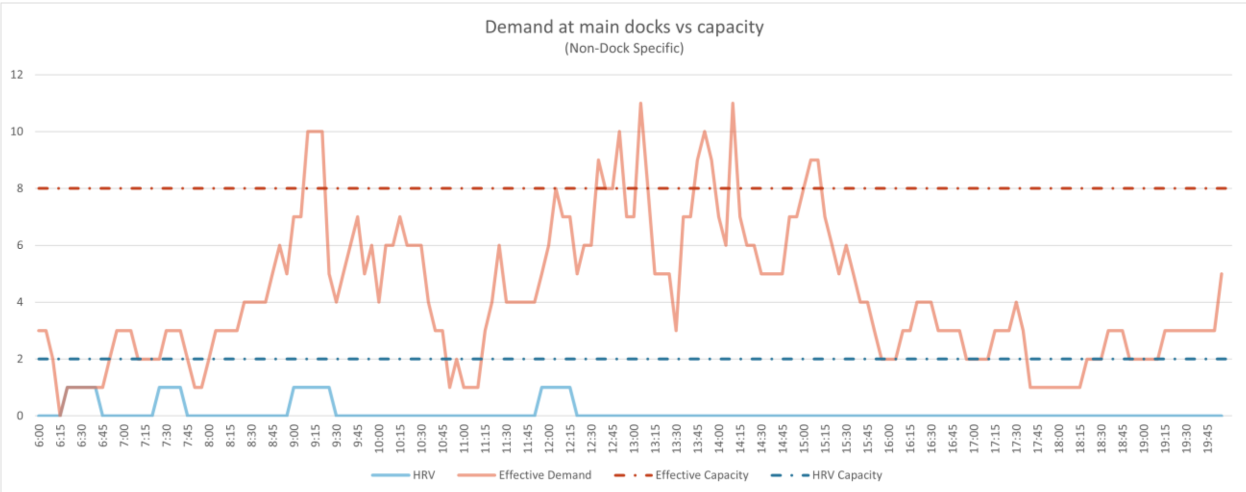
3.13.2 Main loading dock

The main loading dock is located on the south-east of the main hospital building, fronting on Lambie Dew Drive (shown in **Figure 3-24**). This loading dock will be retained as the main loading dock after the redevelopment.

The loading docks are currently unmanaged and dock activity is highest between 9am and 4pm. Vehicles accessing the loading dock range from small courier vehicles to HRVs.

Figure 3-24 Main loading dock on Lambie Dew Drive, viewed from the south

Figure 3-25 Main loading dock demand vs capacity, Wednesday 28 April 2021



As shown in **Figure 3-25,** the demand for loading dock bays exceeds capacity during the peak periods. A survey of loading dock activity was undertaken in April 2021 and analysis shows the peak demand exceeding capacity by up to 3 bays.

Delivery vehicles that do not have a loading bay, park along Lambie Dew Drive instead, restricting movement along the road. This is exacerbated by vehicles needing to turn around on Lambie Dew Drive (due to clearance limits on Gloucester House Drive) and is particularly evident when HRVs exit the loading docks. Due to limited manoeuvring room, a HRV would require multiple movements, usually 5-point turns or more (while making significant use of overhang over the pedestrian path), and sometimes use other empty loading bays to complete a turn around. A photo of the congestion at peak periods is shown in **Figure 3-26**.

Figure 3-26 Congestion on Lambie Dew Drive due to limited docking capacity

Courier vehicles are one of the most common vehicle types delivering at the RPA Hospital. These vehicles only require a parking space to complete their delivery but are currently using the delivery bays as there are no other parking spaces available along Lambie Dew Drive. Alternatively, they are parking along the kerb to allow larger freight vehicles to use the available bays.

Advice from the logistics consultants suggested that a short-medium term solution for rapid expansion in loading dock capacity was to provide parking spaces for courier vehicles near the loading dock. This would allow the main delivery bays to be reserved for larger freight vehicles and retain space on Lambie Dew Drive for movement.

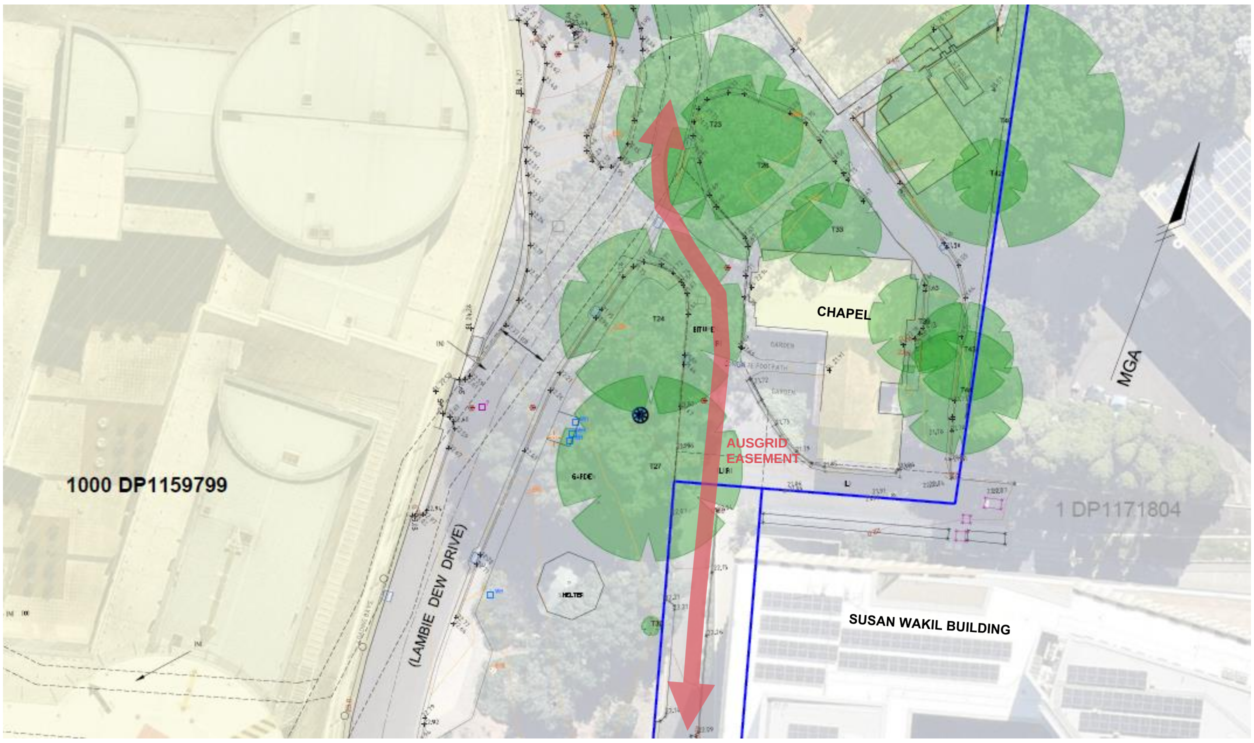
3.13.3 Ausgrid easement arrangement

Ausgrid has an easement agreement to be able to access the Susan Wakil chamber substation from Lambie Dew Drive. This is currently provided by the access road that links Lambie Dew Drive to the laneway on the west of the Susan Wakil Building. An illustration of the access route is shown in **Figure 3-27**.

Ausgrid's access to the chamber substation must be maintained, or a suitable alternative provided. Ausgrid's access requirements, are listed in the Network Standard 113, "*Site Selection and Construction Design Requirements for Chamber Substations*":

– All access ways must be located to ensure egress and ingress from or onto a public street or an all-weather heavy duty access roadway which complies with the BCA egress and ingress requirements.
– Must enable Ausgrid access at all times 24 hours a day, 7 days a week
– 4m wide minimum (increased width at bends and in manoeuvring area adjacent to the substation where lifting operations will be carried out)
– 4m high minimum
– All weather
– Heavy Duty access suitable for a 20T Franna.
– Must not be blocked by loading dock vehicles or equipment
– The surface grade along the Right of Way should not exceed 1:8
– The surface area in the transformer handling area should not exceed 1:20.

Figure 3-27 Ausgrid easement to Susan Wakil via Lambie Dew Drive



4.0 Proposed development

4.1 Development overview

Development consent is sought for:

– **Alterations and additions to the RPA Hospital East Campus**, comprising:

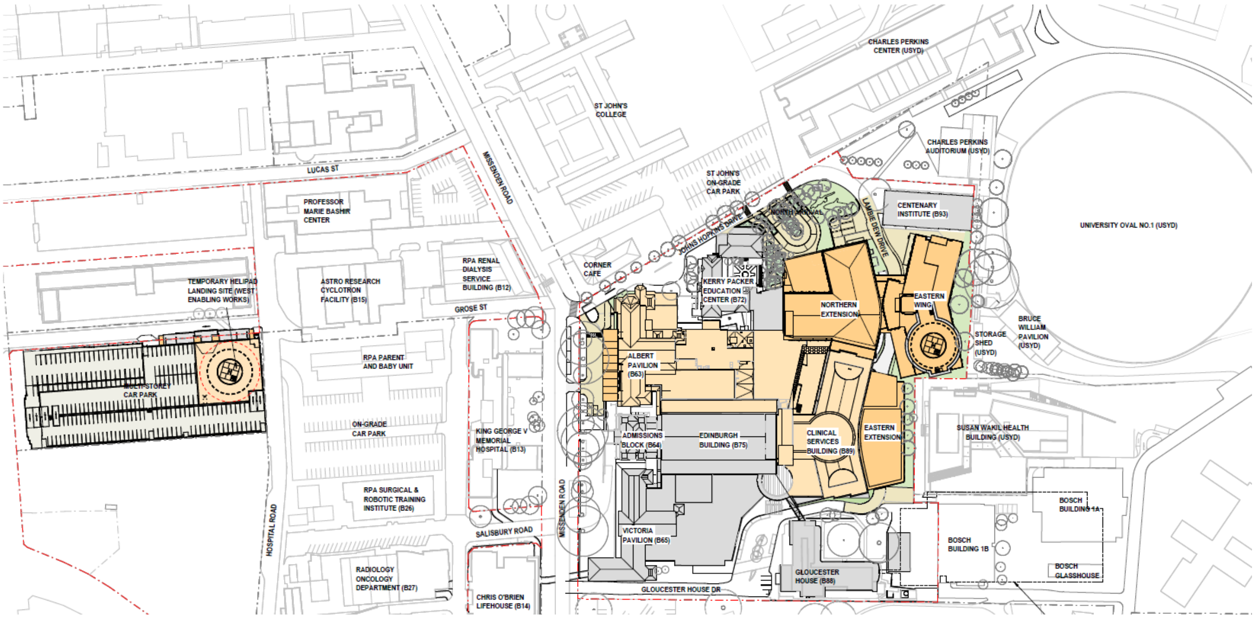
- **Eastern wing**: A new fifteen (15) storey building with clinical space for Inpatient Units (IPU's), Medical Imaging, Delivery, Neonatal and Women's Health Services, connecting to the existing hospital building and a rooftop helicopter landing site (HLS)
- **Eastern extension:** A three (3) storey extension to the east the existing clinical services building to accommodate new operating theatres and associated plant areas
- **Northern expansion:** A two (2) storey vertical expansion over RPA Building 89 accommodating a new Intensive Care Unit and connected with the Eastern Wing
- **Internal refurbishment:** Major internal refurbishment to existing services including Emergency Department and Imaging, circulation and support spaces
- Enhanced Northern Entry/ Arrival including improved pedestrian access and public amenity
- Demolition of affected buildings, structures and trees
- Changes to internal road alignments and paving treatments
- Landscaping works, including tree removal, tree pruning, and compensatory tree planting including off-site on University of Sydney land.

– **Ancillary works to the RPA Hospital West Campus**, comprising:

- Temporary helicopter landing site above existing multi storey carpark;
- Re-routing of existing services; and

Associated tree removal along Grose Street.The hospital is expected to see a growth of approximately 37% as a result of this redevelopment, this includes growth in staffing, patient volume, visitors and logistics activity.

Figure 4-1 Proposed development



Source: Jacobs, 2022

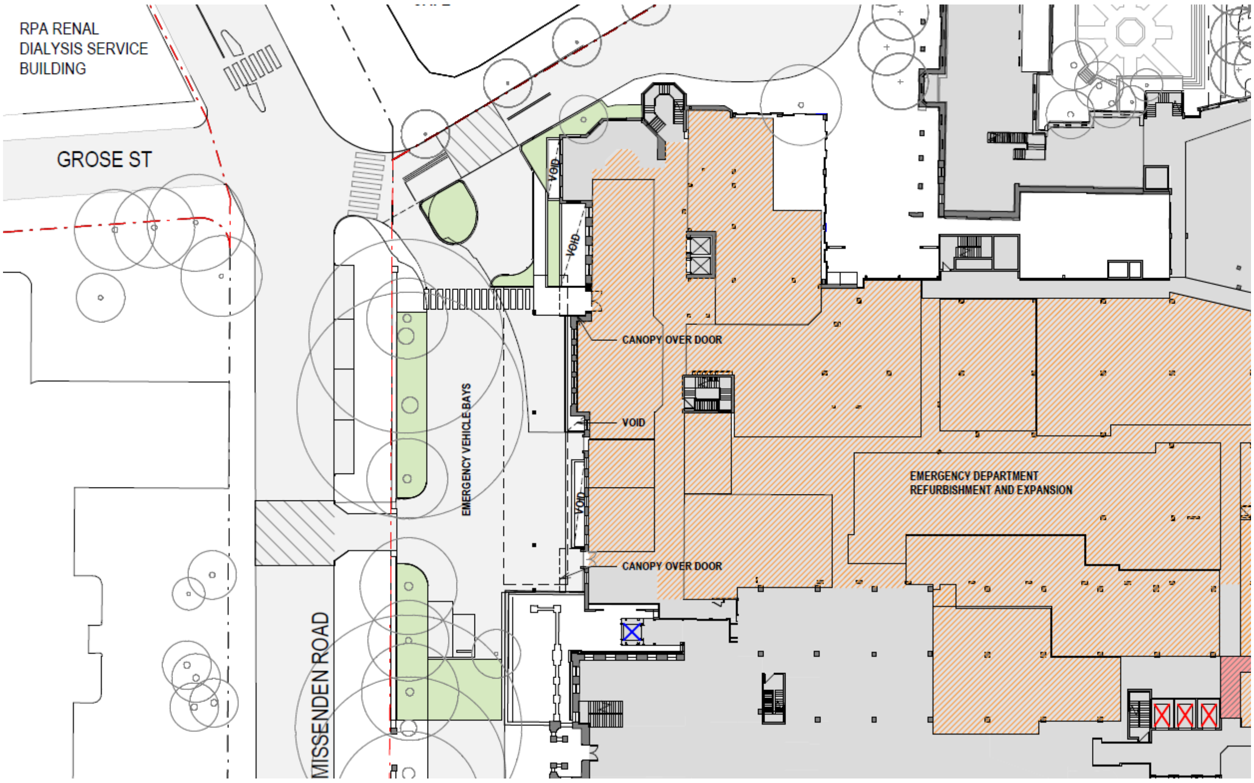
4.2 Emergency Department vehicle access

The emergency department drop off bay will be redesigned to provide additional emergency vehicle bays, a dedicated accessible public drop off bay, and a pedestrian prioritised route into a new public ED entrance. The redevelopment will also seek to have the addition of four drop off bays along Missenden Road in a parallel parking configuration. This is illustrated in **Figure 4-2**.

The proposed ED configuration will have a separated ambulance entrance from Missenden Road while public ED access will be via a new driveway on John Hopkins Drive. The Ambulance Entry should be complemented with a "Keep clear" marking to ensure any queueing does not block the entrance. Pedestrians will be provided with a dedicated walkway and prioritised crossing which is a significant improvement from the existing arrangement.

Changes to access and drop off on Missenden Road will require approval under Section 138 of the Roads Act 1993 as it is a public road.

Figure 4-2 Proposed Emergency Department access



Source: Jacobs, 2022

4.3 Temporary Helicopter Landing Site

The existing Helicopter Landing Site (HLS) will be unavailable once redevelopment construction begins. To maintain helicopter access to the hospital, RPA is constructing a temporary HLS on the roof of the RPA Staff and Visitor Carpark, illustrated in **Figure 4-3**. This will involve the temporary displacement of 195 of parking spaces on the roof level of the carpark and the construction of a new lobby with two lifts, two ambulance bays on the north face of the carpark and two-way traffic flow on Grose Street adjacent to the ambulance bays. The displaced parking at the roof of the carpark will be recommissioned once redevelopment construction is completed and the new HLS is operational.

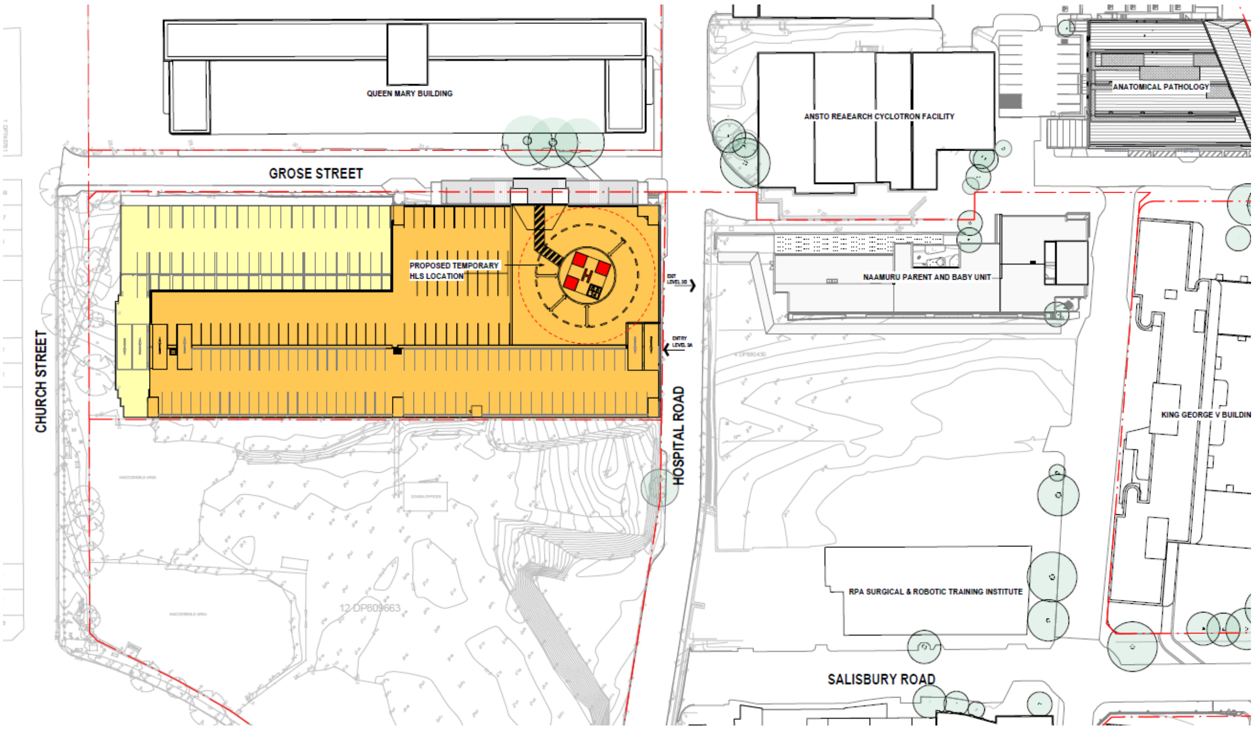
The lift access will be retained after the temporary HLS is removed, allowing more levels of this carpark for accessible parking. The lift lobbies will displace approximately 3 spaces on level 5 and another 3 on level 4.

Two zebra crossings are being added across Grose Street, one at the intersection of Hospital Road and Grose Street, and one at the entrance to the Queen Mary Building. This will improve pedestrian priority and walkability for the area.

Ambulances will transfer patients from the temporary HLS lobby to the ED via Hospital Road, minimising travel distance. This will require two-way travel on Grose Street to allow eastbound movements of ambulances and therefore a relocation of 9 on-street fleet parking to facilitate this. Two way movement is possible once the fleet parking is relocated, as demonstrated by the swept paths in **Figure 4-4**.

Once the HLS is no longer in use, the one-way configuration and the displaced on-street parking can be reinstated.

Figure 4-3 Temporary Helicopter Landing Site on the Staff and Visitor carpark



Source: Jacobs, 2022

Figure 4-4 Temporary HLS, ambulance inbound movement

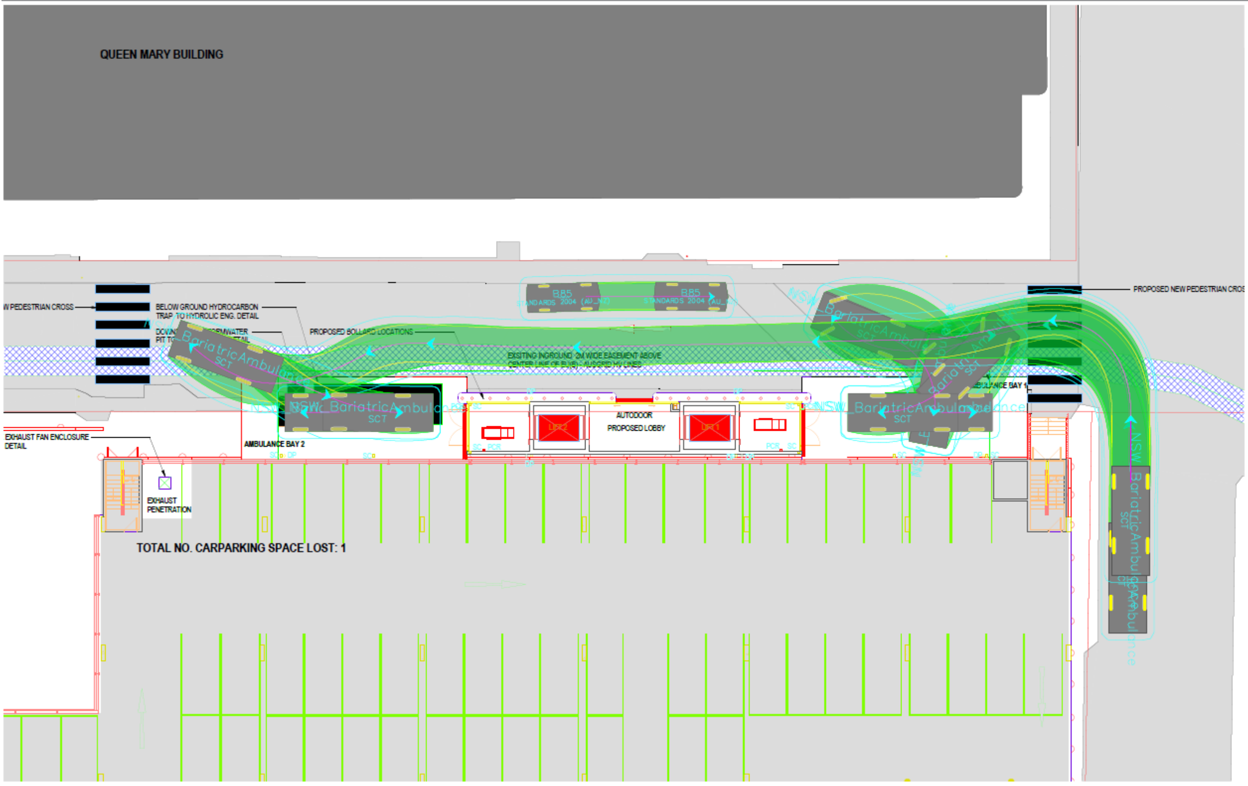
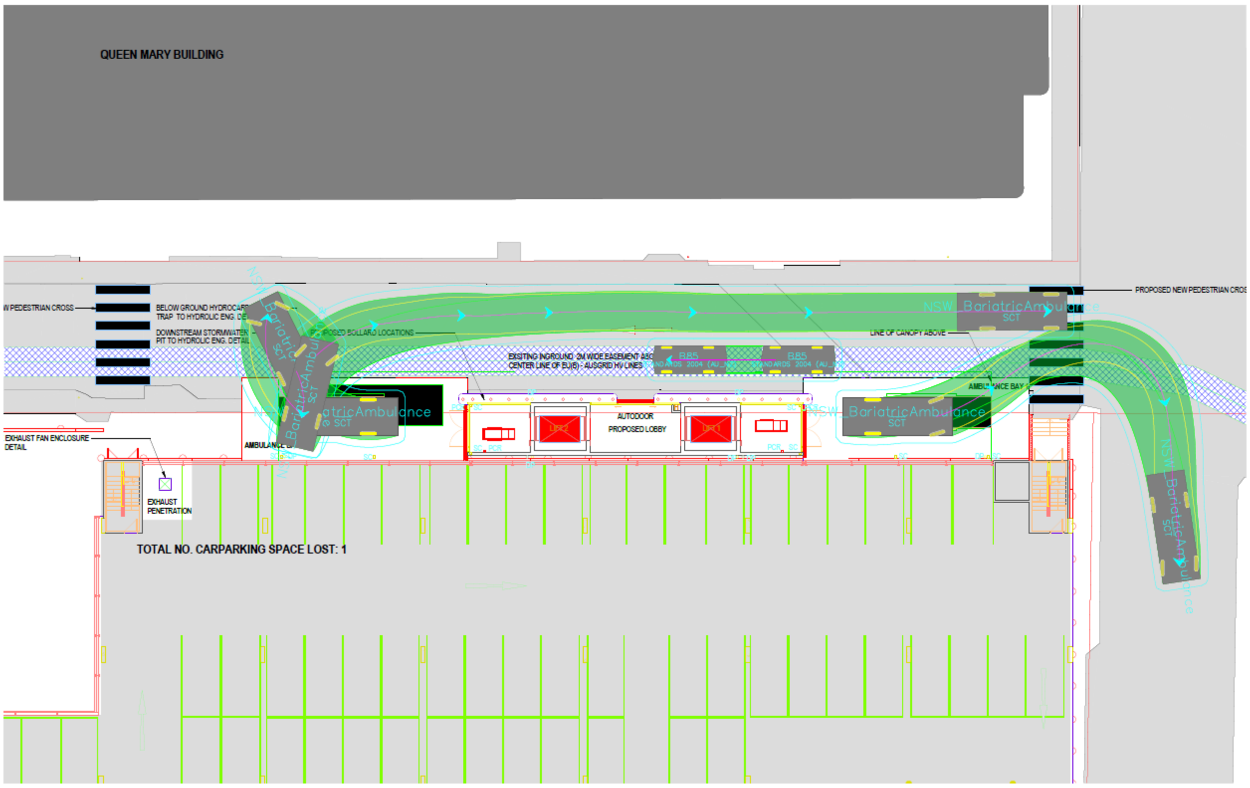


Figure 4-5 Temporary HLS, ambulance outbound movement



4.4 Lambie Dew Drive realignment

The proposed reconfiguration of Lambie Dew Drive will remove a bend outside building 94 and 95 and bring the road alignment closer to the eastern face of building 89. The realignment will require removal of the external ramp that provides access to level 2 car park. This car park is used as a staff car park (12 spaces) and vehicle access to the Mortuary. The proposed road alignment is illustrated in **Figure 4-6**.

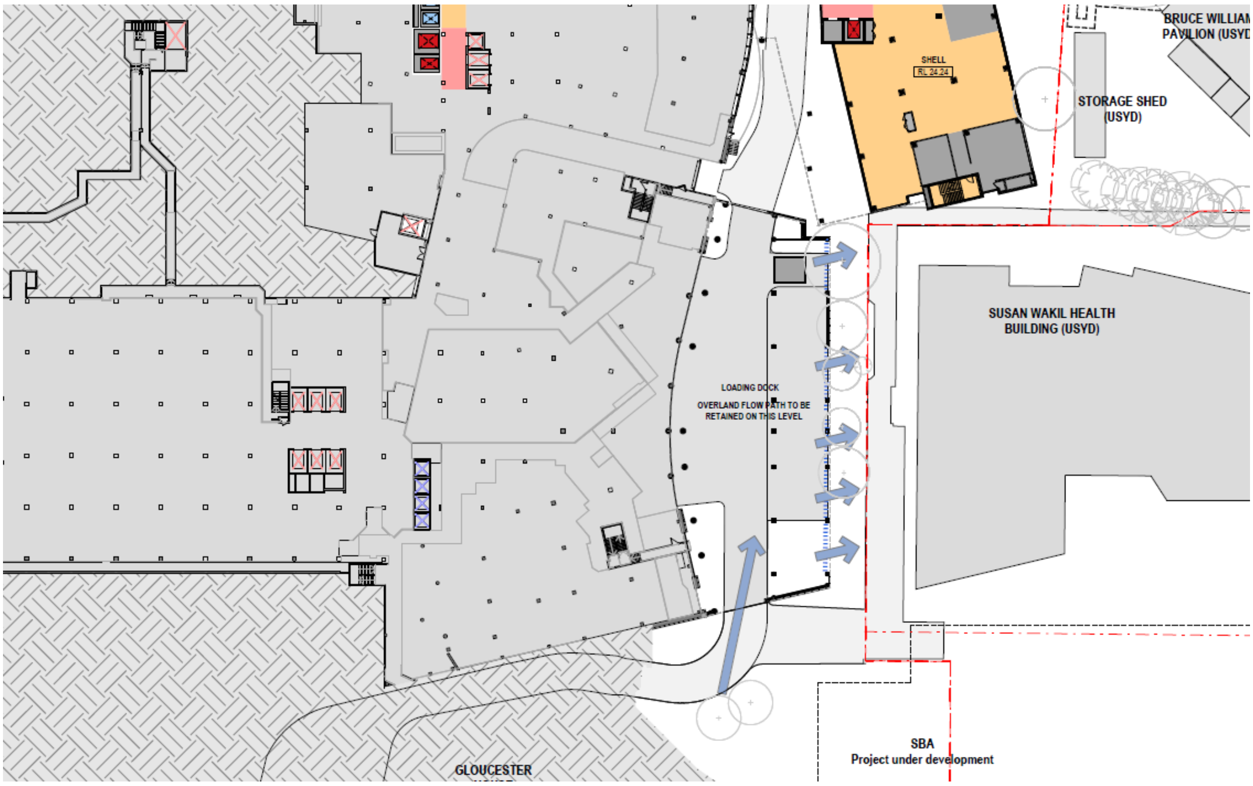
Figure 4-6 Lambie Dew Drive proposed alignment

Source: Jacobs, 2022

The realignment serves to make room for the construction of the eastern wing while also improving movement along Lambie Dew Drive. Freight vehicles, particularly HRVs are currently forced to use the whole width of the roadway due to bends in the road. The realignment will reduce the number of bends in the road and therefore improve two-way traffic flow.

4.5 Main loading dock

Figure 4-7 Proposed main loading dock layout

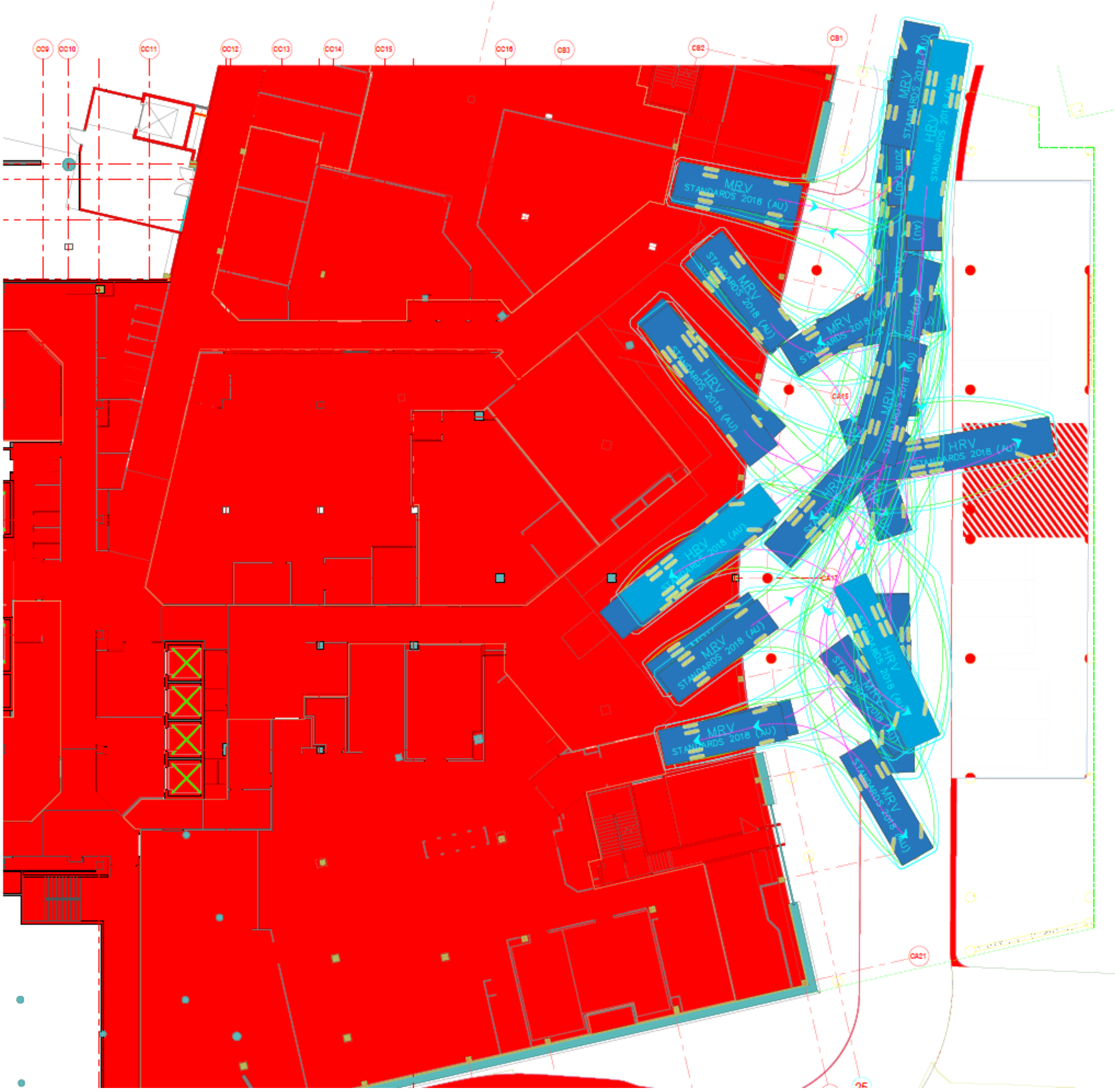


Source: Jacobs, 2022

The existing loading docks in the main hospital building will be expanded to include an additional 7 courier spaces, of which 3 are sized for B99's (99th percentile cars) and 4 are sized for small rigid vehicles (SRV). This provision is expected to significantly improve traffic flow at the loading docks by taking smaller courier vehicles off the roadway. As discussed in **Section 3.13.2**, most logistics vehicles are SRV's or smaller and are taking up bays which are meant for larger freight vehicles.

The straightening of Lambie Dew Drive also increases the manoeuvring space at the loading docks. Manoeuvrability is improved for freight vehicles, particularly for MRVs and HRVs which now only need a three-point turn at most to complete an entry or exit. The improvement is demonstrated by swept paths in **Figure 4-8**.

Figure 4-8 Proposed loading dock configuration swept paths, HRV and MRV



Plan source: Jacobs, 2022

4.6 Northern entry pick-up/drop-off

Figure 4-9 Proposed Northern Arrival

Source: Turf Design Studio, 2022

The existing Women's and Babies pick up / drop off area will be renovated, becoming a general pick up / drop off area. The renovated entry will have a new accessible pedestrian walkway on the west side, a flatter plaza area under the entry canopy, and a new footpath across the driveway where none currently exists. This improves pedestrian amenity and place characteristics.

Short term parking will be moved from the centre of the circulating aisle to the outer edge, allowing for 3 regular spaces and 2 accessible parking spaces. This is a decrease of 3 spaces compared to the existing layout but will provide accessible parking spaces where none currently exist.

Three long term patient transfer spaces are also being proposed on level two, fronting onto Lambie Dew Drive. This will include a space that can serve ambulances from Newborn & paediatric Emergency Transport Service (NETS).

4.7 Public transport access

No changes are proposed for public transport access, with the bus stops remaining in their existing locations. However, as part of the Green Travel Plan, the hospital will continue to advocate for an increase in bus routes / service frequencies along Missenden Road outside the hospital and seek to increase the number of hospital run shuttle buses that bring staff to and from Redfern Station.

4.8 Pedestrian and cyclist access

No major changes are being proposed to pedestrian and cyclist access as entry points remain in the same locations around the main hospital building.

Improvements to pedestrian priority are generally being implemented where the redevelopment is occurring, including at the ED, the Northern Arrival and the temporary HLS. New zebra crossings and additional footpath coverage will increase walkability and pedestrian amenity.

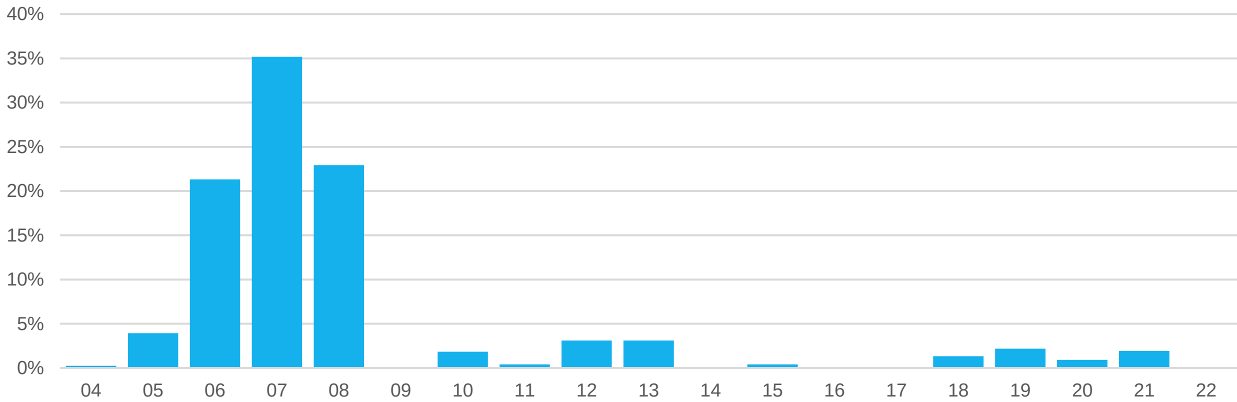
While currently being marked as a "shared zone", the main loading dock area is not particularly suitable for pedestrians and is not recommended to be marked as such. The principle for this area is that pedestrians should not be encouraged to enter this back of house area unless they are staff for freight and servicing activities.

4.9 Mode share targets

There is a general expectation amongst both hospital staff and outsiders that heath workers need to be able to drive to work due to requirements of shift work and abnormal hours. This expectation means that hospitals often have a higher proportion of drivers when compared to their neighbours, and do not extensively pursue strategies to encourage more sustainable travel behaviour.

However, this does not mean that travel behaviour cannot be influenced or changed. As a proportion, 81% of a weekday's staff are part of the morning shift, 12% are afternoon shift, and 7% are night shift. This means that most staff at the hospital work during regular work hours, and many staff in the 2021 staff travel survey indicated that they would be open to more sustainable modes of transport if suitable assistance and incentives were available. Staff arrival time according to the 2021 survey is charted in **Figure 4-10**.

Figure 4-10 Time of staff arrival, 24H time format, 2021 Staff Travel Survey



Mode share targets for staff are listed in **Table 4-1**. These targets are based on the Sustainable Sydney 2030-2050 and an understanding that workers who arrive and depart the hospital at non-typical hours should not be expected to have the same travel behaviour as their colleagues who work typical hours. RPA will aim to achieve the Sustainable Sydney targets by 2050 for staff who work typical hours.

In a similar manner, patients and visitors arriving and departing the hospital have a general expectation that travel by car is possible, especially as they are a relatively vulnerable user group and may arrive and depart at non-regular hours. As the City of Sydney targets are for those who are working, the mode share targets for this assessment will not include patients or their visitors.

Table 4-1 Existing staff mode share and proposed mode share targets

Mode	Pre-COVID-19	Existing 2021	Launch target 2028	Long term target 2050 (Typical Hours)
Walk	9%	9%	10%	12%
Cycle	3%	2%	7%	12%
Rail	17%	13%	18%	23%
Bus	14%	11%	15%	19%
Total non-car	**43%**	**35%**	**50%**	**66%**
Car	**56%**	**64%**	**50%**	**33%**
Other	1%	1%	-	-
Total	100%	100%	100%	100%

Table 4-2 Justification for proposed mode share targets

Mode	Launch target 2028	Change from existing Percentage Points	Justification
Walk	10%	+1pp	Walking mode share is somewhat limited to where staff live. It is not expected that this distribution will be significantly different by the time that the redevelopment is operational. Improvements in walking mode share are targeted through improvement of end of trip facilities.
Cycle	7%	+5pp	The increase of cycling infrastructure in wider area, restricted parking and Green Travel Plan initiatives will contribute to the higher cycling mode share. While this target falls short of the City of Sydney 2030 cycling mode share target of 10%, RPA is increasing from a relatively low baseline, not all staff work regular hours, and it is not clear if cycling infrastructure would be connecting the hospital site directly by the time of launch. 7% is therefore a reasonable and achievable target.
Rail	18%	+5pp	A higher rail mode share is targeted in line with City of Sydney's 2030-2050 vision. Rail use by RPA staff had grown 5 percentage points over the previous decade to 17% (prior to COVID-19). It is expected that the normalisation of COVID-19, incentives as part of the GTP, and a more frequent shuttle service to Redfern station will increase use of rail by the time the development is complete.
Bus	15%	+4pp	This target is 1 percentage point higher than the pre-COVID bus mode share of 14%. It is not expected that new bus routes or increased bus frequency will be delivered on Missenden Road in the next 5 years. However, it is expected that incentives as part of the GTP and a reinstating of parking fees will encourage staff to increase bus use once more.
Total non-car	**50%**	-	-
Car	**50%**	-14pp	This launch target is 6 percentage points lower than pre-COVID-19 levels. GTP initiatives including adjusted parking rates and incentives to use sustainable modes of transport will decrease the dependence on car use. As a comparison, workers at the University of Sydney had a car mode share of 35%[3]. A 50% mode share target is an achievable goal while also catering for the 19% of staff that work irregular hours.

4.10 Parking requirements and provision

4.10.1 Car parking facilities

No net additional car parking facilities are being proposed as part of this development. The realignment of Lambie Dew Drive will decommission the 12 spaces in the access restricted carpark on level 2 of B89, and the new lift lobby will remove a total of 6 spaces from the Staff and Visitor carpark. The expected off-street parking supply once the redevelopment is operational is 2,610.

RPA is seeking to provide car parking rates that balance meeting car parking demand, encourage sustainable transport behaviour, and minimising impacts on a constrained urban road network. Continuing to provide more parking facilities may entrench the existing car dependency and should therefore be avoided where possible. However, the hospital must also consider the requirements of patients, and those who arrive and depart the hospital at non-typical hours, such as late shift staff and visitors. As a result, parking provision should be adequate to supply the needs of those who need to drive, while not being so excessive as to encourage all user groups to drive.

[3] TfNSW 2011 Census Journey to Work Data

4.10.2 Car parking requirements

Parking demand at RPA was estimated by using growth in hospital staff and patient volumes as indicated in the 2031 Clinical Services Plan.

Existing demand was first estimated through an analysis of mode share for each user group, staff shift patterns, patient volumes and length of stay, admission and discharge patterns and number of visitors per patient. Estimated parking demands were then calibrated to on-site occupancy checks and intercept surveys. 2031 parking demand was then determined through an application of growth rates in the Clinical Services Plan and 2031 target mode share for each user group. This is presented in **Table 4-3**.

Table 4-3 Parking demand by user group

User group	2021	2031
Staff	1,617	1,773
Outpatients	332	442
Inpatients & Visitors	128	183
Total	**2,078**	**2,398**

Staff will continue to make up the bulk of parking demand in 2031, but growth in staff demand is limited by Green Travel Plan initiatives, with a driving mode share target of 50% by 2028. This ensures that parking supply is able to cope with the expected growth in parking demand.

4.10.3 Bicycle parking facilities

The City of Sydney Development Control Plan (DCP) DCP does not have specific rates for bicycle parking at public hospitals. RPA is instead directed to provide bike facilities to accommodate Council's mode share targets in the Cycle Strategy and action plan.

With a mode share target of 7% cycling in 2028, RPA will need to have a total of 286 bicycle parking spaces for staff. These spaces should be class 2 bike facilities, as stipulated by the DCP. Class 2 bike facilities (i.e. Security level B according to AS2890.3) are located in a secure room or structure, protected from the weather, and is access controlled using swipe cards, codes or keys. It is recommended that these facilities are complimented with good lighting, lockers, showers, adequate signage and clearly communicated to staff.

The locations being explored for additional bicycle parking facilities include:

– Temporary HLS Ambulance Bays: These bays will no longer be needed once the HLS has been returned to the main hospital building. This location is ideal as it is on ground level and located on a quiet street. It is also close to the east-west green spine. Showers and locker facilities can also be located here, with infrastructure included during the construction of the temporary HLS and lifts.

– Level 1 of the East Block: The ground floor of the east block has the potential to host bicycle parking close to the main hospital building. While it is ideal for parking to be close to the main hospital building, this location will require further investigation due to potential conflict with flood zones and costs involved in additional excavation.

– Northern arrival patient transfer area: The construction of a dedicated patient transfer area opens the possibility of staff bicycle parking, particularly for staff who are involved with non-emergency patient transfer operations. This will provide bicycle parking facilities that are close to the main hospital building.

– East campus public realm and landscaping: Underutilised areas around the northern arrival and the southern pick-up / drop-off area can also be considered for small bicycle parking facilities that are close to the main hospital building.

– Professor Marie Bashir Centre (PMBC) undercover carpark: This car park already has bicycle parking and 3 showers, making it an ideal location prioritise for people who ride. This carpark is consistently underutilised carpark (45% occupied on last spot check) with the potential for significant gains in bicycle parking for small trade-offs of parking spaces (20 bicycle spaces or more for 2 car spaces).

– The Staff carpark: Similarly to the PMBC, this facility has parking spaces that underutilise the available space (due to column placement and car manoeuvring requirements). Poorly utilised spaces within the carpark include

45 degree angled parking that can be converted to approximately 30 bicycle spaces at the cost of 2 car parking spaces.

- The RPA Staff and Visitor carpark: As parking demand eases with mode shift, spaces within the Staff and Visitor carpark can also be considered for conversion to bicycle parking facilities. For example, accessible parking is consistently underutilised in this carpark. A small portion of these spaces could be converted to bicycle parking spaces, with the added benefit of this being on the entry level, at grade with Hospital Road.

While it is ideal for bicycle parking spaces to be close to the destination building, this is not always feasible when internal areas are reserved for the clinical scope of the hospital. In that context, carpark converted spaces are an ideal location for bicycle parking (especially on the ground floor) as drivers and people who ride both need ramps for access and flat grades for parking. Bicycle parking in carparks will also serve as a visible suggestion to those who drive to consider shifting to riding to work, supporting the hospital’s aspiration for a more sustainable way of travelling.

4.11 Trip generation

The car trip generation of the development was estimated through applying growth rates and target mode shares to staff headcount and patient volumes as indicated in the 2031 Clinical Services Plan. Estimations are presented in **Table 4-4**.

Table 4-4 Peak hour vehicle trip generation estimation

User group	Headcount / Volume growth	AM peak 8-9AM Additional trips, 2031		PM peak 4-5PM Additional trips, 2031	
		Inbound	Outbound	Inbound	Outbound
Staff	30%	62	31	31	62
Outpatients	33%	44	22	18	18
Inpatients and visitors	43%	37	7	15	28
Logistics	40%	4	2	2	2
Total	-	147	62	66	110

Trips generated during peak hours are reflective of arrival and departure patterns of staff and patients. Patient activity is calculated from admission and discharge data. For staff, most arrive before the 8-9AM peak, with only 40% of staff indicating they arrive in the network peak in the staff travel survey. This is reflective of the staff shift patterns as provided by RPA, presented in **Table 4-5**.

Table 4-5 Staff shift start and finish times, RPA

Portfolio	Morning Shift Start time	Morning Shift Finish time
Environmental Services	6:00am	2:30pm
Nursing and Midwifery	7:00-7:30am	3:30-4:00pm
Medical	8:00-9:00am	4:30-5:30pm
Support Staff	7:00-9:00am	3:30-5:30pm
Porters	6:00-9:30am	2:30pm-6:00pm
Corporate Staff	7:00-9:30am	3:30-6:00pm

4.12 Trip distribution

Generated car trips were distributed proportionally to the location of staff home postcodes and the home postcode of presenting patients. Travel direction and route choice was split into four quadrants; northwest, northeast, southeast and southwest and then added to the traffic model. The proportion of trips distributed to each quadrant are listed in **Table 4-6**.

Table 4-6 Trip distribution by quadrant and user group

Staff distribution	% of trips	Patient distribution	% of trips
Northwest (NW)	35%	Northwest (NW)	35%
Northeast (NE)	15%	Northeast (NE)	15%
Southeast (SE)	10%	Southeast (SE)	5%
Southwest (SW)	40%	Southwest (SW)	45%

5.0 Traffic and accessibility impact assessment

5.1 Impacts on people who walk

Pedestrian activity around the hospital is expected to grow with increased staff and patient volumes. The footpaths, zebra crossings and signalised crossing will continue to be important for people who walk around RPA.

The increase in people crossing Missenden Road is not as proportionally high to the overall increase in pedestrian activity as the development being concentrated on the east side of the campus, with no changes proposed to the pick up / drop off locations. Restraining driving mode share amongst staff will also be a key factor here, as a portion of the crossing demand is from staff moving from the main carparks to the main hospital building.

The development contributes to the precinct's east-west pedestrian spine ambition by increasing walkability from the northern face of the hospital. The Northern Arrival will establish two new crossing locations on John Hopkins Drive, which will connect pedestrians to and from the east-west link.

In general, pedestrian access is being improved in localised areas where redevelopment is occurring. A dedicated pedestrian path into the ED with prioritised crossing, new accessible footpaths at the Northern Arrival, and new zebra crossings on Grose Street increase the walkability and accessibility within RPA. In addition to the external walkways, circulation within the main hospital building is also be improved, reducing the likelihood of people walking around the outside of the building while searching for a suitable entry.

On Lambie Dew Drive, as a back of house roadway, pedestrian access should be discouraged, and this is reflected in the footpaths at the Northern Arrival now facing away from this road.

While no major changes are being made to access locations and the wider footpath network, people who walk to RPA will find better priority and amenity at locations that are undergoing redevelopment.

5.2 Impacts on people who ride

Provision of attractive and ample bicycle parking and end of trip facilities at RPA will be important in reaching the hospital's target of 7% of staff cycling to work by 2028. Just as parking facilities induce driving behaviour, a good supply of bicycle parking will encourage staff to cycle.

In addition to on-site facilities however, a critical factor to bicycle use is the provision of safe and accessible cycling routes. This is something that is acknowledged by the City of Sydney, who have in their *Cycling Strategy and Action Plan 2018-2030* a priority to connect the network, including building separated cycleways, increasing wayfinding signage and provision of bike parking in the public domain. RPA should continue to advocate for cycling infrastructure in the vicinity of the hospital that can connect to key regional routes.

5.3 Impacts on parking

On-site off-street parking will be able to meet the expected hospital demand once the development is operational, with an occupancy rate of 92%. This occupancy rate highlights a few key things for parking at RPA:

– Parking facilities on site will need to be utilised efficiently: For example, there is currently a large difference in the occupancy rate between the two multi-storey carparks on site. The staff only carpark has a much lower occupancy rate (68%) compared to the publicly accessible Staff and Visitor carpark (96%). Underutilisation of some facilities may result in other facilities reaching capacity and changes to the way carpark access is provided to staff may need to be considered.

– Green travel plan initiatives are critical to manage parking: Increasing uptake of sustainable modes of transport and reducing dependency on car trips will be key to avoiding the need for more parking spaces. This is in line with the City of Sydney's vision of reduced car mode share.

– Parking on site should be considered as constrained: A surplus of parking will induce driving demand. Therefore parking will need to managed in a way that allows users who need to drive, such as patients or shift working staff to find parking, while encouraging those who can use alternative modes of transport to do so instead of driving.

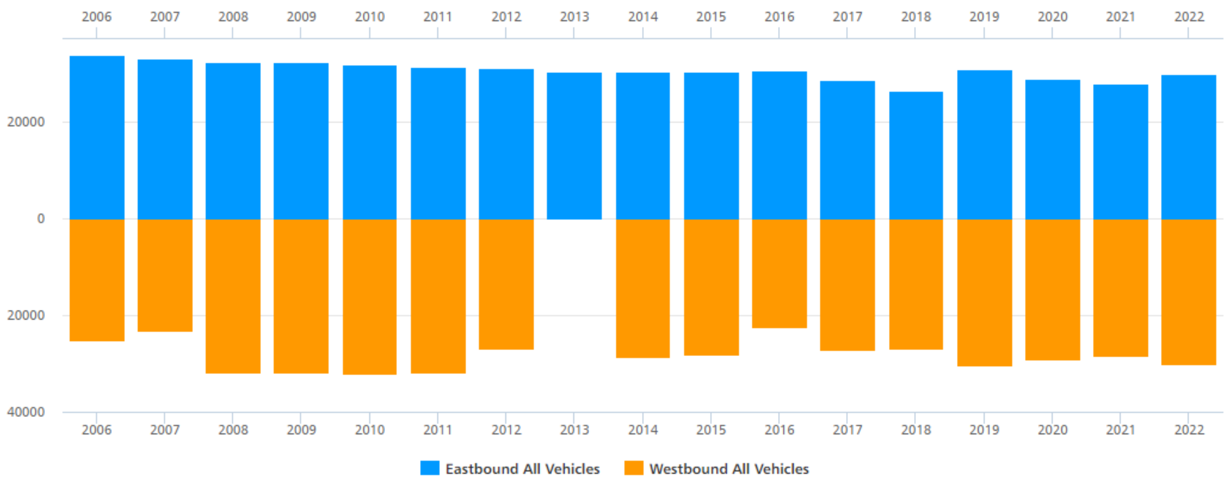
External to this proposal, RPA is planning to shift their fleet parking to the vacant lot on the south-west of the hospital site (note that this is not part of the scope of this SSDA). SLHD fleet is currently parked on-street around the hospital campus (for example along Grose Street and Hospital Road) and off-street in the at-grade car park outside The

Professor Marie Bashir Centre (PMBC). These spaces can then be converted for use by other hospital user groups if required.

5.4 Impacts on the road network

The impact on the road network was determined by adding the expected vehicle trips generated to the modelled intersections. In this future case scenario, background growth was assumed to zero. Located in an inner-city location, traffic on the road network during peak hours is typically at capacity and is controlled through signalised intersections upstream and downstream. Traffic counter data for Parramatta Road at Bridge Road shows that daily volumes have remained stable over the past decade, as shown in **Figure 5-1**. There are also no approved developments in the surrounding area that are yet to be constructed.

Figure 5-1 Average daily traffic, Parramatta Road at Bridge Road, Station Id: 19065



Source: TfNSW

5.4.1 Intersection performance

Table 5-1 RPA development 2031 intersection performance

Intersection	AM Peak with development 2031 8-9AM				PM Peak with development 2031 4-5PM			
	Vol.	DoS	Delay (sec)	LoS	Vol.	DoS	Delay (sec)	LoS
Parramatta Road / Missenden Road	4,029	0.80	19.3	B	3,615	0.83	29.3	C
Missenden Road / Johns Hopkins Drive	763	0.50	12.3	A	796	0.64	13.1	A
Missenden Road / Carillon Avenue	1,687	0.73	35.8	C	1,576	0.67	36.3	C
Carillon Avenue / Hospital Road	1,367	0.70	11.0	A	983	0.34	17.3	B

The impact to the road network as a result of the RPA redevelopment is negligible. Modelling shows that the four key intersections in the vicinity of RPA are expected to perform at an adequate LoS during the peak periods, with the poorest performance being LoS C. The only intersection that has a change in LoS is the Carillon Avenue / Hospital Road intersection in the PM peak, which went from LoS A to LoS B. This is unsurprising as the increase in vehicle traffic as a result of the redevelopment is relatively small and is distributed through the network. No upgrades to road infrastructure is required.

Signal phasing was optimised in the modelling, resulting in some intersections showing a slight improvement in DoS. However, these are relatively minor and phasing optimisation may be practically limited to ensure coordination with the wider signal network.

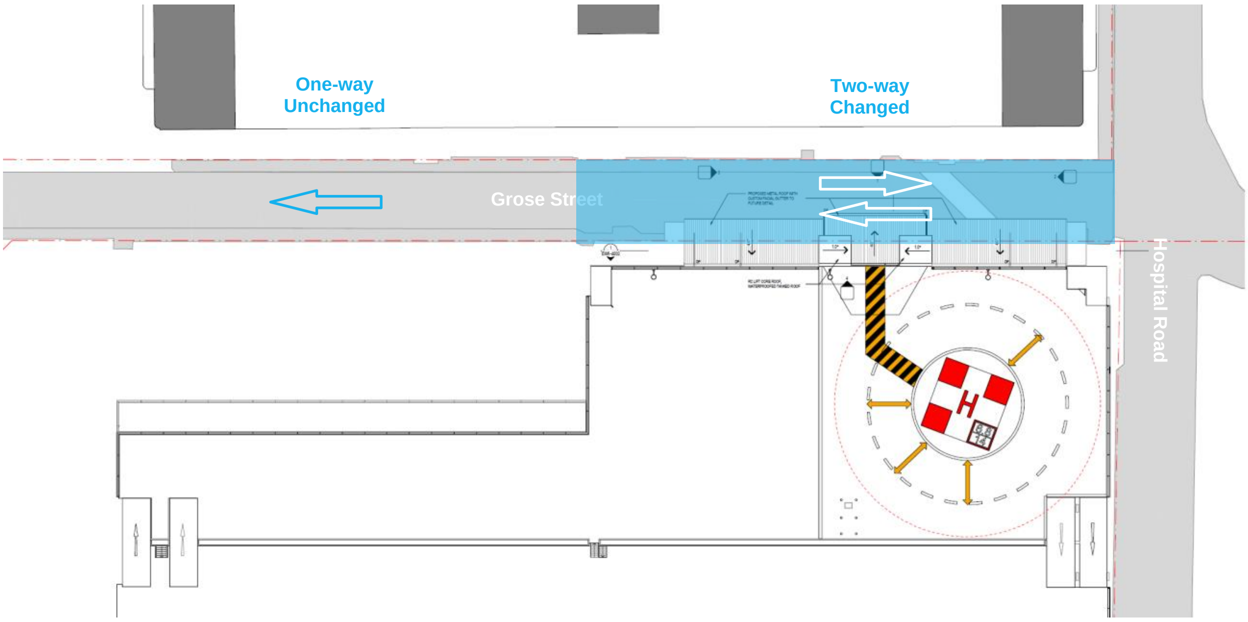
5.4.2 Temporary HLS and Grose Street circulation

The ambulance bays servicing the temporary HLS will necessitate two-way traffic flow on a portion of Grose Street, a private road belonging to RPA (**Figure 5-2**). This will allow ambulances to enter and exit the bays from Hospital Road, the shortest route between the temporary HLS and the ED entrance.

This will be a change to Grose Street which is currently a one-way movement westbound, from Hospital Road to Church Street. Adequate signage and road markings will be required to ensure that drivers and pedestrians are aware of these changes. The number of ambulances at this site and the volume of eastbound movements on Grose Street will be minimal.

No changes will be made to the local road network and the No Entry from Church Street will continue.

Figure 5-2 Changes to Grose Street traffic flow



Base map source: Jacobs, 2022

5.5 Impacts on public transport

A key requirement of reducing dependency on cars is to provide accessible and attractive alternatives. RPA is targeting a growth in public transport usage amongst staff, growing post-COVID-19 rail use by 5 percentage points and bus use by 3 percentage points. These targets are not significantly different to pre-COVID-19 public transport usage, but it is acknowledged that the pandemic has significantly shifted travel behaviour towards car use and this post pandemic mode share will take time to change.

The targeted public transport mode share will see an increase of approximately 110 bus passengers and 130 rail passengers in the AM peak hour compared to existing patronage, or 70 bus and 80 rail passengers more than pre-COVID-19 numbers. This can be accommodated through the regular bus and rail services.

5.6 Impacts on Hospital Operations

5.6.1 Loading dock / Logistics

The proposed loading dock configuration will increase the capacity of the dock and improve manoeuvrability for freight vehicles. The additional 7 courier spaces will ensure that smaller freight vehicles that do not need a raised platform for offloading can be parked to the east of Lambie Dew Drive. This will resolve the issue of courier vehicles either parking along Lambie Dew Drive and reducing the trafficable width of the road or occupying bays that are designed for MRVs or HRVs. The improvement to congestion on Lambie Dew Drive will be significant as courier vehicles (SRV or smaller) are one of the most common delivery vehicle types at RPA's loading docks.

In addition, the realignment of Lambie Dew Drive will also increase the manoeuvring space at the loading docks for MRVs and HRVs. An entry or exit that currently requires a five-point turn or more, including overhanging pedestrian footpaths, will only require three-point turns after the development.

The improvements to physical capacity should be paired with scheduling of deliveries or management of the dock. Data from surveys show that activity at the dock has peaks and troughs which could be spread to maximise capacity of the infrastructure while limiting congestion in the area.

5.6.2 Emergency Department

The proposed upgrade of the ED drop off area will provide additional capacity for growing demand as well as increasing the safety for all user groups. The current ambulance exit will have its direction reversed, so that ambulances will enter the drop off area at this location, where-as a new entryway will provide a separated access for the public. This separation of private car and ambulance drop off locations will reduce the confusion for users on arrival and avoid the scenario of improperly parked cars blocking ambulance access. Pedestrians will now also get their own footpath and marked crossing.

Additional emergency vehicle bays will provide much needed capacity at this location and minimise situations where paramedics have to move their ambulances for new inbounds or to find informal parking. The Ambulance Entry should be complemented with a “Keep clear” marking to ensure any queueing does not block the entrance

5.6.3 Patient pick up / drop off

There will be a trade-off at the Northern arrival of a net reduction of two pick up / drop off spaces for the provision of two accessible parking spaces. These short term parking spaces will need to be managed to ensure drivers move their car within the time limit and allow other users to access the space. The relocation of non-emergency patient transfer to level 2 will reduce the number of user groups at the Northern Arrival, improving traffic flow.

As mentioned in **Section 5.6.2**, a dedicated accessible public drop off at the ED will be a significant improvement as the current ED arrival does not have provision for accessible parking and does not indicate where the public can drop off patients. Ideally, an ED of this size would have more public drop off spaces, but it is acknowledged that the current configuration is constrained by heritage items and unfavourable grades. The provision of more public drop off locations at the ED should be considered in future analysis.

In general, pick up / drop off locations have a problem with drivers ignoring the parking time limits, with a survey of Gloucester House drop off area showing some cars parked for half a day. While it is understood that parking restrictions may not be the key concern for drivers using these spaces, RPA will need to manage these short term parking spaces to ensure that pick up / drop off bays are used fairly and can serve their purpose.

6.0 Green Travel Plan

6.1 What's a Green Travel Plan and why should we make one?

A Green Travel Plan (GTP) is a set of initiatives that seek to encourage people to travel to RPA by public transport, walking, or cycling. Effectively, it is a plan to get people to travel "green" (sustainably). A successful decrease in the proportion of staff who drive is critical to achieving the redevelopment's aim of not constructing more car parks. However, this GTP is not restricted to the context of the proposed redevelopment or to staff only, and is intended to be an on-going program that responds to staff and visitor needs and changing contexts at RPA.

There is an increasing awareness that reliance on cars is unsustainable, particular in a constrained urban context. Unrestricted car growth impacts our environment, congestion, our health and well-being, and focusing on delivering more car parking will only reinforce the pattern of car dependency. Instead, investment into transport infrastructure should be guided by the vision for a careful balance of accessibility and sustainability in how staff and visitors travel.

Green Travel Initiatives are not a new concept to RPA. SLHD has committed to a carbon neutral strategy and set a goal to enhance transportation strategies for patients and staff. The hospital has already implemented initiatives in the past, such as the SLHD run Redfern Shuttle Bus, to decrease the reliance on driving at RPA and encourage use of more sustainable travel choices.

RPA has many opportunities to continue improving access to public transport, walkability and the safety and convenience of cycling, even if the hospital is not located directly next to mass transit. The following sections will set aims, targets and initiatives to encourage mode shift (changing from one way of travel to another) to more sustainable choices.

6.2 Objectives of this Green Travel Plan

The primary objectives of the Green Travel Plan are to:

- **OBJ1:** Increase mode share of public transport, walking, and cycling modes.
- **OBJ2:** Promoting the health benefits of cycling and walking.
- **OBJ3:** Provide staff and visitors with the support and facilities needed to choose sustainable transport modes.
- **OBJ4:** Raise awareness and encourage the use of current and future sustainable transport networks.
- **OBJ5:** Reduce the number of trips made by car to and from RPA and its demand on parking supply.

The focus of the Green Travel Plan will be on considering travel behaviour and encouraging mode shift in staff. Staff make up the largest proportion of parking demand at RPA by significant margins, travel the most to RPA compared to visitors and patients, and are best place to take advantage of initiatives that are set out in this plan.

6.3 Staff Travel Survey 2021

A staff travel survey was conducted in June 2021 and was completed by approximately 25% of all RPA staff (1,199 responses). The purpose of this survey was to determine the effect of COVID-19 on staff travel choices, understand how staff felt about their current method of travel, and gauge their willingness to try a different method of travel. As existing travel behaviour is already presented in **Section 3.11**, this section will explore staff comments in the Staff Travel Survey.

6.3.1 Reasons for driving

When asked for the main reason they decided to travel to the hospital by car, staff selected:

- Alternatives take too long (e.g. indirect or infrequent) - 54.7%
- Comfort of private vehicle compared to alternatives - 24.2%
- Need the car to drive somewhere else before or after work - 18.6%
- Unpredictable work hours - 16.6%
- Alternatives are hard to access (e.g. long walks to stations) - 15.5%

Aside from unpredictable work hours and linked trips that require a car use, the remaining top reasons for driving can be influenced by actions that RPA can take.

6.3.2 Willingness to shift modes

A significant portion of staff were willing to consider public transport, walking or cycling. This is a positive indicator for RPA, that staff would be willing to make use of initiatives to support these travel methods. 68% of drivers, a significant majority, indicated they would consider public transport at least occasionally, and 38% of staff who currently travelled up to 30 minutes said they would at least occasionally consider cycling or walking for their journey. These respondents selected measures that would encourage them to mode shift, the most common being:

- Measures to encourage use of public transport:
  - A direct bus route to my neighbourhood – 42%
  - More frequent services – 34%
  - More bus services stopping directly outside the hospital – 24%
  - Cheaper public transport – 21%
  - Better interchange with other public transport – 20%
- Measures to encourage walking and cycling:
  - More or better cycle lanes – 62%
  - Improved shower / change room facilities – 35%
  - Greater priority for cyclists / pedestrians – 27%
  - More places to store my bicycle / helmet – 26%

6.3.3 Staff suggestions and comments

In addition to selecting measures, many staff also took the time to add comments and suggestions, providing insight on staff sentiment. These included:

- “Changing the way that parking is paid for, this will allow staff members to only use the car park and car on days that are necessary for them and move towards more public transport”
- “Bus transport is the same price as paying for staff parking so it does not really encourage it”
- “The shuttle bus to Redfern in the afternoon is a great help ... It will be great if a shuttle in the morning hours can [also] be organised”
- “If I use public transport I always arrive half an hour early or late to work”
- “The waiting area at the bus stops … are small, for only 3-4 people to sit and often required for patients and other less mobile passengers, not to mention not much protection from rain”
- “Please build shower/ storage facilities for bicycles. I would happily ride to work often, if not everyday. Please do it!”
- “I think having more bike locks and shower, change rooms and locker facilities to allow more people to cycle/run in. With obvious benefits to staff health, reduction in parking and reduction in carbon footprint”
- “Walking around area after hours is dangerous and quite scary especially for night shift nurses”
- "Parking on the street is near impossible, and the car park is expensive. Long waiting times to access staff parking”
- “Parking is not good but is still more convenient than taking public transport as I have to travel past Camperdown before going back to RPA from Central.”

6.4 Staff travel mode share targets

Targets have been established based on the current travel patterns to RPA, the mode share targets set by the City of Sydney's *Sustainable Sydney 2030-2050*, and staff sentiment towards switching to other modes. The mode share targets for completion of the redevelopment in 2028 (5-year targets) are as listed in **Section 4.9** and repeated in **Table 6-1**.

Table 6-1 Existing staff mode share and proposed mode share targets

Mode	Pre-COVID-19	Existing 2021	Launch target 2028	Long term target 2050 (Typical Hours)
Walk	9%	9%	10%	12%
Cycle	3%	2%	7%	12%
Rail	17%	13%	18%	23%
Bus	14%	11%	15%	19%
Total non-car	**43%**	**35%**	**50%**	**66%**
Car	**56%**	**64%**	**50%**	**33%**
Other	1%	1%	-	-
Total	100%	100%	100%	100%

6.5 Strategies

Strategies proposed to achieve these aims can be categorised into the following:

- **Green Travel Plan:** A formal and living document owned and endorsed by the SLHD used to centralise and communicate sustainable travel measures to staff and visitors.
- **Communication to staff:** Regular and thoughtful communication to engage staff on available facilities and initiatives, as well as the benefits of more sustainable modes of transport.
- **Public transport:** Maximising the use of bus routes and rail stations that are available RPA. Promoting public transport and increase its mode share amongst staff.
- **Cycling:** Promotion of cycling to hospital as a method of travel to work. This is in line with the City of Sydney's efforts in improving cycling infrastructure and connecting the wider network within the LGA. Cycling has a low adoption rate amongst staff and further work is needed to promote cycling as a method of travel to work.
- **Walking:** Walking amenity impacts last mile public transport journeys, attractiveness of walking trips, and staff who find on-street parking.
- **Parking demand reduction:** This is a key strategy required to prevent the need for more carparks on site. Parking is often at capacity in many carparks which is also affecting visitors and patients who are driving to the hospital.
- **Advocacy:** RPA and SLHD should represent the travel interests of staff and visitors and explore the implementation of larger strategies involving external stakeholders including TfNSW and City of Sydney. These include public transport routes and walking and cycling infrastructure.

6.6 Proposed initiatives

ID	Initiatives	Measurement and Monitoring	Objectives
Green Travel Plan			
GTP1	This Green Travel Plan outlines strategies endorsed and implemented by RPA. These strategies will change over time as travel patterns evolve. This document is a living document, meaning it will change over time and requires ownership by stakeholders for effective implementation.	– An annual travel survey of staff and visitors should be conducted to understand trends in travel patterns over time. – Occupancy surveys of car parks operated by the Hospital and street parking in the surrounding area should be conducted to determine trends in parking demand. – Occupancy of bicycle parking on Hospital grounds should be monitored to identify changes in cycling mode share.	**OBJ2, OBJ3, OBJ4**
Communication to staff			
COM1	Providing a holistic overview of hospital access via sustainable modes of transport. Staff should be made familiar with locations of local public transport, common walking and cycling routes and bicycle parking. Locations of and access to end-of-trip facilities including showers, change rooms, and lockers should also be provided.	– Annual travel survey of staff to be owned and conducted by a nominated staff member or working group to collect and assess staff travel patterns to discern the ongoing effectiveness of Green Travel Plan communication and adoption. – Monitoring of end of trip facility usage, including bicycle parking.	**OBJ1, OBJ2, OBJ3, OBJ4, OBJ5**
COM2	Consolidate and act on feedback from staff regarding their hesitancies and challenges to identify and address issues common to many individuals.		
Public transport			
PT1	Consider offering salary sacrifice for public transport costs to staff, such as OPAL, and providing OPAL top-up services at retail outlets on campus.	– Annual travel survey of staff to understand trends in travel patterns, particularly staff opinions on public transport. – Track occupancy of the Redfern shuttle bus and determine appropriate frequencies and operating hours.	**OBJ1, OBJ3, OBJ5**
PT2	Increase frequency of the Redfern shuttle bus around peak staff arrival and departure times. Consider beginning with a 10-minute frequency.		
PT3	Consider installation of electronic information and wayfinding displays with live tracking of public transport services and the Redfern shuttle bus.		
Cycling			
CYC1	Increasing the provision of bicycle parking facilities.	– Annual travel survey of staff to understand trends in travel patterns and opinions of staff on cycling to work. – Monitoring of bicycle parking spaces on campus to track trends in uptake and demand. – Anonymised swipe card access could be used to monitor uptake of end of trip facilities	**OBJ2, OBJ3**
CYC2	Improving and maintaining the existing end of trip facilities, such as showers and lockers.		
CYC3	Increasing the visual presence of bicycle and end of trip facilities through wayfinding signage and dedicated access.		
CYC4	Providing and facilitating cycling classes to build cycling confidence in staff.		

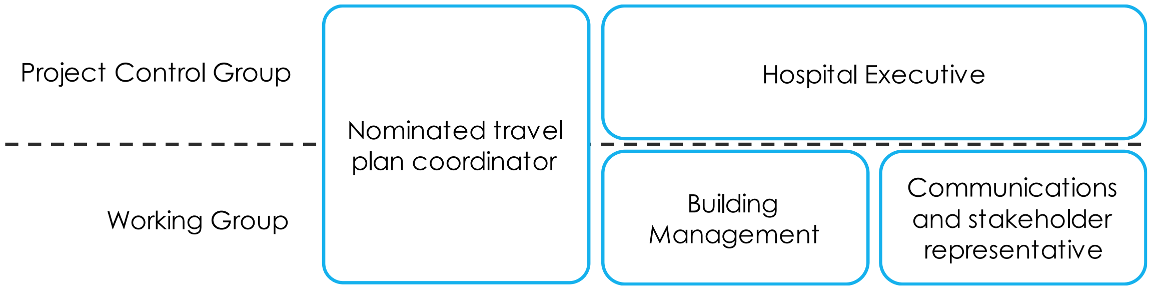
ID	Initiatives	Measurement and Monitoring	Objectives
CYC5	Consider a bike trial program where staff can rent a bike and equipment to reduce introductory investment costs.		
CYC6	Consider subsidising the purchase of bicycles and electric bicycles for staff.		
CYC7	Identify opportunities to install e-bike charging stations.		
Walking			
WAL1	Increase the provision of staff lockers and shower facilities.	– Annual travel survey of staff to understand trends in travel patterns and opinions of staff on walkability. This includes identifying barriers to walking around SGH. – Annual patient travel survey to understand requirements of visitors accessing the Hospital.\ – Anonymised swipe card access could be used to monitor uptake of end of trip facilities	**OBJ2, OBJ3**
WAL2	Improving and maintaining the existing end of trip facilities, such as showers and lockers.		
WAL3	Reduce barriers to walking, including during night conditions as some staff complete shifts after dark.		
WAL4	Improved lighting along common pedestrian routes.		
WAL5	Provision of wayfinding and local area walking maps.		
Parking demand reduction			
PAR1	Reinstate parking fees as soon as permitted by Ministry of Health to ensure that cost incentives do not only favour people who drive. This may be reliant on the COVID situation to ensure staff safety.	– Occupancy surveys of car parks operated by the Hospital and street parking in the surrounding area should be conducted to determine trends in parking demand. – Monitoring of parking entries and exits would provide an indicator of turnover, reflecting trends in parking duration and the proportion of short to long term parking.	**OBJ4, OBJ5**
PAR2	Increase flexibility in staff parking arrangements. Instead of fixed rates or pro-rata, consider not charging staff for days they choose to not drive, even for full time staff.		
PAR3	Consider dividing parking demand by user groups. For example, increasing the cost for staff entering the carpark at regular work hours so that it is in line with public transport user costs, while subsidising those who park for night shift.		
PAR4	Consider allocating a portion of existing parking revenue, or alternatively increase parking rates, to fund and subsidise public transport and cycling incentives.		
PAR5	Investigate the potential of a carpooling incentive by reducing parking rates for those who carpool, with assistance from SLHD to match staff living in similar locations.		
Advocacy			
ADV1	Represent staff in the advocacy of increasing bus service frequency in peak periods to Transport for NSW.	– Survey staff to quantify interest in initiatives listed above and continue monitoring staff	**OBJ1, OBJ2,**

ID	Initiatives	Measurement and Monitoring	Objectives
ADV2	Represent staff in the advocacy of additional bus routes running along Missenden Road that service more destinations. (For example, an orbital route that runs north-south rather than to the south-west).	opinion on effectiveness during and after implementation.	**OBJ3, OBJ4**

6.7 Next steps

RPA has committed to exploring the initiatives set out in this GTP. To achieve the mode share targets outlined in this Green Travel Plan, the next steps include would include ownership of this Plan by RPA and the SLHD, and the establishment of a governance structure to begin exploring how these initiatives can be implemented. An example governance structure is provided in **Figure 6-1**.

Figure 6-1 Proposed Governance Structure



It would be the ongoing responsibility of the Working Group, consisting of a nominated travel plan coordinator, building management and a communications and stakeholder representative, to deliver, monitor and measure the how the Green Travel Plan initiatives are progressing. They would also amend or add to them to steer progress towards the outlined targets.

The Project Control Group would involve the nominated travel plan coordinator and the hospital executive and serves to endorse and approve funding for strategies and related schemes. Programs like these are most effective when the highest levels of the organisation are leading by example and championing the program.

7.0 Construction Impacts

7.1 Works programme

A detailed works program highlighting the expected periods of peak construction activities will be provided by the preferred contractor during the preparation of a formal Construction Traffic Management Plan. The estimated construction phases and their associated timeframes are:

– Demolition / site clearing and excavation: 3 months
– Structure: 10 months
– Façade: 6 months
– Fitout and finishes: 11 months
– Refurbishment: 12 months

7.2 Work hours

It is expected that construction hours will be consistent with those of other hospital redevelopment sites, being:

– Weekdays: 7AM-6PM
– Saturdays: 8AM-1PM
– Sundays and public holidays: No work

Approval is being sought to extend Saturday construction hours for the East extension / East wing, the Vertical Extension and Lambie Dew Drive:

– Saturdays: 7AM-7PM

Workers would be informed of site operating hours during site induction. There may be a need for isolated examples of construction activities to occur outside of the nominated time periods. For example, the delivery of large plant or equipment that requires oversize vehicles to enable delivery. In these cases, approval will be sought from the relevant authorities.

7.3 Construction site access

The majority of construction vehicles are expected to access the site from Parramatta Road or King Street via Missenden Road. Construction staging, delivery and waiting areas are yet to be determined and will be done so by the preferred contractor. These areas are likely to be located along John Hopkins Drive and Lambie Dew Drive, as well as Missenden Road outside St Johns College where vehicle can pull over without disruption of hospital operations or key movement links.

Traffic controllers will be present at delivery zones and key conflict locations, such as the pedestrian crossings on John Hopkins Drive to ensure safety of all user groups during construction.

7.4 Construction traffic volumes

Construction traffic volumes are expected to peak during the structural phase of construction, with an approximate total of 65 vehicle movements per day. 65 vehicle movements over the course of a day is not a large number and impact is expected to be minimal. However, this depends on the arrival pattern of these vehicles, and impacts may be more significant if construction vehicles arrival within a short time window. Impacts of construction traffic vehicle generation will be determined by the Principal Contractor and any required mitigations will be outlined in the detailed CTMP.

7.5 Construction worker traffic and parking arrangements

Located in a constrained urban environment, construction workers are not expected to drive to RPA and will be encouraged to travel using alternate modes. As such, on-site parking will not be provided for use by construction staff, though a small contingency has been reserved in parking forecasts.

Constrained parking and encouraging use of other modes of transport will also minimise the traffic vehicle generation from this user group. Impacts of construction traffic vehicle generation will be determined by the Principal Contractor and any required mitigations will be outlined in the detailed CTMP.

7.6 Impacts to traffic and hospital operations

RPA hospital operations will need to continue throughout the duration of the construction works. Construction vehicles will make extensive use of John Hopkins Drive, including the closure of sections of Lambie Dew Drive during its realignment.

Two-way movement along John Hopkins Drive must be maintained for hospital users due to the dependency of critical hospital functions that depend on the roadway for access including:

- Mothers and Babies pick-up/drop-off and short-term parking
- Main loading docks / freight vehicle access
- Servicing of bulk nitrogen and deliveries at Centenary building
- Dangerous Goods delivery to Anatomical Pathology department
- Ausgrid easement to Susan Wakil chamber substation
- East-west pedestrian spine for connection into University of Sydney

Early and enabling works will enable HRV access on Gloucester House Drive. This will allow the main loading dock to remain operational during the construction period by diverting freight and courier traffic to the south of the main hospital building.

7.7 Impact to pedestrian access

The footpaths around the hospital are well used. Pedestrian access around the site will need to be maintained during the construction process. Key pedestrian access points and desire lines include:

- East-west connectivity from the multistorey car parks to the main hospital building (including crossings over Hospital Road and Missenden Road)
- North-south connectivity along Missenden Road
- Pedestrian connectivity from Missenden Road to USYD, this is expected to be maintained on John Hopkins Drive
- Entry to the Women's and Babies entrance (Northern arrival)
- Entry to the main hospital building via the main entrance on Missenden Road
- Entry to the ED via the main entrance on Missenden Road
- Access to bus stops on both sides of Missenden Road

These access requirements need to be considered by the principal contractor.

7.8 Impact to parking

The main construction impact to parking is the displacement of 195 parking spaces in the Staff and Visitor car park due to the temporary HLS. This HLS is required as construction at the main hospital building will prevent helicopters from accessing the existing helipad.

195 parking spaces is a 7.5% decrease in existing parking supply. This is exacerbated by the fact that this car park is one of the main visitor car parks on campus. When considering the car parks available to the public only, the displacement represents a 13.7% decrease in supply.

Given the already constrained parking situation in the Staff and Visitor car park (96% occupancy at last spot check), the hospital will need to implement measures to alleviate the demand. Recommended mitigation measures include:

- Maximise use of the Staff Only Multistorey car park: This car park has been observed to have significant spare capacity (e.g. 315 at last spot check).

- Reinstating staff parking fees: Since the start of the COVID-19 pandemic, the Ministry of health has removed all parking fees for staff. This includes staff using the Staff and Visitor car park, and car park security have stated that anecdotally most of the car park is being used by staff.
- Increasing the price of parking at the Staff and Visitor car park for non-hospital users: This can be implemented through a “ticket validation” method. Visitors to the hospital will be able to “validate” their ticket with hospital security for the existing rates, whereas non-validated tickets would be charged at a higher rate, in line with typical city parking. This would discourage non-hospital users from using this car park.
- Provide temporary parking on site: For example by using the vacant lot at the south west of the site as temporary staff parking, allowing the Staff and Visitor carpark to reinstate parking fees (for all users), and therefore disincentivising staff from using this facility.
- Encourage use of non-car travel options: This has been detailed in the Green Travel Plan (**Section 6.0**). Initiatives include investing in higher quality end of trip facilities, increase the frequency of the Redfern station shuttle bus and subsidies or incentives for public transport use.

7.9 Coordination with other construction

There is no nearby construction confirmed that would require coordination with the proposed development. While USYD will begin construction of the Sydney Biological Accelerator on their site to the south-east of RPA, the haulage routes and construction zones will be separate from those used for the RPA redevelopment.

7.10 Traffic control plans

The Principal Contractor will be required to provide Traffic Guidance Schemes (TCP) for the proposed work, meeting WorkCover requirements and in accordance with the Transport for NSW *Traffic Control at Work Sites Technical Manual* Issue 6.1 released in February 2022. These TCPs should consider:

- Construction vehicle movements and logistics of construction material delivery
- Minimisation of construction vehicle activity during peak periods
- Priority of pedestrians and passing vehicles
- Installation of A and B Class hoardings to define site boundaries

7.11 Detailed CTMP requirements

A detailed CTMP will be developed by the Principal Contractor and cover / formalise the following information:

- Description of construction activities and duration
- Work hours
- Detailed assessment of construction traffic impacts including any cumulative impacts from surrounding developments
- Details regarding one-off activities such as crane installation and other equipment
- Swept path analysis of heavy vehicle access to the site
- Detailed assessment of on-street parking impacts
- Detailed strategy for pedestrian diversion
- Emergency vehicle access
- Traffic Guidance Schemes
- Contact details of key project personnel

8.0 Summary and conclusion

The proposed redevelopment of RPA Hospital will deliver new buildings and extensions to existing buildings, expanding hospital capacity to serve a growing community. According to the Clinical Services Plan for 2031, the hospital is expected to see a growth of approximately 37%, including growth in staffing, patient volume, visitors and logistics activity.

Existing travel behaviour at RPA Hospital is relatively car dependent when compared to the mode shares of the local area, and has been entrenched further by COVID-19 measures. To support the aspirational mode share targets set by City of Sydney's *Sustainable Sydney 2030-2050*, RPA is targeting a driving mode share of 50% when the development is operational in 2028 and a cycling mode share of 7%. This will mean that no additional car parking spaces need to be delivered despite the uplift in hospital capacity.

An assessment of the proposed development and any potential impacts that may result within and surrounding RPA was undertaken, with the following key observations:

- While no major changes are being made to access locations and the wider footpath network, people who walk to RPA will find better priority and amenity at locations that are undergoing redevelopment.
- Provision of attractive and ample bicycle parking and end of trip facilities (such as showers, change rooms and lockers) at RPA will be important in reaching the hospital's target of 7% of staff cycling to work. RPA will need to have a total of 286 bicycle parking spaces for staff. These spaces should be class 2 bike facilities, as stipulated by the DCP.
- Parking demand is expected to be 2,398 when the development is fully operational. This translates to an occupancy rate of 92% of the available parking facilities post-development. As such, parking will need to be used efficiently (such as utilisation of the spare capacity in the Staff only car park) while the Green Travel Plan continues to improve the attractiveness of alternative methods of travel.
- Vehicle movements are expected to grow by 209 movements in the AM Peak and 176 movements in the PM peak. SIDRA 9 modelling of key intersections around RPA show that the impact to the road network as a result of the redevelopment is negligible.
- The AM Peak public transport demand will grow by approximately 110 bus passengers and 130 rail passengers. It is expected that the existing regular bus and rail services will be able to accommodate this growth.
- The redevelopment will bring improvements to key hospital operations, including relief to the congestion at the main loading docks and increased capacity for ambulances and public drop off at the ED arrival.
- Construction traffic during the most intensive phase of work will amount to 65 vehicle movements per day. The impact of this on the surrounding road network will depend on the arrival pattern of these vehicles. A detailed CTMP will need to be developed by the Principal Contractor and assess construction activity and the impacts of construction traffic.
- Construction workers will not be provided parking on site for RPA and should therefore be encouraged to use other methods of travel to RPA.
- Parking during construction will be constrained due to the 195 spaces displaced by the temporary HLS. This is especially the case for the public as the Staff and Visitor car park is one of the main publicly accessible parking facilities on site. Mitigation measures will be required to alleviate this constraint, including reinstating parking fees for staff and incentivising use of non-car travel options.

A Green Travel Plan (GTP) was developed to support the mode share targets that RPA is pursuing. The successful shift away from driving mode share is a key requirement in minimising transport and traffic impact of the redevelopment. Key GTP recommendations include:

- An annual travel survey of staff and visitors should be conducted to understand trends in travel patterns and monitor initiative efficacy over time.
- Utilising staff's willingness to shift to mode sustainable modes. With 68% of drivers, a significant majority, indicating they would consider public transport at least occasionally if the correct measures were put in place.
- Increased frequency of the Redfern shuttle bus around peak staff arrival and departure times. Consider beginning with a 10-minute frequency.
- Increasing the visual presence of bicycle and end of trip facilities through wayfinding signage and dedicated access.

- Increasing the provision and quality of staff lockers and shower facilities
- Consider allocating a portion of existing parking revenue, or alternatively increase parking rates, to fund and subsidise public transport and cycling incentives.

APPENDIX A

SIDRA 9 Intersection Results

MOVEMENT SUMMARY

Site: 1AM [PAR_MIS_22_AM_BY - DL (Site Folder: AM Base)]

Parra/Missenden
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated   Cycle Time = 141 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Rd														
1	L2	96	8	101	8.3	0.150	34.5	LOS C	4.4	32.9	0.68	0.73	0.68	28.4
2	T1	156	3	164	1.9	0.667	63.4	LOS E	11.7	85.5	1.00	0.83	1.02	21.4
3	R2	10	10	11	100.0	0.667	67.2	LOS E	11.7	85.5	1.00	0.83	1.02	26.6
Approach		262	21	276	8.0	0.667	52.9	LOS D	11.7	85.5	0.88	0.80	0.89	23.7
East: Parramatta Rd														
4	L2	127	8	134	6.3	0.215	27.2	LOS B	6.2	51.8	0.57	0.68	0.57	35.2
5	T1	958	147	1008	15.3	0.535	19.2	LOS B	16.9	130.6	0.55	0.50	0.55	39.8
Approach		1085	155	1142	14.3	0.535	20.2	LOS B	16.9	130.6	0.55	0.52	0.55	39.0
North: Lyons Rd														
7	L2	60	1	63	1.7	0.254	63.9	LOS E	4.0	26.8	0.94	0.75	0.94	21.7
8	T1	179	5	188	2.8	* 0.780	68.4	LOS E	13.7	93.8	1.00	0.90	1.12	18.6
9	R2	9	0	9	0.0	0.780	68.9	LOS E	13.7	93.8	1.00	0.90	1.12	13.8
Approach		248	6	261	2.4	0.780	67.3	LOS E	13.7	93.8	0.99	0.86	1.08	19.2
West: Parramatta Rd														
10	L2	18	0	19	0.0	0.076	7.0	LOS A	0.4	4.1	0.07	0.18	0.07	44.2
11	T1	2146	167	2259	7.8	* 0.745	0.9	LOS A	5.5	40.0	0.08	0.08	0.08	58.5
12	R2	233	11	245	4.7	0.770	61.0	LOS E	12.6	91.6	1.00	0.99	1.09	18.9
Approach		2397	178	2523	7.4	0.770	6.8	LOS A	12.6	91.6	0.17	0.17	0.18	49.5
All Vehicles		3992	360	4202	9.0	0.780	17.2	LOS B	16.9	130.6	0.37	0.35	0.38	40.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Missenden Rd												
P1	Full	49	52	64.8	LOS F	0.2	0.2	0.96	0.96	91.2	34.3	0.38
East: Parramatta Rd												
P2	Full	136	143	65.0	LOS F	0.6	0.6	0.96	0.96	98.7	43.8	0.44
North: Lyons Rd												
P3	Full	90	95	64.9	LOS F	0.4	0.4	0.96	0.96	92.0	35.2	0.38
West: Parramatta Rd												

P4 Full	165	174	65.1	LOS F	0.7	0.7	0.96	0.96	101.3	47.1	0.46
All Pedestrians	440	463	65.0	LOS F	0.7	0.7	0.96	0.96	97.5	42.2	0.43

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

▽ Site: 2AM [MIS_JOH_22_AM_BY (Site Folder: AM Base)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Road															
2	T1	234	7.3	246	7.3	0.287	2.1	LOS A	1.3	9.7	0.51	0.47	0.51	37.6
3	R2	25	0.0	26	0.0	0.287	10.0	LOS A	1.3	9.7	0.51	0.47	0.51	36.6
Approach		259	6.6	273	6.6	0.287	2.9	NA	1.3	9.7	0.51	0.47	0.51	37.5
East: John Hopkins															
4	L2	17	17.6	18	17.6	0.106	4.0	LOS A	0.3	2.3	0.73	0.73	0.73	31.3
6	R2	24	0.0	25	0.0	0.106	9.4	LOS A	0.3	2.3	0.73	0.73	0.73	2.0
Approach		41	7.3	43	7.3	0.106	7.1	LOS A	0.3	2.3	0.73	0.73	0.73	15.0
North: Missenden Road															
7	L2	33	9.1	35	9.1	0.464	10.8	LOS A	3.2	23.5	0.57	0.65	0.75	12.9
8	T1	379	5.3	399	5.3	0.464	3.3	LOS A	3.2	23.5	0.57	0.65	0.75	36.9
Approach		412	5.6	434	5.6	0.464	3.9	NA	3.2	23.5	0.57	0.65	0.75	36.6
West: Grose St															
10	L2	1	100.0	1	100.0	0.007	5.4	LOS A	0.0	0.2	0.62	0.50	0.62	8.1
11	T1	1	100.0	1	100.0	0.007	9.5	LOS A	0.0	0.2	0.62	0.50	0.62	8.1
12	R2	1	0.0	1	0.0	0.007	2.0	LOS A	0.0	0.2	0.62	0.50	0.62	27.3
Approach		3	66.7	3	66.7	0.007	5.6	LOS A	0.0	0.2	0.62	0.50	0.62	18.5
All Vehicles		715	6.3	753	6.3	0.464	3.7	NA	3.2	23.5	0.56	0.59	0.66	35.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3AM [CAR_MIS_22_AM_BY (Site Folder: AM Base)]

Missenden/Carillon
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 120 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Rd														
1	L2	137	1	144	0.7	0.113	11.6	LOS A	2.7	19.4	0.35	0.64	0.35	35.5
2	T1	211	12	222	5.7	0.382	33.4	LOS C	9.6	65.4	0.79	0.71	0.79	21.2
Approach		348	13	366	3.7	0.382	24.8	LOS B	9.6	65.4	0.62	0.68	0.62	25.5
East: Carillon Ave														
4	L2	27	4	28	14.8	0.270	54.6	LOS D	3.9	29.0	0.93	0.73	0.93	24.4
5	T1	228	7	240	3.1	* 0.739	52.5	LOS D	11.2	80.1	0.97	0.85	1.05	24.3
6	R2	76	4	80	5.3	0.266	52.2	LOS D	4.1	30.1	0.91	0.76	0.91	23.1
Approach		331	15	348	4.5	0.739	52.6	LOS D	11.2	80.1	0.95	0.82	1.01	24.1
North: Missenden Rd														
7	L2	175	4	184	2.3	0.183	18.5	LOS B	5.3	37.6	0.53	0.66	0.53	34.5
8	T1	159	12	167	7.5	* 0.604	38.2	LOS C	11.4	80.5	0.88	0.76	0.88	19.6
9	R2	62	4	65	6.5	0.604	41.6	LOS C	11.4	80.5	0.88	0.76	0.88	17.9
Approach		396	20	417	5.1	0.604	30.0	LOS C	11.4	80.5	0.73	0.71	0.73	25.9
West: Carillon Ave														
10	L2	56	5	59	8.9	0.215	34.7	LOS C	5.7	40.5	0.75	0.67	0.75	20.5
11	T1	443	7	466	1.6	* 0.753	35.3	LOS C	22.8	158.8	0.88	0.79	0.90	29.0
12	R2	63	2	66	3.2	0.753	40.8	LOS C	22.8	158.8	0.91	0.81	0.92	21.8
Approach		562	14	592	2.5	0.753	35.8	LOS C	22.8	158.8	0.87	0.78	0.88	27.8
All Vehicles		1637	62	1723	3.8	0.753	35.5	LOS C	22.8	158.8	0.80	0.75	0.82	26.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Missenden Rd												
P1	Full	139	146	54.5	LOS E	0.5	0.5	0.96	0.96	81.6	35.2	0.43
East: Carillon Ave												
P2	Full	296	312	54.9	LOS E	1.0	1.0	0.96	0.96	86.0	40.5	0.47
North: Missenden Rd												
P3	Full	74	78	54.3	LOS E	0.3	0.3	0.95	0.95	81.4	35.2	0.43
West: Carillon Ave												

P4 Full	186	196	54.6	LOS E	0.6	0.6	0.96	0.96	83.2	37.2	0.45
All Pedestrians	695	732	54.7	LOS E	1.0	1.0	0.96	0.96	83.9	38.0	0.45

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4AM [CAR_HOS_22_AM_BY (Site Folder: AM Base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 121 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Appartment Exit														
1	L2	3	0.0	3	0.0	0.014	50.5	LOS D	0.2	1.1	0.90	0.57	0.90	10.3
Approach		3	0.0	3	0.0	0.014	50.5	LOS D	0.2	1.1	0.90	0.57	0.90	10.3
East: Carillon Ave														
4	L2	2	0.0	2	0.0	0.040	14.6	LOS B	0.9	6.6	0.34	0.30	0.34	12.4
5	T1	302	4.6	318	4.6	0.192	4.2	LOS A	4.1	29.7	0.29	0.25	0.29	43.6
6	R2	143	0.0	151	0.0	* 0.342	13.6	LOS A	2.4	16.5	0.50	0.79	0.50	13.7
Approach		447	3.1	471	3.1	0.342	7.2	LOS A	4.1	29.7	0.36	0.43	0.36	24.9
North: Hospital Drive														
7	L2	7	0.0	7	0.0	0.018	39.3	LOS C	0.3	2.3	0.80	0.54	0.80	10.8
9	R2	10	0.0	11	0.0	* 0.053	51.1	LOS D	0.6	3.9	0.91	0.63	0.91	10.3
Approach		17	0.0	18	0.0	0.053	46.2	LOS D	0.6	3.9	0.86	0.59	0.86	10.5
West: Carillon Ave														
10	L2	233	0.0	245	0.0	0.198	15.4	LOS B	5.1	35.9	0.39	0.81	0.39	14.2
11	T1	549	2.6	578	2.6	* 0.596	9.2	LOS A	15.3	109.2	0.49	0.44	0.49	37.7
Approach		782	1.8	823	1.8	0.596	11.0	LOS A	15.3	109.2	0.46	0.55	0.46	24.4
All Vehicles		1249	2.2	1315	2.2	0.596	10.2	LOS A	15.3	109.2	0.43	0.51	0.43	24.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Appartment Exit												
P1	Full	118	124	54.9	LOS E	0.4	0.4	0.96	0.96	78.5	30.6	0.39
East: Carillon Ave												
P2	Full	9	9	54.7	LOS E	0.0	0.0	0.95	0.95	80.9	34.1	0.42
North: Hospital Drive												
P3	Full	46	48	54.8	LOS E	0.2	0.2	0.95	0.95	77.5	29.5	0.38
All Pedestrians		173	182	54.9	LOS E	0.4	0.4	0.95	0.95	78.3	30.5	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1PM [PAR_MIS_22_PM_BY (Site Folder: PM Base)]

Parra/Missenden
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 139 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Rd														
1	L2	172	0	181	0.0	0.359	48.4	LOS D	9.8	68.5	0.85	0.79	0.85	23.9
2	T1	252	2	265	0.8	* 0.963	91.6	LOS F	22.5	158.3	1.00	1.15	1.49	17.0
Approach		424	2	446	0.5	0.963	74.1	LOS F	22.5	158.3	0.94	1.00	1.23	19.1
East: Parramatta Rd														
4	L2	141	5	148	3.5	0.144	20.9	LOS B	4.6	33.3	0.50	0.70	0.50	37.6
5	T1	1594	80	1678	5.0	* 0.753	22.2	LOS B	41.2	300.8	0.80	0.74	0.80	37.9
Approach		1735	85	1826	4.9	0.753	22.1	LOS B	41.2	300.8	0.78	0.74	0.78	37.9
North: Lyons Rd														
7	L2	31	0	33	0.0	0.130	60.9	LOS E	2.1	14.5	0.90	0.73	0.90	23.6
8	T1	102	2	107	2.0	0.560	66.8	LOS E	7.8	55.6	0.99	0.79	0.99	18.8
9	R2	13	0	14	0.0	0.560	69.9	LOS E	7.8	55.6	0.99	0.79	0.99	14.0
Approach		146	2	154	1.4	0.560	65.8	LOS E	7.8	55.6	0.97	0.78	0.97	19.4
West: Parramatta Rd														
10	L2	45	0	47	0.0	0.037	12.8	LOS A	1.0	6.7	0.33	0.64	0.33	34.2
11	T1	1081	53	1138	4.9	0.414	7.8	LOS A	14.7	107.3	0.42	0.38	0.42	49.8
12	R2	149	0	157	0.0	* 0.978	106.8	LOS F	13.7	95.7	1.00	1.07	1.62	13.2
Approach		1275	53	1342	4.2	0.978	19.5	LOS B	14.7	107.3	0.49	0.47	0.56	38.3
All Vehicles		3580	142	3768	4.0	0.978	29.1	LOS C	41.2	300.8	0.70	0.68	0.76	33.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Missenden Rd												
P1	Full	40	42	63.7	LOS F	0.2	0.2	0.96	0.96	90.1	34.3	0.38
East: Parramatta Rd												
P2	Full	140	147	64.0	LOS F	0.6	0.6	0.96	0.96	97.7	43.8	0.45
North: Lyons Rd												
P3	Full	81	85	63.9	LOS F	0.3	0.3	0.96	0.96	90.9	35.2	0.39
West: Parramatta Rd												
P4	Full	112	118	63.9	LOS F	0.4	0.4	0.96	0.96	100.2	47.1	0.47

All Pedestrians	373	393	63.9	LOS F	0.6	0.6	0.96	0.96	96.2	41.9	0.44

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 2PM [MIS_JOH_22_PM_BY (Site Folder: PM Base)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Road														
2	T1	312	2.9	328	2.9	0.532	7.9	LOS A	4.4	31.5	0.72	0.94	1.12	34.1
3	R2	19	0.0	20	0.0	0.532	11.8	LOS A	4.4	31.5	0.72	0.94	1.12	33.2
Approach		331	2.7	348	2.7	0.532	8.1	NA	4.4	31.5	0.72	0.94	1.12	34.0
East: John Hopkins														
4	L2	10	10.0	11	10.0	0.130	2.8	LOS A	0.4	2.5	0.75	0.74	0.75	31.1
6	R2	35	0.0	37	0.0	0.130	9.4	LOS A	0.4	2.5	0.75	0.74	0.75	1.9
Approach		45	2.2	47	2.2	0.130	7.9	LOS A	0.4	2.5	0.75	0.74	0.75	9.0
North: Missenden Road														
7	L2	30	3.3	32	3.3	0.620	12.2	LOS A	6.0	42.7	0.76	0.99	1.35	2.4
8	T1	348	2.3	366	2.3	0.620	9.5	LOS A	6.0	42.7	0.76	0.99	1.35	45.9
Approach		378	2.4	398	2.4	0.620	9.7	NA	6.0	42.7	0.76	0.99	1.35	42.3
West: Grose St														
10	L2	2	0.0	2	0.0	0.002	2.8	LOS A	0.0	0.1	0.59	0.38	0.59	9.7
Approach		2	0.0	2	0.0	0.002	2.8	LOS A	0.0	0.1	0.59	0.38	0.59	9.7
All Vehicles		756	2.5	796	2.5	0.620	8.9	NA	6.0	42.7	0.74	0.95	1.21	35.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3PM [CAR_MIS_22_PM_BY (Site Folder: PM Base)]

Missenden/Carillon
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 121 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Rd														
1	L2	84	1	88	1.2	0.084	17.6	LOS B	2.3	16.3	0.48	0.66	0.48	31.1
2	T1	195	6	205	3.1	0.295	31.9	LOS C	8.7	57.1	0.77	0.69	0.77	21.7
Approach		279	7	294	2.5	0.295	27.6	LOS B	8.7	57.1	0.68	0.68	0.68	24.1
East: Carillon Ave														
4	L2	34	0	36	0.0	0.218	40.7	LOS C	5.2	36.5	0.81	0.68	0.81	28.1
5	T1	334	4	352	1.2	* 0.599	37.8	LOS C	13.3	94.1	0.86	0.73	0.86	28.4
6	R2	97	1	102	1.0	0.190	39.2	LOS C	4.5	31.6	0.79	0.74	0.79	26.6
Approach		465	5	489	1.1	0.599	38.3	LOS C	13.3	94.1	0.84	0.73	0.84	28.0
North: Missenden Rd														
7	L2	168	1	177	0.6	0.139	10.8	LOS A	3.5	24.7	0.37	0.60	0.37	38.6
8	T1	164	5	173	3.0	0.546	35.8	LOS C	11.4	77.5	0.85	0.74	0.85	20.3
9	R2	64	1	67	1.6	* 0.546	39.2	LOS C	11.4	77.5	0.85	0.74	0.85	18.6
Approach		396	7	417	1.8	0.546	25.7	LOS B	11.4	77.5	0.65	0.68	0.65	27.5
West: Carillon Ave														
10	L2	48	1	51	2.1	0.237	48.1	LOS D	4.6	31.2	0.88	0.73	0.88	16.5
11	T1	265	1	279	0.4	* 0.828	52.6	LOS D	19.8	135.5	0.98	0.92	1.11	24.0
12	R2	85	1	89	1.2	0.828	58.7	LOS E	19.8	135.5	1.00	0.96	1.15	17.0
Approach		398	3	419	0.8	0.828	53.3	LOS D	19.8	135.5	0.97	0.91	1.09	22.0
All Vehicles		1538	22	1619	1.4	0.828	37.0	LOS C	19.8	135.5	0.80	0.75	0.83	25.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Missenden Rd												
P1	Full	90	95	54.9	LOS E	0.3	0.3	0.95	0.95	81.9	35.2	0.43
East: Carillon Ave												
P2	Full	226	238	55.2	LOS E	0.8	0.8	0.96	0.96	86.3	40.5	0.47
North: Missenden Rd												
P3	Full	74	78	54.8	LOS E	0.3	0.3	0.95	0.95	81.9	35.2	0.43
West: Carillon Ave												

P4 Full	176	185	55.1	LOS E	0.6	0.6	0.96	0.96	83.7	37.2	0.44
All Pedestrians	566	596	55.1	LOS E	0.8	0.8	0.96	0.96	84.2	37.9	0.45

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4PM [CAR_HOS_22_PM_BY (Site Folder: PM Base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 113 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	INPUT VOLUMES HV] %	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Appartment Exit														
1	L2	2	0.0	2	0.0	0.016	48.0	LOS D	0.2	1.1	0.90	0.58	0.90	10.4
3	R2	1	0.0	1	0.0	0.016	47.1	LOS D	0.2	1.1	0.90	0.58	0.90	10.1
Approach		3	0.0	3	0.0	0.016	47.7	LOS D	0.2	1.1	0.90	0.58	0.90	10.3
East: Carillon Ave														
4	L2	4	0.0	4	0.0	0.060	12.5	LOS A	1.2	8.6	0.29	0.28	0.29	12.5
5	T1	431	0.7	454	0.7	* 0.289	5.3	LOS A	6.7	47.5	0.35	0.31	0.35	42.2
6	R2	19	0.0	20	0.0	* 0.638	76.9	LOS F	1.3	9.0	1.00	0.75	1.24	8.7
Approach		454	0.7	478	0.7	0.638	8.3	LOS A	6.7	47.5	0.37	0.33	0.38	35.0
North: Hospital Drive														
7	L2	67	0.0	71	0.0	0.195	41.0	LOS C	3.3	22.8	0.87	0.68	0.87	10.6
9	R2	81	0.0	85	0.0	* 0.403	49.9	LOS D	4.4	31.1	0.96	0.75	0.96	10.4
Approach		148	0.0	156	0.0	0.403	45.9	LOS D	4.4	31.1	0.92	0.72	0.92	10.5
West: Carillon Ave														
10	L2	8	0.0	8	0.0	0.041	12.4	LOS A	0.8	5.8	0.29	0.35	0.29	15.4
11	T1	310	1.0	326	1.0	0.203	4.9	LOS A	4.7	33.0	0.33	0.30	0.33	42.4
Approach		318	0.9	335	0.9	0.203	5.1	LOS A	4.7	33.0	0.33	0.30	0.33	40.4
All Vehicles		923	0.7	972	0.7	0.638	13.4	LOS A	6.7	47.5	0.45	0.38	0.45	25.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	AVERAGE BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Appartment Exit												
P1	Full	73	77	50.8	LOS E	0.2	0.2	0.95	0.95	74.4	30.6	0.41
East: Carillon Ave												
P2	Full	23	24	50.7	LOS E	0.1	0.1	0.95	0.95	76.8	33.9	0.44
North: Hospital Drive												
P3	Full	28	29	50.7	LOS E	0.1	0.1	0.95	0.95	73.4	29.5	0.40
All Pedestrians		124	131	50.8	LOS E	0.2	0.2	0.95	0.95	74.6	31.0	0.42

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1AM [PAR_MIS_22_AM_DEV - DL (Site Folder: AM Development)]

Parra/Missenden
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated   Cycle Time = 141 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Rd														
1	L2	99	9	104	9.1	0.125	25.7	LOS B	3.8	28.4	0.57	0.71	0.57	32.5
2	T1	160	3	168	1.9	0.578	58.7	LOS E	11.5	83.9	0.97	0.80	0.97	22.5
3	R2	10	10	11	100.0	0.578	62.6	LOS E	11.5	83.9	0.97	0.80	0.97	27.7
Approach		269	22	283	8.2	0.578	46.7	LOS D	11.5	83.9	0.82	0.77	0.82	25.4
East: Parramatta Rd														
4	L2	129	10	136	7.6	0.274	37.2	LOS C	7.7	65.1	0.70	0.72	0.70	31.8
5	T1	958	147	1008	15.3	0.666	32.4	LOS C	23.8	184.4	0.77	0.69	0.77	32.4
Approach		1087	157	1144	14.4	0.666	33.0	LOS C	23.8	184.4	0.76	0.69	0.76	32.3
North: Lyons Rd														
7	L2	60	1	63	1.7	0.208	59.6	LOS E	3.8	25.7	0.91	0.74	0.91	22.6
8	T1	193	5	203	2.6	* 0.704	61.7	LOS E	13.8	95.1	0.98	0.84	1.01	19.9
9	R2	9	0	9	0.0	0.704	62.4	LOS E	13.8	95.1	0.98	0.84	1.01	14.9
Approach		262	6	276	2.3	0.704	61.3	LOS E	13.8	95.1	0.96	0.82	0.99	20.4
West: Parramatta Rd														
10	L2	23	0	24	0.0	0.086	8.3	LOS A	0.7	7.1	0.12	0.23	0.12	42.2
11	T1	2146	167	2259	7.8	* 0.804	2.0	LOS A	11.7	85.7	0.17	0.17	0.17	56.8
12	R2	242	13	255	5.3	0.648	35.8	LOS C	10.6	77.4	0.96	0.82	0.96	25.0
Approach		2411	180	2538	7.5	0.804	5.5	LOS A	11.7	85.7	0.25	0.23	0.25	51.0
All Vehicles		4029	365	4241	9.0	0.804	19.3	LOS B	23.8	184.4	0.47	0.43	0.48	38.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Missenden Rd												
P1	Full	49	52	64.8	LOS F	0.2	0.2	0.96	0.96	91.2	34.3	0.38
East: Parramatta Rd												
P2	Full	136	143	65.0	LOS F	0.6	0.6	0.96	0.96	98.7	43.8	0.44
North: Lyons Rd												
P3	Full	90	95	64.9	LOS F	0.4	0.4	0.96	0.96	92.0	35.2	0.38

West: Parramatta Rd											
P4 Full	165	174	65.1	LOS F	0.7	0.7	0.96	0.96	101.3	47.1	0.46
All Pedestrians	440	463	65.0	LOS F	0.7	0.7	0.96	0.96	97.5	42.2	0.43

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

▽ Site: 2AM [MIS_JOH_22_AM_DEV (Site Folder: AM Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Road														
2	T1	237	17	249	7.2	0.304	2.2	LOS A	1.5	10.9	0.52	0.51	0.54	38.2
3	R2	36	0	38	0.0	0.304	10.3	LOS A	1.5	10.9	0.52	0.51	0.54	37.5
Approach		273	17	287	6.2	0.304	3.3	NA	1.5	10.9	0.52	0.51	0.54	38.1
East: John Hopkins														
4	L2	22	4	23	18.3	0.137	6.4	LOS A	0.4	3.0	0.75	0.87	0.75	33.8
6	R2	28	1	29	3.6	0.137	12.3	LOS A	0.4	3.0	0.75	0.87	0.75	2.3
Approach		50	5	52	10.0	0.137	9.7	LOS A	0.4	3.0	0.75	0.87	0.75	17.5
North: Missenden Road														
7	L2	47	7	50	14.0	0.500	10.2	LOS A	3.7	27.1	0.59	0.69	0.81	1.9
8	T1	390	20	410	5.1	0.500	3.6	LOS A	3.7	27.1	0.59	0.69	0.81	37.1
Approach		437	27	460	6.1	0.500	4.3	NA	3.7	27.1	0.59	0.69	0.81	33.2
West: Grose St														
10	L2	1	1	1	100.0	0.007	5.4	LOS A	0.0	0.2	0.63	0.52	0.63	8.1
11	T1	1	1	1	100.0	0.007	10.4	LOS A	0.0	0.2	0.63	0.52	0.63	8.0
12	R2	1	0	1	0.0	0.007	2.1	LOS A	0.0	0.2	0.63	0.52	0.63	27.1
Approach		3	2	3	66.7	0.007	6.0	LOS A	0.0	0.2	0.63	0.52	0.63	18.4
All Vehicles		763	51	803	6.6	0.500	4.3	NA	3.7	27.1	0.57	0.64	0.71	33.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3AM [CAR_MIS_22_AM_DEV (Site Folder: AM Development)]

Missenden/Carillon
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 121 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Rd														
1	L2	151	1	159	0.7	0.125	12.0	LOS A	3.1	22.1	0.36	0.64	0.36	35.5
2	T1	222	12	233	5.4	0.466	36.6	LOS C	10.7	73.0	0.83	0.73	0.83	20.3
Approach		373	13	392	3.5	0.466	26.7	LOS B	10.7	73.0	0.64	0.70	0.64	24.9
East: Carillon Ave														
4	L2	27	4	28	14.8	0.263	54.1	LOS D	4.0	29.6	0.92	0.73	0.92	24.6
5	T1	232	7	244	3.0	* 0.721	51.6	LOS D	11.2	80.5	0.96	0.83	1.03	24.6
6	R2	77	4	81	5.2	0.258	51.8	LOS D	4.2	30.4	0.91	0.76	0.91	23.3
Approach		336	15	354	4.5	0.721	51.9	LOS D	11.2	80.5	0.95	0.81	0.99	24.3
North: Missenden Rd														
7	L2	180	5	189	2.8	0.196	20.2	LOS B	5.8	41.1	0.56	0.67	0.56	33.8
8	T1	162	12	170	7.4	* 0.722	44.5	LOS D	12.6	89.5	0.93	0.83	0.99	17.9
9	R2	62	4	65	6.5	0.722	48.0	LOS D	12.6	89.5	0.93	0.83	0.99	16.3
Approach		404	21	425	5.2	0.722	34.2	LOS C	12.6	89.5	0.76	0.76	0.80	24.5
West: Carillon Ave														
10	L2	66	5	69	7.6	0.207	33.2	LOS C	5.6	40.1	0.73	0.67	0.73	21.3
11	T1	446	7	469	1.6	* 0.725	32.8	LOS C	22.5	156.7	0.86	0.77	0.86	29.9
12	R2	63	2	66	3.2	0.725	38.1	LOS C	22.5	156.7	0.88	0.78	0.88	22.7
Approach		574	14	604	2.4	0.725	33.4	LOS C	22.5	156.7	0.85	0.76	0.85	28.6
All Vehicles		1687	63	1775	3.7	0.725	35.8	LOS C	22.5	156.7	0.80	0.75	0.82	25.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Missenden Rd												
P1	Full	139	146	55.0	LOS E	0.5	0.5	0.96	0.96	82.1	35.2	0.43
East: Carillon Ave												
P2	Full	296	312	55.4	LOS E	1.0	1.0	0.96	0.96	86.5	40.5	0.47
North: Missenden Rd												
P3	Full	74	78	54.8	LOS E	0.3	0.3	0.95	0.95	81.9	35.2	0.43

West: Carillon Ave												
P4	Full	186	196	55.1	LOS E	0.6	0.6	0.96	0.96	83.7	37.2	0.44
All Pedestrians		695	732	55.2	LOS E	1.0	1.0	0.96	0.96	84.4	38.0	0.45

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4AM [CAR_HOS_22_AM_DEV (Site Folder: AM Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 121 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Appartment Exit														
1	L2	3	0	3	0.0	0.034	61.8	LOS E	0.2	1.3	0.97	0.61	0.97	9.8
Approach		3	0	3	0.0	0.034	61.8	LOS E	0.2	1.3	0.97	0.61	0.97	9.8
East: Carillon Ave														
4	L2	2	0	2	0.0	0.037	15.6	LOS B	0.9	6.4	0.36	0.32	0.36	12.3
5	T1	302	14	318	4.6	0.178	2.5	LOS A	2.8	20.2	0.21	0.18	0.21	46.0
6	R2	161	0	169	0.0	* 0.319	12.5	LOS A	3.1	21.5	0.49	0.78	0.49	19.7
Approach		465	14	489	3.0	0.319	6.0	LOS A	3.1	21.5	0.31	0.39	0.31	30.6
North: Hospital Drive														
7	L2	7	0	7	0.0	0.017	38.4	LOS C	0.3	2.3	0.79	0.54	0.79	10.8
9	R2	10	0	11	0.0	* 0.108	62.1	LOS E	0.6	4.4	0.98	0.66	0.98	9.6
Approach		17	0	18	0.0	0.108	52.4	LOS D	0.6	4.4	0.90	0.61	0.90	10.1
West: Carillon Ave														
10	L2	320	0	337	0.0	0.510	16.0	LOS B	8.1	56.8	0.45	0.75	0.45	25.2
11	T1	561	14	591	2.5	* 0.698	10.8	LOS A	17.0	121.8	0.54	0.48	0.54	36.3
Approach		882	14	928	1.6	0.698	12.7	LOS A	17.0	121.8	0.50	0.58	0.50	30.9
All Vehicles		1367	28	1438	2.0	0.698	11.0	LOS A	17.0	121.8	0.44	0.52	0.44	29.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Appartment Exit												
P1	Full	118	124	54.9	LOS E	0.4	0.4	0.96	0.96	78.5	30.6	0.39
East: Carillon Ave												
P2	Full	9	9	54.7	LOS E	0.0	0.0	0.95	0.95	80.9	34.1	0.42
North: Hospital Drive												
P3	Full	46	48	54.8	LOS E	0.2	0.2	0.95	0.95	77.5	29.5	0.38
All Pedestrians		173	182	54.9	LOS E	0.4	0.4	0.95	0.95	78.3	30.5	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1PM [PAR_MIS_22_PM_DEV (Site Folder: PM Development)]

Parra/Missenden
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 139 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Rd														
1	L2	178	1	187	0.6	0.308	41.8	LOS C	9.3	65.2	0.78	0.78	0.78	25.9
2	T1	260	2	274	0.8	* 0.822	60.8	LOS E	18.5	130.6	0.98	0.92	1.13	22.4
Approach		438	3	461	0.7	0.822	53.1	LOS D	18.5	130.6	0.90	0.87	0.99	23.6
East: Parramatta Rd														
4	L2	142	6	149	4.2	0.162	25.2	LOS B	5.3	38.3	0.57	0.72	0.57	35.8
5	T1	1594	80	1678	5.0	* 0.834	29.2	LOS C	47.3	345.4	0.91	0.84	0.92	34.0
Approach		1736	86	1827	5.0	0.834	28.9	LOS C	47.3	345.4	0.89	0.83	0.89	34.2
North: Lyons Rd														
7	L2	31	0	33	0.0	0.105	55.9	LOS D	2.0	13.9	0.86	0.72	0.86	24.9
8	T1	108	2	114	1.8	0.452	60.3	LOS E	7.8	55.5	0.95	0.78	0.95	20.1
9	R2	13	0	14	0.0	0.452	63.5	LOS E	7.8	55.5	0.95	0.78	0.95	15.1
Approach		152	2	160	1.3	0.452	59.7	LOS E	7.8	55.5	0.93	0.77	0.93	20.7
West: Parramatta Rd														
10	L2	54	0	57	0.0	0.046	14.5	LOS B	1.3	9.1	0.37	0.65	0.37	32.8
11	T1	1081	53	1138	4.9	0.436	10.0	LOS A	16.7	121.5	0.48	0.43	0.48	47.6
12	R2	153	1	161	0.7	* 0.809	77.3	LOS F	11.6	81.6	1.00	0.89	1.19	16.4
Approach		1288	54	1356	4.2	0.809	18.2	LOS B	16.7	121.5	0.54	0.50	0.56	39.2
All Vehicles		3615	145	3805	4.0	0.834	29.3	LOS C	47.3	345.4	0.76	0.72	0.78	33.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Missenden Rd												
P1	Full	40	42	63.7	LOS F	0.2	0.2	0.96	0.96	90.1	34.3	0.38
East: Parramatta Rd												
P2	Full	140	147	64.0	LOS F	0.6	0.6	0.96	0.96	97.7	43.8	0.45
North: Lyons Rd												
P3	Full	81	85	63.9	LOS F	0.3	0.3	0.96	0.96	90.9	35.2	0.39
West: Parramatta Rd												

P4	Full	112	118	63.9	LOS F	0.4	0.4	0.96	0.96	100.2	47.1	0.47
All Pedestrians		373	393	63.9	LOS F	0.6	0.6	0.96	0.96	96.2	41.9	0.44

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 2PM [MIS_JOH_22_PM_DEV (Site Folder: PM Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Road														
2	T1	319	9	335	2.8	0.548	8.1	LOS A	4.7	33.4	0.73	0.96	1.16	34.4
3	R2	24	0	25	0.0	0.548	12.1	LOS A	4.7	33.4	0.73	0.96	1.16	33.8
Approach		342	9	360	2.6	0.548	8.4	NA	4.7	33.4	0.73	0.96	1.16	34.3
East: John Hopkins														
4	L2	19	2	20	10.4	0.174	5.4	LOS A	0.5	3.6	0.75	0.86	0.76	36.8
6	R2	43	1	45	2.4	0.174	12.1	LOS A	0.5	3.6	0.75	0.86	0.76	2.6
Approach		62	3	65	4.9	0.174	10.0	LOS A	0.5	3.6	0.75	0.86	0.76	15.2
North: Missenden Road														
7	L2	37	3	39	8.1	0.641	13.1	LOS A	6.4	46.1	0.77	1.02	1.42	2.4
8	T1	353	8	371	2.3	0.641	9.9	LOS A	6.4	46.1	0.77	1.02	1.42	45.3
Approach		390	11	410	2.8	0.641	10.2	NA	6.4	46.1	0.77	1.02	1.42	41.1
West: Grose St														
10	L2	2	0	2	0.0	0.002	2.8	LOS A	0.0	0.1	0.59	0.38	0.59	9.6
Approach		2	0	2	0.0	0.002	2.8	LOS A	0.0	0.1	0.59	0.38	0.59	9.6
All Vehicles		796	23	838	2.9	0.641	9.4	NA	6.4	46.1	0.75	0.98	1.25	35.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3PM [CAR_MIS_22_PM_DEV (Site Folder: PM Development)]

Missenden/Carillon
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 121 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Missenden Rd														
1	L2	90	1	95	1.1	0.087	16.3	LOS B	2.3	16.5	0.45	0.66	0.45	32.2
2	T1	200	6	210	3.0	0.349	35.2	LOS C	9.4	62.0	0.81	0.71	0.81	20.7
Approach		290	7	306	2.4	0.349	29.3	LOS C	9.4	62.0	0.70	0.70	0.70	23.5
East: Carillon Ave														
4	L2	34	0	36	0.0	0.241	43.4	LOS D	5.4	38.1	0.83	0.70	0.83	27.4
5	T1	336	4	354	1.2	* 0.662	40.7	LOS C	13.9	98.3	0.89	0.75	0.89	27.5
6	R2	98	1	103	1.0	0.209	41.8	LOS C	4.7	33.0	0.82	0.75	0.82	25.8
Approach		468	5	492	1.1	0.662	41.1	LOS C	13.9	98.3	0.87	0.75	0.87	27.2
North: Missenden Rd														
7	L2	177	2	187	1.1	0.161	13.8	LOS A	4.4	31.3	0.44	0.63	0.44	37.2
8	T1	170	5	179	2.9	* 0.667	40.6	LOS C	12.5	85.0	0.90	0.78	0.91	19.0
9	R2	64	1	67	1.6	0.667	44.0	LOS D	12.5	85.0	0.90	0.78	0.91	17.3
Approach		411	8	433	1.9	0.667	29.6	LOS C	12.5	85.0	0.70	0.71	0.71	26.2
West: Carillon Ave														
10	L2	52	1	55	1.9	0.189	42.6	LOS D	4.3	29.7	0.82	0.71	0.82	18.0
11	T1	270	1	284	0.4	* 0.660	41.1	LOS C	17.4	118.9	0.92	0.80	0.92	27.1
12	R2	85	1	89	1.2	0.660	46.1	LOS D	17.4	118.9	0.93	0.81	0.93	20.0
Approach		407	3	429	0.7	0.660	42.3	LOS C	17.4	118.9	0.91	0.79	0.91	24.9
All Vehicles		1576	23	1659	1.5	0.667	36.3	LOS C	17.4	118.9	0.81	0.74	0.81	25.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Missenden Rd												
P1	Full	90	95	54.9	LOS E	0.3	0.3	0.95	0.95	81.9	35.2	0.43
East: Carillon Ave												
P2	Full	226	238	55.2	LOS E	0.8	0.8	0.96	0.96	86.3	40.5	0.47
North: Missenden Rd												
P3	Full	74	78	54.8	LOS E	0.3	0.3	0.95	0.95	81.9	35.2	0.43

West: Carillon Ave											
P4 Full	176	185	55.1	LOS E	0.6	0.6	0.96	0.96	83.7	37.2	0.44
All Pedestrians	566	596	55.1	LOS E	0.8	0.8	0.96	0.96	84.2	37.9	0.45

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4PM [CAR_HOS_22_PM_DEV (Site Folder: PM Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Appartment Exit														
1	L2	2	0	2	0.0	0.012	46.6	LOS D	0.2	1.1	0.86	0.56	0.86	10.4
3	R2	1	0	1	0.0	0.012	45.7	LOS D	0.2	1.1	0.86	0.56	0.86	10.1
Approach		3	0	3	0.0	0.012	46.3	LOS D	0.2	1.1	0.86	0.56	0.86	10.3
East: Carillon Ave														
4	L2	4	0	4	0.0	0.071	17.0	LOS B	1.8	12.8	0.40	0.36	0.40	12.2
5	T1	431	3	454	0.7	* 0.342	10.5	LOS A	9.9	69.4	0.48	0.42	0.48	36.5
6	R2	28	0	29	0.0	* 0.327	69.9	LOS E	1.8	12.3	1.00	0.72	1.00	13.2
Approach		463	3	487	0.7	0.342	14.1	LOS A	9.9	69.4	0.51	0.44	0.51	32.0
North: Hospital Drive														
7	L2	67	0	71	0.0	0.149	36.6	LOS C	3.1	22.0	0.80	0.63	0.80	10.9
9	R2	81	0	85	0.0	* 0.341	48.5	LOS D	4.5	31.5	0.92	0.73	0.92	10.5
Approach		148	0	156	0.0	0.341	43.1	LOS D	4.5	31.5	0.87	0.68	0.87	10.7
West: Carillon Ave														
10	L2	50	0	53	0.0	0.059	14.5	LOS B	1.5	10.4	0.40	0.59	0.40	36.5
11	T1	319	3	336	0.9	0.293	10.2	LOS A	8.1	57.5	0.47	0.42	0.47	36.7
Approach		370	3	389	0.8	0.293	10.8	LOS A	8.1	57.5	0.46	0.44	0.46	36.7
All Vehicles		983	6	1035	0.6	0.342	17.3	LOS B	9.9	69.4	0.55	0.48	0.55	24.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Appartment Exit												
P1	Full	73	77	54.3	LOS E	0.2	0.2	0.95	0.95	77.9	30.6	0.39
East: Carillon Ave												
P2	Full	23	24	54.2	LOS E	0.1	0.1	0.95	0.95	80.3	33.9	0.42
North: Hospital Drive												
P3	Full	28	29	54.2	LOS E	0.1	0.1	0.95	0.95	76.9	29.5	0.38
All Pedestrians		124	131	54.3	LOS E	0.2	0.2	0.95	0.95	78.1	31.0	0.40

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SCT
Consulting