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THE CHILDREN'S HOSPITAL AT WESTMEAD REDEVELOPMENT STAGE 2 MULTI-STOREY CAR PARK

TRANSPORT ASSESSMENT

JUNE 2021

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The Children's Hospital at Westmead Redevelopment Stage 2 Multi-Storey Car Park Transport Assessment

Health Infrastructure

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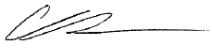
Prepared by:	Christopher Wong	29/06/2021	
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EXECUTIVE SUMMARY

EXISTING TRANSPORT NETWORK

The Westmead Health Precinct is located within Westmead, west of Parramatta CBD. It comprises several medical facilities including (but not limited to) The Children's Hospital at Westmead (CHW) and Westmead Hospital.

The CHW's site location and surrounding transport network comprises:

- North-west Transitway (T-way) and Darcy Road stations about 500m to the south
- Westmead station is about 950m to the south
- visitor access to CHW is generally via Hawkesbury Road and Hainsworth Street to the south-east
- staff access is generally via Institute Road and Dragonfly Drive to the north-west and Redbank Road north-east
- active transport facilities are provided along the south-west periphery, facilitating linkage to Parramatta CBD via a mixture of on-road and off-road paths
- a T-way only section of road exists at the northern end of Mons Road, connecting with Briens Road.

In addition to the above, it is noted that Parramatta Light Rail Stage 1 is currently under construction on Hawkesbury Road and Hainsworth Street, along the south-east boundary of the campus (and site).

It is estimated that nearly 80 per cent of the CHW current staff population drive to/from the site, with nearly 18 per cent using public transport and nearly 3 per cent using active modes.

The CHW's peak traffic activity occurs within a brief 30-minute period between 6:45am and 7:15am in the AM and a brief 15-minute period between 4:00pm and 4:15pm in the PM (based on boomgate data). Traffic volumes are significantly lower outside these peak periods. Therefore, the selected assessment peak hours for this project are 7:00am-8:00am and 4:00pm-5:00pm.

Intersection modelling indicates that the surrounding intersections are generally operating with some spare capacity during the assessed CHW peak hours with the exception of the intersections of Briens Road and Redbank Road and Darcy Road, Mons Road and Institute Road, which are generally operating at capacity during the AM and PM peak hours, respectively.

STRATEGIC CONTEXT

The Greater Sydney Region Plan, A Metropolis of Three Cities was released by the NSW Government in March 2018 to guide land use planning decisions over the next 40 years. It identifies the location of future urban development, strategic transport corridors and major centres, including a vision to support the growth of the Greater Parramatta and the Olympic Peninsula (GPOP) as a key part of the Central River City. The Westmead Health and Education Precinct is identified as a key growth area and is located at the western extent of the GPOP Economic Corridor. The Parramatta CBD and the Westmead precinct are at the centre of the Central River City.

The NSW Government released five District Plans to determine how the *Greater Sydney Region Plan, A Metropolis of Three Cities* will be applied to local areas. In the Central City District Plan, the Westmead area is identified as an Urban Renewal Area due to its proximity to the Parramatta CBD and role as a major employment hub and economic generator. Westmead is also strategically located between Western Sydney Airport and the Parramatta and Sydney CBDs, and therefore has the potential to benefit from improved transport links between these major destinations.

The *Future Transport 2056* was released in March 2018 superseding the *Long-Term Transport Master Plan* (2012). The Strategy contains a wide range of planning visions, directions and outcomes to guide the progression of transport in Sydney over the next 40 years.

Positioned in Greater Parramatta and at the centre of the Central River City, the plan recognises that Westmead will benefit from radial mass transit initiatives designed to achieve a 30-minute access journey from surrounding suburbs. These initiatives will further strengthen the connection between Westmead and the Parramatta CBD and assist in reducing car use. PLR including any future extensions will also support local access and urban renewal along its alignment, potentially resulting in more staff living along the alignment in the future. These links will also make Greater Parramatta more attractive to surrounding suburbs and help to reduce car dependency in areas further west.

PROPOSED DEVELOPMENT

The proposed development under this SSDA is a MSCP accommodating both staff and visitor car parking to be located on Labyrinth Way, on the site of The Lodge.

The scope of proposed works includes:

- Demolition of The Lodge
- Construction of a new MSCP, approximately 8 car parking storeys, which is equivalent to the height of 5 storeys of the hospital.
  - Facilitating 996 car parking spaces for staff and visitors
  - Vehicular access from Labyrinth Way and / or Redbank Road
  - A split-level approach to the MSCP to respond to the natural ground level
- Ancillary retail facilities
- Road works:
  - Realignment of Redbank Road with vehicular access connection to MSCP
- Tree removal
- Associated landscape works.

The MSCP is being designed to be constructed in a single stage yet car parking will be staged operationally to come on-line with parking demand across the precinct:

- The first stage of car parking operation would provide replacement car parking for the demolished P17 car park. There would be no net increase of parking on site under this stage.
- The second stage of car parking operation to serve the growth in hospital activity associated with the future PSB (subject to a separate SSDA) would only come on-line operationally with the PSB SSDA consent becoming operational, specifically at occupation. This would provide growth of around 280 additional spaces in line with hospital activity projections until 2031.

OPERATIONAL IMPACT ASSESSMENT

The traffic generation for the Stage 2 Redevelopment has been estimated based on the proposed car parking provision of an additional 280 spaces. This is because the surrounding on-street parking supply is generally at capacity and therefore, the small car park increase would encourage staff and visitors to use more sustainable transport modes to access the site.

Based on a new car parking supply of 280 spaces (approximately 110 staff spaces and 170 visitor spaces), the development would generate an additional 89 vehicles in the AM peak hour and an additional 76 vehicles in the PM peak hour. In addition, a minor increase in set-down and pick-up activity is expected to occur along Hawkesbury Road. Based on CHW's forecast growth, the existing drop-off activity could increase by 25 per cent. By applying this to the existing set-down/pick-up activity that occurs during the assessed peak hours, the development's set-down/pick-up activity could generate an additional 23 vehicle trips (two-way) and 29 vehicle trips (two-way) during the AM and PM peak hours, respectively.

The drop-off activity would use the existing CHW drop-off, whereas the car park activity would likely access the site via Redbank Road or Institute Road. The car parking supply would be provided in the proposed MSCP to be located on the corner of Labyrinth Way and Redbank Road

Traffic modelling indicates that the anticipated traffic volumes associated with the development's traffic generation would have limited impact on the surrounding road network. The key intersections would continue to operate with similar operating conditions during the AM and PM peak hours in 2020 (7:00am-8:00am and 4:00-5:00pm). However, in 2030, many of the surrounding intersections would be operating at or above capacity due to background growth.

Given the development has a marginal impact on the existing traffic conditions of the arterial roads, this requires mitigation and improvement measures to be undertaken at a whole-of-government level, with consideration of the wider road network.

CONSTRUCTION IMPACT ASSESSMENT

It is anticipated that the construction works would commence in late 2021 and would be completed by mid-2023. The construction staging, timeframe and duration would be confirmed once a contractor is appointed for the project.

Construction work would be undertaken in accordance with the construction hours set out in the conditions of approval for the Environmental Impact Statement. These are expected to be Monday to Friday 7:00am to 6:00pm and Saturday 8:00am to 5:00pm.

The site is in close proximity to well established and high frequency public transport services, therefore construction workers should also be encouraged to use public transport instead of driving. Notwithstanding this, a small amount of construction worker parking may be established within the site. However, workers would not be permitted to park outside the construction site. This presents an opportunity for the contractor to encourage car pooling and implement measures that minimise the number of workers who would arrive during the AM and PM peak periods for the campus and also the broader road network.

Construction vehicles likely to be generated by the proposed construction activities would generally include rigid vehicles (6.4m-12.5m), 18m truck-and-dog vehicles and/or 19m semi-trailers and vans and utes depending on the construction activity being undertaken at any given time. The campus roads have generally been designed to accommodate for vehicles up to a 19m semi-trailer. Therefore, the envisaged construction vehicle types can be accommodated on the internal road network and along the proposed construction vehicle access routes.

Detailed information on the number of construction vehicles likely to be generated by the proposed works is not currently known. However, it is estimated that the works could generate up to 10 vehicles per hour and up to 80 vehicles per day.

These peak vehicles estimates would likely occur during periods of large concrete pouring stages. Outside these peak activity periods, the construction vehicle generation would be less.

The MSCP construction works would likely coincide with construction of the PSB (subject to separate approval). The appointed contractors would need to coordinate the construction to minimise the likelihood of peak construction activity stages occurring simultaneously across both sites.

The anticipated peak construction vehicle volumes are unlikely to impact the surrounding and/or campus transport network, or its operations including the key campus access intersections of Darcy Road/Mons Road/ Institute Road, Briens Road/Redbank Road and Darcy Road/Hawkesbury Road, particularly given the construction activities would replace the current construction activities that have been occurring across the precinct over the last few years.

The key construction vehicles routes are likely to include to/from north and east via Redbank Road and Briens Road and to/from south and west via Institute Road, Darcy Road and Cumberland Highway. Redbank Road would be the preferred route, given that it provides a more direct access between the site and the arterial road network to/from the site from the north-east.

Where possible and safe to do so, pedestrian and cyclist access should be maintained in the vicinity of the construction site, for the duration of the works. The existing footpath on the southern side of Redbank Road is to be closed prior to

commencement of PSB construction works. No footpaths currently exist along the site frontage on Redbank Road or Labyrinth Way. Therefore, interaction between vehicles accessing the site and pedestrians and cyclists would be minimal.

As there are no formal separated cycle paths provided along Redbank Road, cyclists would continue to use the available traffic lane while the construction works are underway.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

Health Infrastructure (HI) and Sydney Children's Hospital Network (SCHN) are planning The Children's Hospital at Westmead (CHW) Stage 2 Redevelopment. The redevelopment will enable the expansion and replacement of several paediatric and neonatal services in a new Paediatric Services Building (subject of a separate planning approval), and refurbishment of the existing facility.

As part of the Stage 2 Redevelopment, HI and SCHN have demolished the existing CHW multi-storey staff car park (P17) to construct a new Paediatric Services Building (PSB); subject of a separate planning application. Furthermore, a new multi-storey car park (MSCP) is planned to be built on the former Ronald McDonald House site (known as the Lodge).

These works follow the completion of the Westmead Stage 1 Redevelopment where the Central Acute Services Building (CASB) has been completed. The CASB is set to be officially opened in 2021.

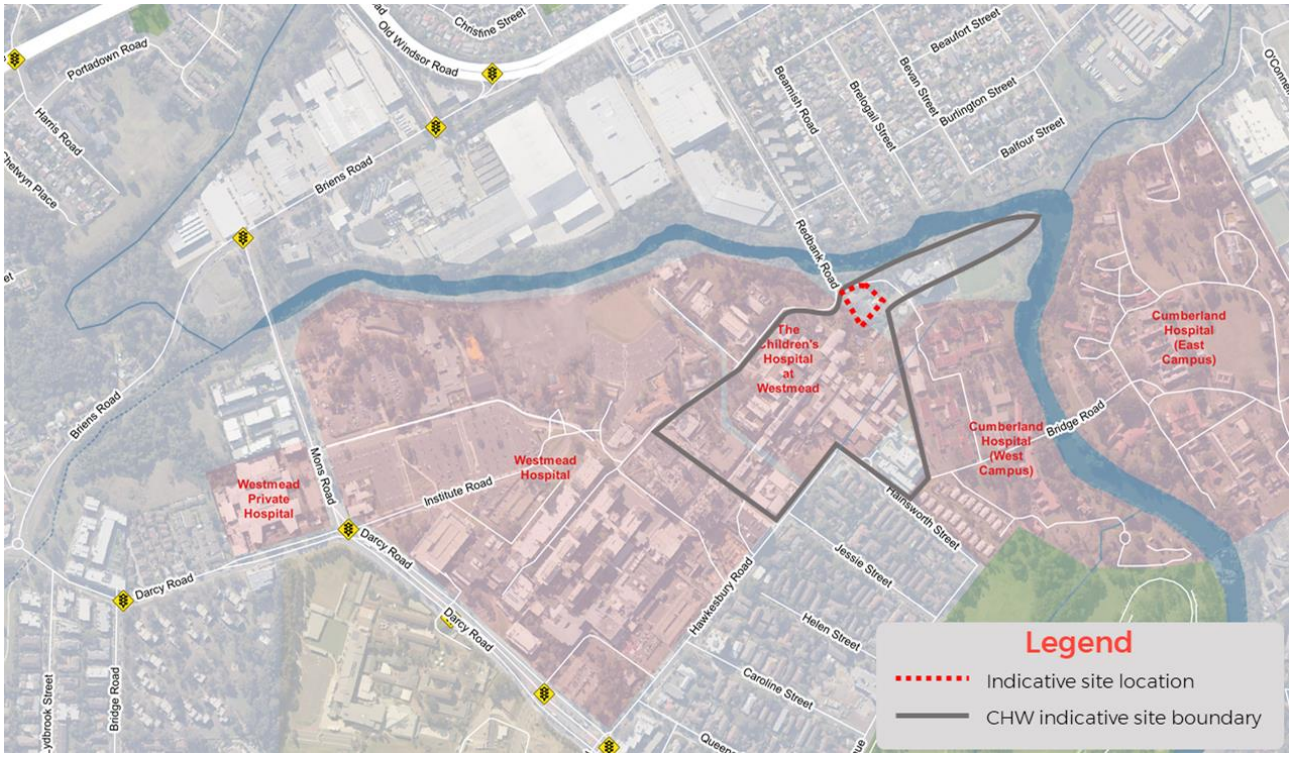
A State Significant Development Application (SSDA), which this transport assessment supports, is to be lodged with the NSW Department of Planning, Industry and Environment (DPIE). The application is seeking consent for the construction of the proposed MSCP.

A separate SSD Application is to be lodged for the construction of the PSB and ancillary works.

Health Infrastructure engaged WSP to prepare a Transport Impact Assessment for the proposed MSCP. Whilst this report may reference the proposed PSB, the assessment's focus is on the transport impacts of the MSCP.

1.2 SITE LOCATION

The Westmead Health Precinct is located within Westmead, west of Parramatta CBD. It comprises several medical facilities including (but not limited to) CHW and Westmead Hospital. The CHW boundary is indicatively shown in Figure 1.1. The proposed MSCP would be located on the former Ronald McDonald House site (known as the Lodge) and is generally bound by Redbank Road to the north and Labyrinth Way to the east, as shown in Figure 1.2.



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure 1.1 Site location within the Westmead Health Precinct

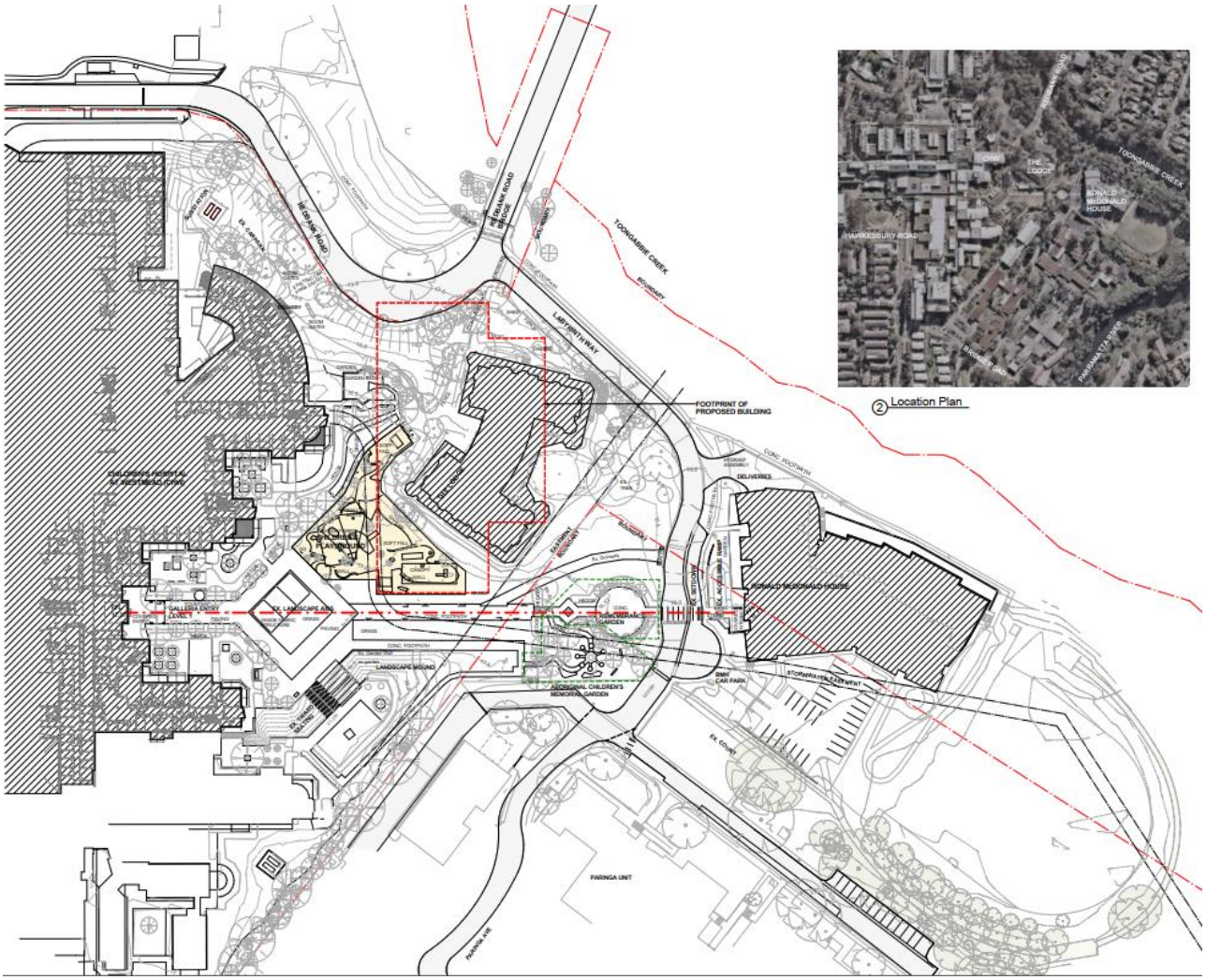


Image source: *Billard Leece Partnership Architects (June 2021)*

Figure 1.2 Multi-storey carpark indicative site location

1.3 THE PROPOSED DEVELOPMENT

The proposed development under this SSDA is a MSCP accommodating both staff and visitor car parking to be located on Labyrinth Way, on the site of The Lodge.

The scope of proposed works includes:

- Demolition of The Lodge
- Construction of a new MSCP, approximately 8 car parking storeys, which is equivalent to the height of 5 storeys of the hospital.
  - Facilitating 996 car parking spaces for staff and visitors
  - Vehicular access from Labyrinth Way and / or Redbank Road
  - A split-level approach to the MSCP to respond to the natural ground level
- Ancillary retail facilities
- Road works:

- Realignment of Redbank Road with vehicular access connection to MSCP

- Tree removal

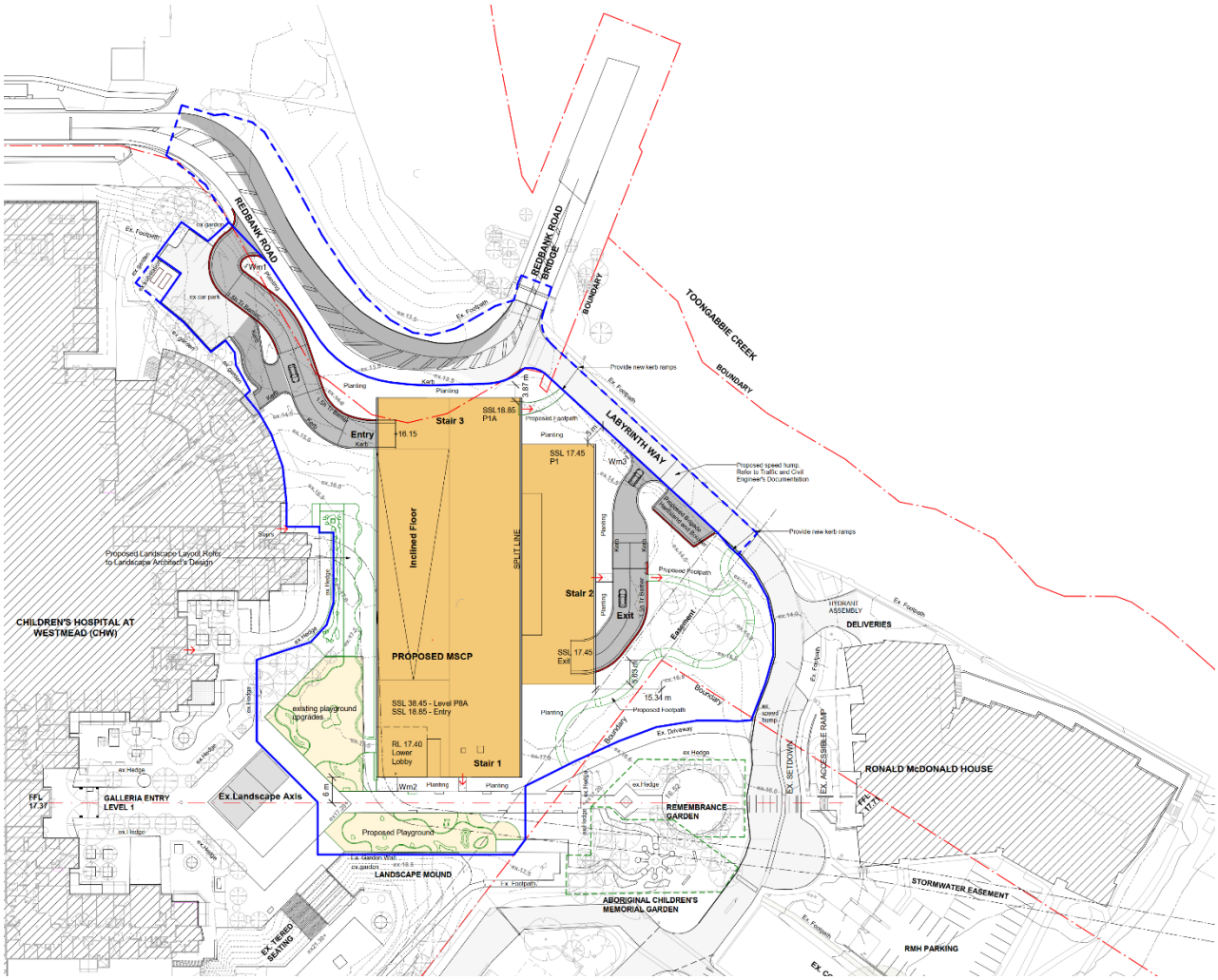
- Associated landscape works.

The MSCP is being designed to be constructed in a single stage yet car parking will be staged operationally to come on-line with parking demand across the precinct:

- The first stage of car parking operation would provide replacement car parking for the demolished P17 car park. There would be no net increase of parking on site under this stage.

- The second stage of car parking operation to serve the growth in hospital activity associated with the future PSB (subject to a separate SSDA) would only come on-line operationally with the PSB SSDA consent becoming operational, specifically at occupation. This would provide growth of around 280 additional spaces in line with hospital activity projections until 2031.

The proposed MSCP is indicatively shown in Figure 1.3.



Source: Billard Leece Partnership Architects, (June 2021)

Figure 1.3 Proposed CHW MSCP indicative layout

1.4 WESTMEAD HEALTH PRECINCT

The Westmead Health Precinct contains many different facilities and services. Majority of the services are centred on the provision of healthcare and treatment services. Supplementary services for patients and staff are also provided such as short term patient accommodation and childcare facilities. The location of the following precinct services/facilities can be seen in Figure 1.4:

1 Westmead Hospital

2 Research and Education Network

3 Westmead Centre for Oral Health (Dental)

4 Westmead Institute for Medical Research

5 Children's Medical Research Institute

6 The Children's Hospital at Westmead

7 Proposed Paediatrics Services Building and MSCP

8 Central Acute Services Building (to be opened in 2021)

9 Kids Research

10 Healthshare

11 Brain Injury Unit

12 Childcare Centres

13 College of Dental Therapy

14 Redbank House

15 Cumberland Hospital

Basemap source: *Westmead Redevelopment, http://www.westmeadproject.health.nsw.gov.au/ visited 01 November 2020*

Figure 1.4 Westmead Health Precinct services and facilities

1.5 FORECAST CHW ACTIVITY

The CHW Stage 2 Redevelopment is planned to accommodate more employees, visitors and patients by 2031/32, as summarised in Table 1.1.

Table 1.1 CHW forecast growth

Category	2019	2026/2027	2031/2032
CHW full time equivalent (FTE)staff	3,204	3,664	4,014
Outpatients service events annual (weekday daily)	239,623	275,251	297,941
Emergency Department (ED) presentation annually (daily)	62,641	75,600	85,089
Inpatients bed	359	474	474

1.6 PURPOSE OF THIS REPORT

This report sets out an assessment of the transport implications of the proposed development, including consideration of the following:

- Existing transport conditions surrounding the site
- Suitability of the proposed parking in terms of supply and layout, referring to a parking demand study which was engaged separately to this work
- Suitability of the proposed access arrangements for the MSCP
- The traffic generating characteristics of the proposed MSCP
- The transport impact of the MSCP on the surrounding road network
- Preliminary Construction Traffic Management Plan.

1.7 RESPONSE TO SEAR'S

This report has been prepared in response to the relevant Planning Secretary's Environmental Assessment Requirements (SEAR's) issued for The Children's Hospital at Westmead – Multi-storey car park project and dated 20 November 2020. The relevant traffic and accessibility SEAR's fall under key issues number 6 and are included below in Table 1.2.

Table 1.2 Secretary's Environmental Assessment Requirements (SEAR's)

SEAR description		Relevant report sections
Include a transport and accessibility impact assessment, which includes, but is not limited to the following:	Analysis of the existing transport network, including: — road hierarchy — pedestrian, cycle and public transport infrastructure — details of current daily and peak hour vehicle movements based on traffic surveys and / or existing traffic studies relevant to the locality — existing performance levels of nearby intersections utilising appropriate traffic modelling methods (such as SIDRA network modelling)	Section 2
	Details of the proposed development, including: — a map of the proposed access which identifies public roads, bus routes, footpaths and cycleways — vehicular access arrangements, including for service and emergency vehicles, including swept path analysis demonstrating the largest design vehicle entering and leaving the site and moving in each direction through intersections along the proposed transport routes — number of car parking spaces and any bicycle parking — pedestrian or road infrastructure improvements or safety measures.	Sections 2.1, 3.2, 4.1, 4.6
	Analysis of the impacts due to the operation of the proposed development, including: — estimated total daily and peak hour vehicular trip generation — a clear explanation and justification of the: — assumed growth rate applied — volume and distribution of proposed trips to be generated — type and frequency of design vehicles accessing the site. — details of performance of nearby intersections with the additional traffic generated by the development both at the commencement of operation and in a 10-year time period (using SIDRA network modelling) — cumulative traffic impacts from any surrounding approved development(s) — adequacy of car parking including assumptions made to determine/justify the amount of car spaces sought to service the associated hospital — adequacy of the existing / proposed pedestrian infrastructure to enable convenient and safe access to and from the site for all users.	Sections 3.2, 4.5, 5

SEAR description		Relevant report sections
	Measures to ameliorate any adverse traffic and transport impacts due to the development based on the above analysis, including infrastructure improvements, including details of timing and method of delivery.	Sections 5
	Analysis of the impacts of the traffic generated during construction of the proposed development, including: — construction vehicle routes, types and volumes — construction program (duration and milestones) — on-site car parking and access arrangements for construction, emergency and construction worker vehicles — cumulative impacts associated with other construction activities in the locality (if any) — road safety at identified intersections near the site due to conflicts between construction vehicles and existing traffic in the locality — measures to mitigate impacts, including to ensure the safety of pedestrian and cyclists during construction.	Section 6
	A preliminary Construction Traffic and Pedestrian Management Plan	Section 6

1.8 STAKEHOLDER CONSULTATION

Members of the project team met with key representatives of Transport for NSW to discuss the approach for this transport assessment. We understand that Transport for NSW was generally in agreement with the transport assessment approach that has been documented in this report.

1.9 REFERENCES

In preparing this assessment, the following documents have been referenced:

- Architectural Drawings prepared by Billard Leece Partnership Pty Ltd dated 02 June 2021
- Australian Standards AS2890.
- Cycling Aspects of Austroads Guides (Austroads, 2017)
- EIS Guidelines - Road and Related Facilities (Department of Urban Affairs and Planning (DUAP), 1996)
- Guide to Traffic Generating Developments (Transport for NSW, 2002)
- Guide to Traffic Generating Developments – Updated Traffic Surveys (Transport for NSW, 2013)
- Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments (Austroads, 2020)
- Holroyd Local Environmental Plan (2013)
- Holroyd Development Control Plan (2013)
- NSW Planning Guidelines for Walking and Cycling (Department of Infrastructure, Planning and Natural Resources (DIPNR), 2004)
- Parramatta Local Environmental Plan (2011)
- Paramatta Development Control Plan (2011)
- The Children's Hospital at Westmead Stage 2 Redevelopment Car Parking Demand Study (GTA Consultants, 2019).

2 EXISTING TRANSPORT CONDITIONS

2.1 OVERVIEW

The CHW's site location and surrounding transport network are shown in Figure 2.1. In summary, the transport network comprises:

- North-west Transitway (T-way) and Darcy Road stations about 500m to the south
- Westmead station is about 950m to the south
- visitor access to CHW is generally via Hawkesbury Road and Hainsworth Street to the south-east
- staff access is generally via Institute Road and Dragonfly Drive to the north-west and Redbank Road north-east
- active transport facilities are provided along the south-west periphery, facilitating linkage to Parramatta CBD via a mixture of on-road and off-road paths
- a T-way only section of road exists at the northern end of Mons Road, connecting with Briens Road.

In addition to the above, it is noted that Parramatta Light Rail Stage 1 is currently under construction on Hawkesbury Road and Hainsworth Street, along the south-east boundary of the precinct (and site).

Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure 2.1 Existing transport context

2.2 LAND USE ZONING

The site is zoned Infrastructure (SP2) Zone of the Paramatta Local Environmental Plan (LEP) 2011.

2.3 SURROUNDING ROAD NETWORK

The surrounding local road network connects with Sydney's arterial (main road) network, via:

- Hawkesbury Road which connects with the Great western Highway and the M4 Western Motorway (M4)
- Redbank Road which connects with Briens Road, which in turn provides access to the Old Windsor Road, Pennant Hills Road and James Ruse Drive
- Darcy Road which connects with the Cumberland Highway.

The surrounding road network can generally be summarised as follows:

Hawkesbury Road is a collector road between CHW (at Hainsworth Street) and the Great Western Highway. It generally has one traffic lane in each direction, with a 40-50 km/h speed limit plus school speed zones. Kerbside parking is generally provided as 2 hour parking. Hawkesbury Road, north of Darcy Road (along the precinct frontage), is a High Pedestrian Activity Area with a speed limit of 40 km/h.

Redbank Road is a local road between the precinct and Briens Road. It provides access to the precinct from the north-east. It generally has one traffic lane in each direction, with a 50 km/h speed limit. Redbank Road has a mix of 2P and unrestricted kerbside parking.

Labyrinth Way is a local road between Redbank Road and Paringa Avenue. It provides access to the existing Ronald McDonald House and the Cumberland sites. Labyrinth Way accommodates two-way traffic movements with a single lane in each direction and has a posted speed limit of 20km/h.

Darcy Road is a collector road that provides access to the precinct from the west. It generally has two lanes for each direction. The speed limit varies between 40 km/h and 50 km/h, with a High Pedestrian Activity Area and school speed zones during both the morning and afternoon weekday periods. Darcy Road also accommodates the North-West Transit-way (T-way).

Mons Road is a local road between Briens Road and Darcy Road, generally with one traffic lane in each direction and a mix of 2P and 1/4P restricted kerbside parking. At its northern end, Mons Road functions as a restricted T-way with no public access to Briens Road. Mons Road is a 40km/h High Pedestrian Activity Area.

The **M4 Western Motorway (M4)** is an arterial road that extends from Strathfield in the east to Emu Plains in the west. It is one of Sydney's major motorways, providing a high standard alignment and high-speed driving conditions. Exit ramps connect to Coleman Street and the Cumberland Highway near Westmead. The M4 is designated as a B-double route and allows vehicles with a maximum vertical height clearance of 4.6 m. A variable speed limit applies which is typically 90 km/h or more.

The **Great Western Highway (Route A44)** is an arterial road that runs parallel to the M4 Western Motorway for much of its length. It is designated as a B-double route and allows vehicles with a maximum vertical height clearance of 4.6 m, where the road is generally signposted as a 60 km/h speed zone. The section near Westmead generally provides a divided road configuration with two lanes and one bus lane per direction.

Cumberland Highway/Hart Drive (Route A28) is an arterial road that surrounds the precinct, running north-south to the west and east-west to the north of the precinct. The road is generally signposted as a 70 km/h speed zone with a divided carriageway, that is mostly three lanes in each direction.

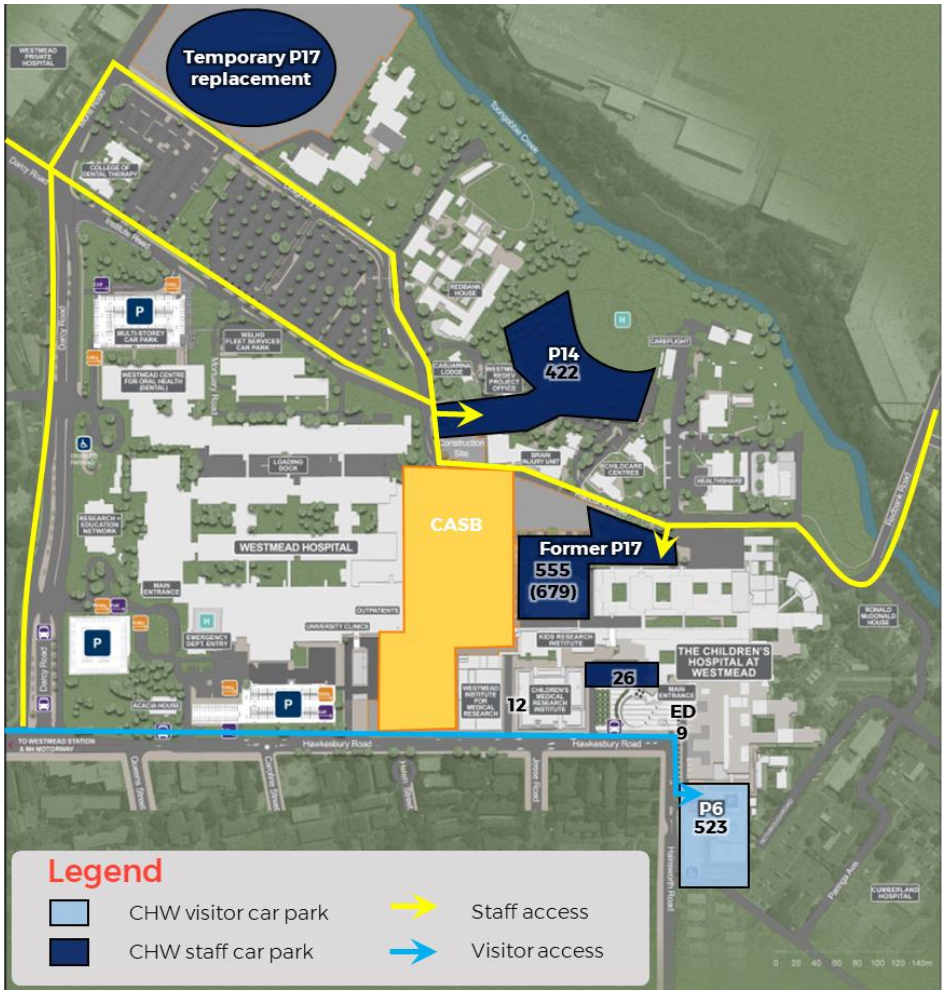
2.4 PARKING ARRANGEMENTS

CHW has a total parking supply of 1,547 spaces[1] spread across the following main car parks (and some small parking areas, totalling 47 spaces):

- P6 visitor car park fronting Hainsworth Street and accessed via a roundabout on Hainsworth Street
- P14 staff (oval) car park located within the precinct and accessed via Redbank Road, Institute Road and Dragonfly Drive
- P17 staff car park which was located within the precinct and accessed via Redbank Road, Institute Road and Dragonfly Drive and has recently been demolished and temporarily replaced by a temporary car park located north of Dragonfly Drive.

P17 also accommodates up to 124 vehicles via stacked arrangements, increasing the CHW's parking capacity to 1,671 vehicles. This parking capacity excludes the 33 spaces provided on Redbank Road for maintenance vehicles and visitors to The Lodge.

The CHW's car parks and associated access arrangements are shown in the existing traffic access plan in Figure 2.2.



Basemap source: *Westmead Redevelopment, http://www.westmeadproject.health.nsw.gov.au/ visited 27 February 2020*

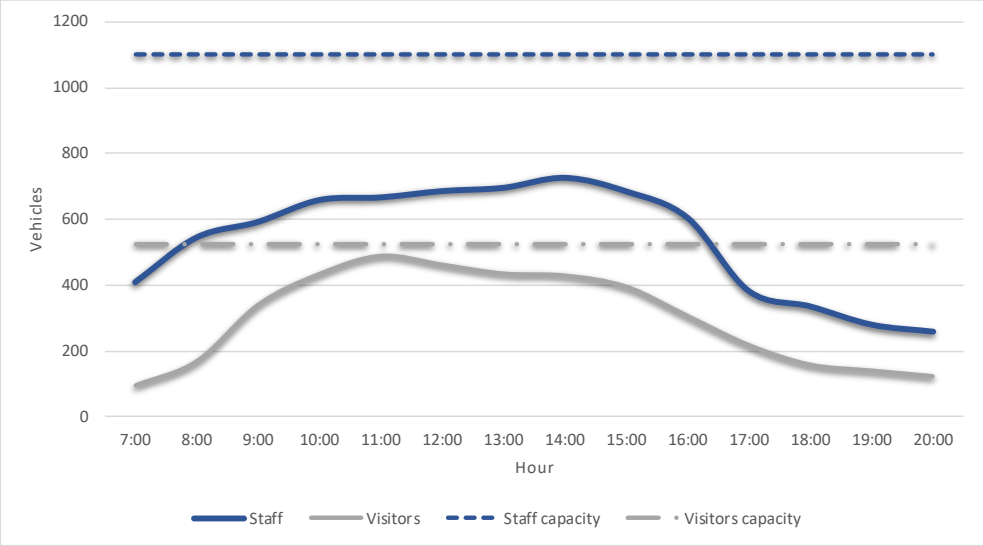
Figure 2.2 Existing parking and traffic access plan

[1] Car Parking Demand Study prepared by GTA Consultants (October 2019),

2.5 PARKING DEMAND

Health Infrastructure provided February 2020 car parking accumulation data for the CHW car parks operated by Secure Parking. A typical daily parking accumulation profile is shown in Figure 2.3.

Peak parking demand occurs in the middle of the day, between 11:00am and 2:00pm, where staff demand ranges from 650 to 750 vehicles and visitor demand ranges from around 430 to 500 vehicles. Overall the data indicates that the peak parking demand is around 70 per cent of the total CHW parking capacity.



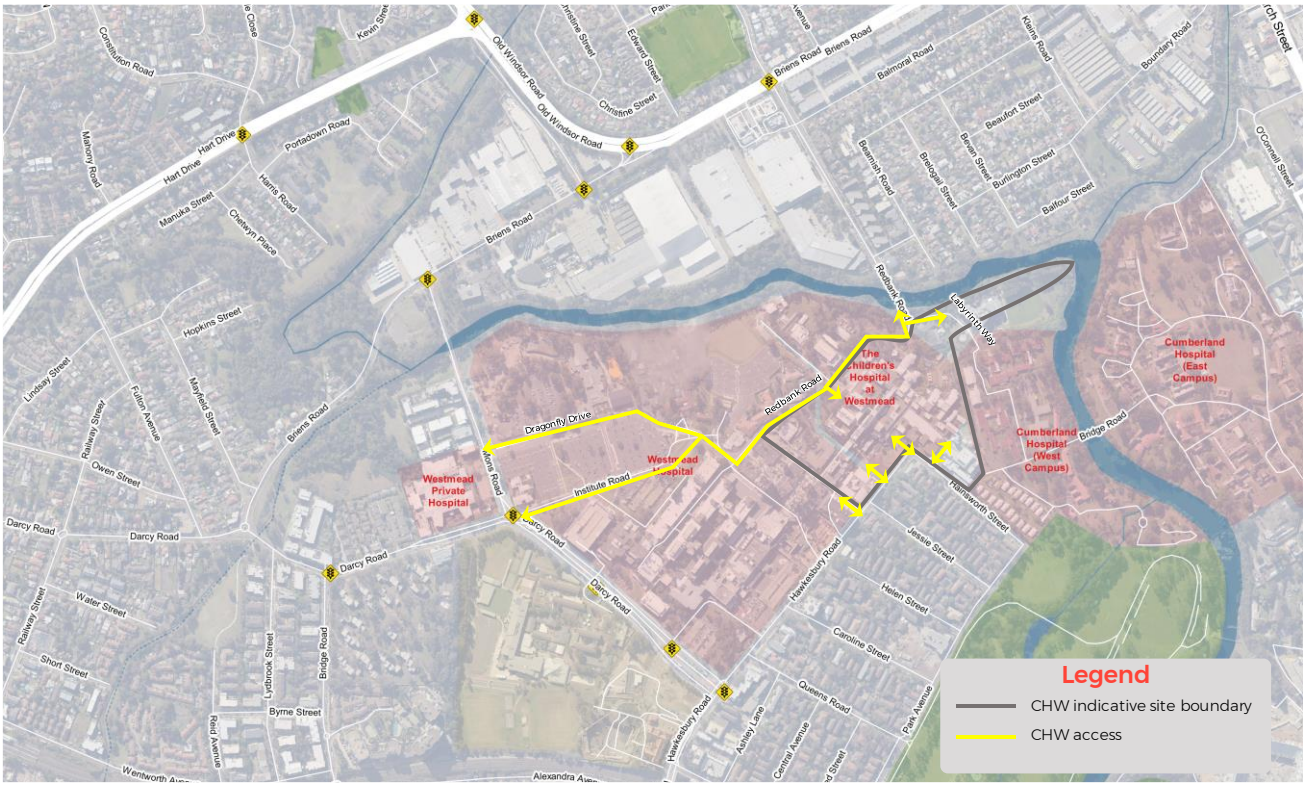
Data source: *Secure Parking, 2020*

Figure 2.3 CHW on-site parking demand

2.6 CHW ACCESS

The Westmead Health Precinct's internal road network generally comprises Redbank Road, Institute Road and Dragonfly Drive, as shown in Figure 2.4. These provide access to several car parks across the precinct, as well as providing back-of-house (primarily staff) access to CHW.

The main public access to CHW is via Hawkesbury Road and Hainsworth Street.



Basemap source: *NSW Department of Lands Spatial Information Exchange*

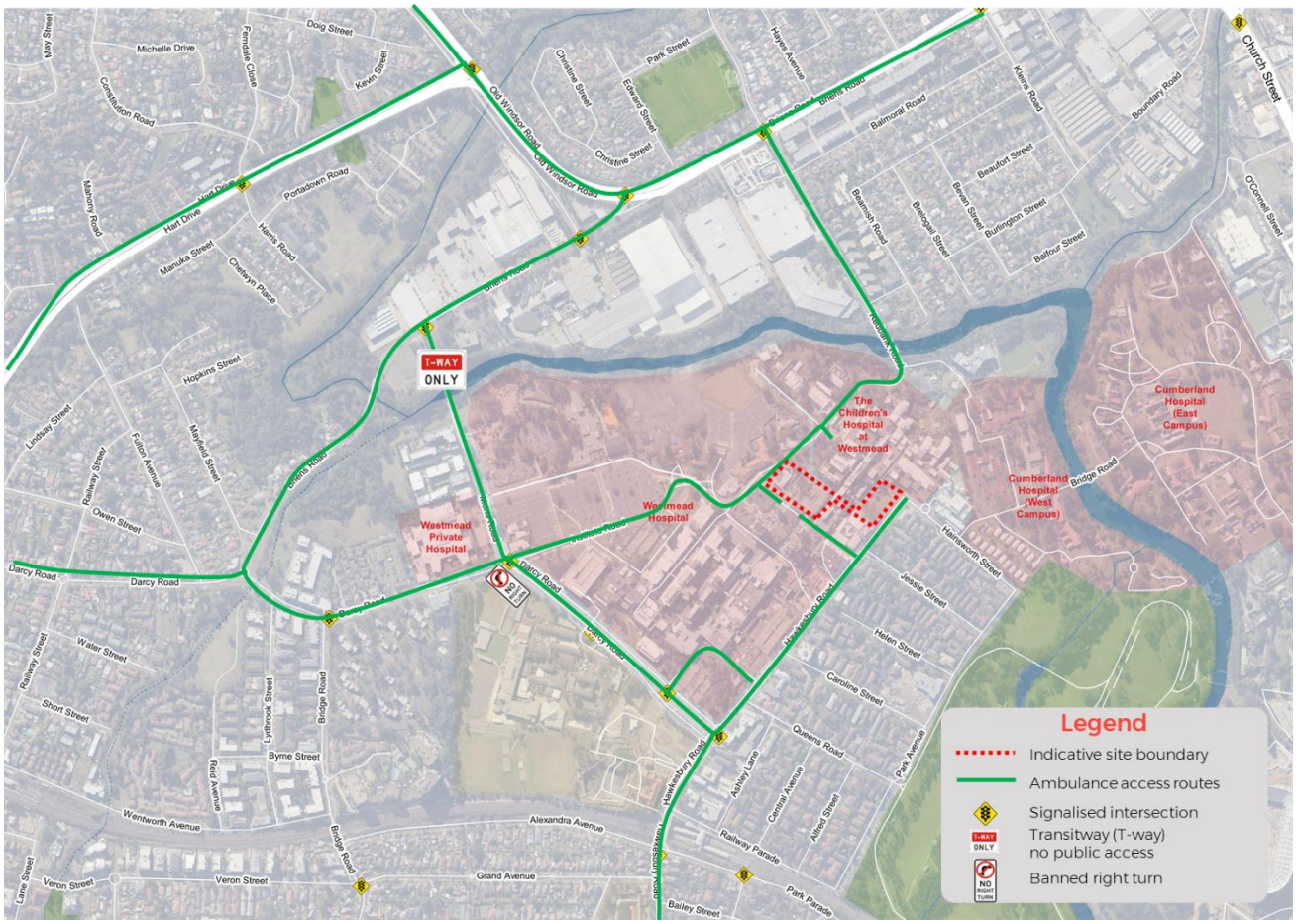
Figure 2.4 CHW vehicle access

2.7 AMBULANCE ROUTES

The existing Westmead Hospital and CHW Emergency Department's (ED) currently front Hawkesbury Road. Therefore, ambulances have typically accessed these locations via Darcy Road, Hawkesbury Road and Mons Road. These ED's have relocated to the recently constructed CASB, which has primary ambulance access from Redbank Road, immediately adjacent to the proposed PSB site. There is also an alternate ambulance access to the CASB building via Hawkesbury Road and Kids Research Lane.

Emergency vehicles, including ambulances are permitted on the T-way.

The existing and future ambulance access routes are shown in Figure 2.5.



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure 2.5 Ambulance access routes

2.8 CHW TRAFFIC PATTERNS

2.8.1 STAFF

Referencing boom gate data for the CHW staff car park (P17), the daily traffic profile for the main staff car park is shown in Figure 2.6 across two days in February 2020. The peak period profiles on the same days are shown in Figure 2.7.

The data indicates the following:

- The peak period traffic profiles at P17 are relatively consistent across the two days that were analysed, although some variation occurred in the off-peak periods.
- Peak arrivals occur between 7:00am and 8:00am, with around 200 vehicles arriving in this hour.
- Peak departures occur between 4:00pm and 5:00pm, with around 160-190 vehicles departing during this hour.
- The AM peak activity generally occurs within a brief 30-minute period between 6:45am and 7:15am.
- The PM peak activity is spread out across the PM peak with a 15-minute spike between 4:00pm and 4:15pm.

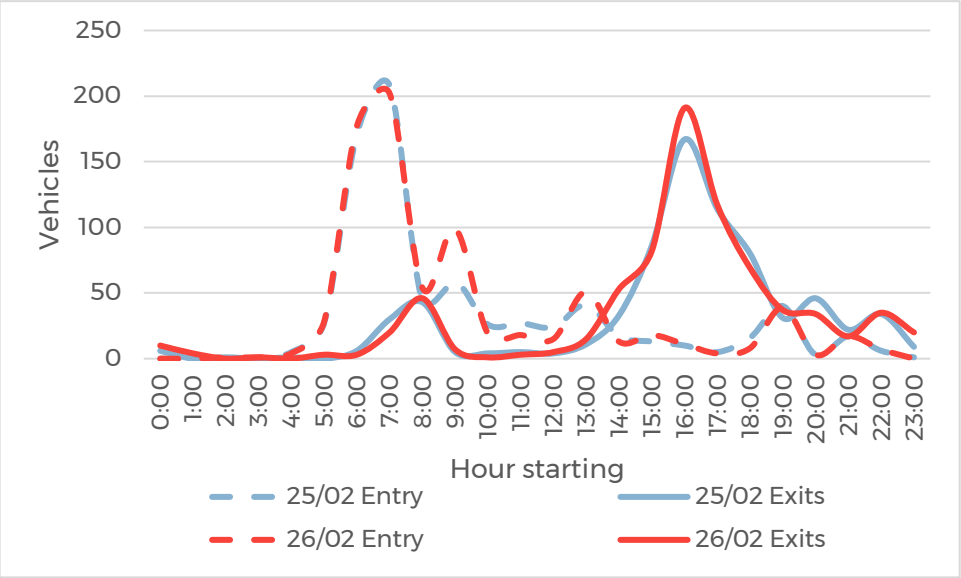


Figure 2.6 P17 staff car park boom gate daily profile

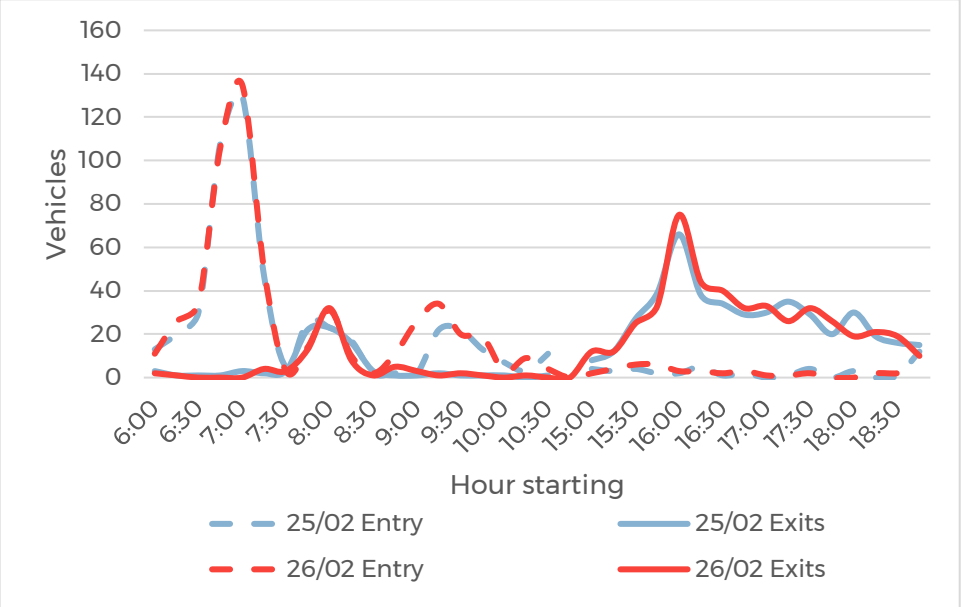


Figure 2.7 P17 staff car park boom gate peak period profile

2.8.2 VISITOR

The boom gate data for the CHW visitor car park (P6) is shown in Figure 2.8. The data shows that:

- The AM peak arrivals occur at 7:30-8:30am, with peak arrivals of 155 vehicles
- The AM peak departures occur at 3:15-4:15pm, with peak departures of 120 vehicles.

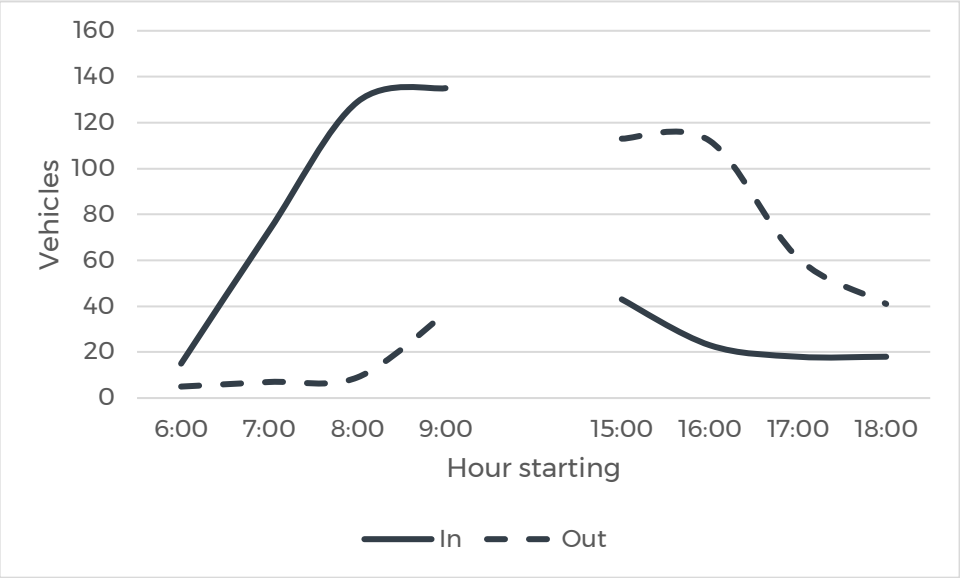


Figure 2.8 P6 visitor car park boom gate peak period profile

2.9 ROAD NETWORK TRAFFIC VOLUMES

2.9.1 SURVEY DATA

It is noted that this assessment has been conducted during the COVID-19 period, when typical travel patterns weren't observed and data collection couldn't be conducted. Therefore, we have relied on historical traffic data obtained from Matrix Traffic Surveys from 2018 and 2019, as well as February 2020 SCATS traffic counts (obtained from TfNSW) for the purpose of this assessment.

Weekday peak period traffic counts from 2018 were obtained for the following intersections:

1. Darcy Road/ Hawkesbury Road
2. Darcy Road/ Farmhouse Road/ Hospital access
3. Darcy Road/Catherine McAuley Westmead/Dental access
4. Darcy Road/Mons Road/Institute Road
5. Darcy Road/Bridge Road/Coles entry
6. Briens Road/ Old Windsor Road
7. Briens Road/ Redbank Road

2.9.2 PEAK HOUR SELECTION

As discussed in section 2.8, the CHW's peak traffic activity occurs within a brief 30-minute period between 6:45am and 7:15am in the AM and a brief 15-minute period between 4:00pm and 4:15pm in the PM. Traffic volumes are significantly lower outside these peak periods, as shown in Figure 2.7.

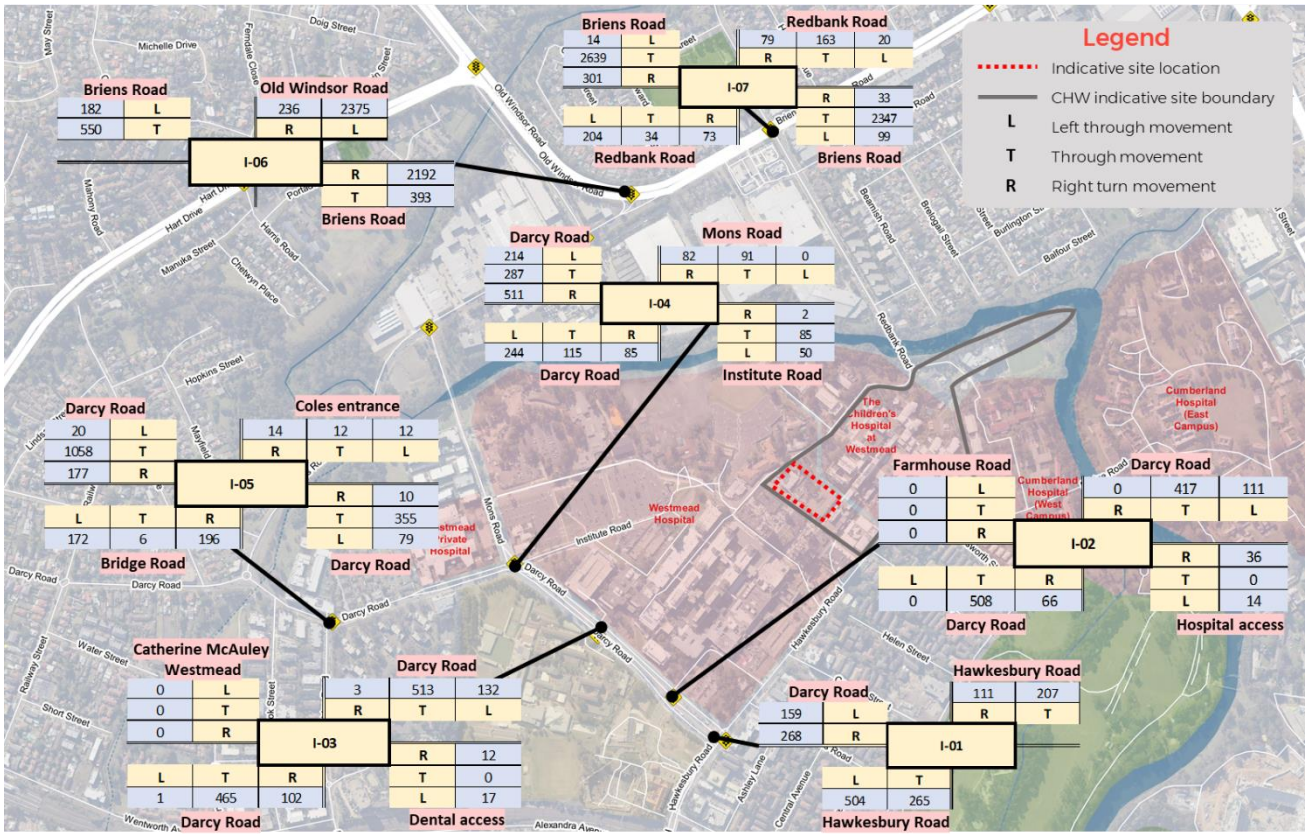
It is expected that these traffic patterns would also be adopted by future staff of the CHW and the proposed PSB, using the MSCP. Therefore, the selected assessment peak hours for this project are:

- AM peak hour - 7:00am-8:00am
- PM peak hour - 4:00pm-5:00pm.

It is noted that the development's AM peak hour would occur outside the road network AM peak hour.

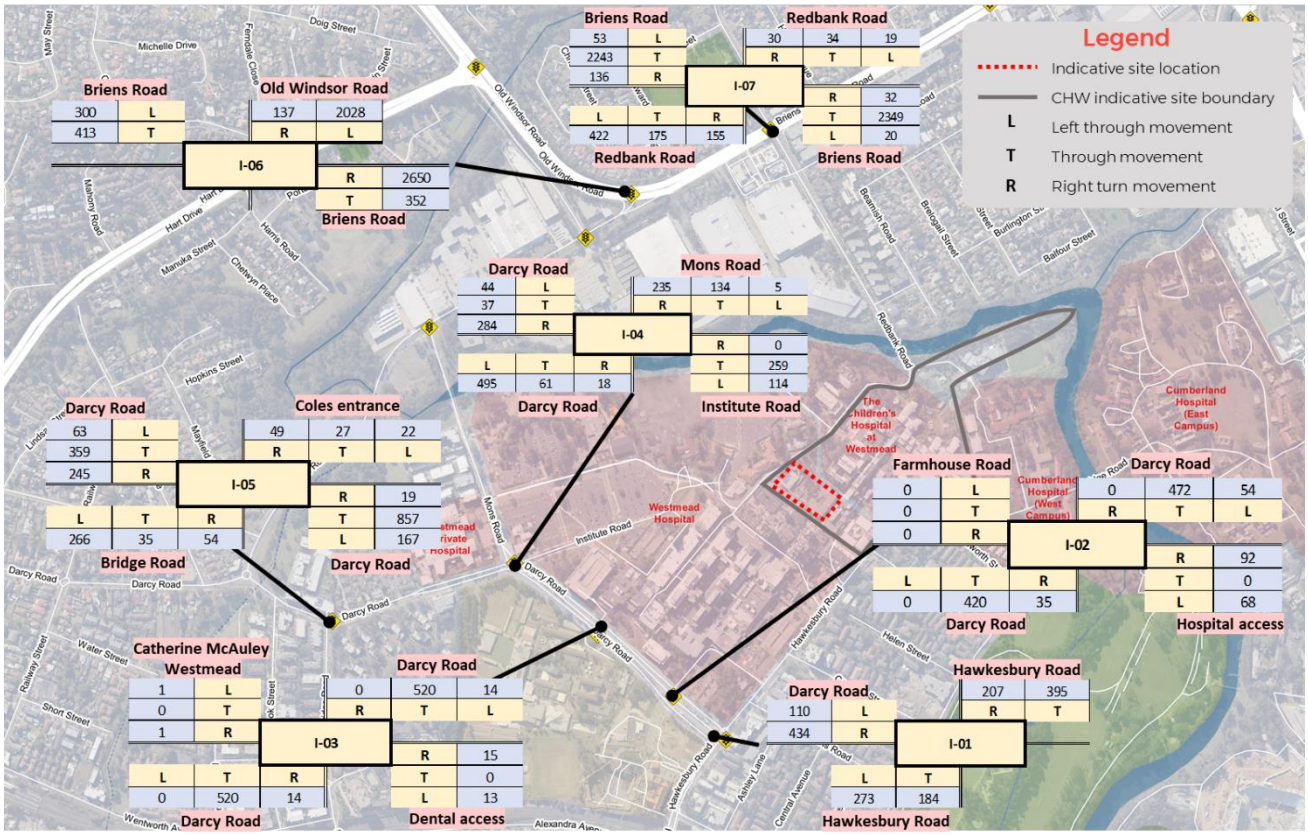
2.9.3 2018 EXISTING

The 2018 surveyed traffic volumes at the surrounding intersections for the AM and PM peak hours are shown in Figure 2.9 and Figure 2.10, respectively.



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure 2.9 2018 existing AM peak hour surveyed traffic volumes



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure 2.10 2018 existing PM peak hour surveyed traffic volumes

2.9.4 2020 BASE CASE

In the absence on new traffic data (due to COVID-19) we have reviewed historical 2018 traffic counts, supplemented by 2019 traffic counts at selected locations and February 2020 SCATS traffic counts at key locations. Overall, the traffic volumes across the three sets of data showed relatively consistent patterns, with some growth identified at specific locations. The daily traffic profiles and comparisons between available data sets are shown in Appendix A, for the Darcy Road, Hawkesbury Road and Institute Road corridors.

Based on the dataset comparisons, the 2018 traffic survey data through volumes has been increased to 2020 by adopting the compound growth factors for each of the corridors as summarised in Table 2.1 and Table 2.2 for the AM and PM peak hours, respectively.

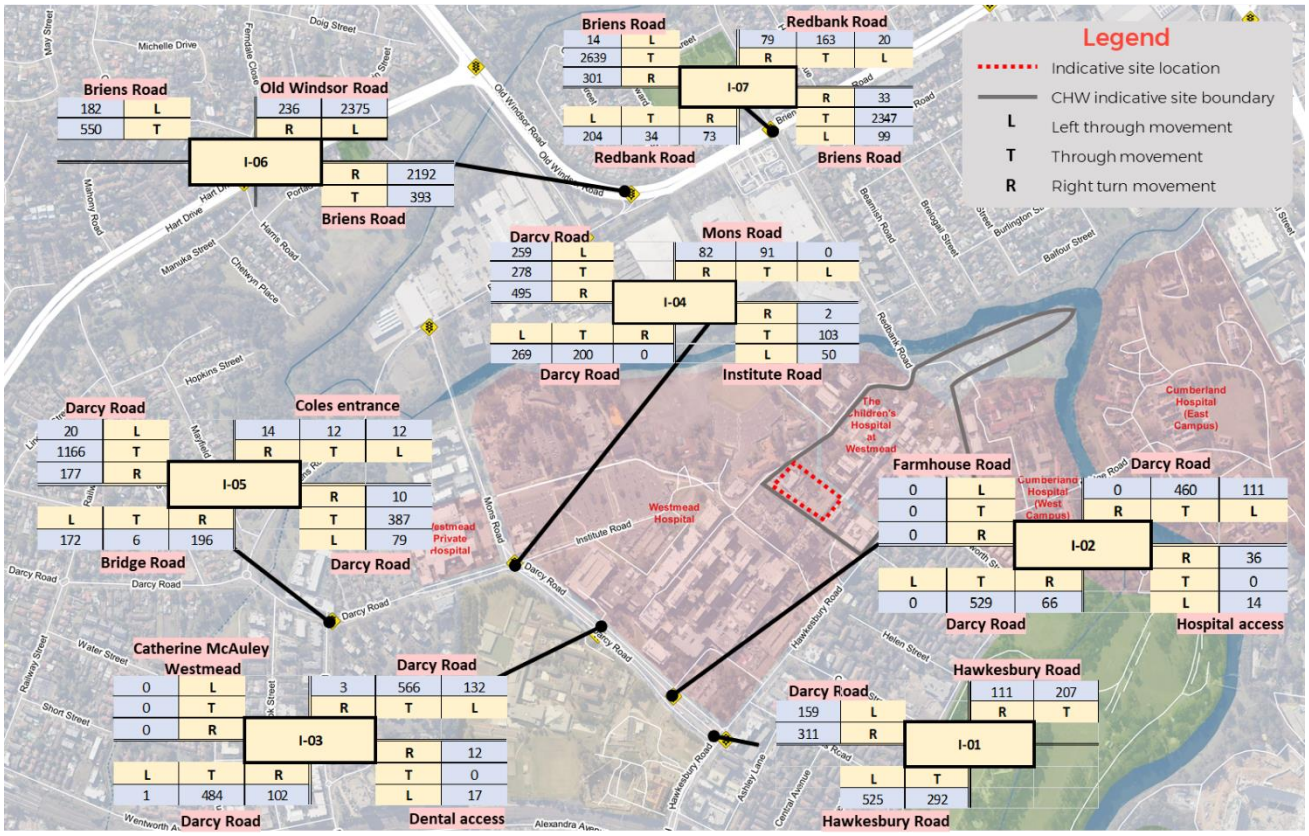
Table 2.1 AM peak growth factors from 2018

Corridor	Eastbound	Westbound	Northbound	Southbound
Briens Road corridor	None	None	-	-
Darcy Road corridor	-	-	2%	5%
Hawkesbury Road corridor	None	None	-	-
Institute Road	None	10%		

Table 2.2 PM peak growth factors from 2018

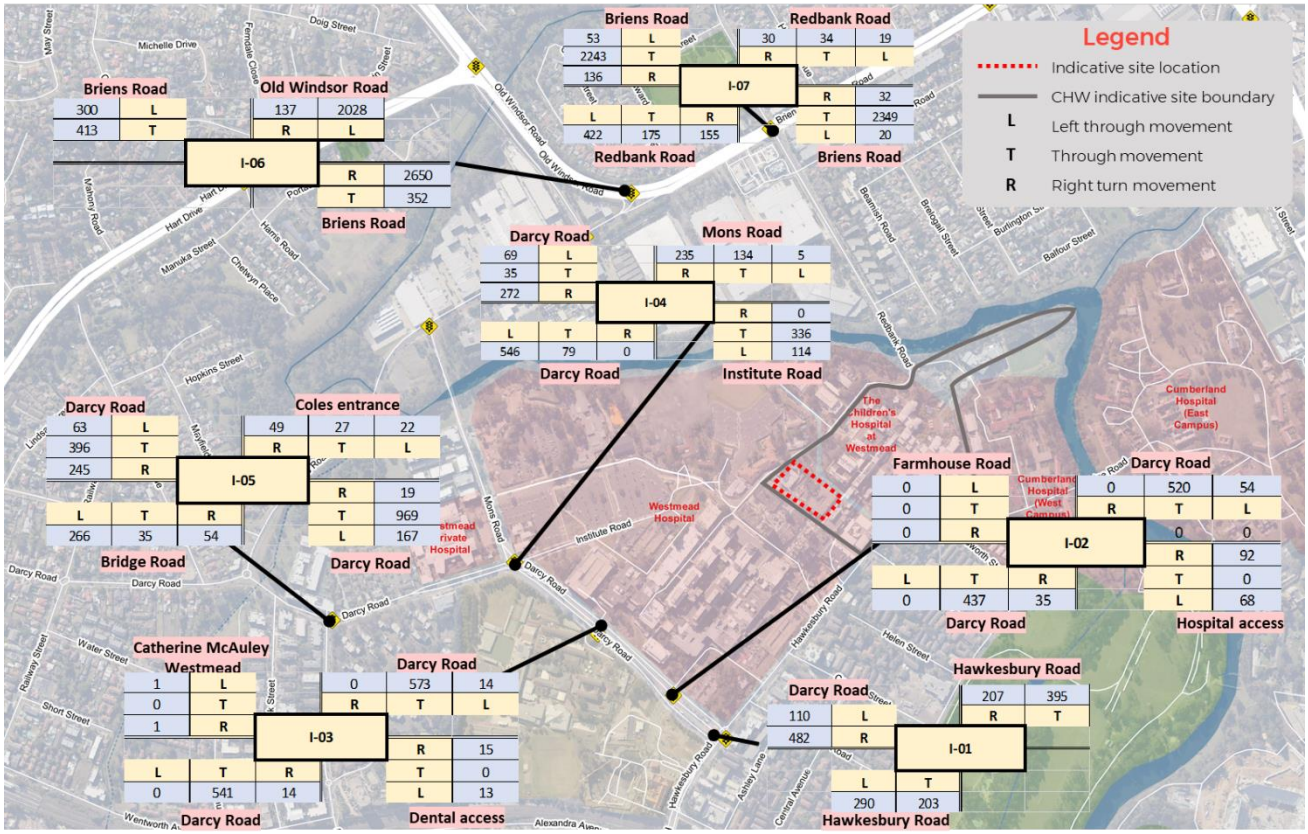
Corridor	Eastbound	Westbound	Northbound	Southbound
Briens Road corridor	None	None	-	-
Darcy Road corridor	-	-	None	None
Hawkesbury Road corridor	5%	None	-	-
Institute Road	None	14%		

The 2020 base case traffic volumes at the surrounding intersections for the AM and PM peak hours are shown in Figure 2.11 and Figure 2.12, respectively.



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure 2.11 2020 AM peak traffic volumes



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure 2.12 2020 PM peak traffic volumes

2.10 INTERSECTION OPERATION

The operation of the study intersections has been assessed using the SIDRA Intersection modelling software, adopting the 2020 base case traffic volumes.

The Traffic Modelling Guidelines (Roads and Maritime Services, 2013) specifies that intersection operation is generally measured by degree of saturation, level of service and 95th percentile base of queue distance.

SIDRA Intersection measures these elements, with the intersection level of service being a measure of the average delay at the intersection, as defined by the criteria set out in Table 2.3.

Table 2.3 SIDRA intersection level of service criteria

Level of service	Average delay (seconds per vehicle)	Criteria for traffic signals	Criteria for give way and stop signs
A	<14	Good operation	Good operation
B	15 to 28	Good operation with acceptable delays and spare capacity	Good operation with acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays	At capacity, requires other control mode
F	>70	Extra capacity required	At capacity, requires other control mode

Source: Adopted from Guide to Traffic Generating Developments (Roads and Maritime Services, 2002)

Table 2.4 and Table 2.5 present a summary of the 2020 base case intersection operations of the key study intersections during the weekday AM and PM peak hours.

It should be noted that the critical movement for level of service at a roundabout or priority-controlled intersection is the movement with the worst delay, whereas for a signalised intersection, the average movement delay and level of service over all movements should be adopted.

The intersection modelling results indicate the surrounding intersections are generally operating with some spare capacity during the assessed CHW peak hours (not the road network peak hours) with the exception of the intersections of Briens Road and Redbank Road and Darcy Road, Mons Road and Institute Road, which are generally operating at capacity during the AM and PM peak hours, respectively.

Table 2.4 AM peak intersection operation – 2020 base case

Intersection	Degree of saturation	Average delay (secs)	95th percentile queue (m)				Level of service
			South	East	North	West	
Briens Road and Redbank Road	1.04	51	71	506	-	505	D
Bridge Road and Darcy Road	0.91	30	60	46	6	160	C
Darcy Road, Mons Road and Institute Avenue and	0.78	31	36	21	19	99	C
Dental Hospital, Marist High School and Darcy Road	0.37	10	25	3	30	0	A
Hospital Access, WSU and Darcy Road	0.38	17	52	9	13	5	B
Darcy Road and Hawkesbury Road	0.52	25	-	22	33	49	B
Railway Parade and Hawkesbury Road	0.54	11	22	45	-	18	A
Alexandra Avenue and Hawkesbury Road	0.63	33	39	46	52	80	C

Table 2.5 PM peak intersection operation – 2020 base case

Intersection	Degree of saturation	Average delay (secs)	95th percentile queue (m)				Level of service
			South	East	North	West	
Briens Road and Redbank Road	0.80	30	184	323	-	289	C
Bridge Road and Darcy Road	0.74	27	51	105	21	44	B
Darcy Road, Mons Road and Institute Avenue and	0.99	46	45	82	56	24	D
Dental Hospital, Marist High School and Darcy Road	0.21	4	4	4	13	0	A
Hospital Access, WSU and Darcy Road	0.6	41	56	25	64	5	C
Darcy Road and Hawkesbury Road	0.73	23	-	58	50	49	B
Railway Parade and Hawkesbury Road	0.74	30	58	130	-	24	C
Alexandra Avenue and Hawkesbury Road	0.78	35	58	55	37	54	C

2.11 PUBLIC TRANSPORT SERVICES

2.11.1 TRAIN

The T1 Western, T5 Cumberland and Blue Mountains lines stop at Westmead station, which is about a 12 minute walk from the CHW.

The T1 Western Line operates in the east-west direction via the City Circle in the east and Emu Plains or Richmond in the west and north west respectively. It interchanges with the T9 Northern Line at Strathfield, the T7 Olympic Park Line and the T3 Bankstown Line at Lidcombe and the T2 Inner West and Leppington line at Parramatta, Lidcombe or Strathfield.

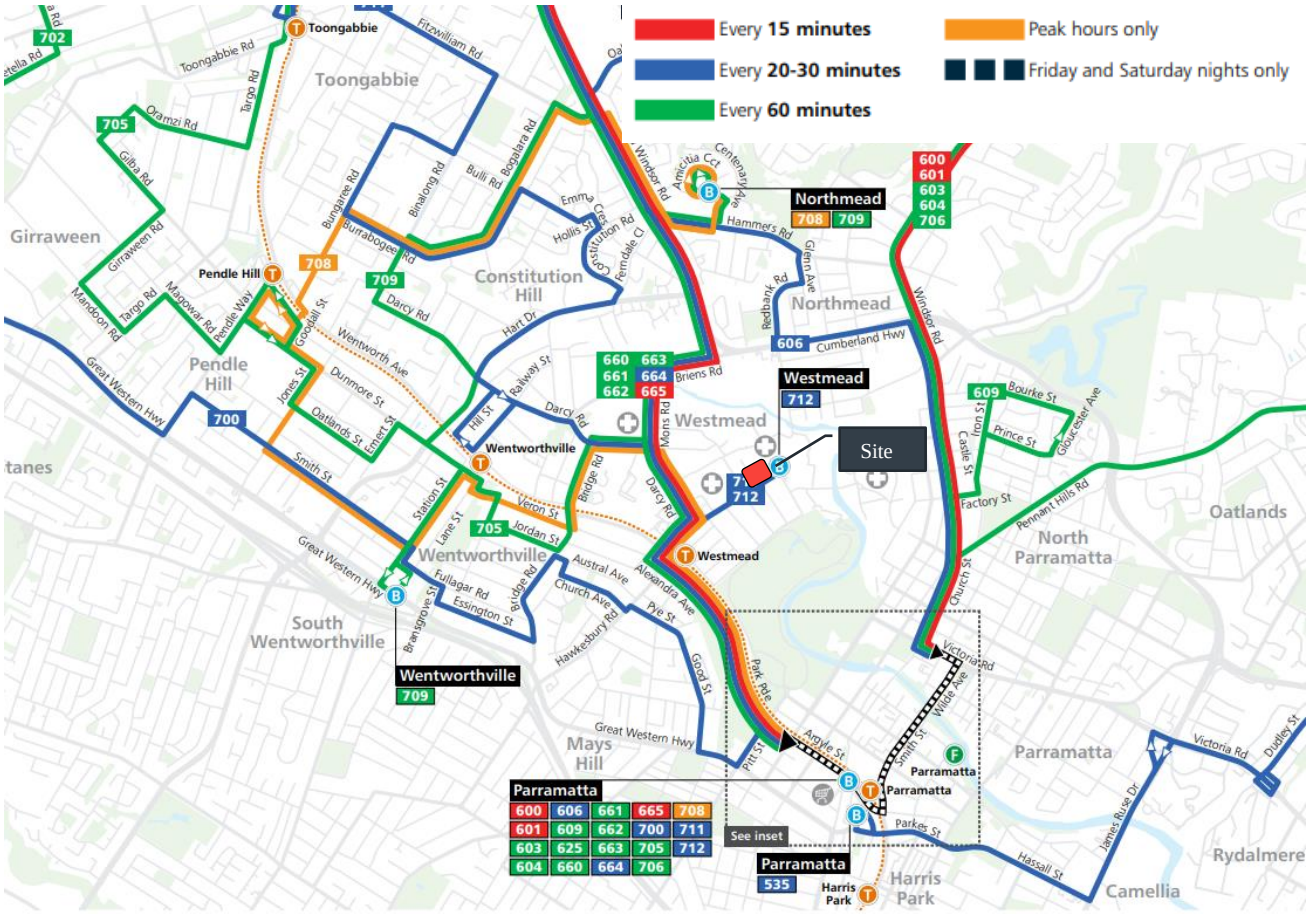
The T5 Cumberland Line provides a north-south line servicing western Sydney from Richmond to Leppington. The line interchanges with the T1 Western and T2 Inner West and Leppington lines at Parramatta, the T3 Bankstown Line at Cabramatta and Liverpool, and the T8 Airport and South Line at Glenfield.

The T1 Western Line and the T5 Cumberland Line operate with a peak weekday frequency of 5-10 minutes and 30 minutes, respectively. The Blue Mountains train stops at Westmead station four times per weekday in each direction.

2.11.2 BUS

The surrounding bus network including its routes and frequencies are shown in Figure 2.13. Several routes, with a range of frequencies, use the T-way along Mons Road and Darcy Road, connecting to north-west Sydney. This includes route 665 which operates between Rouse Hill and Parramatta on a 15 minute frequency. In addition, the following routes service the site:

- 705 (Blacktown to Parramatta via Seven Hills) stops on Darcy Road and operates hourly throughout the day, with some 30 minute services during the weekday peak periods
- 708 (Constitutional Hill to Parramatta via Pendle Hill) stops on Darcy Road but operates with one afternoon service and one AM peak service
- 711 (Blacktown to Parramatta via Wentworthville) and route 712 (CHW to Parramatta) stop on Hawkesbury Road and have a 20-30 minute frequency during the weekday peaks
- 818 (Westmead to Merrylands) stops on Hawkesbury Road and operates hourly throughout the day.



Source: *Hills District Bus Guide, http://www.cdcbus.com.au/images/files/maps/hillsbus/Region_4_Network_Map.pdf, accessed 27 February 2020*

Figure 2.13 Surrounding bus network (excluding route 818)

2.11.3 SYDNEY'S BUS FUTURE

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

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

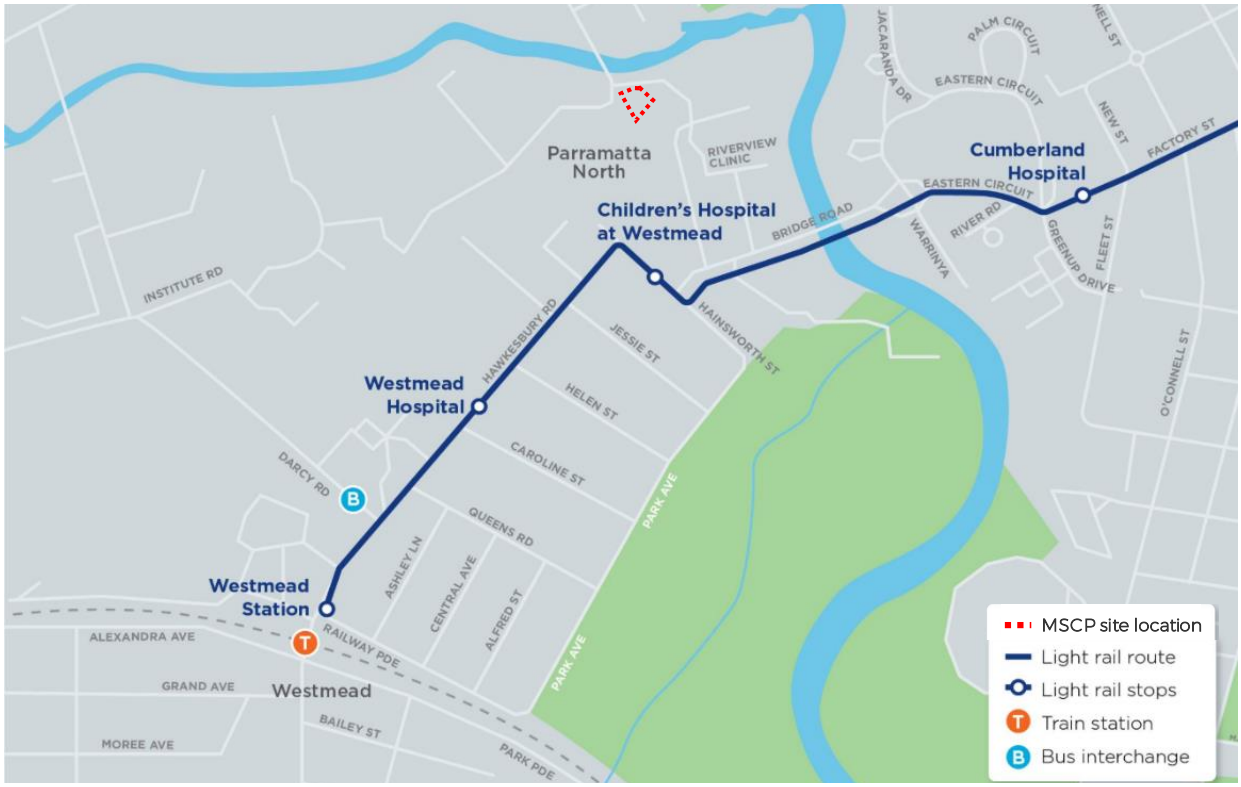
The plan has now been superseded by the *Future Transport 2056 Strategy* and planning has been revised for most of the "rapid bus routes" identified for Greater Parramatta, however it is still a useful guide for bus network and infrastructure planning. Bus network changes to the North-West T-way may have an impact on the Westmead and Wentworthville precincts.

2.11.4 FUTURE PARRAMATTA LIGHT RAIL

Parramatta Light Rail (PLR) is a major infrastructure project connecting Westmead with Parramatta, Camellia and Carlingford. Stage 1 was approved in 2018 and is currently under construction. It is expected that services will commence in 2023.

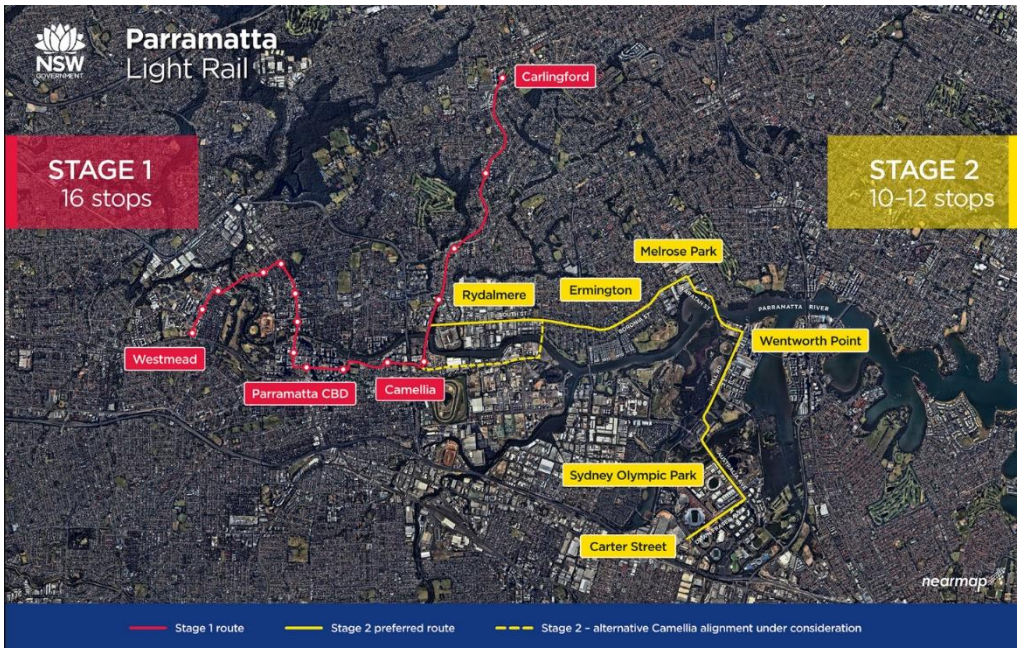
In Stage 1, there will be three stops within Westmead, as shown in Figure 2.14. The Westmead stop is located to the east side of Hawkesbury Road, on the opposite side of Railway Parade to the station. The Westmead Hospital stop is located in the centre of Hawkesbury Road and the CHW stop is to be located on Hainsworth Street about 250-300m from the proposed PSB. These three stops combine to significantly increase the public transport accessibility of Westmead.

The approved Stage 1 and the preferred Stage 2 network is shown in Figure 2.15.



Basemap source: http://www.parramattalightrail.nsw.gov.au/node/213/, accessed 23 October 2020

Figure 2.14 Parramatta Light Rail preferred alignment through Westmead



Source: http://data.parramattalightrail.nsw.gov.au/s3fs-public/PLR_Stages1&2_Waratah2.jpg?PS.cK_UytTwCs3MztqO819g6DwcnuZ3V, accessed 23 October 2020

Figure 2.15 Parramatta Light Rail preferred alignment for Stage 1 and Stage 2

2.12 CYCLING

2.12.1 EXISTING AND PLANNED NETWORK

Westmead currently lacks a comprehensive network of safe, complete and connected cycling routes. Sections of cycling infrastructure, where present, are short and isolated, with poor links both within, and to and from the precincts.

The *Parramatta Bike Plan 2017* was released in May 2017 in support of Parramatta City Council's vision to become more sustainable, liveable and productive as Sydney's Central City. The plan aspires to encourage safe and healthy lifestyles by increasing cycling mode share to 5 per cent of all trips to work (commute) in the City of Parramatta LGA and 10 per cent of all trips ending in the CBD. The Plan outlines several "network design principles" to be used in the development of the Parramatta bicycle network including safety, connecting centres, strengthening the existing network, directness and coverage.

The proposed Parramatta Cycling Network identifies several corridors within the study area of varying typology (Figure 2.16). Corridors that may be beneficial to the CHW's staff and visitors include:

- Proposed painted bicycle lanes on Park Avenue, Hainsworth Street and Hawkesbury Road in Westmead
- Existing physically separated bicycle lanes From Westmead to Parramatta CBD (Queens Road and Parramatta Park)
- Existing off-road separated bicycle lanes along Darcy Road and Mons Road (North-West T-way)
- Proposed Toongabbie Creek shared path
- Proposed on-road facilities on Redbank Road, Balmoral Road and Kleins Road.

Source: Parramatta Bike Plan, Parramatta City Council, (2018)

Figure 2.16 Planned cycling network within the Westmead region

Parramatta Light Rail will also include an active transport link along its alignment which will also strengthen cycling connections to Parramatta CBD and the wider region.

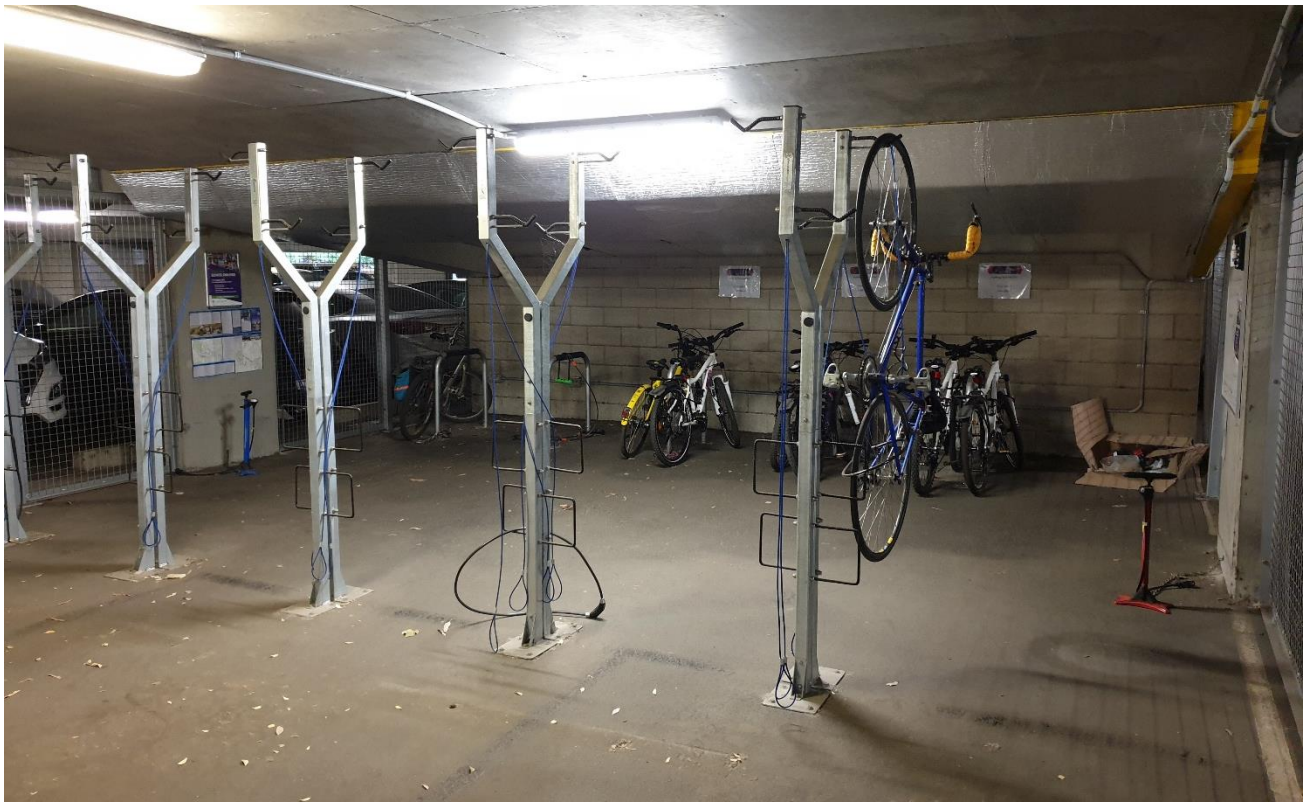
Bicycle storage facilities are provided across campus, including a mixture of secure bicycle cages and bike hoops at strategic entry points for visitors. CHW staff were using a bicycle parking facility which was located in the P17 car park. Following the demolition of P17, the existing bike parking is to be relocated and expanded to an unused undercroft area located in the Kid's Research Institute (KR) building, adjacent to the proposed PSB. The facility could be accessed via Redbank Road and Hawkesbury Road via Kids Research Lane.

The proposed bicycle parking would have capacity for up to 50 spaces, set out in accordance with the Australian Standards. It is noted the proposed bicycle parking has been approved through a Review on Environmental Factors.

On-site observations indicated that the existing bike parking facility typically had plenty of spare capacity, as shown in Figure 2.17. The facility had capacity for around 40 bicycles, therefore, the proposed larger facility would be suitable to accommodate the existing and future staff bicycle parking demand.

In addition, the CHW staff have access to the following substantial end-of-trip facilities located within the precinct:

- The recently opened CASB contains 8 showers, change rooms and 90 bike spaces.
- The proposed PSB would have 6 staff showers and change rooms available throughout the building, co-located with clinical departments.
- The existing CHW has centralised end-of-trip facilities including 8 showers and change rooms located near the new bicycle storage. Anecdotally, these are located due to staff preference to utilise facilities adjacent to the clinical departments, of which there are facilities throughout the existing CHW.



Source: PwC

Figure 2.17 Existing bike parking facility utilisation

2.12.2 SYDNEY'S CYCLING FUTURE

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

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

The Westmead Health Precinct will benefit from identified cycle network improvements including the Parramatta Valley Cycleway, cycleway improvements in Parramatta Park and the M4 Cycleway. Opportunities exist to improve connections to these cycleways including improved cycle infrastructure along the Parramatta River, as well as new north-south connections to the M4 Cycleway. The plan identifies that cycling links which feel safe and match cyclists' abilities are key to promoting increased cycling trips. These links are required outwards from centres and connecting to key routes and destinations such as other centres. Also identified is the importance of providing adequate end-of-trip facilities at key destinations.

2.13 WALKING

2.13.1 EXISTING NETWORK

For pedestrians accessing CHW via train, the walking distance between Westmead station and CHW is approximately 850m or a 10-15 minute walk, via Hawkesbury Road. The Hawkesbury Road footpath in front of the CASB has been upgraded to be 4-5m wide. Further footpath widening works along Hawkesbury Road are also under construction as part of PLR works.

2.13.2 SYDNEY'S WALKING FUTURE

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

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

Sydney's Walking Future targets the removal of barriers to pedestrian movement within approximately 2km of activity centres.

2.14 JOURNEY TO WORK DATA

Australia Bureau of Statistics (ABS) Journey to Work (JtW) data from the 2011 and 2016 Census's were reviewed to understand the commuter mode share patterns for staff of the Westmead area. The data is only available for a Statistical Area 2 (shown in Figure 2.18), which is larger than the CHW site or the Westmead Health Precinct. However, given that the precinct has a large staff population, the data is considered to be representative of employees of the Westmead Health Precinct.

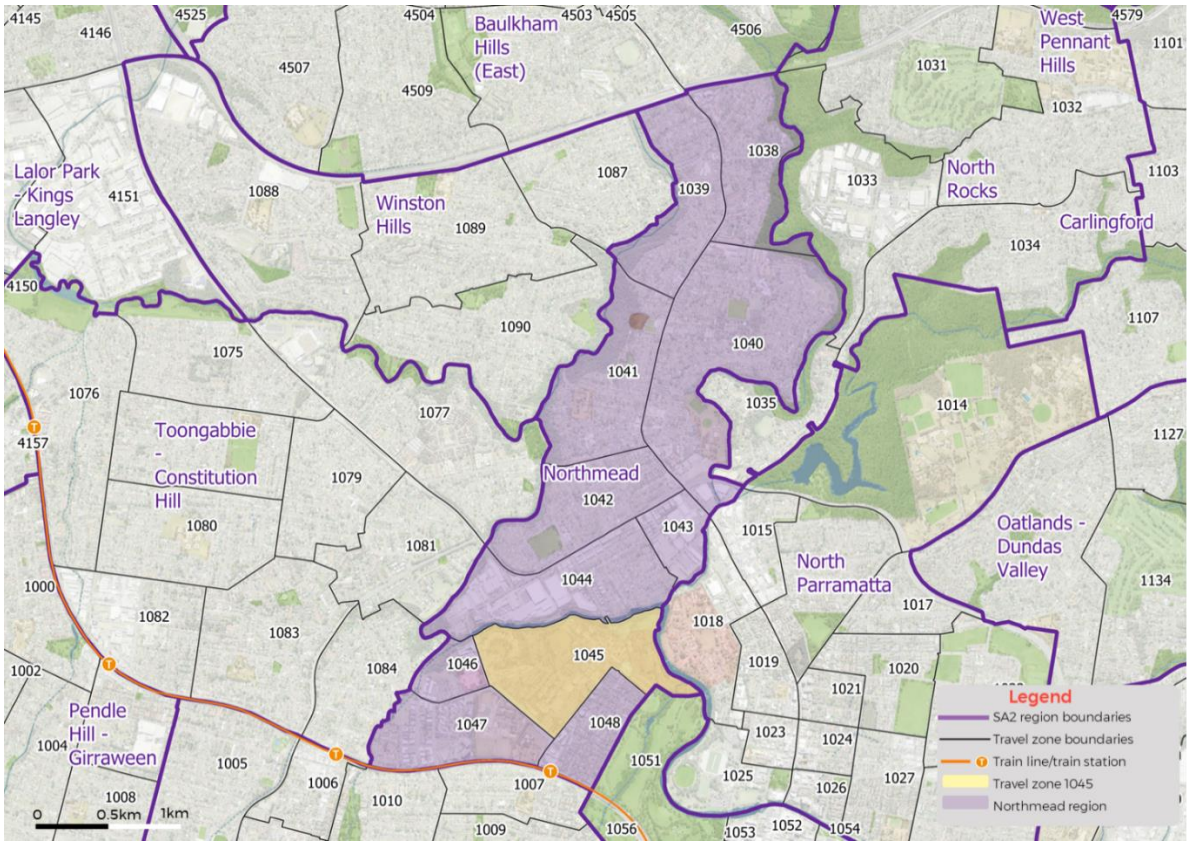


Figure 2.18 Journey to Work region boundaries

The mode share data for 2011 and 2016 JtW data is summarised in Table 2.6. The place of origin for the employees of the area are shown in Figure 2.19.

Overall, the JtW highlights the following:

- Large proportion of employees originate from areas nearby to the Westmead Health Precinct or to the west and north-west of the precinct, with the top three regions being:
- Northmead
- Girraween – Westmead
- Toongabbie – Constitution Hill
- Approximately half of the commuters who live in the Northmead area, walk to their place of work 403 of 996 employees).
- The number of employees who rely on private vehicle has reduced by around 4 per cent since 2011. Similarly, the he number of employees who use public transport has increased since 2011 by 7 per cent.

Table 2.6 Journey to Work data for Statistical Area 2

Mode	2011	2016	% change from 2011 to 2016
People	13,732	14,715	
Vehicle driver	78%	75%	-3%
Vehicle passenger	5%	4%	-1%
Train	9%	12%	+3%
Bus	0%	4%	+4%
Walk	4%	4%	0%
Cycling	1%	0%	-1%
Other	3%	1%	-2%

Source: Australia Bureau of Statistics Journey to Work

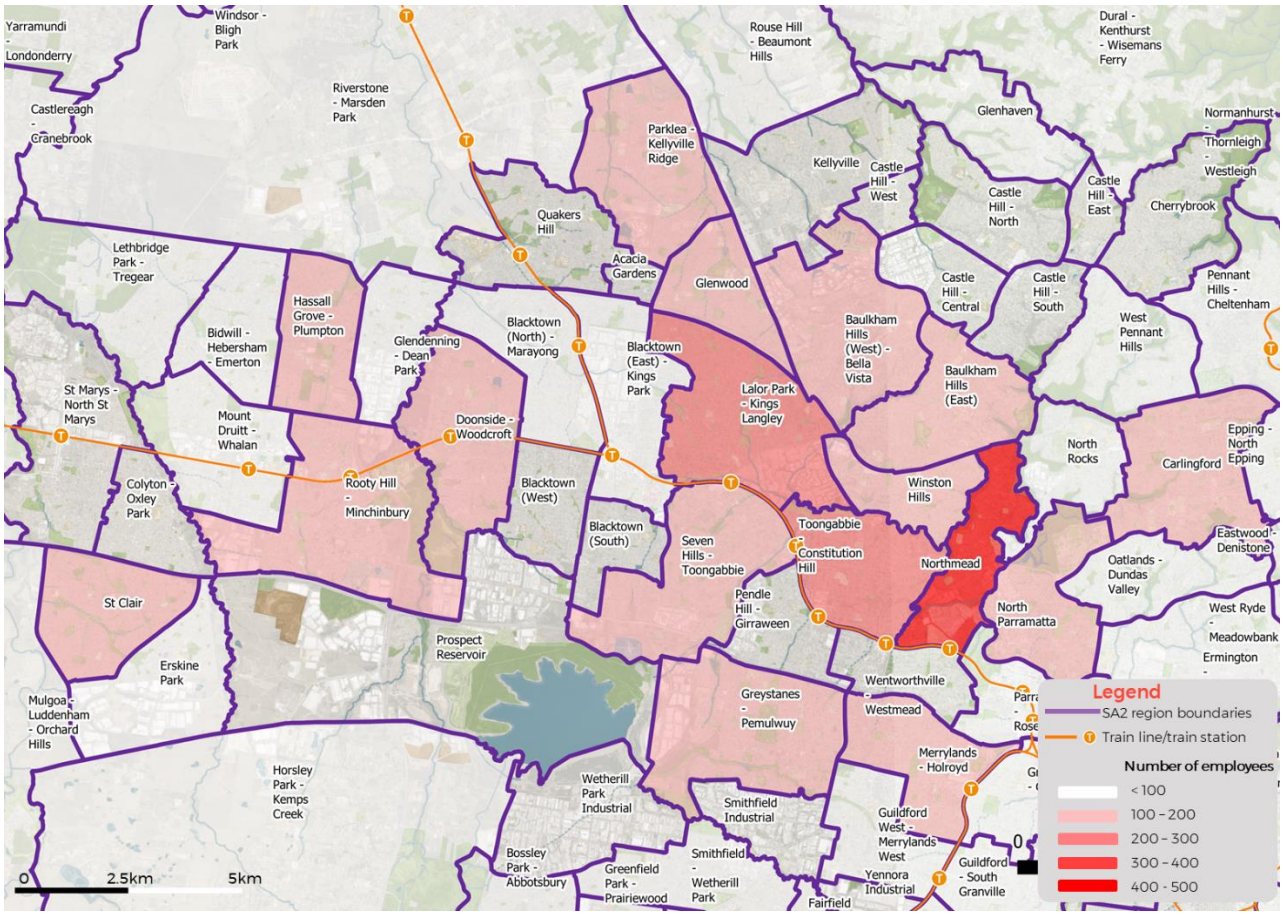


Figure 2.19 Journey to Work 2016 employee place of origin

2.15 STAFF TRAVEL SURVEYS

CHW staff surveys were completed in July 2019 by GTA Consultants as part of the CHW Stage 2 Car Park Demand Study. The surveys had 864 responses and identified the mode share splits summarised in Table 2.7. The staff travel survey results reflected similar results to the JtW data, including nearly 80 per cent of staff travel to/from CHW via private vehicle.

The staff travel surveys also noted that the average private vehicle occupancy was 1.1 persons per vehicle, demonstrating a lack of carpooling from staff.

Table 2.7 Mode share of staff respondents

Mode of transport	Stage travel survey response (%)
Car	79.2
Train	11.7
Bus	2.6
Combination of bus and train	3.7
Bicycle	0.8
Walk	1.8
Other	0.2

Source: CHW Stage 2 Parking Demand study (GTA Consultants, 2019)

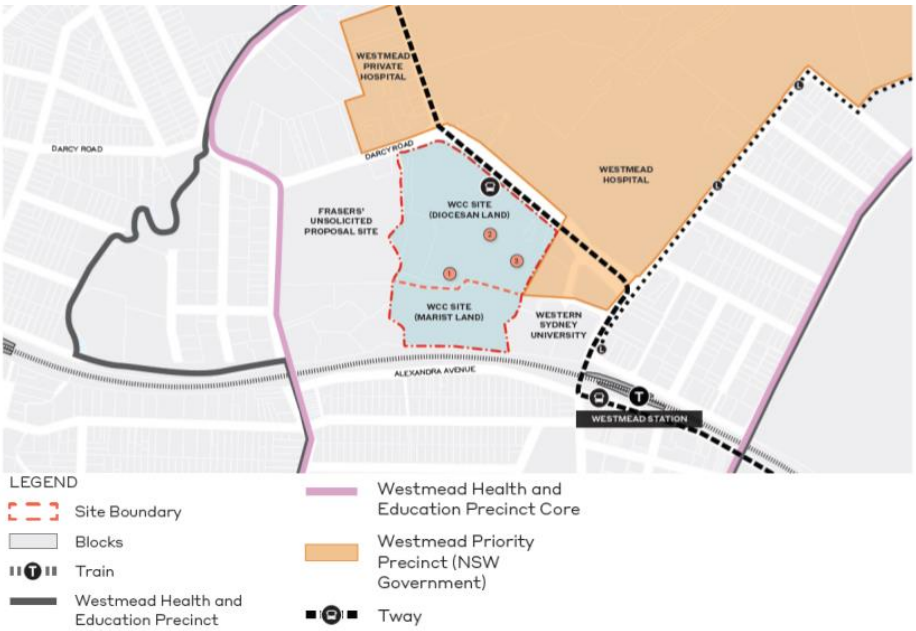
CHW staff also provided responses to why they did not use public transport. The main factors contributing to staff not choosing public transport include:

- Longer commute times using public transport when compared with driving
- No direct route to the CHW site, requiring staff to change services to complete their journey
- Lack of convenient public transport stops, and routes close to home
- Insufficient public transport services available for typical start and finish times.

2.16 SURROUNDING PLANNED DEVELOPMENTS

2.16.1 WESTMEAD CATHOLIC EDUCATION CAMPUS

The Westmead Catholic Education Campus has submitted a State Significant Development application requesting the redevelopment and extension of the education campus located on 2 Darcy Road. The extent of the proposed redevelopment is seen on Figure 2.20.



Basemap source: *Ethos Urban*

Figure 2.20 Westmead Catholic Education Campus site location and context

The transport impact assessment indicated that the primary school is expected to generate an additional 90 trips in each direction in both AM and PM school peak hours in 2023, and an additional 450 trips in each direction in both AM and PM peak hours by 2033.

A proposed Out-of-School Hours childcare facility to be developed in parallel within the site is expected to reduce the developments peak hour traffic generation by between 49 and 77 per cent of peak trips. With the proposed childcare facility moving trips out of the peak hours, the intersections along Darcy Road and Hawkesbury Road were expected to perform similar to their current operation.

2.16.2 PARRAMATTA NORTH

The Parramatta North Urban Transformation project is located on the existing Cumberland Hospital sites surrounding the Parramatta River in Westmead and Parramatta North. The approved Parramatta North Urban Transformation rezoning proposed to deliver:

- 20,000 square metres of floor space of heritage items
- Village centre of approximately 4,000 square metres of floor space
- 3,000 homes that are located within the proximity of the Parramatta CBD, transport and local services.

The Department of Planning, Industry and Environment is undertaking more detailed planning for the precinct.

3 CAR PARKING ASSESSMENT

3.1 REQUIREMENTS

3.1.1 FUTURE CAR PARKING DEMAND

The car parking requirements for different development types are set out in City of Parramatta Council's DCP 2011, and The Guide to Traffic Generating Developments (RMS, 2002). However, neither guide provides any specific parking requirements for hospitals. Therefore, a detailed parking demand study was completed on behalf of Health Infrastructure to determine parking requirements for the proposed CHW Redevelopment Stage 2.

It is understood that the Car Parking Demand Study (GTA Consultants, 2019) was completed using a Parking Demand Model based on first principles analysis and calibrated against on-site parking observations. The study is attached in Appendix B.

The study determined that an additional 280 spaces would be required to accommodate the 2031/32 demands of the Stage 2 Redevelopment adopting some private vehicle mode share reduction to account for the expected increase in public transport uptake, once PLR and Sydney Metro are completed.

Approximately 110 of these spaces would be staff and 170 would be for visitors.

In addition, the study identified the need for a further 35 spaces to replace the stacked parking arrangements that are currently accommodated within the P17 car park that is planned to be demolished.

3.1.2 P17 REPLACEMENT

As discussed in section 2.4, the existing CHW staff car park, P17 will need to be replaced as part of the project. P17 currently accommodates the following:

- 555 formal parking spaces
- an additional 124 vehicles via stacked parking arrangements.

Therefore, P17's total capacity is 679 spaces. It is proposed that all 679 spaces be replaced within the new MSCP.

3.1.3 OTHER CAR PARK REPLACEMENT

The proposed car park entry ramp requires the removal of about 33 spaces accessed via Redbank Road. These spaces are used by visitors to The Lodge and/or maintenance vehicles that access an adjacent maintenance storage shed.

It is proposed that all 33 spaces are relocated within the MSCP.

3.2 ADEQUACY OF CAR PARKING PROVISION

The proposed MSCP would have 996 spaces that could accommodate at least the following:

- 110 new staff spaces
- 170 new visitor spaces
- 679 replaced staff spaces from P17
- 33 replaced spaces for the MSCP site.

3.3 CAR PARKING STAGING

As per Figure 3.1, the current total supply of car parking spaces accommodated in main car parks is 1,657. This number includes the small parking area on Redbank Road used by maintenance vehicles and visitors to The Lodge. This parking supply also accounts for the interim replacement parking provided due to the loss of P17, identified as P23 in Figure 3.1. The interim parking and stacked parking arrangement replace P17 in its entirety, with no net change in parking supply.

Figure 3.1 Current CHW large car parks

As per the Car Parking Demand Study completed by GTA in 2019, it was determined that an additional 280 spaces would be required to accommodate the 2031/32 demands due to the CHW Stage 2 Redevelopment. The 280 spaces will service 110 staff and 170 visitors.

Both the new MSCP and PSB (subject to separate planning approvals) will provide car parking spaces. The MSCP will be eight storeys high and provide 996 car parking spaces that service both additional demand and the replacement of lost spaces. This includes all 280 spaces required to accommodate the 2031/32 demands from the Stage 2 Redevelopment, as well as the replacement of Redbank Road parking and the P17 staff car park.

The PSB (subject to a separate planning approval) will provide 128 spaces located on Level 2 of the PSB and adjacent to an existing at-grade parking. These are provided only as an interim use of the space. These spaces are separate to the spaces provided in the MSCP.

The parking associated with the PSB submission is located in areas that have been master planned for clinical services expansion and will be lost to this clinical expansion in the future (see Figure 3.2). However, these areas provide an interim opportunity for proximal parking for particular “at need” users, such as disabled parking (staff and visitor) and frequent hospital visitors (e.g. day oncology patients).

Figure 3.2 PSB clinical expansion replacing interim at-grade parking

The MSCP will provide a total of 996 spaces, which, in conjunction with other existing on-site parking supply (P6 and P14), will provide sufficient capacity to 2031/32 (GTA Car Parking Demand Study, 2019). MSCP car parking supply is proposed to be operated (in conjunction with the other Precinct car parks) in stages, allowing car parking operations to come online as demand across the Precinct increases. A summary of the parking supply at each stage is shown in Table 3.1.

The first operational stage will replace the former car parking supply of P17 (currently provided as interim parking labelled as P23 in Figure 3.1) and the supply of the Redbank Road car park – 712 spaces total, inclusive of stacked parking arrangements, resulting in nil net increase in car parking supply from existing conditions. A summary of the parking supply under this operational stage is shown in Figure 3.3.

Figure 3.3 Car parking supply at first operational stage

The second stage of MSCP operation is expected to come online with the completion and occupation of the PSB. During this stage, the PSB will provide up to 128 parking spaces, and the MSCP will provide the remainder of the parking spaces. It is expected that parking in the MSCP will come online as demand increases across the Precinct. A summary of the parking supply at this operational stage is shown in Figure 3.4.

Figure 3.4 Car parking supply at second operational stage

As the spaces in the PSB are provided purely as an interim offering, it is expected the final stage of MSCP operation would see this facility operating at full capacity (996 spaces) with no parking spaces provided at the PSB. This would serve the growth in hospital activity associated with the future PSB, estimated to require 280 spaces additional to existing conditions. A summary of car parking supply in this end-state stage is shown in Figure 3.5.

Figure 3.5 Car parking supply end-state

Table 3.1 Car parking supply summary

	CURRENT	Q2 2023 (MSCP OPERATIONAL	Q1 2025 (PSB OPERATIONAL)	FUTURE (PSB CLINICAL EXPANSION)
P6	523	523	523	523
P14	422	422	422	422
Redbank Road	33	-	-	-
P23 (Interim Parking)	479	-	-	-
Stacked Parking (P6, P14, P23)	200	-	-	-
PSB	-	-	128[1]	-
MSCP	-	712	864 – 996	996
Total	**1,657**	**1,657**	**1,941 – 2,069**	**1,941**

Note 1: Subject to clinical fit-out and expansion

3.4 DISABLED PARKING PROVISIONS

The Building Code of Australia (BCA) outlines requirements for the provision of car parking for people with disabilities. Under the BCA the proposed MSCP, which is to be used by staff and visitors of the hospital, is considered to be a Class 9A building and attracts a requirement of 1 disabled space for every 100 car parking spaces or part thereof.

Given 996 car spaces are to be provided within the MSCP, the development generates a requirement to provide at least 10 disabled car parking spaces.

The proposed MSCP plans currently include 14 disabled parking spaces, which is considered suitable given the above requirement.

Disabled parking as well as the adjacent disabled shared zones have been designed in accordance with the Australian Standards AS2890.6:2009, which require minimum dimensions of 2.4m width by 5.4m length.

3.5 MOTORCYCLE PARKING

The Paramatta DCP 2011 does not include a specific requirement for motorcycle parking within the Westmead precinct, however, the DCP does provide motorcycle parking rates for the Paramatta City Centre.

For the purposes of this assessment, the motorcycle parking rates for the Paramatta City Centre has been adopted, given the proximity of both precincts.

Control 6 (C.6) of the Paramatta DCP 2011 for the Paramatta City Centre requires 1 motorcycle parking space for every 50 car parking spaces provided or part thereof, as separate parking for motorcycles.

Given that 996 car spaces are to be provided in the MSCP, it is recommended that at least 20 motorcycle parking spaces are provided.

26 motorcycle spaces have been included in the proposed MSCP, which is considered suitable given the above requirement.

Motorcycle parking spaces have been designed in accordance with Australian Standards, with dimensions of 1.2m wide by 2.5m long. The dimensions of the motorcycle parking spaces are in accordance with AS2890.1:2004.

3.6 ELECTRIC VEHICLE CHARGING

Health Infrastructure design guidelines have electric vehicle charging requirements of power supply allowance for 1% of car spaces and power and comms conduit provision for 2% of car spaces.

Following a review by Health Infrastructure and the project's Environmentally Sustainable Design (ESD) consultant, it was determined that 50 electric vehicle charging spaces were to be accommodated within the MSCP.

As such, the proposed MSCP plans include 50 electric vehicle charge spaces, exceeding the Health Infrastructure design guidelines.

3.7 BICYCLE END-OF-TRIP FACILITIES

As discussed in section 2.12.1, the bicycle parking facility which was located in the P17 car park is planned to be relocated to an unused undercroft area located in the KR building, adjacent to the proposed PSB.

The KR bike parking could be accessed via Redbank Road and Hawkesbury Road via Kids Research Lane. The facility would also be a short walk to/from the CASB's end-of-trip facilities and the showers and change rooms planned to be provided in the PSB. The bike parking facility is planned to have capacity for around 50 bicycles (an increase of 10 bicycles). It is noted the proposed bicycle parking has been approved through a Review on Environmental Factors

Staff and visitors to the CHW could also use alternative bike parking facilities that are provided across the campus including those within the CASB for staff, the bike loops located within the CASB forecourt and the CHW forecourt fronting Hawkesbury Road. Furthermore, as mentioned in section 2.12, a significant number of showers and change room facilities will be located within the PSB and existing CHW. These facilities combine to provide considerable end-of-trip facilities for those arriving to the site via bicycle or by foot.

Therefore, the KR bike parking facilities, as well as the CASB bike parking and the precinct's existing bike parking areas and end-of-trip facilities would be well placed to encourage sustainable transport modes and have sufficient capacity to accommodate CHW's existing and future bicycle parking demands.

On the above basis, no bike parking or end-of-trip facilities are proposed within the MSCP, which will be strategically located on the periphery of the precinct.

4 CAR PARK DESIGN

4.1 SITE ACCESS

The vehicle access to the proposed MSCP is via a one-way entry ramp from Redbank Road, and vehicle exit via a one-way ramp to Labyrinth Way, as shown in Figure 4.1.

The entry and exit ramp grades are compliant with AS2890.1:2004, as shown in Appendix C. The maximum ramp grades proposed are 1:6.5, with maximum transitions of 1:10, while AS2890.1:2004 allows for maximum ramp grades of 1:6 and maximum transitions of 1:6.7.

Swept path diagrams have been prepared for the site access and exit using Autoturn V10.2 and the B99 design vehicle from AS2890.1:2004, and are attached in Appendix C. The diagrams confirm that a B99 vehicle can enter and exit the site in an appropriate manner.

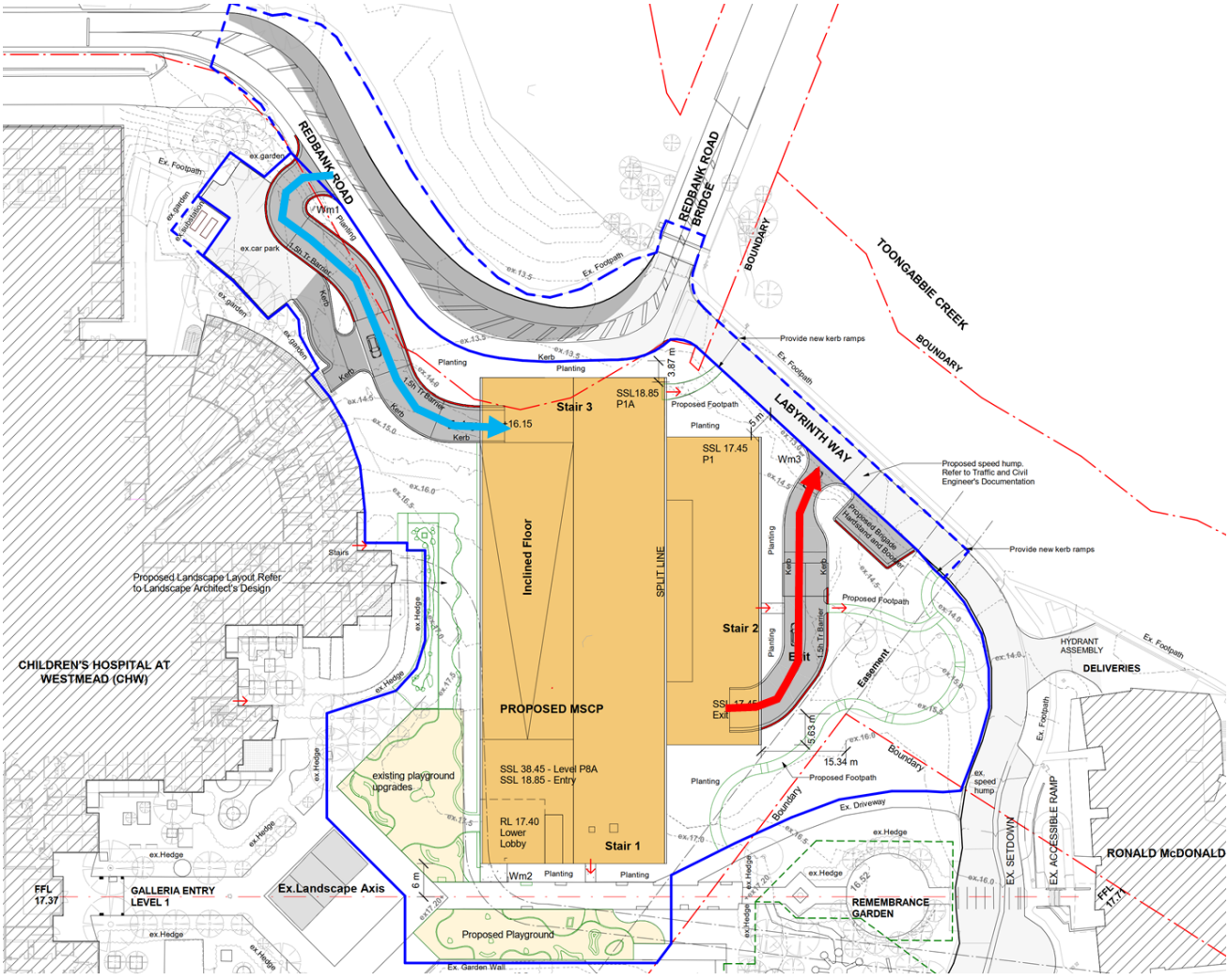


Image source: *Billard Leece Partnership Architects (June 2021)*

Figure 4.1 MSCP access arrangements

The entry ramp also provides access to an existing storage area and small substation. Access to/from the substation is expected to be infrequently needed by a small truck (assumed to be 6.4m SRV). As shown in Appendix C, the SRV would need to enter and exit the substation area via the MSCP entry ramp. Access to/from the substation would need to be completed under a managed scenario that minimises impacts on the MSCP operations. The SRV may also require

neighbouring spots to be vacant to allow for the parking manoeuvre to its designated spot. It is expected that the substation area would be serviced by only one vehicle under a managed scenario, and as such, these manoeuvring requirements are considered acceptable.

Access to the storage area would be via the MSCP entry ramp and would exit via the MSCP and its exit ramp (vehicles up to B99 only). Swept paths of this manoeuvre have been included in Appendix C.

4.2 BOOM GATE QUEUE ANALYSIS

Preliminary queuing analysis has been completed for the proposed boom gates at the MSCP entry and exit. The analysis conservatively adopts an arrival rate that is based on the CHW staff arrival patterns and hasn't been reduced to recognise that some of the car park would be reserved for visitors.

The queueing analysis for the entry and exit arrangements during the AM and PM peak hours are summarised in Table 4.1. The assessment is based on the queueing theory approach addressed in AS2890.1.

Table 4.1 AM and PM peak queuing assessment

Requirement	Entry (AM)	Exit (PM)
Service rate based on AS2890.1 for manually controlled access (vehicles per hour)	400	300
Traffic volumes	451	251
Minimum required number of lanes	2	2
99th percentile vehicle queue per lane (metres)	48	30
Total 95th percentile vehicle queue (metres)	96	60

Based on the above, the analysis shows that the 99th percentile anticipated queue lengths for the MSCP would be up to 96m on entry and 60m on exit. These queuing arrangements can generally be accommodated via the current entry and exit ramp designs, as shown in Appendix C, albeit there may be some minor queuing within the MSCP on exit.

Therefore, it is anticipated that vehicles would not queue on Redbank Road, Labyrinth Way or significantly impact circulation within the MSCP during the AM and PM peak periods when entering or exiting the car park.

4.3 CAR PARK DIMENSIONS

The MSCP would predominantly be for staff and visitors of the CHW, and would therefore be designed for User Class 3 facilities under the Australian Standards AS2890.1:2004. As such, the minimum required dimensions for 90-degree parking bays are 2.6m width by 5.4m length, accessed from an aisle of at least 5.8m wide. AS2890.1:2004 allows for small car parking provision with bays of 2.3m width by 5.0m length. The architectural plans provided show the car parking layout typically meets this requirement, with all car parking aisles dimensioned at 5.8m, all small car parking spaces dimensioned at 2.3m by 5.0m, and all regular car parking spaces dimensioned at 2.6m by 5.4m.

The MSCP has generally been designed in accordance with AS2890.1:2004. However, some comments are made on the drawings included in Appendix C regarding some amendments that will be required. In particular, 300mm clearance is to be provided between a wall and the side of any adjacent car parking space.

4.4 INTERNAL CIRCULATION

Internal circulation is accommodated via one-way aisles, where possible, and access between parking levels is proposed via one-way only split ramps, as shown in Figure 4.2. In accordance with AS2890.1:2004, one-way ramps are to be 3m minimum between kerbs. The proposal exceeds this requirement and is therefore considered satisfactory. Swept path

diagrams have been prepared for internal circulation along ramps between parking levels using the Austroads B99 car. Swept path diagrams show that an Austroads B99 (see Appendix C) car can circulate the car parking levels in an appropriate manner.

The proposed car park circulation, as well as the site access/egress is considered satisfactory.

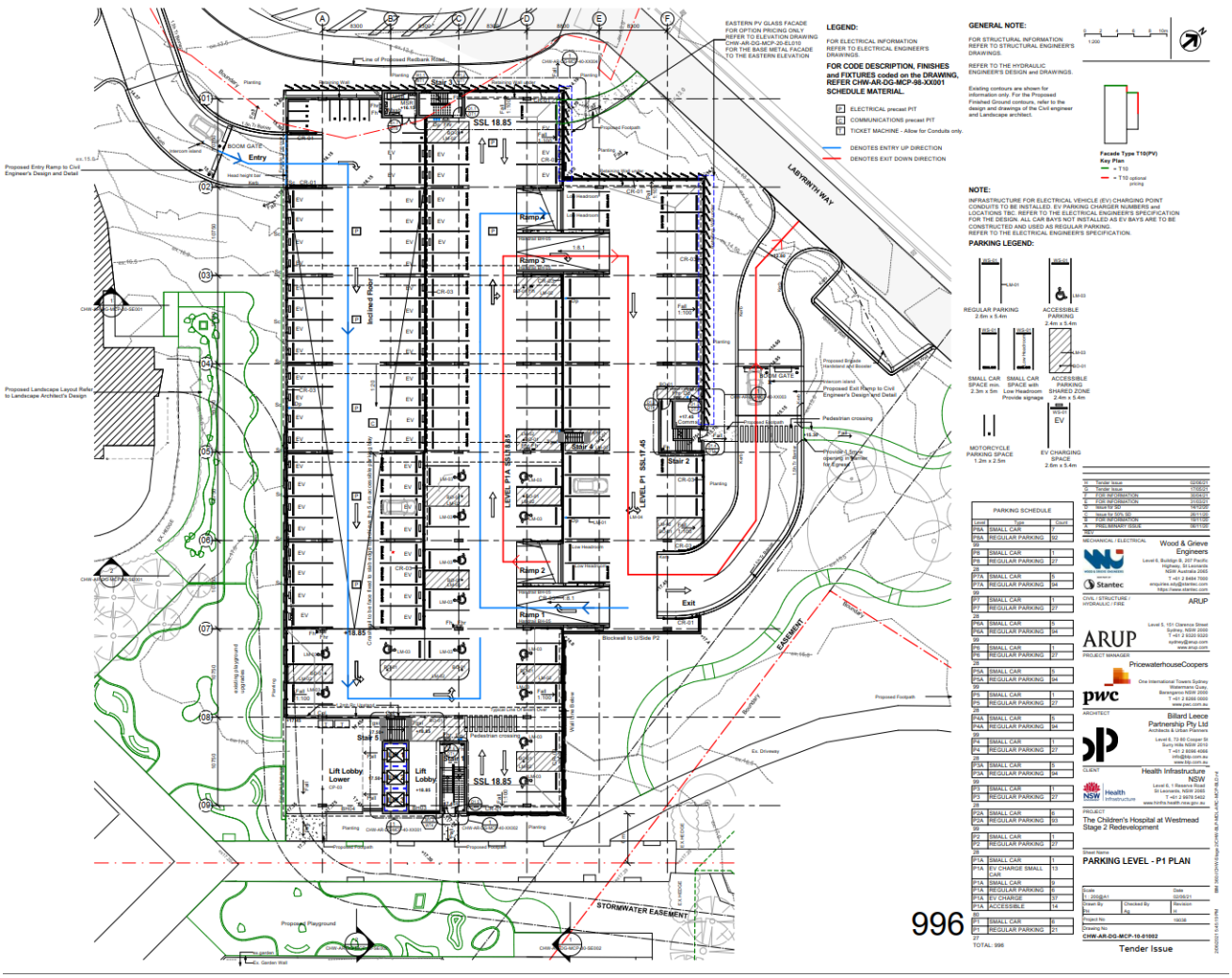


Image source: *Billard Leece Partnership Architects (June 2021)*

Figure 4.2 MSCP internal circulation

4.5 PEDESTRIAN ACCESS

The primary pedestrian access to/from the MSCP would be via lifts and a ramp at southern end of the car park. This access provides good access between the MSCP and Ronald McDonald House to the east and CHW to the west via the east-west landscaped pedestrian spine. The pedestrian access is shown in Figure 4.3.

Secondary pedestrian access and fire stairs are located along the eastern site frontages.

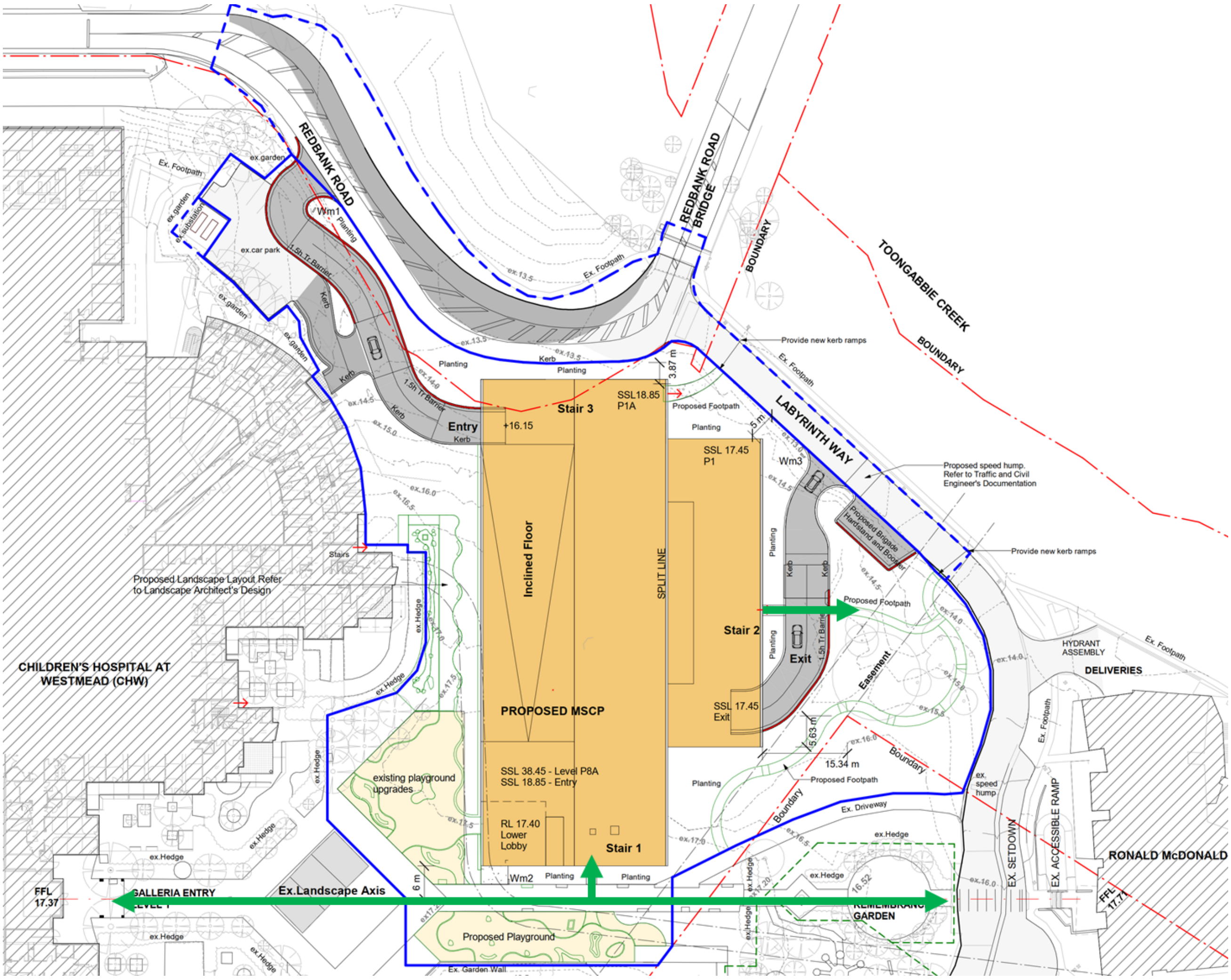


Image source: *Billard Leece Partnership Architects (June 2021)*

Figure 4.3 MSCP pedestrian access

4.6 REDBANK ROAD REALIGNMENT

The proposed MSCP requires realignment of Redbank Road to enable the MSCP to geometrically be located south of Redbank Road and north of a key east-west pedestrian spine.

The realignment will be designed to allow for a semi-trailer to enter the precinct simultaneously with a B99 car leaving the precinct. It is understood that a semi-trailer does not need to exit the precinct via Redbank Road.

While, the MSCP would be located in close proximity to the Redbank Road realignment, Redbank Road has a 20km/h posted speed limit, therefore, road safety risks associated with this are considered to be minor.

5 TRAFFIC IMPACT ASSESSMENT

As discussed in section 3.1, the proposed MSCP would largely cater for replacement car parking and 280 new spaces that are required for the CHW Stage 2 Redevelopment. The impacts of the CHW Stage 2 Redevelopment, including the traffic impacts associated with providing an additional 280 spaces are a direct result of the CHW Redevelopment Stage 2 Paediatric Services Building.

The existing traffic patterns and traffic demands associated with the existing P17 and the adjacent Lodge parking spaces would be maintained despite being relocated to the MSCP. Therefore, the proposed MSCP itself would have negligible impact on the surrounding road network. Nevertheless, the following sections outline the traffic generation for the Stage 2 Redevelopment (generated by the PSB and the forecast growth in staff and visitors).

5.1 TRAFFIC GENERATION

The traffic generation for the Stage 2 Redevelopment has been estimated based on the proposed car parking provision of an additional 280 spaces. This is because the surrounding on-street parking supply is generally at capacity and therefore, the small car park increase would encourage staff and visitors to use more sustainable transport modes to access the site.

To estimate the traffic generation associated with the redevelopment, WSP has reviewed the peak activity at the two main CHW car parks (P6 for visitors and former P17 for staff) and have applied the same characteristics to the proposed additional parking supply. Refer Section 2.8, which discussed existing CHW traffic patterns.

Based on the traffic profiles at P6 and the former P17, the number of vehicles that arrive and exit the CHW car parks can be proportionally applied to the capacity, using the rates summarised in Table 5.1.

Table 5.1 Adopted traffic generation rates (proportion of car park capacity)

User	AM peak		PM peak	
	In	Out	In	Out
Staff	45%	5%	5%	25%
Visitor	15%	5%	5%	20%

Based on a new car parking supply of 280 spaces (approximately 110 staff spaces and 170 visitor spaces), the development would generate an additional 89 vehicles in the AM peak hour and an additional 76 vehicles in the PM peak hour, as shown in Table 5.2.

It is noted that these peak traffic volumes would occur in the CHW peaks of 7:00am-8:00am and 4:00-5:00pm. As demonstrated in Figure 2.7, the staff traffic generation is significantly less outside of these peak hours.

Table 5.2 Additional traffic generation

User	AM (7:00am-8:00am)			PM (4:00pm-5:00pm)		
	In	Out	Total	In	Out	Total
Staff	50	6	56	6	28	34
Visitor	25	8	33	8	34	42
Drop-off	12	11	23	15	14	29
Total	**87**	**25**	**112**	**29**	**76**	**105**

In addition, a minor increase in set-down and pick-up activity is expected to occur along Hawkesbury Road. Based on CHW's forecast growth discussed in Section 1.5, the existing drop-off activity could increase by 25 per cent. By applying this to the existing set-down/pick-up activity that occurs during the assessed peak hours, the development's set-

down/pick-up activity could generate an additional 23 vehicle trips (two-way) and 29 vehicle trips (two-way) during the AM and PM peak hours, respectively.

5.1 TRAFFIC ASSIGNMENT AND DISTRIBUTION

For the purposes of this assessment, the following assumptions are made:

— Staff would be discouraged from accessing any new car parking via Hawkesbury Road or Hainsworth Street. Staff would continue to use Redbank Road as the primary access road, with some using Institute Road to access new car parking.

— Visitors would not be encouraged to access any new car parking via Redbank Road. Visitors would continue to use Hawkesbury Road and Hainsworth Street and could also use Institute Road to access any new car parking.

5.1.1 P17 REASSIGNMENT

Given that the former P17 car park supply would also be replaced within the MSCP, the traffic patterns for the P17 car park would be unchanged, with most staff expected to continue to arrive and depart as they currently do (mostly via Redbank Road).

5.1.2 DEVELOPMENT TRAFFIC DISTRIBUTION AND ASSIGNMENT

The following traffic assignments have been adopted for the new staff and visitor traffic:

— Based on our on-site observations, it is estimated that around 80 per cent of CHW staff would use Redbank Road to access the Campus, with around 20 per cent using the Institute Road or Dragonfly Drive accesses.

— It is estimated that all new visitor traffic would use the Institute Road access except for the drop-off activity which would continue to use Hawkesbury Road and Hainsworth Street.

5.1.3 BACKGROUND GROWTH AND SURROUNDING DEVELOPMENTS

The background growth rates discussed in Section 2.9.4 have been adopted for the 2030 future year scenario. These growth rates were established based on historical growth in the area and recognise the ongoing traffic growth associated with both surrounding developments and an increase in the through traffic that uses the local and arterial road network.

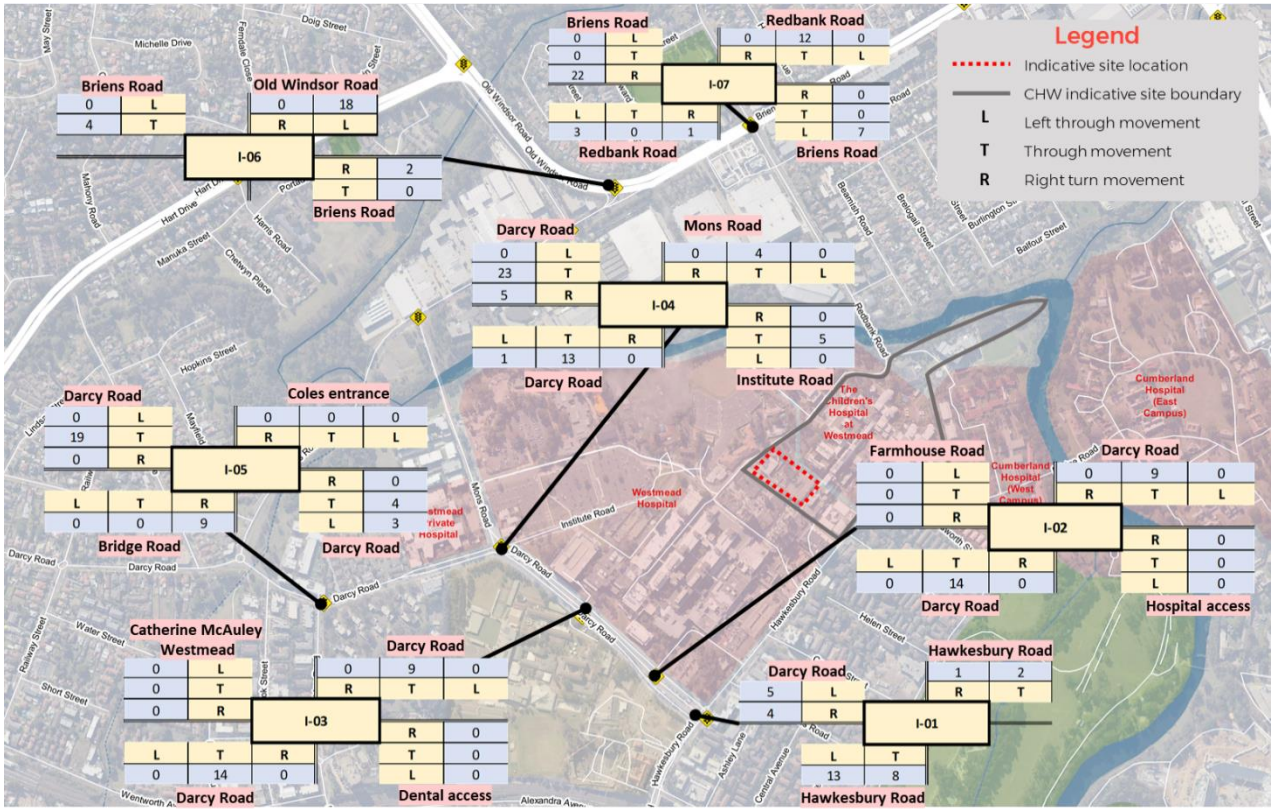
It is recognised that the surrounding road network is reaching capacity and that all developments within the Westmead area, as well as the broader Western Sydney region need to encourage the use of sustainable and public transport modes, as much as practical to limit their cumulative impacts on the road network.

This redevelopment's estimated parking demand and traffic generation was developed assuming an increase in public transport and sustainable transport use. A Green Travel Plan has been prepared to support these assumptions.

5.1.4 SUMMARY OF TRAFFIC VOLUME CHANGES

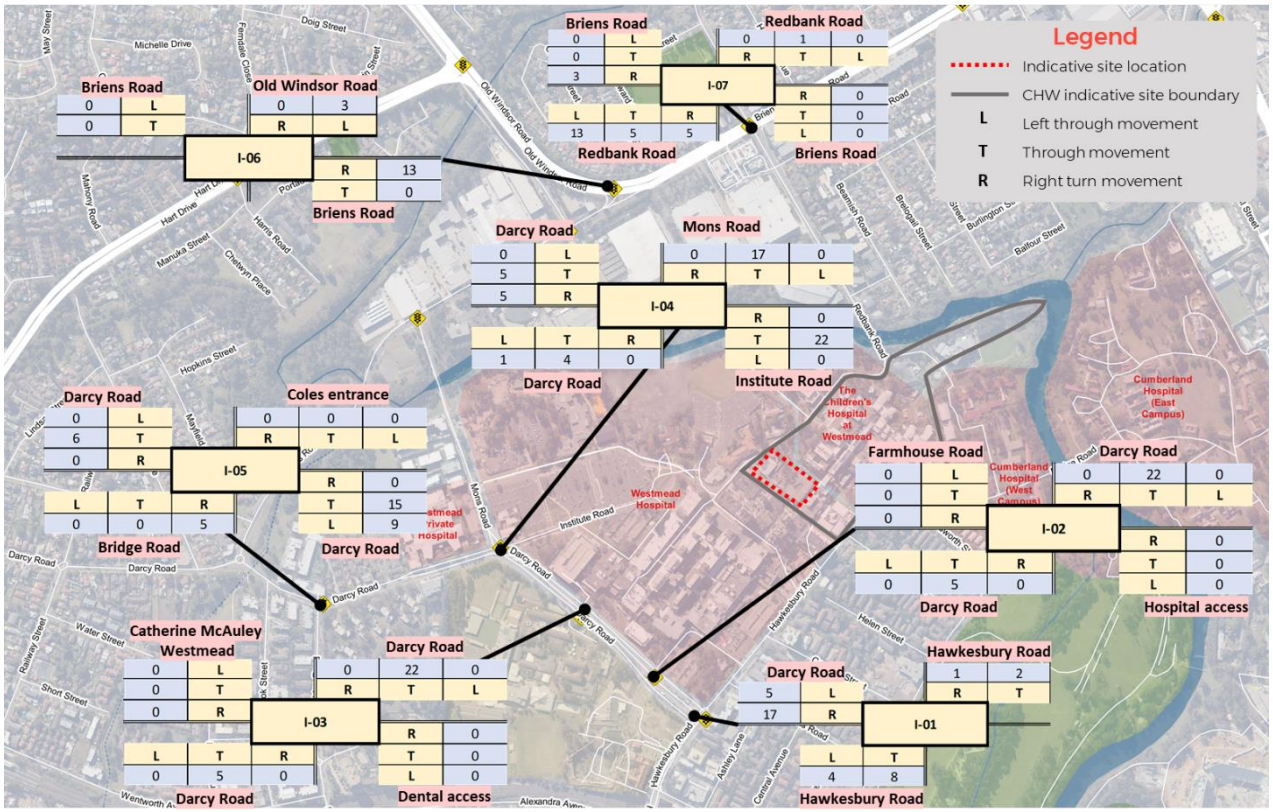
Overall, the estimated additional traffic volume at the key intersections during the AM and PM peak hours are shown in Figure 5.1 and Figure 5.2, respectively.

The overall post-development traffic volumes across the road network in the AM and PM peak periods in 2020 and 2030 are shown in Appendix D.



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure 5.1 AM peak development traffic volume estimates



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure 5.2 PM peak development traffic volume estimates

5.2 FUTURE INTERSECTION OPERATION

Table 5.3 and Table 5.4 show the performance for key intersections for the 2020 without development and the 2020 with development scenarios in the AM and PM peaks respectively. Similarly, Table 5.5 and Table 5.6 show the performance for key intersections for the 2030 without development and 2030 with development scenarios in the AM and PM peak hours, respectively.

The traffic modelling assessment indicates that the anticipated traffic volumes associated with the development's traffic generation would have limited impact on the surrounding road network. Table 5.3 and Table 5.4 show that most intersections would continue to operate with similar operating conditions during the AM and PM peak hours in 2020 (7:00am-8:00am and 4:00-5:00pm).

Most intersections would operate with the same level of service with or without the development. However, the level of service at the intersection of Darcy Road, Institute Road and Mons Road would change from a level of service D to E during the PM peak hour. As the intersection is currently operating at capacity (degree of saturation 1), a minor increase in traffic volumes would alter the level of service. However, the development's overall impact to the Darcy Road, Institute Road and Mons Road intersection and the Darcy Road corridor is minor. Further, there are limited physical intersection improvements available at this intersection, recognising the extent of improvements investigated and implemented as part of the Stage 1 Redevelopment project. Instead, CHW would continue to actively encourage sustainable and public transport modes, in consultation with TfNSW.

Table 5.5 and Table 5.6 show that in 2030, many of the surrounding intersections would be operating at or above capacity due to background growth associated with other developments. The level of service would not change at these intersections as a result of the proposed development.

In response to the surrounding traffic issues associated with accessing the Westmead Health Precinct, Health is actively involved in the whole-of-government place-based approach to address short, medium and long term transport issues in a coordinated way.

TfNSW and DPIE are leading the development of a Place-Based Transport Strategy, that will consider government investments in the Westmead Health and Innovation District, growth and development over the coming years. Health is part of the Steering Committee for this work, due to be undertaken in 2021 and will consider the initiatives within traffic and transport required to support future developments within a zone inclusive Briens, Darcy and Hawkesbury Roads, which are all arterial road access to the Precinct.

Given the development has a marginal impact on the existing traffic conditions of the arterial roads, this requires mitigation and improvement measures to be undertaken at a whole-of-government level, with consideration of the wider road network.

Health is also involved in the Parramatta Outer Ring Road Strategic Corridor Plan, which aims to develop a strategic corridor plan for targeted future infrastructure upgrades and improvements within a larger zone bordered by James Ruse Drive, Briens Road, Cumberland Highway and the M4 Motorway. Targeted meetings will be held with Health in 2021 specific to the Health Precinct, with the whole plan due for completion in 2022.

The full modelling results are shown in Appendix E.

Table 5.3 2020 post development intersection performance - AM peak

Intersection	2020 without development intersection performance							2020 with development intersection performance						
	Degree of saturation	Average delay (seconds)	95th percentile queue (m)				Level of service	Degree of saturation	Average delay (seconds)	95th percentile queue (m)				Level of service
			South	East	North	West				South	East	North	West	
Briens Road and Redbank Road	1.04	51	71	506	-	505	D	1.12	55	73	512	-	511	D
Bridge Road and Darcy Road	0.91	30	60	46	6	160	C	0.91	31	63	47	6	165	C
Darcy Road, Institute Avenue and Mons Road	0.78	31	36	21	19	99	C	0.81	32	40	22	19	104	C
Dental Hospital, Marist High School and Darcy Road	0.37	10	25	3	30	0	A	0.37	10	25	3	31	0	A
Hospital Access, WSU and Darcy Road	0.38	17	52	9	13	5	B	0.38	17	53	9	14	5	B
Darcy Road and Hawkesbury Road	0.52	25	-	22	33	49	B	0.54	25	-	22	34	51	B
Railway Parade and Hawkesbury Road	0.54	11	22	45	-	18	A	0.54	11	22	46	-	18	A
Alexandra Avenue and Hawkesbury Road	0.63	33	39	46	52	80	C	0.63	33	39	46	52	80	C

Table 5.4 2020 post development intersection performance - PM peak

Intersection	2020 without development intersection performance							2020 with development intersection performance						
	Degree of saturation	Average delay (seconds)	95th percentile queue (m)				Level of service	Degree of saturation	Average delay (seconds)	95th percentile queue (m)				Level of service
			South	East	North	West				South	East	North	West	
Briens Road and Redbank Road	0.8	30	184	323	-	289	C	0.83	31	191	323	-	289	C
Bridge Road and Darcy Road	0.74	27	51	105	21	44	B	0.74	27	51	105	21	50	B
Darcy Road, Institute Avenue and Mons Road	0.99	46	45	82	56	24	D	1.04	57	44	104	56	37	E
Dental Hospital, Marist High School and Darcy Road	0.21	4	4	4	13	0	A	0.21	4	4	4	10	0	A
Hospital Access, WSU and Darcy Road	0.6	41	56	25	64	5	C	0.6	42	57	25	69	5	C
Darcy Road and Hawkesbury Road	0.73	23	-	58	50	49	B	0.76	24	-	59	49	57	B
Railway Parade and Hawkesbury Road	0.74	30	58	130	-	24	C	0.69	29	58	130	-	23	C
Alexandra Avenue and Hawkesbury Road	0.78	35	58	55	37	54	C	0.78	41	58	55	37	54	C

Table 5.5 2030 post development intersection performance - AM peak

Intersection	2030 without development intersection performance							2030 with development intersection performance						
	Degree of saturation	Average delay (seconds)	95th percentile queue (m)				Level of service	Degree of saturation	Average delay (seconds)	95th percentile queue (m)				Level of service
			South	East	North	West				South	East	North	West	
Briens Road and Redbank Road	1.04	51	71	506	-	505	D	1.12	55	73	512	-	511	D
Bridge Road and Darcy Road	1.43	97	171	49	7	501	F	1.49	105	189	50	7	519	F
Darcy Road, Institute Avenue and Mons Road	0.91	37	40	45	19	110	C	0.94	38	43	48	19	114	C
Dental Hospital, Marist High School and Darcy Road	0.48	10	22	3	50	0	A	0.48	10	22	3	50	0	A
Hospital Access, WSU and Darcy Road	0.45	13	45	9	17	5	A	0.46	13	46	9	18	5	A
Darcy Road and Hawkesbury Road	0.83	30	-	26	66	97	C	0.84	31	-	25	69	96	C
Railway Parade and Hawkesbury Road	0.73	15	24	89	-	53	B	0.74	15	24	88	-	54	B
Alexandra Avenue and Hawkesbury Road	1.19	153	93	55	62	524	F	1.21	159	101	55	62	543	F

Table 5.6 2030 post development intersection performance - PM peak

Intersection	2030 without development intersection performance							2030 with development intersection performance						
	Degree of saturation	Average delay (seconds)	95th percentile queue (m)				Level of service	Degree of saturation	Average delay (seconds)	95th percentile queue (m)				Level of service
			South	East	North	West				South	East	North	West	
Briens Road and Redbank Road	0.83	30	184	323	-	289	C	0.83	31	191	323	-	289	C
Bridge Road and Darcy Road	0.85	31	51	160	21	77	C	0.85	31	51	163	21	78	C
Darcy Road, Institute Avenue and Mons Road	2.14	402	88	629	56	38	F	2.19	419	88	653	56	39	F
Dental Hospital, Marist High School and Darcy Road	0.61	5	4	4	34	0	A	0.63	5	4	4	37	0	A
Hospital Access, WSU and Darcy Road	1.33	199	65	25	165	5	F	1.36	215	65	25	165	5	F
Darcy Road and Hawkesbury Road	1.09	65	-	64	90	122	E	1.06	46	-	62	90	130	D
Railway Parade and Hawkesbury Road	0.95	31	101	120	-	36	C	0.94	30	97	114	-	35	C
Alexandra Avenue and Hawkesbury Road	0.82	37	72	55	39	102	C	0.83	37	70	55	39	103	C

6 PRELIMINARY CONSTRUCTION TRAFFIC MANAGEMENT PLAN

6.1 CONSTRUCTION STAGING AND PROGRAM

6.1.1 MSCP WORKS

The proposed MSCP is planned to be constructed in one stage, commencing in late 2021. The works are expected to be completed by mid 2023.

6.1.2 REDBANK ROAD WORKS

As discussed in section 4.6, Redbank Road is planned to be realigned. While the potential construction staging along Redbank Road is currently unknown, it is envisaged that the works may require a partial road closure, with contra-flow traffic activity maintained via a single traffic lane and stop-go traffic control.

If a single traffic lane was maintained along Redbank Road, vehicles up to a semi-trailer would need to be accommodated, as well as ambulances in emergency situations.

The realignment of Redbank Road is to be implemented in stages to minimise the impact on vehicles and pedestrians. The appointed contractor will be responsible for the detailed construction staging, ensuring a single traffic lane is maintained along Redbank Road during all stages of the realignment. The contractor would be responsible for maintaining two-way traffic activity with stop-go traffic control whilst ever the single lane is in place.

If any of the works requires a full closure of Redbank Road, this should occur at night where practical, to minimise impacts to the surrounding road network and also to the precinct operations and subject to separate approval.

6.2 PROPOSED WORKING HOURS

Construction work would be undertaken in accordance with the conditions of consent, which are expected to be:

- Monday to Friday 7:00am to 6:00pm
- Saturday 8:00am to 5:00pm.

No works would be undertaken on Sundays or public holidays.

The contractor would be responsible for informing and ensuring all sub-contractors adhere to the set hours of work.

It may be necessary to carry out some work outside of the set hours to mitigate any disruptions to daily traffic and disturbances to hospital staff and patients as well as surrounding landowners. If this occurs, prior notice will be given to the community and appropriate approvals sought.

6.3 CONSTRUCTION WORKER PARKING

The site is in close proximity to well established and high frequency public transport services, therefore construction workers should also be encouraged to use public transport instead of driving.

Notwithstanding this, a small amount of construction worker parking may be established within the site. However, workers would not be permitted to park outside the construction site. This presents an opportunity for the contractor to encourage car pooling and implement measures that minimise the number of workers who would arrive during the AM and PM peak periods for the precinct and also the broader road network.

The appointed contractor will be responsible for adhering to the above parking objectives in consultation with Health Infrastructure and SCHN.

6.4 CONSTRUCTION VEHICLE TYPES

Construction vehicles likely to be generated by the proposed construction activities would generally include rigid vehicles (6.4m-12.5m), 18m truck-and-dog vehicles and/or 19m semi-trailers and vans and utes depending on the construction activities.

The precinct roads have generally been designed to accommodate for vehicles up to a 19m semi-trailer. Therefore, the envisaged construction vehicle types can be accommodated on the internal road network and along the proposed construction vehicle access routes.

It is anticipated that limited oversized or overmass vehicles would be required for the works. However, if an oversize or overmass vehicle is needed, this would be subject to consultation and approval from Transport for NSW. A separate Construction Traffic Management Plan (CTMP) would be prepared in the event that there is a requirement for an oversized vehicle during the proposed works.

6.5 CONSTRUCTION VEHICLE ACCESS ROUTES

Generally, construction vehicles will have origins and destinations from a wide variety of locations throughout Sydney. However, all construction vehicles will be restricted to the arterial road network, where possible.

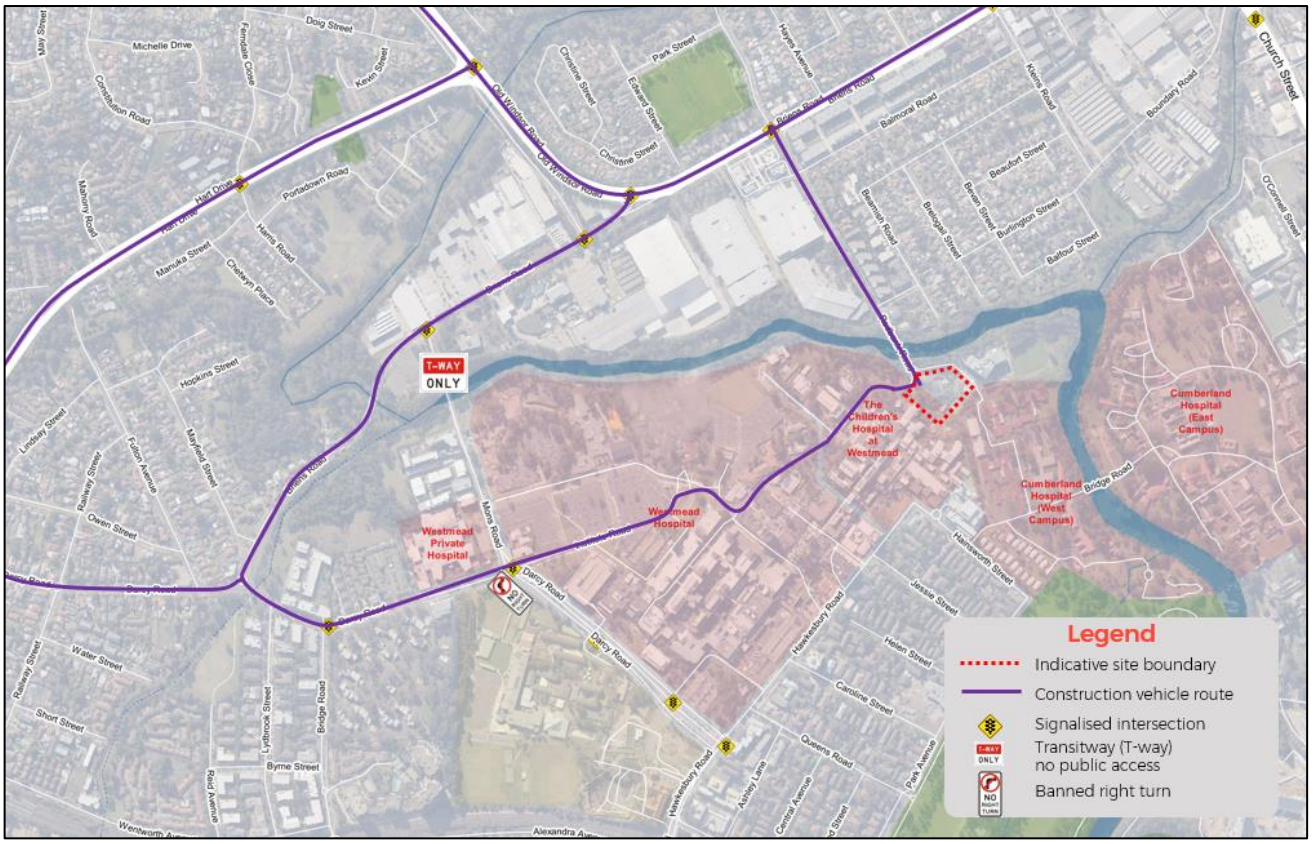
As such, dedicated construction vehicle routes have been developed with the aim to provide the shortest distances to/from the arterial road network, whilst minimising the impact of construction traffic on the local road network in the vicinity of the site. Alternative routes would not be used without specific prior approval from the appropriate stakeholders.

The potential construction vehicle routes are shown in Figure 6.1 and include:

- to/from north and east via Redbank Road and Briens Road
- to/from south and west via Dragonfly Drive, Darcy Road and Cumberland Highway.

Redbank Road would be the preferred route, given that it provides a more direct access to/from the site from the north-east.

Construction vehicles would likely access the site via Redbank Road. However, specific details of the site access arrangements will need to be developed in conjunction with the appointed contractor and their construction methodology. The selected construction vehicle access would need to allow for all vehicles to enter and exit the site in a forward direction and would need to minimise any vehicle queuing on Redbank Road, which could affect emergency vehicle access or the precinct traffic operations.



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure 6.1 Construction vehicle routes

6.6 NUMBER OF CONSTRUCTION VEHICLES

Detailed information on the number of construction vehicles likely to be generated by the proposed works is not currently known. However, the preliminary construction vehicle estimates are:

- Up to 10 vehicles per hour
- Up to 80 vehicles per day.

These peak vehicles estimates would likely occur during periods of large concrete pouring stages. Outside these peak activity periods, the construction vehicle generation would be less. Therefore, the MSCP construction activities are unlikely to impact the precinct transport network, and/or the surrounding road network and intersections.

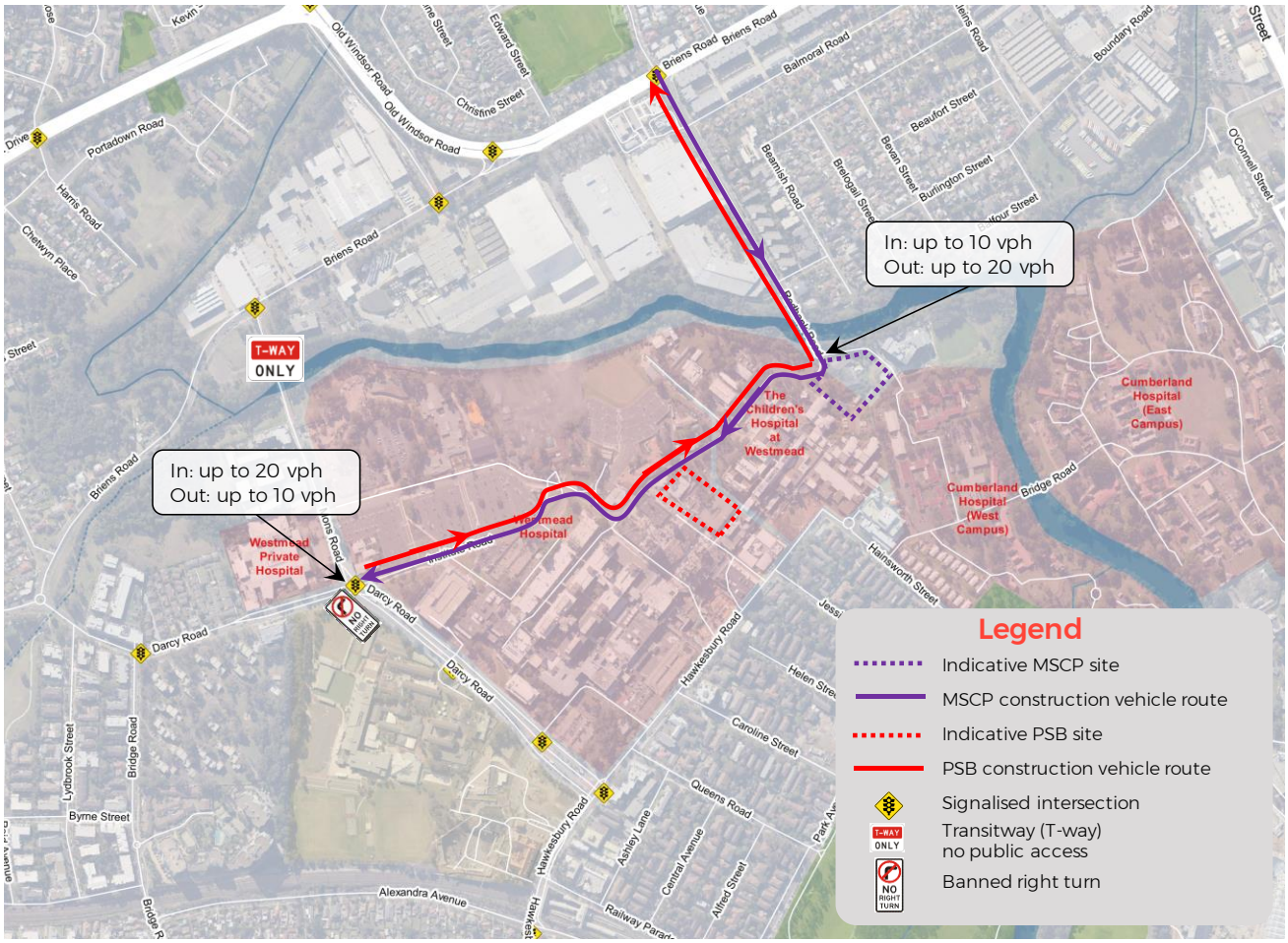
While the appointed contractors would coordinate the construction works to minimise the likelihood of peak construction activity occurring simultaneously across the Precinct, the MSCP construction works would likely coincide with construction of the PSB for brief periods (subject to separate approval). However, the cumulative Stage 2 Redevelopment works replace the larger Stage 1 Redevelopment works which had been active from 2016-2020. It is understood that the Stage 1 Redevelopment works were managed effectively to minimise disruption to the internal precinct traffic operations, and also minimise impacts to the operation of surrounding intersections. Management measures that were implemented during the Stage 1 works include staggered construction activities and restricted construction activities during the road network and precinct peak periods. The cumulative traffic impacts of the Stage 2 works would be managed using the same measures.

During peak cumulative construction periods, construction vehicle activity would be limited (as much as practical) to the period between 9:00am and 4:00pm when the surrounding road network traffic volumes are significantly lower than the morning and evening peak periods of (7:00am-9:00am and 4:00pm-6:00pm). In addition, during peak cumulative

construction periods, construction vehicle access routes could be restricted for each project to distribute the construction vehicle volumes across the Precinct access intersections. The managed construction vehicle access routes would likely be as shown in Figure 6.2 and include:

- PSB routes: inbound only via Dragonfly Drive and outbound only (up to 20 construction vehicle movements per hour) via Redbank Road (up to 20 construction vehicle movements per hour)
- MSCP routes: inbound only via Redbank Road and outbound only (up to 10 construction vehicle movements per hour) via Dragonfly Drive (up to 10 construction vehicle movements per hour).

The managed construction vehicle routes would minimise the cumulative impacts to the surrounding intersections, with up to 30 vehicle movements expected at each intersection, during the peak cumulative construction periods.



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure 6.2 Managed construction vehicle routes

It is noted that the existing traffic conditions discussed in Section 2.10 include the impacts of the Stage 1 construction activity. Given that the Stage 2 construction activities are smaller and therefore expected to generate less traffic volumes than the Stage 1 construction activities, the cumulative traffic volumes generated by the Stage 2 works would have negligible impact on the level of service of the surrounding intersections. The intersections would continue to operate as per the current conditions, as discussed in Section 2.10.

6.7 OTHER CONSTRUCTION PROJECTS

It is expected construction of the MSCP may coincide with construction of the Parramatta Light Rail (PLR) and Sydney Metro West.

While construction vehicles will have origins and destinations from a wide variety of locations, construction vehicles are generally limited to the arterial road network, and dedicated construction vehicle routes are developed with the aim to provide the shortest distances to/from the arterial road network. As described in Section 6.5, the primary construction vehicle routes for the MSCP are likely to include to/from north and east via Redbank Road and Briens Road and to/from south and west via Institute Road, Darcy Road and Cumberland Highway. Redbank Road would be the preferred route, as it provides a more direct access between the site and the arterial road network to/from the site from the north-east.

It is understood that the primary construction vehicle route for Sydney Metro West and Westmead Metro Station would be Hawkesbury Road and the M4 to the south, and that the primary construction vehicle route for PLR would be Hawkesbury Road, Darcy Road and Cumberland Highway. These routes are shown in Figure 6.3. Given the low anticipated peak construction activity and the differing primary construction vehicle routes for the MSCP, it is not anticipated that the cumulative construction impacts would be measurably greater than isolated construction impacts.

Source: NSW Department of Planning, Industry and Environment

Figure 6.3 PLR (left) and Sydney Metro (right) construction vehicle routes

6.8 ON-STREET WORK ZONES

It is not anticipated that any Works Zones would be required during the MSCP construction works.

6.9 PEDESTRIANS AND CYCLISTS

Where possible and safe to do so, pedestrian and cyclist access should be maintained in the vicinity of the construction site, for the duration of the works.

No footpaths currently exist along the site frontage on Redbank Road or Labyrinth Way. Therefore, interaction between vehicles accessing the site and pedestrians and cyclists would be minimal.

As there are no formal separated cycle paths provided along Redbank Road or Labyrinth Way, cyclists would continue to use the available traffic lane while the construction works are underway.

6.10 PUBLIC TRANSPORT

Given the infrequent heavy vehicle movements associated with the works, the overall impact to existing public transport services is expected to be negligible. This includes the impact on bus services along Darcy Road, Mons Road (including the T-way) and in the vicinity of the site.

6.11 EMERGENCY VEHICLES ACCESS

The existing and future emergency access routes to/from CHW and Westmead Hospital would be maintained via Hawkesbury Road, Institute Road, Redbank Road and Kids Research Lane as required.

While not expected, if any temporary partial or full road closures are required, traffic controllers would manage the emergency vehicles around the work site and giving them priority.

6.12 MANAGEMENT MEASURES

The following proposed traffic management principles should be adopted during the construction period:

- A detailed construction transport management plan and associated Traffic Control Plans (TCP's) would be developed and incorporated into the construction environmental management plan (CEMP).
- Traffic controllers and associated signage would be required to facilitate any temporary partial or full road closures that may be required (although not anticipated).
- Traffic controllers would allow for priority emergency vehicle movements around the construction sites.
- Footpaths and/or pedestrian access should be maintained, where possible. If any short-term closures are required, suitable alternative routes should be provided. These will need to be identified and mitigated as part of the future Construction Traffic Management Plan's and traffic control plans for the works, when more detailed construction methodology and staging information is known.
- Construction vehicles entering or leaving the site would use arterial roads wherever possible, via the identified construction vehicle routes.
- Construction vehicle movements and worker arrivals would be minimised during the AM and PM peak hours for both the road network and the precinct peak arrival and departure times.
- The appointed contractors would coordinate the construction works to minimise the likelihood of peak construction activity occurring simultaneously at the PSB and MSCP sites.
- During peak cumulative construction periods, construction vehicle activity would be limited (as much as practical) to the period between 9:00am and 4:00pm when the surrounding road network traffic volumes are significantly lower than the morning and evening peak periods.
- During peak cumulative construction periods, construction vehicle access routes could be restricted for each project (MSCP and PSB) to distribute the construction vehicle volumes across the Precinct access intersections.

7 CONCLUSION

The proposal seeks to construct a Multi-Storey Car Park (MSCP) comprising of 8 parking levels above ground level as part of the Children's Hospital at Westmead (CHW) Stage 2 Redevelopment. The proposed MSCP would be located on the Lodge site, which is generally bound by Redbank Road to the north and Labyrinth Way to the east.

The MSCP is proposed to include 996 spaces including 14 disabled spaces.

Access and exit to and from the proposed MSCP is via Redbank Road and Labyrinth Way, respectively. The proposal also includes modifications to Redbank Road along the site frontage.

Having consideration for the preceding analysis, it is concluded that:

- A Car Parking Demand Study (GTA Consultants, 2019) was completed using a Parking Demand Model based on first principles analysis and calibrated against on-site parking observations and it determined that an additional 280 spaces would be required to accommodate the 2031/32 demands of the Stage 2 Redevelopment adopting some private vehicle mode share reduction to account for the expected increase in public transport uptake, once PLR and Sydney Metro are completed.
- The MSCP also needs to accommodate the replacement of the CHW P17 parking spaces and an additional 33 spaces that are currently located on the MSCP site.
- The proposed MSCP would have 996 spaces that could accommodate the future CHW demands and the replacement car parks.
- Given 996 car spaces are to be provided within the MSCP, the development generates a requirement to provide at least 10 disabled car parking spaces. The proposed MSCP plans currently include 14 disabled parking spaces, which is considered suitable given the above requirement.
- Given that 996 car spaces are to be provided in the MSCP, it is recommended that at least 20 motorcycle parking spaces are provided.
- Swept path diagrams have been prepared for the site access and exit. The diagrams confirm that a B99 vehicle can enter and exit the site in an appropriate manner.
- Preliminary queuing analysis has been completed for the proposed boom gates at the MSCP entry and exit. The analysis conservatively identifies a need for two entry lanes of 48m each and two exit lanes of 30m each to accommodate the 99th percentile vehicle queue during the AM and PM peak hours. The MSCP design accommodates this requirement. Therefore, it is anticipated that vehicles would not queue on Redbank Road, Labyrinth Way or impact circulation within the MSCP.
- The MSCP would predominantly be for staff and visitors of the CHW, and should therefore be designed for User Class 3 facilities under the Australian Standards AS2890.1:2004. As such, the minimum required dimensions for 90-degree parking bays are 2.6m width by 5.4m length, accessed from an aisle of at least 5.8m wide. The architectural plans provided show the car parking layout typically meets this requirement, with the majority of car parking aisles dimensioned at 5.8m.
- Internal circulation is accommodated via one-way aisles, where possible, and access between parking levels is proposed via one-way only split ramps. These have generally been designed in accordance with AS2890.1:2004.
- No bicycle parking is proposed as part of the MSCP. Bicycle parking facilities are instead to be located at more convenient locations across the precinct to encourage sustainable transport modes.
- The existing traffic patterns and traffic demands associated with the existing P17 and the adjacent Lodge parking spaces would be maintained despite being relocated to the MSCP.

- The traffic modelling assessment indicates that the anticipated traffic volumes associated with the CHW Stage 2 Redevelopment would have limited impact on the surrounding road network and most intersections would continue to operate with similar operating conditions during the AM and PM peak hours in 2020.
- In 2030, many of the surrounding intersections would be operating at or above capacity due to background growth associated with other developments. However, the level of service would not change at these intersections as a result of the proposed development.
- The construction impacts of the MSCP would be manageable, assuming that the identified traffic management measures are implemented.
- The existing traffic conditions discussed in Section 2.10 include the impacts of the Stage 1 construction activity. Given that the Stage 2 construction activities are smaller and therefore expected to generate less traffic volumes than the Stage 1 construction activities, the cumulative traffic volumes generated by the Stage 2 works (MSCP and PSB) would have negligible impact on the level of service of the surrounding intersections.

APPENDIX A

TRAFFIC VOLUME PROFILE

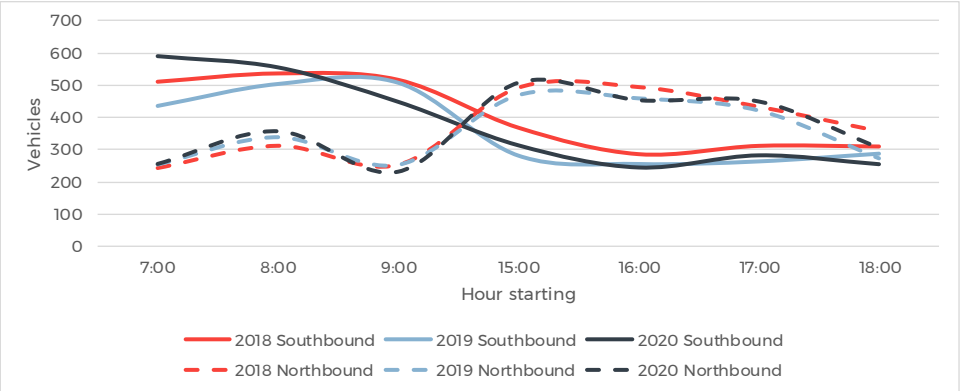


Figure A.1 Darcy Road corridor traffic volume comparisons

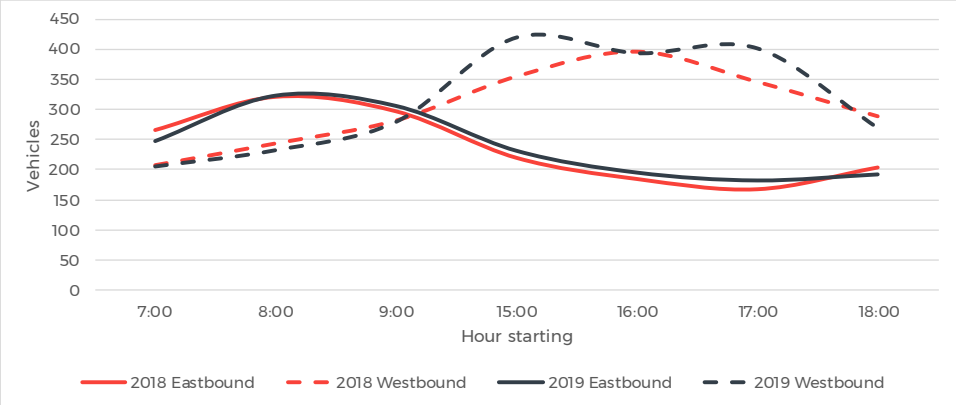


Figure A.2 Hawkesbury Road corridor traffic volume comparisons

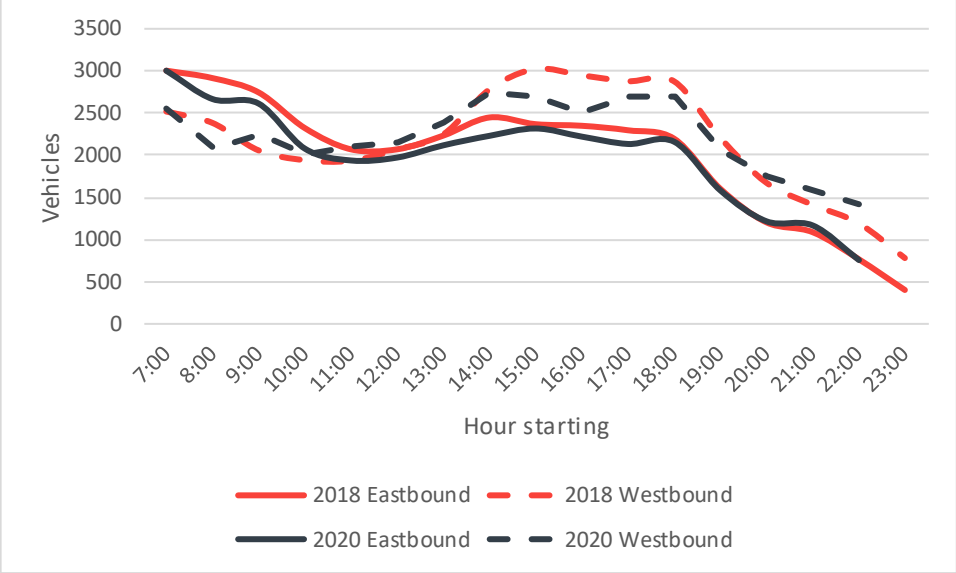


Figure A.3 Briens Road corridor traffic volume comparisons

APPENDIX B

CAR PARKING DEMAND STUDY (GTA, 2019)

The Children's Hospital at Westmead

Stage 2 Redevelopment
Car Parking Demand Study

Prepared by: GTA Consultants (NSW) Pty Ltd for Health Infrastructure
on 23/10/19
Reference: N117285
Issue #: B

GTAconsultants

The Children's Hospital at Westmead

Stage 2 Redevelopment
Car Parking Demand Study

Client: Health Infrastructure

on 23/10/19

Reference: N117285

Issue #: B

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	16/09/19	Final	Andrew Zhou Ingrid Bissaker	Brett Maynard	Brett Maynard	Brett Maynard
B	23/10/19	Final – minor update	Ingrid Bissaker	Brett Maynard	Brett Maynard	

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

GTA Consultants (GTA) was commissioned by Health Infrastructure to prepare a car parking demand study to inform the business case for The Children's Hospital Westmead (CHW) Stage 2 Redevelopment.

This report sets out an assessment of the anticipated car parking requirements for the proposed redevelopment. This assessment includes a review of the current car parking demand profile of the existing CHW. To ensure the proposed quantum of parking can accommodate the operations of the proposed redevelopment, this assessment has considered the parking demand of the CHW in the future design years 2026/ 27 and 2031/ 32.

Existing Hospital

The existing CHW currently has 3,204 full time equivalent (FTE) staff and a total of 359 beds. The site is serviced by up to 1,547 on-site parking spaces, as well as available off-site parking.

An online staff questionnaire was distributed to all hospital staff in July 2019 to understand existing staff travel patterns. The results of the survey indicate that car travel was generally the main mode of travel to/from the hospital, with around 79 per cent of respondents travelling by private vehicle (including car passengers and motorcyclists).

GTA obtained car park occupancy data from Secure Parking for all CHW car parks operated by Secure Parking. The results indicate that on-site car parking demand at CHW remains high across the day and that staff parking demand exceeds capacity, however Car Park 17 operates in a stacked arrangement to improve available parking supply. The peak demand for parking resulted in an overall car parking demand of 1,515 vehicles. This excludes any off-site parking demand. For the purposes of this assessment, off-site car parking demand has been empirically assessed based on existing staff travel mode share and staff and visitor survey responses. This equates to an assumed off-site parking demand for 462 spaces.

Combined on-site peak parking demand of 1,515 spaces and the off-site assumption of 462 spaces indicates that a total demand of 1,977 spaces is currently being generated by CHW.

Parking Demand Model

A collation of attributes involving separate parking for staff, public/ visitors, and LHD controlled fleet vehicles has been used to model parking demand. The model attempts to analyse the total number of persons which utilise the site against the parking demand through weighting factors such as rates of attendance, vehicle occupancy, and parking space turnover.

Based on input parameters agreed with Health Infrastructure, the parking demand model calculated a peak demand of 2,029 spaces for the existing CHW. This calculated demand is within three percent of the observed peak demand of 1,977 spaces. Allowing for minor fluctuations in assumptions, this is considered a suitable reflection of the existing demand and therefore the parking model is appropriately calibrated for determining car parking requirements for the proposed redevelopment.

Various other options for determining suitable car parking requirements for the proposed redevelopment were assessed, including a review of the *Guide to Traffic Generating Developments* (Roads and Maritime Services, 2002) and the Development Control Plan requirements of nearby councils. However, the projected parking numbers were considered low when reviewed against existing hospital demand.

The Children's Hospital at Westmead Stage 2 Redevelopment

It is proposed that the redevelopment would provide an additional 115 beds. It is understood that the hospital is projected to employ an additional 460 FTE staff in 2026/27 and 810 FTE staff in 2031/32. It is noted that the number of inpatient beds and FTE staff are likely to reduce and therefore the adopted numbers represent a conservatively high growth estimates.

Using the calibrated parking demand model, an additional demand of 280 parking spaces is estimated for the design horizon of 2031/2032, comprising 110 staff and 170 public spaces[1]. Therefore, it is recommended that a total on-site parking supply of 1,827 spaces be provided. This includes 1,085 spaces for staff, 699 spaces for the public, 37 spaces for LHD and Fleet vehicles and 6 for emergency/ patient transport/ community bus. This excludes the provision of additional spaces for ambulance parking, LHD and Fleet vehicles or visiting medical officers.

Summary

It is recommended that an additional on-site parking supply of 280 spaces be provided for the proposed CHW Stage 2 Redevelopment.

In addition, the redevelopment would be required to reinstate any parking removed from the CHW as a result of the new building footprint and ancillary works. This is understood to be in the order of 560 – 680 parking spaces, bringing the total requirement for any new multi-storey car park to around 900 - 1,000 parking spaces.

[1] Based on pro-rata growth of workforce in line with CSP projected activity.

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1. INTRODUCTION

01

1.1. Background

Health Infrastructure and the Sydney Children's Hospital Network are investigating Stage 2 of The Children's Hospital at Westmead (CHW) redevelopment. Health Infrastructure commissioned GTA to complete a car parking demand study to inform the business case for the proposed development.

1.2. Purpose of the Report

This report sets out an assessment of the anticipated car parking requirements for the proposed redevelopment. This assessment includes a review of the current car parking demand profile of the existing CHW. To ensure the proposed quantum of parking can accommodate the operations of the proposed redevelopment, this assessment has considered the parking demand of the CHW in 2026/ 27 and 2031/ 32.

As part of the assessment, the following matters have been considered:

1. existing parking conditions surrounding the site
2. existing parking demand profile of the current CHW
3. existing visitor and staff travel patterns to/ from the current CHW
4. the traffic generating characteristics of the proposed redevelopment
5. various options for determining suitable car parking requirements.

1.3. References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds
- car parking supply surveys undertaken by GTA
- car parking demand data provided by Secure
- car park demand assessment template, Health Infrastructure, 23 July 2018
- online surveys completed by hospital staff/ visitors
- on-site interview surveys with hospital visitors
- Roads and Maritime Services (Roads and Maritime) Guide to Traffic Generation Developments 2002
- a range of Sydney metropolitan Council Development Control Plan's.

2. SITE CONTEXT

02

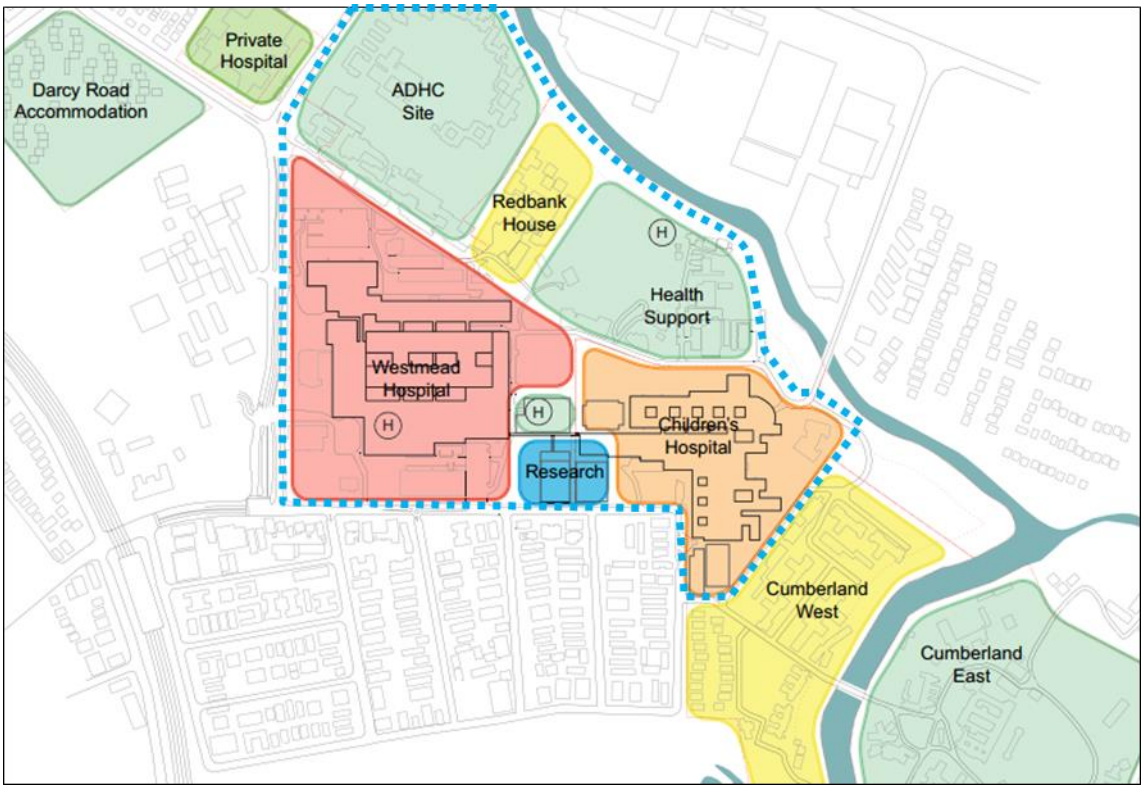
2.1. Overview

2.1.1. Westmead Health Campus

Westmead Health Campus comprises Westmead Hospital and The Children's Hospital at Westmead (CHW) amongst other specialty health services. It represents a significant portion of the Westmead Health Precinct, as indicated by the blue outline in Figure 2.1.

The Campus is in Westmead, directly west of Parramatta CBD and plays a significant role in Sydney's Greater Metropolitan area.

Figure 2.1: Westmead Health Precinct and Campus



Base image source: Westmead Alliance

2.1.2. Stage 1 Redevelopment

The Campus is currently undergoing Stage 1 of its redevelopment, planned to continue over the next three years in several phases. These include:

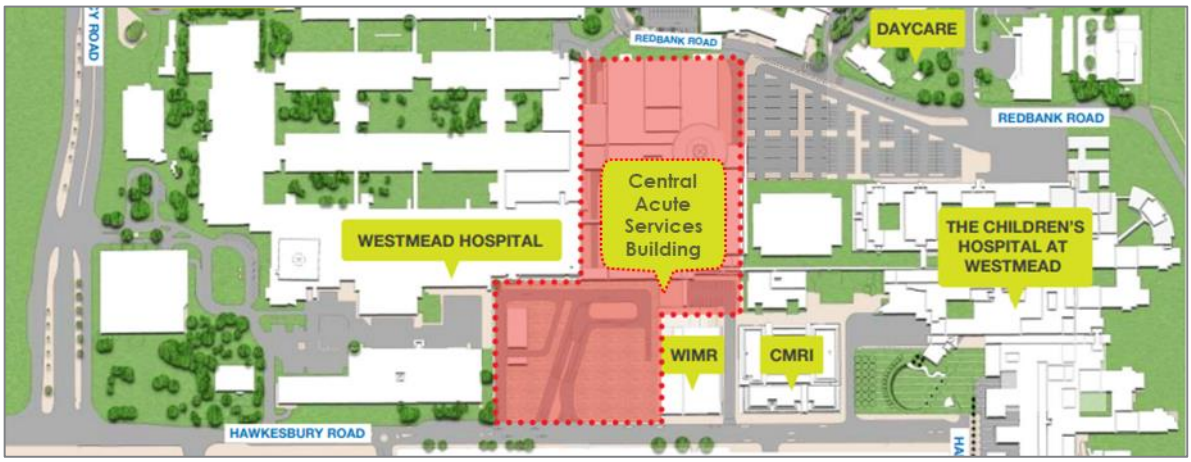
- construction of at-grade parking along Dragonfly Drive (complete)
- construction of a new Multi-Storey Car Park on the corner of Darcy Road and Institute Road (complete)
- construction of the new Central Acute Services Building (CASB), Innovation Centre and Hawkesbury Road Plaza (underway)
- refurbishment of existing hospital buildings (underway).

The new CASB will increase integration between Westmead Hospital, CHW and the University of Sydney. It will host both adult and children's services, including emergency, pharmacy, imaging and state-of-the art operating suites. Key features of the new building include:

- two new emergency departments — one for Westmead Hospital and one for CHW
- a two-level undercroft car park for use primarily by visitors and patients of the CASB.

The location of the new CASB and its proximity to CHW is illustrated in Figure 2.2. The CASB is currently under construction and planned to open in late 2020.

Figure 2.2: Central Acute Services Building



Base image source: Westmead Redevelopment Prototype rooms map, Westmead Redevelopment, 20 September 2018

2.1.3. Westmead Precinct Travel Plan

The Westmead Sustainable Travel Plan was prepared to manage travel demand, improve transport access and transport operations for the Westmead Precinct. The purpose of this plan is to encourage patients, staff and visitors to travel to the Westmead Precinct by modes other than private vehicle. This will ultimately reduce parking issues and promote public and active transport opportunities.

The Westmead Precinct comprises Westmead Hospital, CHW, Westmead Private Hospital, Cumberland Hospital and several other entities and institutions outlined in Figure 2.1. The Sustainable Travel Plan is intended to be a living document that is periodically updated and continues to drive positive transport outcomes for the Precinct into the future.

The objectives of the Travel Plan include:

- allow all staff, patients, families and visitors to easily access the Precinct by a range of transport modes
- reduce the dependency on private car to 65 per cent by 2026
- increase cycling and walking
- improve health and well-being
- build strong partnerships across government to support the uptake of active transport.

Most notably, the Travel Plan is committed to reducing the dependency of private vehicle travel by over 16 per cent by 2026. This results in a Westmead Health Campus future vehicle mode share target of 65 per cent.

3. EXISTING HOSPITAL

03

3.1. Overview

This section details the existing transport environment around CHW.

3.2. Current Hospital Operations

CHW is located at the corner of Hawkesbury Road and Hainsworth Street, Westmead NSW. The hospital is part of the Sydney Children's Hospital Network and is one of two major children's hospitals in metropolitan Sydney.

The hospital currently has 3,204 full time equivalent (FTE) staff and a total of 359 beds. The site is serviced by parking for up to 1,547 on-site parking spaces as well as available off-site parking, outlined further in section 3.4.

3.3. Surrounding Road Network

3.3.1. Road Hierarchy

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions within Sydney, and throughout the State. Roads and Maritime is responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the 1993 Roads Act, and the regulation to manage the road system is stated in the Australian Road Rules (2014).

Roads and Maritime defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

Arterial Roads – Controlled by Roads and Maritime, typically no limit in flow and designed to carry vehicles long distance between regional centres.

Sub-Arterial Roads – Managed by either Council or Roads and Maritime under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their purpose is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).

Collector Roads – Provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.

Local Roads – Provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

3.3.2. Road Network

CHW is accessed via several key traffic routes with key access points located along Hainsworth Street, Hawkesbury Road and Redbank Road.

Table 3.1 provides a summary of the characteristics of the surrounding key roads.

Table 3.1: Surrounding road network

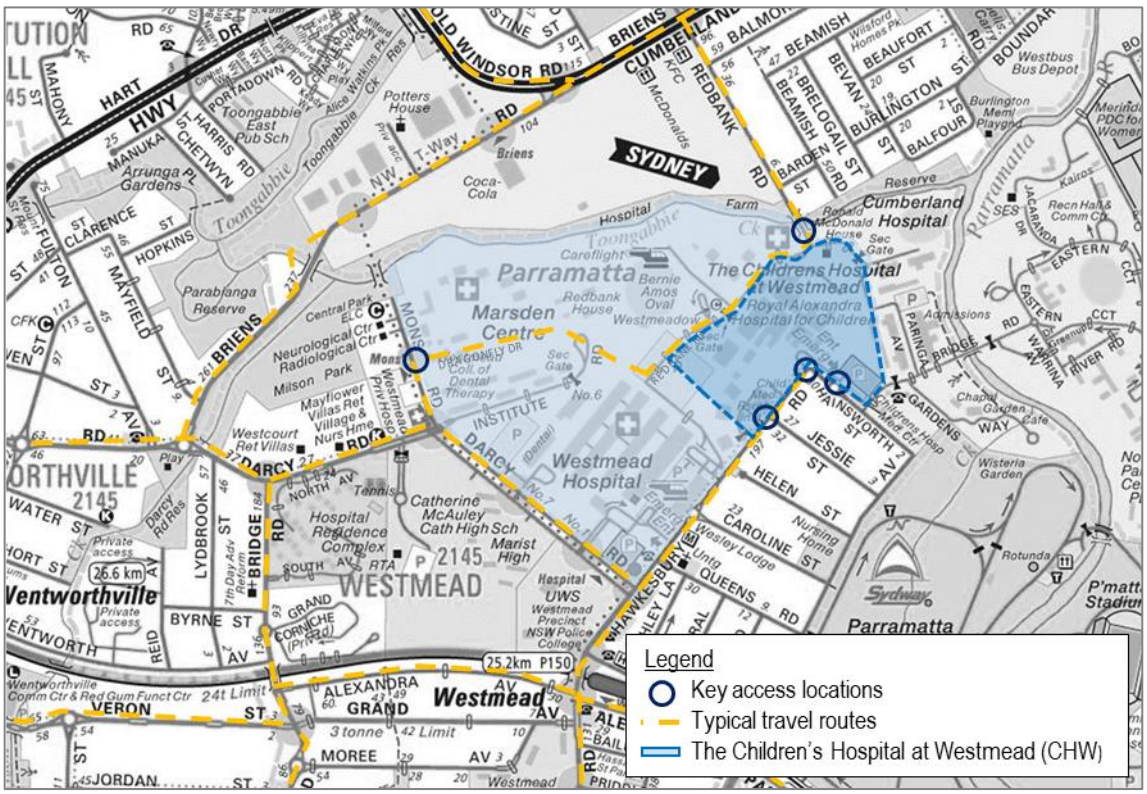
Road	Classification	Authority	Characteristics
Hainsworth Street	Local Road	Council	Two-way, two lane road with kerbside parking. Connecting between Hawkesbury Road and Park Avenue.
Hawkesbury Road	Local Road/ Regional Road	Council RMS west of Darcy Road	Two-way, two lane road with kerbside parking. At intersections, parking is removed to allow additional traffic lanes and bus only lanes. It connects to the Great Western Highway to the south and is an RMS Regional Road west of Darcy Road.
Redbank Road	Local Road/ Private Access Road	Council, HI/ LHD	Two-way, 2-lane road with kerbside parking. It connects to Briens Road, located north of the Hospital. Redbank Road is a private access road within the Campus.
Darcy Road	Regional Road	RMS	Two-way, 4-lane road with an additional Transit Way (T-Way) running through the median. It connects to Hawkesbury Road to the south.
Institute Road	Private Access Road	HI/ LHD	Provides local access into a Hospital staff car park with boom gates limiting access.
Mons Road	Local Road	Council RMS - T-Way and Bus Lanes	Two-way, 2-lane road with marked kerbside parking for the southern portion and is an exclusive T-Way for the northern portion. Mons Road connects to Briens Road to the north and Institute Road and Darcy Road to the south.
Briens Road	Local Road	Council RMS - Bus Lanes	Generally a 4-lane road with bus lanes between Mons Road to the west and Cumberland Highway to the east. Arterial road further to the east (also known as Cumberland Highway) with 3-lanes in each direction.

The surrounding local road network connects with the broader arterial network, including connections to the Cumberland Highway (Hart Drive), Great Western Highway, M4 Western Motorway (M4), Old Windsor Road and Pennant Hills Road.

The Great Western Highway and the M4 both provide east-west access to greater Sydney including Sydney CBD, Parramatta, Blacktown and key regional centres. The Cumberland Highway provides a north-south arterial road link to south-west Sydney areas including Liverpool and extending to the M5 South-West Motorway to allow access to Campbelltown, Canberra and southern regional centres. The M2 Hills Motorway and Westlink M7 also combine more broadly to provide a convenient north-south link.

The location of the Westmead Campus and its surrounds, as well as the CHW key access locations and typical access routes to the Hospital are shown in Figure 3.1.

Figure 3.1: Surrounding road network and key access routes



Base map source: Sydway

3.4. Car Parking

It is noted that the available on- and off-site parking supply is changing periodically throughout the course of the Westmead Redevelopment as a result of construction staging and work area requirements.

3.4.1. On-Site Supply

GTA completed a review of all Westmead Health Campus car parking in late October 2015, prior to the Westmead Hospital redevelopment works commencing. Subsequently, GTA completed a review of the CHW on-site car parking in March 2019 to record car parking changes due to the Westmead Hospital redevelopment works, with the current staff, visitor and authorised user car parking supply across CHW summarised in Table 3.2 and shown graphically in Figure 3.2.

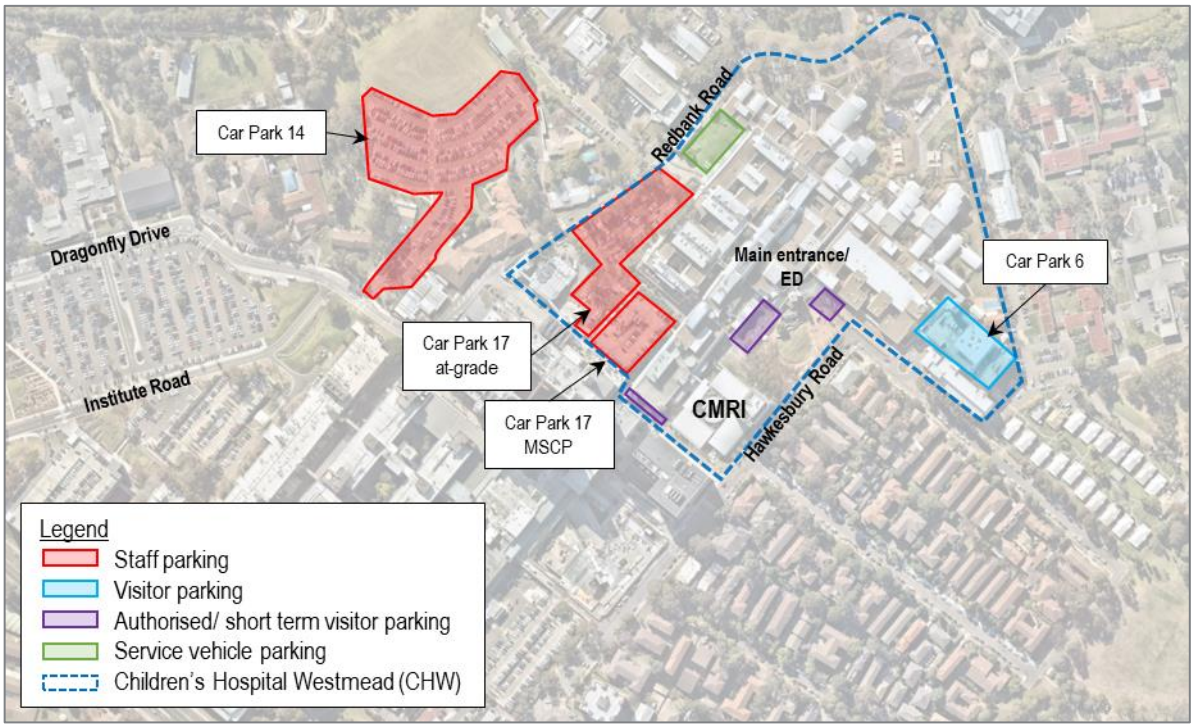
Overall, CHW currently accommodates 1,547 spaces predominately within one visitor and two staff car parking facilities. It is noted that a portion of both staff car parks (car park 14 and at-grade car park 17) are currently occupied by Multiplex to assist with construction of the Central Acute Services Building. Once construction is complete, car parking spaces will be reinstated. It has not been confirmed if CHW car parking supply will increase as a result (noting Westmead Hospital may begin to partially occupy car park 14 if car park 17 spaces are reinstated and given to CHW). Therefore, these spaces have not been considered in this study.

Table 3.2: Existing (March 2019) CHW parking supply

Description[3,4]	Visitor (including short stay)	Staff	Disabled		Authorised	Total
			Visitor	Staff		
Car park 6	512		10		1	**523**
Car park 14[1,2]		416		6		**422**
At-grade car park 17[1]		126		5	2	**133**
Multi-storey car park 17		418		4		**422**
CHW ED	4		3		2	**9**
Car park near ED					26	**26**
On-street near CMRI					12	**12**
Total	**516**	**960**	**13**	**15**	**43**	**1,547**

[1] Car park partially occupied by Multiplex to assist with construction of the Central Acute Services Building
[2] Car park includes four additional spaces allocated for Casuarina Lodge however these have not been included as they are not CHW controlled spaces
[3] Loading area near Redbank Road accommodates informal service vehicle parking and is not included as part of official CHW parking supply
[4] Stacked parking arrangement in car park 17 not included in formal parking supply.

Figure 3.2: Existing (2019) parking facilities



Base image source: Nearmap

Car Park Operations

To accommodate the high demand for staff parking, car park 17 currently operates in a stacked arrangement that is managed by the car park operator, Secure. The stacked car park arrangement accommodates a maximum of 124 additional vehicles. In addition, a shift changeover allowance of 88 car parking spaces are reserved on the top level of the multi-storey car park that are made available to staff from 10am each weekday morning.

The CHW staff car parks currently operate as follows:

- Car park 17 is filled to the reduced capacity of 467 spaces (noting allowance of 88 spaces for shift changeover).
- Once car park 17 is full, vehicles are directed to car park 14.
- Before 10:00am and if car park 14 becomes full, car park 17 is stacked by Secure in the at-grade parking area near the multi-storey car park (indicative maximum capacity of around 15 spaces reported by the car park operators).
- After 10:00am, vehicles are allowed to park on the top level of car park 17 multi storey car park (capacity of 88 spaces).
- Once the top level of car park 17 multi storey car park is full, vehicles are stacked from the top level of the car park down to a maximum capacity of 124 stacked spaces.

Furthermore, due to the helipad being relocated from the CASB construction site to the top level of car park 6, Secure operate a valet style service for the top level of parking. The valet service only takes effect once all other car parking levels are full.

Parking Fees

Current staff parking rates for full time staff is $22.70 per week. A summary of the types of staff parking permits is shown in Table 3.3.

Table 3.3: Types of Parking Permits – Access Times[1]

Permit type	Fee and work type	Details
All-day permit	Full-Time	24 hours/ 7 days a week access for staff members who work over 32 hours per week
	Part-Time	24 hours/ 7 days a week access to staff members who work part-time hours up to a maximum of 32 hours a week.
After hours	After-Hours	Staff working rotating shifts starting after 1.00pm and finishing on or after 6.30pm Monday to Friday, weekends and Public Holidays. No waiting list normally applies however this is subject to availability. Applications to be submitted to the Transport Manager by the applicant.
	Special After-Hours	Staff working shifts starting after 10.30am and finishing after 6.30pm Monday to Friday, weekends, and Public Holidays. Shifts need to be verified via email to SCHN-CHW-Transport@health.nsw.gov.au by the Department Head or NUM before Special After Hours is allocated, noting the staff member needs After-Hours parking before Special after hours can be issued.
On-Call Parking Access	On call staff	"On-Call" staff who require access to attend to CHW patients, particularly in an emergency After-Hours can access the Staff Car Park P17 by pressing the boom gate intercom and state to Secure Parking that they are on call & have been called in.

[1] [1] Staff Parking – Westmead Policy, page 7, prepared by The Children's Hospital at Westmead, dated 29 July 2019

Current public parking fees are detailed in Table 3.4.

Table 3.4: Public car parking fees

Type	Length of Stay	Fees
Normal	First 15 mins	Free
	15mins – 1 hr	$6.80
	1 – 2 hrs	$10.10
	2 – 3 hrs	$13.50
	3 – 4 hrs	$15.80
	4 – 5 hrs	$18.10
	5 + hrs	$20.20
	Lost Ticket	$20.20
Concession	0-3 hrs	Free
	3 + hrs	$5.60
	3-day ticket	$11.30
	7-day ticket	$22.60

3.4.2. On-Street Parking Supply

GTA completed a review of all on-street car parking in the vicinity of the site in 2015. Subsequently, GTA completed a review of car parking changes due to development works in the local area, including the Westmead Hospital redevelopment and Parramatta Light Rail works. The parking supply for key areas identified as being most likely used by staff and visitors to CHW has been summarised in Table 3.5 and illustrated in Figure 3.3.

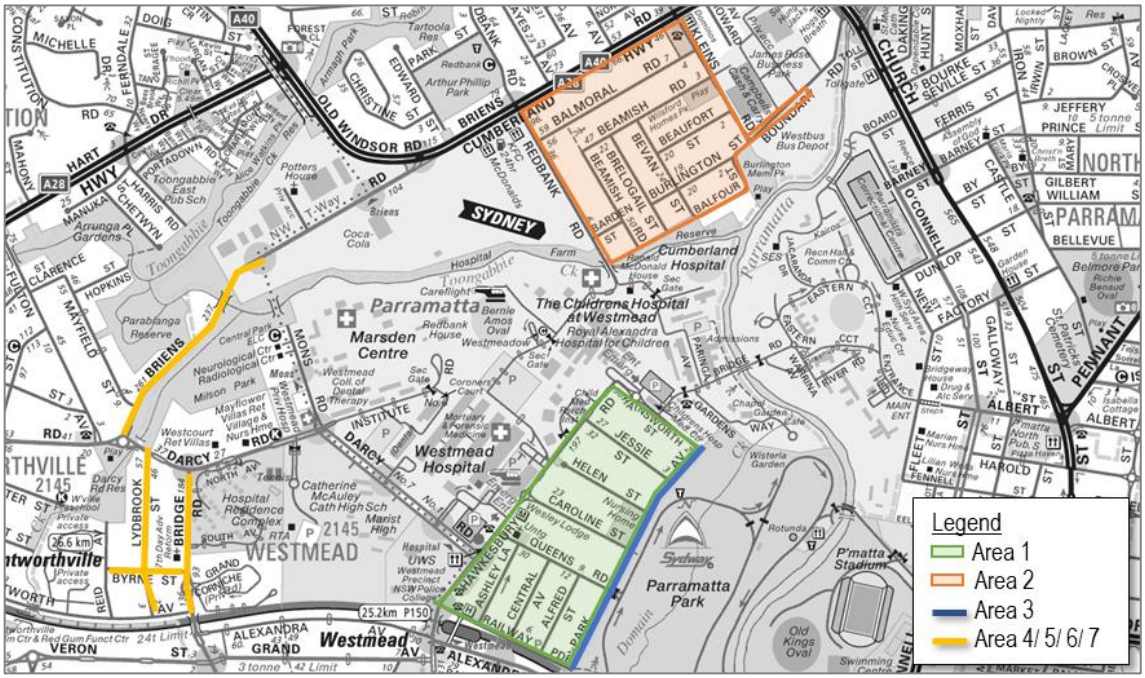
Overall, there are approximately 1,770 publicly available spaces in the surrounding area including approximately 960 unrestricted spaces.

Table 3.5: Relevant on-street parking supply

Area #	Location	Unrestricted Spaces	1P/2P	Disabled	Total Estimated Parking Supply
1	Hawkesbury Road and south to Parramatta Park [1]	263	414	11	**688**
2	South of Cumberland Highway to Toongabbie Creek	329	242	1	**572**
3	Park Avenue along western side of Parramatta Park	0	140	0	**140**
4	Briens Road between Mons Road and Darcy Road	146	0	0	**146**
5	Bridge Road	76	0	0	**76**
6	Lydbrook Street	119	0	0	**119**
7	Byrne Street	28	0	0	**28**
Total		**961**	**796**	**12**	**1,769**

[1] Approximately five 2 hour on-street parking spaces were removed from the CASB construction site frontage during construction. Furthermore, from the commencement of Parramatta Light Rail Hawkesbury Road widening works, 57 on-street parking spaces were removed from Hawkesbury Road. 11 disabled and 16 2 hour spaces were relocated to Caroline, Helen and Jessie Street.

Figure 3.3: Relevant on-street parking areas



Basemap source: Sydway

3.5. Public Transport

CHW is generally located within a 900-metre walk from Westmead Railway Station. Westmead Railway Station is serviced by the Western Line (T1) providing frequent services to the Sydney CBD and is complemented by the Cumberland Line (T5) which provides a north-south link between Campbelltown and Schofields.

Parramatta Railway Station is located one stop to the east of Westmead, providing a number of additional NSW TrainLink services extending to the Blue Mountains, and less regular services to Central West NSW including Orange, Bathurst and Dubbo.

The Hospital is also well-served by the North-West T-Way which opened in 2007 and provides regular bus services with significantly increased reliability and good travel times, improving the level of service offered to passengers.

All bus services that pass the Hospital originate or terminate at Parramatta Railway Station with the exception of the 818 Merrylands to Westmead service. The majority of bus services operate as part of the T-Way, which provides direct services to/ from the north-west Sydney growth area that includes Rouse Hill, Glenwood and Bella Vista. There are also limited services which provide local links to Blacktown and Constitution Hill.

The existing public transport services in the vicinity of the Hospital are summarised in Table 3.6 and presented in Figure 3.4.

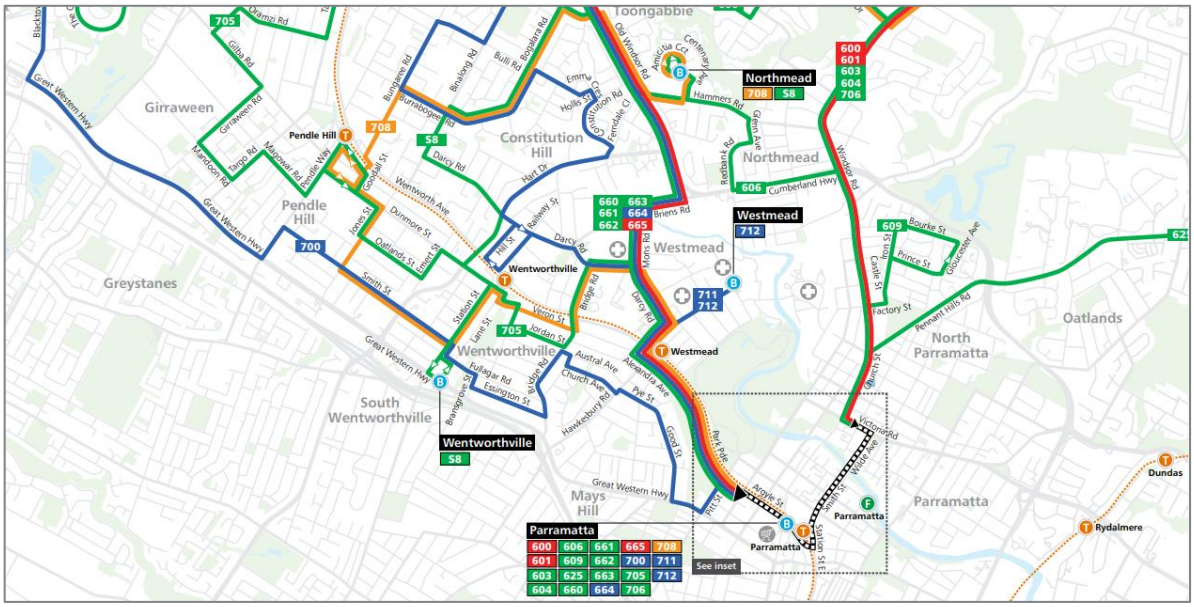
Table 3.6: Existing public transport services

Mode	Route	Location of Stop	Distance	Route	Peak Hour Frequency
Train	T1	Westmead	900m	Penrith/Richmond to Epping/Hornsby	5-10 mins
	T5			Schofields to Campbelltown	30 mins
	Blue Mountains	Parramatta	2.5km	Sydney to Lithgow	Twice Daily
	Regional			Sydney to Dubbo	Daily

Mode	Route	Location of Stop	Distance	Route	Peak Hour Frequency
Bus	711	Hawkesbury Road	50m	Parramatta to Blacktown	30 min
	712			Westmead Children's Hospital to Parramatta	30 min
	818			Westmead to Merrylands	Hourly
	660, 662	Darcy Road/ Mons Road T-Way	550m	Castlewood to Paramatta Castle Hill to Parramatta	5-15 mins
	661			Blacktown to Parramatta	
	663, 664, 665, 666			Rouse Hill Station to Parramatta	
	708			Constitution Hill to Parramatta	2 services per day (1 during AM peak)
	705			Blacktown to Parramatta	30 min

The bus network map is shown in Figure 3.4, noting that the 818 bus service is not shown given that it is operated by Transit Systems.

Figure 3.4: Bus network map



Source: Hills District Bus Guide – Network Map effective from 28 July 2019

4. EXISTING TRAVEL PATTERNS

04

4.1. Overview

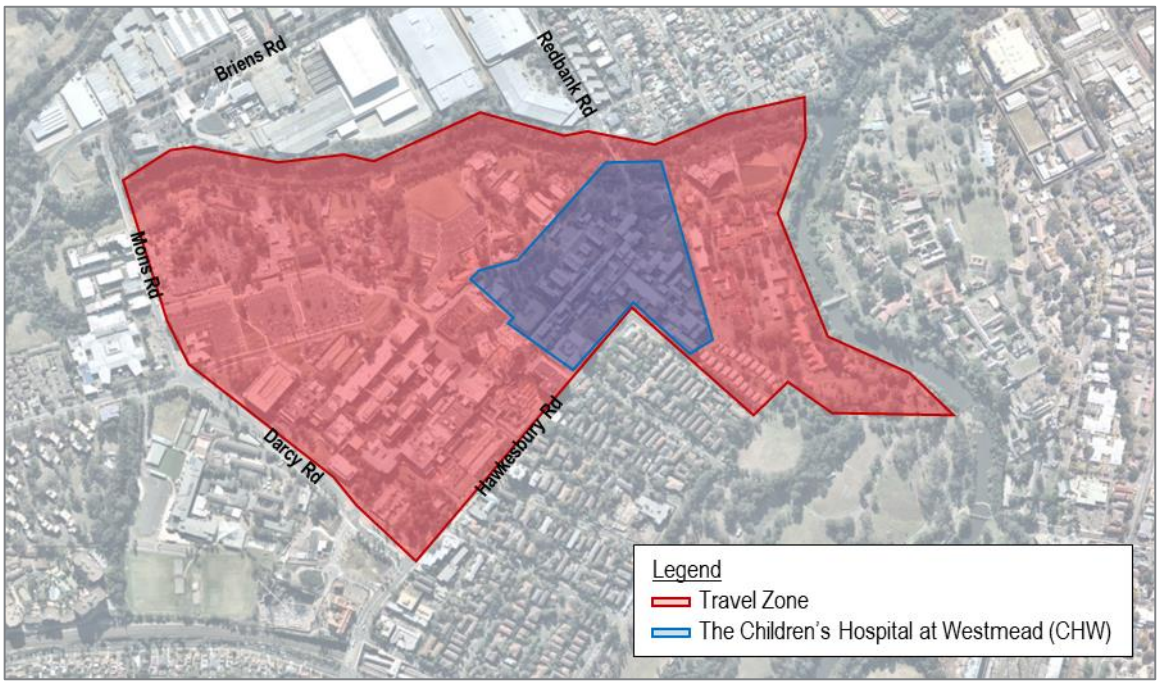
This section provides an assessment of the current travel patterns and car parking demand profile of the existing CHW.

4.2. Travel Patterns

4.2.1. Journey to Work

Journey to work (JTW) data has been sourced from the Australian Bureau of Statistics 2016 census and provides an indication of existing travel patterns to/ from the Westmead Health Campus. Figure 4.1 details the catchment of census data analysed which corresponds to the Transport for NSW Transport Performance and Analytics geographical area of a Travel Zone (TZ). The relevant TZ used for this assessment is 1045, and contains Westmead Hospital, CHW and Cumberland Hospital west campus.

Figure 4.1: Travel zone containing CHW (TZ 1045)



[1] Destination zone (114913685) corresponds to TZ1045

Base image source: Nearmap

2011 and 2016 JTW data for the travel zone was analysed to gain an initial understanding of any change in staff travel mode share over the five year period. This analysis is summarised in Table 4.1.

Table 4.1: Travel characteristics comparison for Westmead Health Campus destination zone (114913685) JTW

Mode	2011 JTW Data Travel Zone	2016 JTW Data Destination Zone	% Change
Vehicle Driver	76%	71%	-5%
Vehicle Passenger	5%	4%	-1%
Train	10%	15%	5%
Bus	2%	3%	1%
Walk	5%	4%	-1%
Other (100% - sum of other rows)	2%	3%	0%

Table 4.1 indicates the following:

- Private vehicle mode share (as a driver or passenger) for commuter trips to Westmead Hospital Campus has reduced by 6% between 2011 and 2016.
- These private car trips shifted to public transport, noting commuter trips by train increased by 5% and trips by bus increased by 1%.

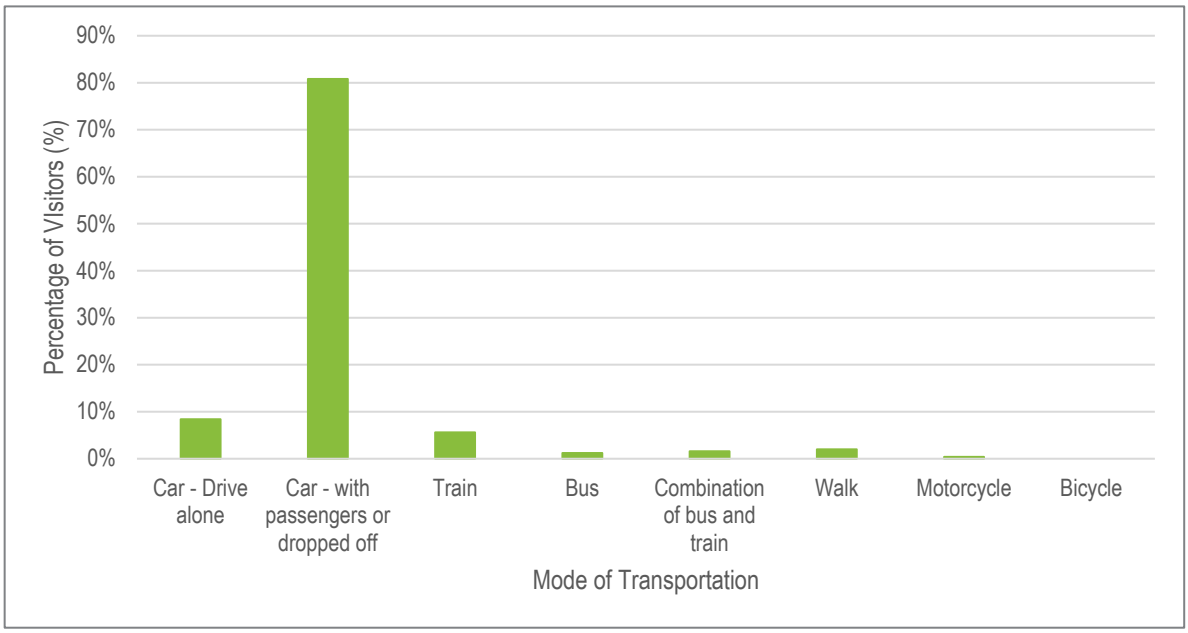
Notwithstanding the above, it should be noted that considering the travel zone contains the entire Westmead Health Campus, the private vehicle mode share reductions are likely due to changes at Westmead Hospital during the Stage 1 Redevelopment and may not have been achieved by CHW to the same extent.

4.2.2. Visitor Surveys

Two visitor surveys were completed to understand current visitor travel patterns to/ from the hospital. These include an online questionnaire that was distributed to hospital visitors via the Sydney Children's Hospital Network (SCHN) social media channels in July 2019 and an intercept survey, with surveyors positioned at the CHW main entrance on 23 and 24 July 2019 during typical visiting times. A total of 250 visitor responses were received across the two surveys.

A summary of visitor mode of transportation is shown in Figure 4.2.

Figure 4.2: Visitor survey[1] – CHW mode of transportation



[1] Combined dataset from the online and intercept surveys

As shown in Figure 4.2, respondents predominantly arrived by car with only 10 per cent of visitors arriving by public transport or walking. Outpatients recorded a higher mode share of 94 per cent arriving by car (including 4 per cent as passengers dropped off), whereas visitors to inpatients recorded a lower mode share of 79 per cent arriving by car.

Overall, nine per cent of visitors travelling by car drive alone, with the remaining 91 per cent traveling with one or more passengers. The average vehicle occupancy for various users are summarised in Table 4.2.

Table 4.2: Visitor survey – average vehicle occupancy

Category	Average people per car
All visitors	2.5
Visitors to inpatients	1.8

Table 4.2 indicates that the average visitors to inpatients vehicle occupancy is lower than the average for all visitors. The relatively high average for all visitors is likely to be influenced by vehicles containing families who are attending with one child patient.

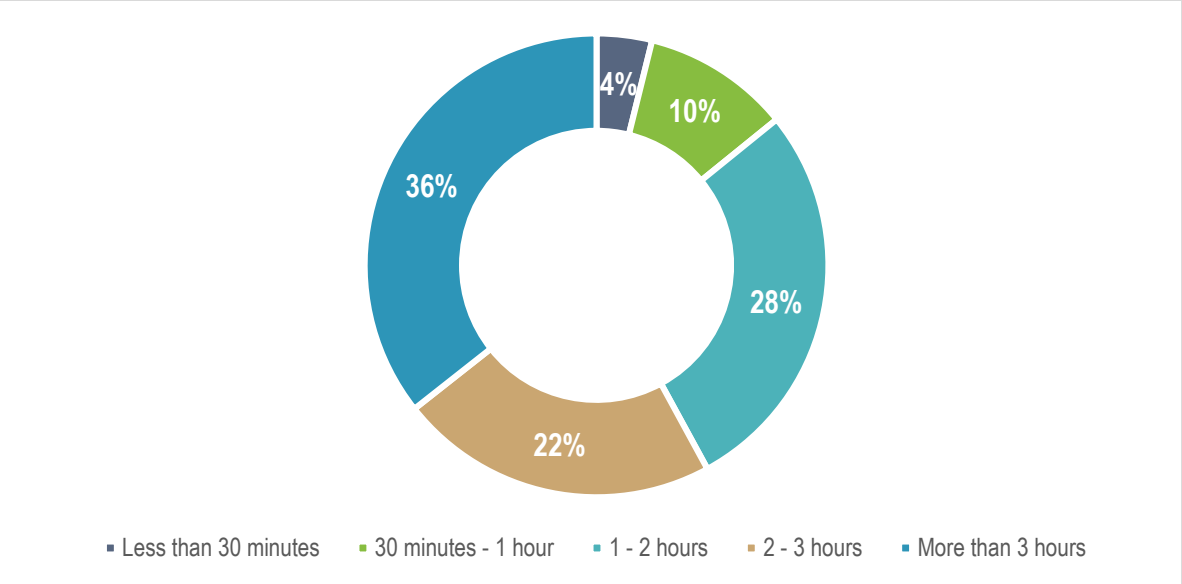
A summary of typical visitor parking locations is outlined in Table 4.3.

Table 4.3: Visitor survey – visitor parking methods

Description	Visitor percentage (%)
Children's Hospital Westmead Visitor Car Park	76
Westmead Hospital Visitor Car Park	2
Off-site parking	17
Dropped off by someone	5

The visitor surveys indicated that 36 per cent of visitors surveyed stayed at the hospital for a duration of more than three hours, with 86 per cent of those surveyed staying at the hospital between the range one and three hours. 14 per cent of those surveyed identified as having a duration of stay less than one hour. A summary of responses is identified in Figure 4.3.

Figure 4.3: Visitor survey[1] – average duration of stay



[1] Combined dataset from the online and intercept surveys

4.2.3. Staff Surveys

An online staff questionnaire was distributed to all hospital staff in July 2019 to understand existing staff travel patterns, and a total of 864 responses were received. The results of the survey indicate that car travel was generally the main mode of travel to/from the hospital, with almost 80 per cent of responses travelling by private vehicle (including car passengers and motorcyclists) with an average vehicle occupancy of 1.1 persons per vehicle according to those surveyed.

The mode of travel for hospital staff was generally higher than the 2011/ 2016 JTW data noted in Section 4.2.1. The survey responses relating to current staff modes of transportation is summarised in Table 4.4.

Table 4.4: Mode of travel of staff

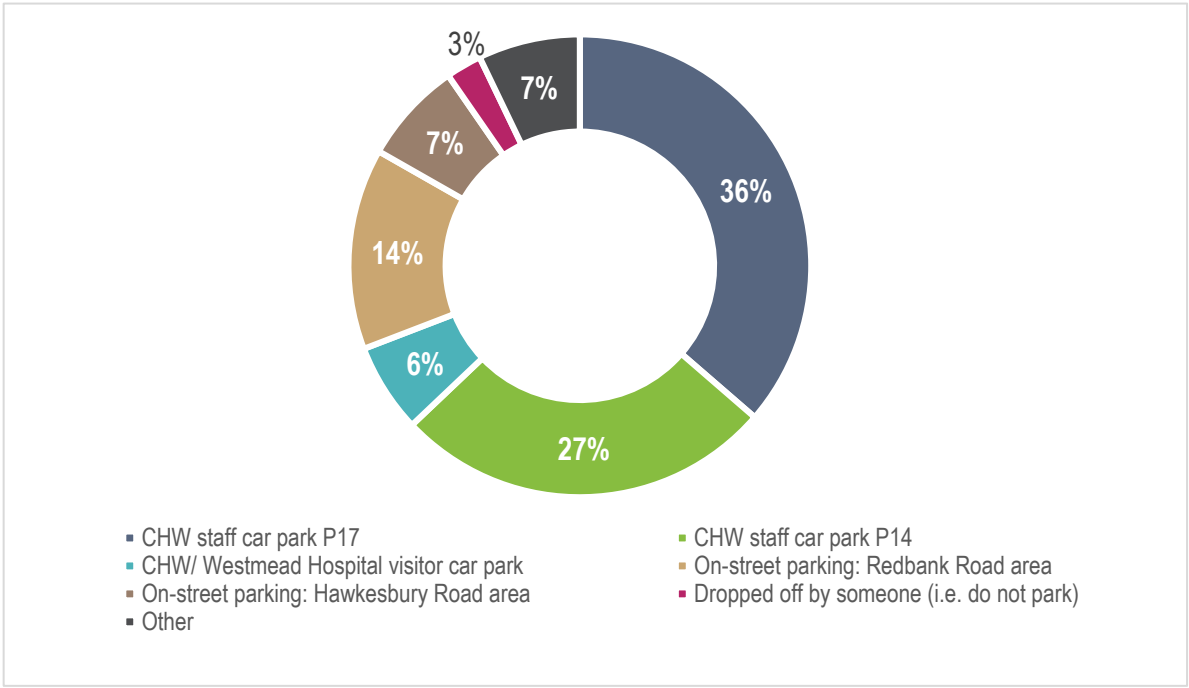
Mode of transport	Responses (%)
Car	79.2
Bus	2.6
Train	11.7
Combination of Bus and Train	3.7
Motorcycle / scooter	0.2
Bicycle	0.8
Walk	1.8

A summary of typical staff parking locations for staff is outlined in Table 4.5 and locations identified in Figure 4.4.

Table 4.5: Staff survey - staff parking methods

Description	Staff percentage (%)
On-site CHW car park	69
Off-campus car parking	1
On-street parking around Westmead Precinct	21
Dropped off by someone (No parking required)	2
Other	7

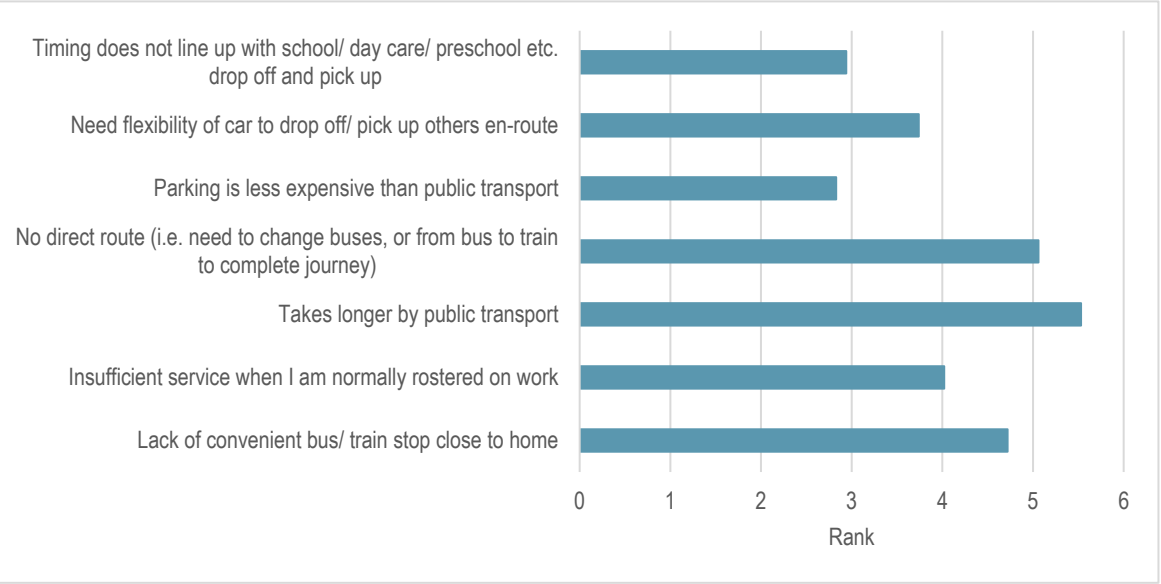
Figure 4.4: Staff survey – staff parking location



The survey identified common reasons for staff not choosing public transport with the four most common reasons (score greater than 4 out of 6) including:

- journey to work trip takes longer by public transport than car
- lack of convenient bus/ train stops close to home
- no direct route, requiring staff to change services to complete the journey
- insufficient services for typical shift start and finish times.

Figure 4.5: Staff survey – reasons for staff not choosing public transport



Further to the above, qualitative comments made by staff during the survey have been summarised in Table 4.6.

Table 4.6: Staff survey – public transport usage

Use public transport	Don't use public transport	Staff recommendation
Prefer to catch a bus	Parent - School drop off and pickup	• CCTV in oval parking • Fee reduction for car pooling • Improved street lighting in popular on and off-site parking areas, including along creek • Add shaded parking for staff in the oval with better stormwater drainage infrastructure. Improved signage for pedestrian crossings • Wondering if there will be any facilities for electric cars planned for the future • Priority parking closest to hospital should be given to staff members arriving or leaving in the dark • Mobility parking needs to be evaluated in conjunction with the staff who require it • Needs some type of cover from car parks to hospital. • Pedestrian and bicycle access in terms of both amenity and safety into and around the Westmead Health campus need improvement; to encourage both active and multi-modal transport. eg. train/light rail bicycle/walk. Quality end of trip facilities cycling facilities located within buildings and collocated with showers would do same • Provide a Sustainability Incentive Program for staff that, walk, cycle, take public transport etc to encourage more staff to do so, and to make public transport more attractive. Currently, Merck Sharp and Dohme offer a Sustainability Incentive Program to their Sydney staff who take public transport. SCHN talk a lot about sustainability however should consider this incentive for staff.
Street Parking is poor and never available unless you are at work 0530-0600. About 1-2 hrs before work.	Longer journey times compared to driving	
Despite many staff living in the Hills area, public transport does not cater for them	Difficult with shift work	
Walking around and through the hospital grounds in the dark is a security issue.	Flexibility with driving	
Redbank road is a nightmare at 5pm	More expensive than parking	
Weather and traffic also often play a role in my driving or public transport use	No direct lines and no fast and frequent services	
The Penrith trains do not stop at Westmead during peak times which add an extra 15 minutes to my commute	Feel unsafe using at night	

Based on the above, opportunities for increased public transport usage are likely to require improved public transport services and routes.

The survey also identified common reasons for staff choosing public transport with the two most common reasons including:

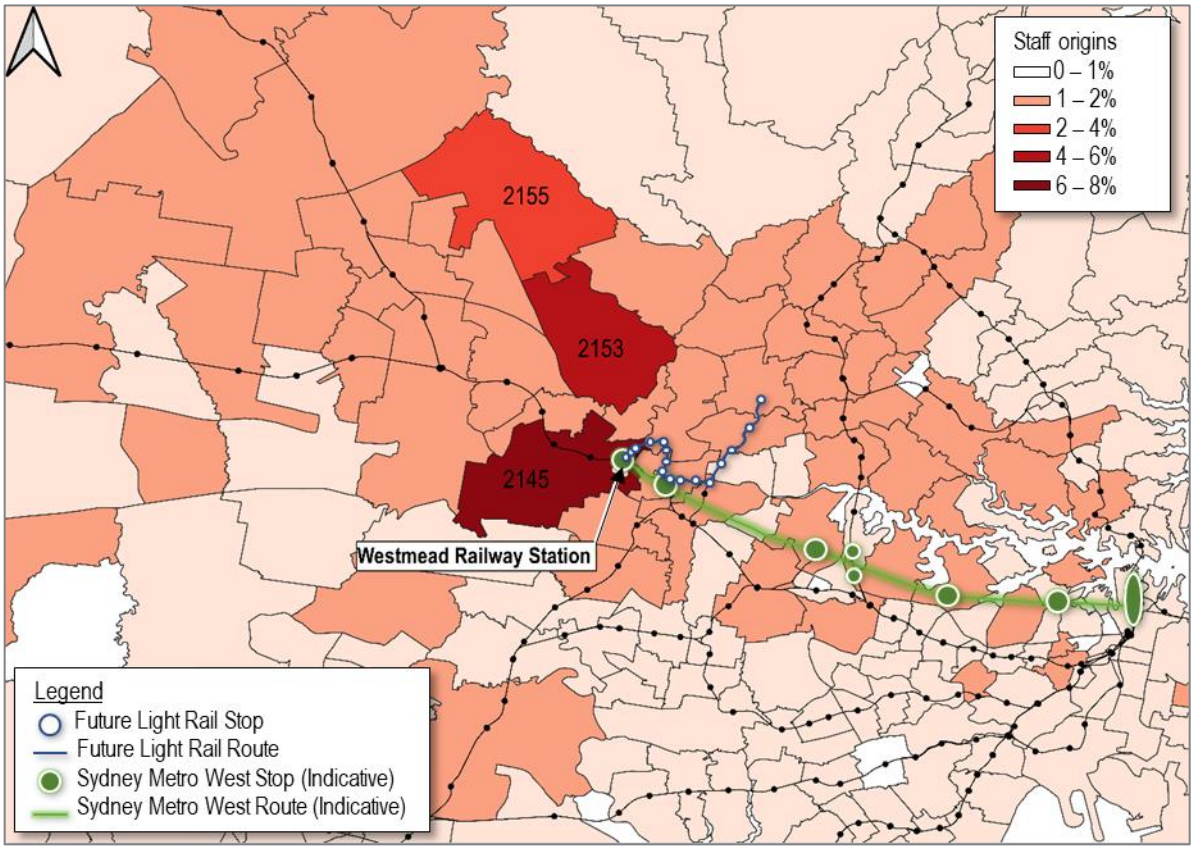
- difficulty finding parking on street
- parking not available on-site.

Around 67 per cent of staff surveyed work a day shift starting between 7am to 9am, with around 78 per cent finishing between 3:00pm to 7:00pm. Around 26 per cent start that their working hours are variable with rotating shift work and out of hours on call.

4.2.4. Post code data

Sydney Children's Health Network provided GTA with staff post code data. Detailed GIS analysis was completed for the post code data set identifying key staff origins, as shown in Figure 4.6.

Figure 4.6: CHW staff origin heat map



The post code data indicates that staff journey to work trips are largely from the local area and the north and west. Given this, it is evident that Darcy Road (to the west) and Briens Road (to the north) currently accommodate the majority of staff vehicle trips on a day-to-day basis. Darcy Road users typically make use of Institute Road and Briens Road users make use of Redbank Road to access the various car parks located across the Campus.

A reasonable number of staff also arrive from the local southwest and southeast areas, while a limited number of staff travel from the far northeast, far southeast and far southwest.

A summary of the most common staff origins based on postcodes is provided in Table 4.7.

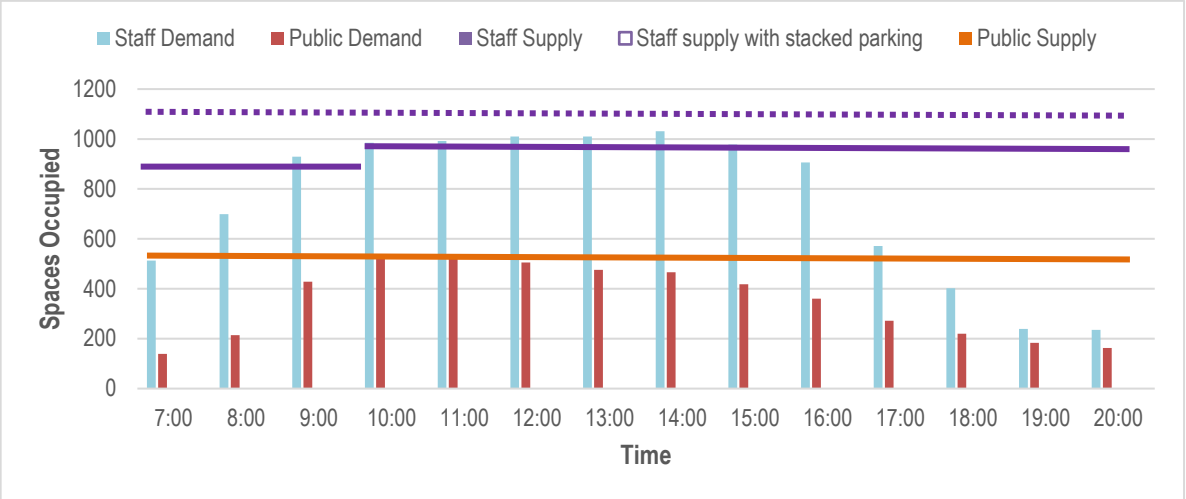
Table 4.7: Staff post code data - staff origins

Postcode	Staff origin (based on postcodes)	% Staff
2145	Constitution Hill, Girraween, Greystanes, Mays Hill, Pemulwuy, Pendle Hill, South Wentworthville, Wentworthville, Westmead	9%
2153	Baulkham Hills, Bella Vista, Winston Hills	4%
2155	Beaumont Hills, Kellyville, Kellyville Ridge, Rouse Hill	3%
2067	Chatswood, Chatswood West	2%
2147	Kings Langley, Lalor Park, Seven Hills, Seven Hills West	2%
2148	Arndell Park, Blacktown, Blacktown Westpoint, Huntingwood, Kings Park, Marayong, Prospect	2%
2154	Castle Hill	2%
2152	Northmead	2%
2146	Old Toongabbie, Toongabbie, Toongabbie East	2%
	% Total	**27%**

4.3. Current Parking Demand

GTA was provided with car parking data for CHW Car Parks operated by Secure for the period between 1 July 2018 to 1 July 2019 to gain an understanding of current on-site parking demand. Peak parking activity was recorded on Monday 4 June 2019, as shown in Figure 4.7. It is noted that Car Park 17 operates with a stacked parking arrangement during peak demand for parking.

Figure 4.7: CHW on-site peak parking occupancy (4 June 2019)[1]



[1] 88 car parking spaces are reserved on the top level of staff car park 17 until 10:00am to allow for staff shift changeover

Figure 4.7 indicates that on-site car parking demands remain high across the day. The peak demand for staff parking occurred at 2:00pm, with a demand for 1,031 spaces, whereas the peak demand for visitor parking occurred at 10:00am, with a demand for 523 spaces (i.e. car park at capacity). The overall peak demand for parking occurred at 12:00pm, with a combined staff/ visitor demand for 1,515 spaces, comprised of 1,010 staff spaces and 505 visitor spaces.

In addition, Figure 4.7 indicates that demand for staff parking exceeds the formal supply of 975 spaces between 11:00am and 3:00pm. Furthermore, between 9:00am and 10:00am demand for staff parking exceeds the reduced formal supply of 887 spaces, noting that 88 spaces are reserved in car park 17 for shift changeover. Therefore, between 9:00am and 3:00pm, car park 17 operates in a stacked arrangement to accommodate the additional demand for parking. During peak demand for staff parking at 2:00pm, a total of 56 vehicles were stack-parked. During the overall peak demand for parking at 12:00pm, Car Park 17 generated a demand for 35 stacked parking spaces. It is noted that demand for staff parking never exceeded the combined formal and stacked parking supply of 1,099 spaces.

Due to car park 6 being occupied by 10:00am and staff parking being over capacity (operating in a stacked arrangement) after 9:00am, it is likely that a significant percentage of the surrounding on street parking is occupied by hospital related vehicles. Furthermore, a limited number of staff parking permits are available for CHW staff. Therefore, a proportion of staff rely exclusively on other parking arrangements, including on-street parking or off-site parking facilities. Table 4.5 and Figure 4.4 indicate that staff primarily park on street around the Westmead Precinct, with 14 per cent of staff parking between Redbank Road and Cumberland Highway and seven per cent of staff parking between Hawkesbury Road and Parramatta Park.

Considering demand for on-street parking is shared with other Westmead Precinct staff and visitors, in addition to local residents and business owners, on-street car parking demand surveys would not accurately determine on-street parking demand generated by CHW. Therefore, for the purposes of this assessment, off-site (including on-street or off-campus parking facilities) car parking demand has been empirically assessed based on existing staff mode shares and staff and visitor survey responses.

CHW staff off-site car parking demand has been calculated as follows:

- of the existing 3,204 FTE staff, 71 per cent are assumed to be present on weekdays
- of the 2,275 staff present on weekdays, a maximum of 65 per cent are present during shift change over (i.e. during peak demand for parking)
- Table 4.4 indicates that 79 per cent of staff drive. Therefore, 1,168 staff require a park during shift change over
- Table 4.5 indicates that 28 per cent of staff who drive park off-site (including on-street or off-site parking facilities). Therefore, 331 staff park off-site.

Furthermore, CHW visitor off-site car parking demand has been calculated as follows:

- Table 4.3 indicates that 17 per cent of visitors park off-site, 2 per cent of visitors park in Westmead Hospital visitor car parks and 76 per cent of visitors park in the CHW Hainsworth Street visitor car park
- Figure 4.7 indicates the peak demand for visitor parking in the CHW visitor car park is 523 spaces. Assuming this represents 76 per cent of visitors travelling to CHW, the total persons traveling in a car to CHW during peak demand is 691 vehicles
- Therefore, the number of visitors parking off-site would equate to 131 vehicles during the peak demand for parking.

The combined staff and visitor on-site peak parking demand of 1,515 spaces and off-site assumption of 462 spaces outlines that a total demand of 1,977 spaces is currently being generated. This is summarised in Table 4.8.

Table 4.8: Current parking demand summary

User	Description	Demand (no. of spaces)
Staff	On-site parking demand[1]	1,010
	Off-site parking demand[2]	331
	Sub-total	**1,341**
Visitor	On-site parking demand[1]	505
	Off-site parking demand[2]	131
	Sub-total	**636**
	Total	**1,977**

[1] Determined from Secure car park occupancy counts
[2] Assumed, based on empirical assessment of off-site car parking demand

5. SUSTAINABLE TRAVEL PLANNING

05

5.1. Overview

As discussed, The Westmead Sustainable Travel Plan was prepared to encourage patients, staff and visitors to travel to the Westmead Precinct by modes other than private vehicle. The Travel Plan is committed to reducing the dependency of private vehicle travel by over 16 per cent by 2026. This results in a Westmead Health Campus future vehicle mode share target of 65 per cent.

This section reviews how the mode share target may be achieved by each hospital/ entity within the Westmead Health Campus.

5.2. 2026 mode share target

5.2.1. Mode share reduction since 2011

2011 and 2016 JTW data for the travel zone has been analysed to gain an initial understanding of any change in staff travel mode share over the five-year period. This analysis is summarised in Table 5.1.

Table 5.1: Survey mode share analysis

Mode	2011 JTW Data Travel Zone	2016 JTW Data Destination Zone	% Change
Vehicle Driver	76%	71%	-5%
Vehicle Passenger	5%	4%	-1%
Vehicle total	**81%**	**75%**	**-6%**

Table 5.1 indicates that the private vehicle mode share (as a driver or passenger) for commuter trips to the travel zone has reduced by 6 per cent between 2011 and 2016.

5.2.2. Current mode share reductions by entity

An online staff questionnaire was distributed to all Sydney Children's Health Network staff and all Western Sydney Local Health District (WSLHD) staff based at Westmead or Cumberland campus respectively in July 2019 and September 2019 to understand existing staff travel patterns. A total of 864 CHW and 1,247 WSLHD responses were received, noting the WSLHD survey is ongoing and will close on 11 October. Table 5.2 compares the staff private vehicle mode share recorded as part of the Westmead Redevelopment by Parking and Traffic Consultants in 2015 against the staff private vehicle mode share recorded as part of the 2019 surveys.

Table 5.2: Survey mode share analysis

Entity	2015 Survey Results (PTC)	2019 Survey Results[1] (GTA)	Difference
Westmead Hospital	93%	70%	**-23%**
CHW	82%	79%	**-3%**
All other WSLHD hospitals/ entities	55% to 91%	55% to 90%	**0% to 1%**

As shown in Table 5.2, the primary driver for the six per cent reduction to private vehicle mode share across the travel zone detailed in Table 5.1 is Westmead Hospital. The Hospital experienced a significant 23 per cent reduction in private vehicle mode share since 2015, whereas CHW only experienced a modest three per cent reduction in private vehicle mode share. All other entities have either recorded or are assumed to have no change in mode share over this period.

5.2.3. Future mode share reductions by entity

One of the primary reasons for Westmead Hospital's significant private vehicle mode share reduction is due to the increase in weekly staff parking fees from as little as three dollars prior to the redevelopment to now be in line with the Ministry of Health guidelines ($22.70). CHW had already increased parking fees hence their private vehicle mode share reduction was much less significant.

Furthermore, considering CHW have already implemented Westmead Hospital's primary mode share reduction driver of car park fee increases and car park fees are unlikely to be increased by the Ministry of Health, it is unrealistic to assume CHW will achieve significant mode share reductions as exhibited by Westmead Hospital.

With this is mind, the Travel Plan overall mode share target of 65 per cent will likely be a result of varied private vehicle mode shares from each hospital/ entity located on the Westmead Health Campus. Furthermore, it is unlikely that CHW will achieve a 14 per cent mode share reduction between 2019 and 2026 in the same period where Westmead Hospital only achieves a five per cent mode share reduction (when strictly applying the 65 per cent target to each entity). This is particularly apparent considering the low mode share reduction demonstrated in Table 5.2.

Therefore, probable 2026 mode shares for each hospital/ entity within Westmead Health Campus have been detailed in Table 5.3.

Table 5.3: Travel mode share analysis

Entity	Full Time Equivalent Staff (approximate)	2026 mode share target	2019 to 2026 mode share reduction
Westmead Hospital	8,200	60%	**-10%**
CHW	3,700	74%	**-5%**
All other WSLHD hospitals/ entities[1]	100 to 700	51% to 74%	**-4% to -16%**

[1] Changes to attributes as a result of different planning scenarios results in -1 per cent to + 1 per cent variance to weighted average of overall mode share. Therefore, insignificant impact to results.

The weighted average of the approximate FTE staff numbers and probable hospital/ entity mode shares detailed in Table 5.3 results in an overall private vehicle mode share of 65 per cent in 2026 for the Westmead Health Campus, in accordance with the Travel Plan objectives.

6. FUTURE TRANSPORT INITIATIVES

06

6.1. Overview

6.1.1. Parramatta Light Rail

The Parramatta Light Rail Stage 1 route will connect Westmead with Carlingford via the Parramatta CBD. The route will provide a high frequency transport service to support existing residential catchments as well as several priority urban renewal precincts in the greater Parramatta to Olympic Peninsula Priority Urban Renewal Area, including Parramatta North, Camellia, Rydalmere and the Carlingford Corridor (including Telopea and Dundas).

The service is expected to commence in 2023 and will likely influence a shift in mode share away from private vehicle to the light rail service.

6.1.2. Sydney Metro West

In November 2016, the NSW Government announced the Sydney Metro West project. Sydney Metro West will service the key precincts of Greater Parramatta, Sydney Olympic Park, The Bays Precinct and the Sydney CBD. The scope of works includes a new underground metro station at Westmead, to support the growing residential area as well as the health, research and education precinct.

While funding has been committed for the planning of Sydney Metro West, it is understood that an investment decision has not yet been made. Detailed station location information is not yet available; however, it is understood that the new Westmead station would be in the vicinity of the existing heavy rail station to allow appropriate interchange between services.

Sydney Metro West would not service key staff catchments to the northwest and southwest, however could significantly improve travel times and service frequency from the inner west, Sydney CBD and north shore. The existing barrier of connectivity to the CHW would still exist, noting that the PLR assists this connection. Given that Sydney Metro West is not likely to open until circa 2030, the opportunity for further mode shift as a result of this service is likely to be realised beyond the 2031 design year being considered by this study.

6.1.3. Staff/ Visitor uptake

The staff and visitor surveys included questions regarding uptake of future public transport initiatives available at/ near CHW. For staff, this included both the Parramatta Light Rail and Sydney Metro West projects, with results summarised in Table 6.1.

Table 6.1: Staff survey – Potential Parramatta Light Rail/ Sydney Metro West uptake

Response	Staff current mode of transport		
	All modes of transport	Car mode only	Train/ Bus mode only
Parramatta Light Rail	11%	9%	16%
A combination of heavy rail and light rail	10%	6%	25%
Sydney Metro West	7%	6%	9%
Parramatta Light Rail and Sydney Metro West	4%	3%	8%
None of the above	68%	75%	41%

Table 6.1 indicates that up to 32 per cent of journey to work trips to CHW could be via Parramatta Light Rail and/ or Sydney Metro West once they open. However, it is important to note that a large proportion of the mode shift is at the expense of existing train/ bus mode share instead of private vehicle mode share.

In this regard, only 25 per cent of staff currently travelling by private vehicle to CHW indicated they would shift to either mode of transport, with the remaining 75 per cent of staff indicating that would not use either. Of the 25 per cent of staff currently travelling by private vehicle, 15 per cent indicated they would potentially use Parramatta Light Rail, 6 per cent indicated they would potentially use Sydney Metro West and 3 per cent indicated they would use both.

For visitors, the survey included a question about the Parramatta Light Rail only, with results summarised in Table 6.2.

Table 6.2: Visitor survey – Parramatta Light Rail uptake

Response	Visitor current mode of transport		
	All modes of transport	Car mode only	Train/ Bus mode only[1]
Yes	18%	16%	47%
No	62%	63%	35%
Unsure	20%	21%	18%

[1] Small sample size as shown in Figure 4.2 likely skews results

6.2. Expected Catchment

6.2.1. Parramatta Light Rail

Sydney Children's Health Network provided GTA with CHW staff home post code data, compiled into a staff origin heat map illustrated in Figure 4.6. The indicative percentage of staff who currently live in areas surrounding the proposed alignment is summarised in Table 6.3.

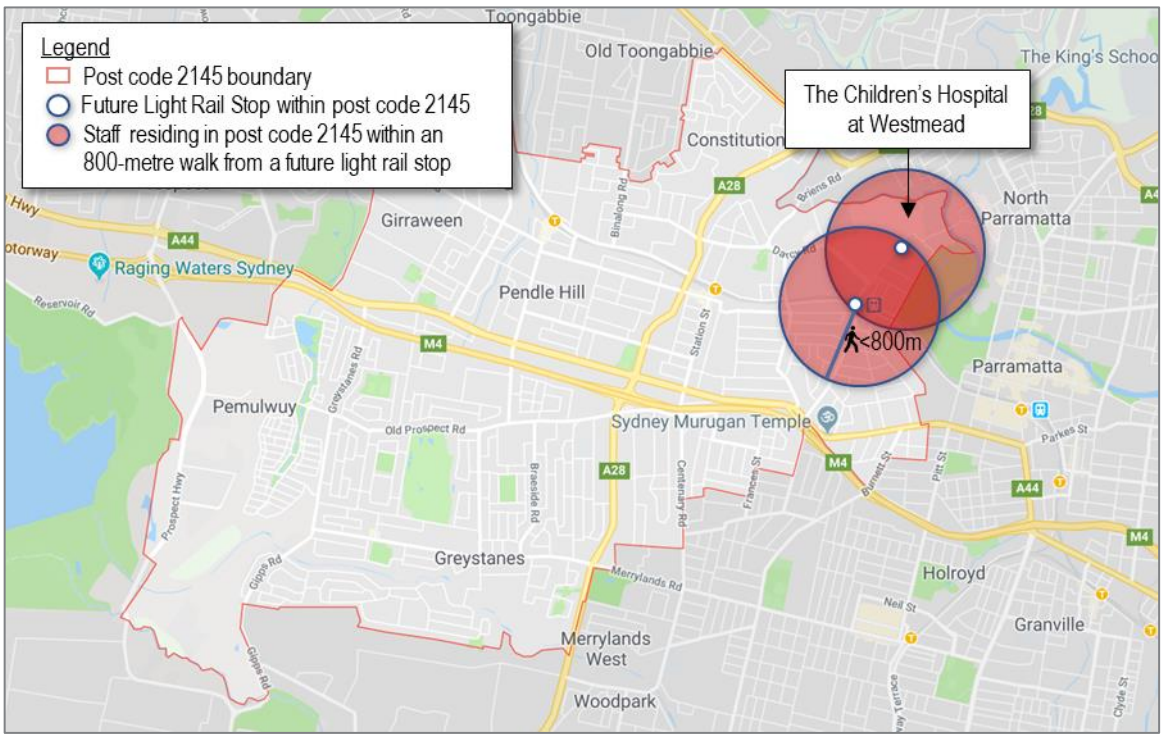
Table 6.3: Origin of staff on the PLR route[1]

Postcode	Staff origin (based on postcodes)	% Staff
2151	North Parramatta, North Rocks	1.4%
2150	Parramatta, Harris Park	0.9%
2116	Rydalmere	0.3%
2117	Dundas, Telopea, Oatlands	0.7%
2118	Carlingford, Kingsdene	0.9%
	% Sub-total	**4.2%**
2145	Westmead, Pendle Hill, Pemulwuy, Wentworthville, Constitution Hill, Girraween, Greystanes, Mays Hill	8.7%
	% Total	**12.8%**

[1] Dataset includes all CHW staff, including part time staff

Table 6.3 indicates that the majority of staff residing in a post code surrounding the proposed alignment reside in post code 2145, which includes the suburbs of Westmead, Pendle Hill, Pemulwuy, Wentworthville, Constitution Hill, Girraween, Greystanes and Mays Hill. However, it is important to note that majority of postcode 2145 is located outside the typical 800 metre capture radius of light rail stops, as illustrated in Figure 6.1.

Figure 6.1: Future light rail stops within post code 2145



Base map source: Google Maps

Therefore, it is unlikely that the Stage 1 route could improve public transport accessibility for more than 50 per cent of staff residing in post code 2145, if at all.

With consideration for the above, it is evident that the Stage 1 route could improve public transport accessibility for an absolute maximum of 9 per cent of existing staff, noting that a proportion of these staff would reside outside of the typical 800 metre capture radius of light rail stops. Notwithstanding this, it is expected that the Parramatta Light Rail would have significant influence on the travel choices made by future staff who would be more likely to live in key growth areas, particularly those serviced by high frequency public transport such as light rail.

In addition to the above, it is expected that staff and visitors would make use of the Parramatta Light Rail to connect between Westmead railway station and CHW, assuming that interchange between the two services functions well.

6.2.2. Sydney Metro West

Sydney Children's Health Network provided GTA with CHW staff home post code data. Detailed station location information is not yet available; however, indicative station precinct areas are illustrated in Figure 4.6. The percentage of staff who currently live in areas surrounding the indicative station precincts is summarised in Table 6.4.

Table 6.4: Origin of staff on the Sydney Metro West route[1]

Postcode	Staff origin (based on postcodes)	% Staff
2150	Parramatta, Harris Park	0.9%
2127	Sydney Olympic Park, Newington, Wentworth Point	0.6%
2041	Balmain East, Balmain, Birchgrove	0.6%
2138	Rhodes, Liberty Grove, Concord West DC, Concord West	0.4%
2137	North Strathfield, Mortlake, Concord, Cabarita, Breakfast Point	0.7%
2039	Rozelle	0.4%
2000	Sydney CBD	0.2%
	% Sub-total	**3.8%**
2145	Westmead, Pendle Hill, Pemulwuy, Wentworthville, Constitution Hill, Girraween, Greystanes, Mays Hill	8.7%
	% Total	**12.8%**

[1] Dataset includes all CHW staff, including part time staff

Table 6.4 indicates that the majority of staff residing in a post code surrounding an indicative station precinct area reside in post code 2145, which includes the suburbs of Westmead, Pendle Hill, Pemulwuy, Wentworthville, Constitution Hill, Girraween, Greystanes and Mays Hill. Postcode 2145 is located near the last Sydney Metro West indicative station precinct near Westmead Station. Therefore, considering this station precinct would be the destination of staff traveling along Sydney Metro West to CHW, the 8.7 per cent of staff residing in post code 2145 would unlikely benefit from increased public transport accessibility.

With consideration for the above, it is evident that the Sydney Metro West could improve public transport accessibility for an absolute maximum of 3.8 per cent of existing staff, noting that a proportion of these staff would reside outside of the typical 800 metre capture radius of light rail stops. Notwithstanding that, it is understood that a number of station precincts would be in the vicinity of the existing heavy rail or metro stations to allow appropriate interchange between services hence improving accessibility for staff residing along existing heavy rail or metro lines.

As discussed, given that Sydney Metro West is not likely to open until circa 2030, the opportunity for mode shift as a result of this service is likely to be realised beyond the 2031 design year being considered by this study.

6.3. Expected Impact on Mode Share

Table 6.1 identified that 15 per cent of staff who currently travel by private vehicle indicated they would travel to CHW using the Parramatta Light Rail when it opens. It is likely that only 50 per cent of these staff would actually change modes, resulting in a private vehicle mode share reduction of 7.5 per cent. It should be noted that this would include staff outside of the direct Parramatta Light Rail catchment that choose to use a combination of public transport services (i.e. heavy rail to Westmead station, followed by Parramatta Light Rail to CHW) once Parramatta Light Rail opens. This mode share reduction of 7.5 per cent is therefore higher than the catchment analysis presented above.

Any remaining private vehicle mode share reduction as a result of the Parramatta Light Rail will likely be by the travel choices made by future staff who would be more likely to live in key growth areas along the Parramatta Light Rail alignment.

7. STAGE 2 REDEVELOPMENT

07

7.1. Overview

7.1.1. CHW Stage 2 Redevelopment

Stage 1 of the CHW redevelopment comprised of a new and expanded Children's Emergency Department, short-stay unit, additional operating theatres and shared medical imaging services located within the Westmead Hospital Central Acute Services Building (CASB). The CASB is currently under construction and expected to open in mid-2020.

Stage 2 of the CHW redevelopment will include a new Paediatric Services Building (PSB) and refurbishment of the existing facilities, including:

- Operating Theatres
- Neonatal Intensive Care Unit
- Paediatric Intensive Care Unit
- Cancer Services
- Pharmacy Department
- Expansion of Pathology services
- Mental Health inpatient and ambulatory care.

It is understood that the proposed redevelopment has a gross floor area of around 50,000 square metres and would provide 115 inpatient beds. Furthermore, the hospital is projected to employ an additional 460 FTE staff in 2026/ 27 and 810 FTE staff in 2031/ 32 (noting that these numbers are conservatively high as previously discussed).

Early construction works for the redevelopment are expected to commence in 2020.

7.1.2. Proposed location

The new PSB is proposed to be located on the existing Car Park 17 Multi-Storey car park and adjacent at-grade parking. As such, these existing car parking spaces will need to be replaced within the Westmead Hospital Campus. Currently, car park 17 provides 555 spaces. However, to accommodate the high demand for staff parking, the car park operates in a stacked arrangement that is managed by the car park operator. This total demand will also need to be considered.

Therefore, the redevelopment will need to be provide at a minimum:

- 555 replacement spaces for existing car park 17
- Up to 124 spaces to cater for existing demand generated by the stacked parking arrangement
- Additional parking spaces for the Stage 2 redevelopment.

7.2. Proposed Car Parking Demand

This section outlines the various options for determining suitable car parking requirements for the redevelopment and is based on a combination of the following:

- Health Infrastructure parking demand model
- City of Parramatta Council Development Control Plan (DCP) and various other Council DCPs
- Roads and Maritime Guide to Traffic Generating Developments (2002)
- Empirical Assessment of Car Parking Demand.

7.2.1. Health Infrastructure Parking Demand Model

A collation of attributes involving separate parking for staff, public/ visitors, and LHD controlled fleet vehicle parking has been used to model parking demand. The model attempts to analyse the total number of persons which utilise the site against the parking demand through weighting factors such as rates of attendance, vehicle occupancy, and parking space turnover.

Staff Parking

Consideration for staff parking is made based on the total driving staff numbers present at work at any one time. Total FTE staff numbers are factored by the percentage of staff who will be present on site at any one time, the percentage of staff who drive to work, the average occupancy rates of staff vehicles, as well as a nominal staff shift changeover allowance.

This number is increased by an allowance for VMO vehicle demand, which is also factored by driving demand, vehicle occupancy and vehicle space turnover.

Public/ Visitor Parking

Consideration for public/ visitor parking is based on a combination of outpatient visitors, inpatients, Emergency Department (ED) presentations and other on-site users not accounted for otherwise.

Outpatient demand is a factor of the annual average number of service events, factored by total weekdays each year, percentage of outpatients who drive, and parking space turnover rates.

ED demand is a factor of annual average number of ED presentations, factored by total weekdays each year, percentage not admitted to an overnight bed, percentage who will have a related party travel by vehicle (non-ambulance presentations and related parties), day-time presentations, and parking space turnover rates.

Inpatient demand is a factor of the total number of beds, by the weekday occupancy rates, visitors per bed, percentage of visitors who drive and the vehicle occupancy rates, day-time visitors, and parking space turnover rates.

LHD Controlled Spaces

LHD controlled parking is provided as a nominal figure. These are allocated for the LHD fleet and service vehicles.

Existing Demand Calculation

Based on the agreed forecast parameters a demand of 2,029 spaces is calculated for the existing site. This calculated demand is within three percent of the observed demand of 1,977, allowing for minor fluctuations in assumptions, this is considered a suitable reflection of the existing demand.

Demand Assumptions

The assumptions surrounding staffing and patient/ visitor activity that were used as the basis for the demand calculations are outlined in Table 7.1 and Table 7.2.

Table 7.1: Parking demand model assumptions (patient/ visitor)

Factor	Input			Reference Source
	2019	2026/27	2031/2032	
Outpatients service events annual (weekday daily)	239,623	275,251	297,941	Clinical Services Plan version 2
Percentage outpatient driving	90%	90%	90%	Visitor survey (Section 4.2.2)
Outpatient space turnover factor	1.34	1.34	1.34	Secure Data
ED presentations annually (daily)	62,641	75,600	85,089	Clinical Services Plan version 2
ED presentation utilising private vehicle	89%	89%	89%	CHW ED Mode of Arrival 2017/ 2018 financial year[2]
ED presentations not admitted to an overnight bed	74%	74%	74%	Bureau of Health Information – CHW average April 2018 to April 2019[3]
ED presentations in day time	60%	60%	60%	Average of other hospitals
ED presentation vehicle turnover factor	1.34	1.34	1.34	Secure Data
Inpatient Beds	359	474	474	Investment Decision (December 2018)
Inpatient weekday bed occupancy	94%	80%	80%	Clinical Services Plan version 2
Inpatient visitor vehicle occupancy	1.8	1.8	1.8	Visitor survey (Section 4.2.2)
Inpatient turnover factor (daytime)	1.34	1.34	1.34	Secure Data
Percentage inpatient daytime visitors	65%	65%	65%	Assumption based on other hospitals
Number of visitors per bed	1.75	1.75	1.75	Average of other hospitals

Table 7.2: Parking demand model assumptions (staff)

Factor	Input			Reference Source
	2019	2026/27	2031/2032	
FTE Staff	3,204	3,664	4,014	Assumption agreed with HI, pro rata based on activity growth
Percentage staff present on weekdays	71%	71%	71%	Assumption agreed with HI
Maximum percentage of staff present on shift changeover	65%	65%	65%	Assumption agreed with HI
Percentage of staff driving to work	79%	See Table 7.3	See Table 7.3	Staff survey (Section [1])
Average staff vehicle occupancy	1.1	1.1	1.1	Staff survey (Section [1])
VMOs present on weekdays	64	64	64	Assumed 40% VMOs attend hospital on a weekday
Percentage VMOs driving to work	100%	100%	100%	Based on other hospitals
Average VMO vehicle occupancy	1.0	1.0	1.0	Based on other hospitals
VMO space turnover factor	1.0	1.0	1.0	Assumed
Nominal changeover allowance	88	88	88	Based on existing allocation for changeover in CP17[4]

[2]CHW Emergency Dept Presentations 2017/ 2018 by mode of arrival, CaSPA Portal - ED Activity Analysis Tool developed by NSW Ministry of Health
[3]Hospital data – Emergency Department, Bureau of health information, http://www.bhi.nsw.gov.au/Healthcare_Observer, accessed 28 August 2019
[4] Staff Parking – Westmead Policy, page 3, prepared by The Children's Hospital at Westmead, dated 29 July 2019

Ambitious future staff private vehicle mode share targets are outlined in Section 6.3. These include a reduction in private vehicle mode share from 79 per cent in 2019 to 65 per cent in 2026 and 60 per cent in 2032. However, these mode share reductions are contingent on the Sydney Children's Hospital Network in conjunction with the Westmead Precinct partners engaging in effective travel planning for Westmead and cannot exclusively rely on future transport initiatives such as the Parramatta Light Rail and Sydney Metro West.

Therefore, three sensitivity scenarios have been tested as follows, detailed in Table 7.3:

- Scenario 1: Assume Travel Plan mode share reduction targets are achieved (14 per cent reduction between 2019 and 2026).
- Scenario 2: Assume five per cent reduction in private vehicle mode share between 2019 and 2026 and another five per cent reduction between 2026 and 2031 (total 10 per cent reduction).
- Scenario 3: Assume no reduction to private vehicle mode share between 2019 and 2031.

Table 7.3: Parking demand model - mode share assumptions (staff)

Scenario	Assumption	Private Vehicle Mode Share Model Input Value		
		2019	2026/ 27	2031/ 2032
1	Travel Plan overall WHC mode share targets achieved (total 19 per cent reduction)	79%	65%	60%
2	Mode share reductions of 5 per cent between each study year (total 10 per cent reduction)	79%	74%	69%
3	No private vehicle mode share reduction achieved	79%	79%	79%

Based on the demand assumptions outlined in Table 7.1, Table 7.2 and Table 7.3, the additional parking demand generated by the redevelopment is outlined in Table 7.4.

Table 7.4: Parking demand model – estimated parking demand

Scenario [1]	Assumption[1]	Description	Projected Parking Demand for CHW		
			2019	2026/ 27	2031/ 2032
1	Travel Plan overall WHC mode share targets achieved	Total demand	2,029	2,088	2,167
		- Additional demand from 2019	-	*+121*[2]	*+189*[2]
2	Some mode share reduction achieved	Total demand	2,029	2,226	2,319
		- Additional demand from 2019	-	*+197*	*+289*
3	No mode share reduction achieved	Total demand	2,029	2,303	2,487
		- Additional demand from 2019	-	*+274*	*+458*

[1] Detailed in Table 7.3
[2] Total additional demand is 58 in 2026/ 2027 and 138 in 2031/32 however this is artificially low due to the reduced private car mode share of existing staff resulting in an overall decrease in staff parking demand. For the purposes of this table, staff parking demand is assumed to have no growth and the growth is generated by increased demand for visitor parking only.

Table 7.4 indicates that the redevelopment generates a parking requirement of between 189 and 458 on-site spaces, depending on the proposed reduction to private vehicle mode share.

7.3. Roads and Maritime Guidance

The *Guide to Traffic Generating Developments* (Roads and Maritime, 2002) does not provide rates for public hospitals. However, the private hospital rate indicates that the Peak Parking Accumulation (PPA) can be estimated referencing the total number of beds and the ASDS. It is noted that the ASDS has been calculated as 80 per cent of the FTE staff.

- PPA = -19.56 + 0.85B + 0.27ASDS, where B is the number of beds.

The number of beds and FTE staff have been calculated as any staff increase beyond the 2018/2019 staffing level.

Based on the Roads and Maritime Guide, the peak parking accumulation for the proposed facility would be 178 in 2026/27 and 253 in 2031/32.

7.4. City of Parramatta Council DCP

The City of Parramatta Council's DCP 2011 does not provide any specific guidance for hospitals. A comparison of various DCP hospital car parking requirements from Council areas similar to Westmead is summarised in Table 7.5.

Table 7.5: Hospital car parking requirements comparison

Council DCP	DCP	Size	DCP Parking Rate	DCP Parking Requirement		
				2019	2026/2027	2031/2032
Randwick City Council	DCP 2013	FTE staff[1] and bed assumptions outlined in Table 7.2 and Table 7.1.	One visitor space per three beds; plus, one space per two staff.	938	1,104 (+166 spaces)	1,187 (+249 spaces)
Ryde Council	DCP 2015		One space per doctor likely to be on the premises at any one time; AND one space per two employees likely to be on duty at any one time; AND one space per four beds; AND one visitor space per four beds.[2]	1,227	1,419 (+192 spaces)	1,543 (+316 spaces)
Ku-ring-gai Council	DCP 2016		One space per three beds plus one space per two day-shift staff or practitioners. One space per one full time night-shift employee	1,257	1,459 (+202 spaces)	1,583 (+326 spaces)
			Total	**938 to 1,257**	**+166 to 202 spaces**	**+249 to 326 spaces**

[1] Daily staff numbers have been calculated as 71 per cent of FTE staff.

[2] Number of doctors unknown, therefore assumed all doctors are employees. Noted this aligns with Westmead Hospital Campus travel planning objectives to reduce private vehicle mode share.

Based on Table 7.5, the redevelopment would be required to provide between 166 and 202 spaces in 2026/ 27 and 249 and 326 in 2031/ 32.

7.5. Increase in Beds/ Staff from Existing Hospital

The total estimated existing parking demand is 1,950 spaces during the recorded peak.

The increase in staff numbers and inpatient beds projected for the new hospital is outlined in Table 7.6.

Table 7.6: Hospital staff and bed growth

Source	Existing CHW	CHW 2032 Projection	Percentage Increase (%)
Staff	3,204	4,014	+ 25
Inpatient beds	359	474	+ 32
Combined	3,563	4,488	+ 26

Increasing the current staff and visitor parking demand of 1,950 spaces by 26 per cent results in a future parking demand of 2,457 spaces, or an additional 507 car parking spaces.

8. PARKING DEMAND RECOMMENDATION

08

8.1. Parking Demand Estimates

8.1.1. Parking demand comparison

A comparison of the existing parking demand using different methods is outlined in Table 8.1.

Table 8.1: Parking demand comparison

Model	Existing Hospital Demand	Variance to Existing Demand
Observed demand (boom gate data)	1,977	
Parking Demand Model estimate	2,047	+52 (+3%)
Roads and Maritime parking rates	919	-1,058 (-54%)
DCP parking rates	938 to 1,257	-1,039 (-53%) to -720 (-36%)

Table 8.1 shows that parking rates from the Guide to Traffic Generating Developments (Roads and Maritime, 2002) and other Council DCPs estimate a much lower demand for existing hospital activities, compared to that observed. Utilising the parking demand model more accurately reflects the existing demand with a three percent variance.

8.1.2. Parking demand model calibration

The future parking demand appears to be best estimated by the parking demand model, projecting an additional demand of 289 spaces in total. Notwithstanding the above, the parking demand model calculates a lower staff demand and higher visitor demand than observed, respectively by 10 and 28 per cent.

As discussed, demand for on-street parking is shared with other Westmead Precinct staff and visitors, in addition to local residents and business owners and therefore on-street car parking demand surveys would not accurately determine on-street parking demand generated by CHW. Therefore, for the purposes of this assessment, off-site (including on-street or off-campus parking facilities) car parking demand has been empirically assessed based on existing staff travel mode share and staff and visitor survey responses. It is noted that a total of 250 visitor responses were received during the survey period. Due to the relatively small sample size, it is likely that survey results may not portray the full extent of on-street/ off-site parking demand. Furthermore, sampling techniques including survey staff positioned at the CHW main entrance may have resulted in a disproportionately low number of visitors who parked on-street (and potentially some distance away) responding, as these visitors may have been less amendable to answering questions. It is noted that the comments section of the visitor survey also conveyed frustration with the lack of on-site parking capacity and reliance on parking on-street.

Therefore, a total off-site visitor demand greater than indicated by the travel mode share surveys has been adopted for the purpose of this study. A 28 per cent increase in off-site visitor demand is considered excessive, hence the visitor demand projections in the parking demand model have been reduced by 10 per cent. This results in an increased visitor off-site parking demand from 131 spaces to the calibrated parking demand model calculation of 228 spaces. Noting the existing on-site visitor parking constraints and availability of on-street parking, the revised existing visitor demand for 228 off-site spaces has been adopted.

In addition to the above and to account for the variance in staff demand, the staff demand projections in the parking demand model have been increased by 10 per cent.

With regards to the above, the current parking demand summary contained in Table 4.8 has been revised in Table 8.2 to reflect the calibrated parking demand model results.

Table 8.2: Calibrated current parking demand summary

User	Description	Demand (no. of spaces)
Staff	On-site parking demand[1]	1,010
	Off-site parking demand[2]	326
	Sub-total	**1,336**
Visitor	On-site parking demand[1]	505
	Off-site parking demand[2]	228
	Sub-total	**733**
	Total	**2,069**

[1] Determined from Secure car park occupancy counts, no change from Table 4.8
[2] Assumed, based on empirical assessment of off-site car parking demand and revised through calibration of the parking demand model

The parking demand for the existing year (2019) has therefore been revised in accordance with Table 8.2, from a total demand for 2,029 spaces to 2,069 spaces, comprised of 1,336 staff spaces and 733 visitor spaces.

A summary of the car parking demand projections based on the calibrated and uncalibrated parking demand model for the design horizon of 2026/27 and 2031/32 is outlined in Table 8.3.

Table 8.3: Parking demand model calibration

Scenario	Assumption	Year	Peak Parking Demand		
			Uncalibrated	Calibrated	Variance
1	Travel Plan mode share targets achieved	2026/2027	121	109	-12
		2031/2032	189	170	-19
2	Some mode share reduction achieved	2026/2027	197	192	-5
		2031/2032	289	280	-9
3	No mode share reduction achieved	2026/2027	274	277	3
		2031/2032	457	465	8

Table 8.3 indicates that calibrating the parking demand model has an insignificant impact to the total demand calculated for the redevelopment.

8.1.3. Parking demand projections

A summary of the car parking demand projections based on the calibrated parking demand model for the design horizon of 2026/27 and 2031/32 is outlined in Table 8.4. It is noted that the three scenarios assume no reduction in private car mode share for patients/ visitors and therefore, future car parking demand projections for patients/ visitors remain the same across all scenarios.

Table 8.4: CHW staff and patient/ visitor calibrated parking demand estimates

Scenario	Assumption	Year	Peak Parking Demand		
			Staff	Patient/ Visitor	Total
1	Travel Plan mode share targets achieved	2026/2027	0	109	**109**
		2031/2032	0	170	**170**
2	Some mode share reduction achieved	2026/2027	83	109	**192**
		2031/2032	110	170	**280**
3	No mode share reduction achieved	2026/2027	168	109	**277**
		2031/2032	295	170	**465**

Table 8.4 indicates that if the staff mode share reduction targets outlined in Section 6.3 are achieved, then no additional staff car parking would be required for the redevelopment. However, achieving a staff mode share reduction of 14 per cent between 2019 and 2026 (and a further 5 per cent reduction by 2031/32) is ambitious and would likely require extensive travel planning including consistent financial investment. Furthermore, even with extensive travel planning, staff uptake of travel planning initiatives may be slower than anticipated, resulting in lower mode share reductions being achieved over the timeframe. As such, a stretch target if this magnitude is not considered an appropriate for planning future car parking supply.

Scenario 2 contemplates some staff mode share reduction between 2019 and 2032 and is therefore considered more appropriate as a baseline for planning purposes. It is therefore recommended that on-site parking supply of 280 spaces be provided.

8.1.4. Stretch mode share target

Notwithstanding the above section, a less aspirational "stretch" mode share target could be considered for planning purposes. However, it is noted that any mode share reduction proposed above the baseline outlined in scenario 2 would require a consistent commitment to travel planning by the redevelopment team and SCHN. A summary of the car parking demand projections based on the calibrated parking demand model and a "stretch" mode share of seven per cent between each study year for the design horizon of 2026/27 and 2031/32 is outlined in Table 8.5.

Table 8.5: CHW staff and patient/ visitor calibrated parking demand estimates – stretch mode share target

Scenario	Assumption	Year	Peak Parking Demand		
			Staff	Patient/ Visitor	Total
4	"Stretch" mode share target of 7 per cent between each study year (total 14 per cent reduction)	2026/2027	49	109	**158**
		2031/2032	36	170	**206**

Table 8.5 indicates that if the staff "stretch" mode share reduction targets are achieved, the redevelopment generates an additional parking requirement of 206 on-site spaces.

It is noted that should CHW achieve a private vehicle mode share of 72 per cent in 2026, the weighted average mode share for the Westmead Health Campus as calculated in Section 5.2.3 would still remain as 65 per cent in accordance with the Travel Plan objectives.

8.1.5. Parking demand scenario testing

Scenarios 1 through 4 assume the mode share assumptions outlined in Table 7.4 are achieved by both existing and future staff. Therefore, Scenarios 1, 2 and 4 result in a "credit" of parking spaces available on-site as existing staff parking demand reduces. This available parking is filled by the demand for parking generated by the redevelopment, resulting in reduced overall demand estimates.

Table 8.4 and Table 8.5 have been replicated in Table 8.6 without the benefit of the car parking credit generated by existing staff.

Table 8.6: CHW staff and patient/ visitor parking demand estimates – redevelopment only[1]

Scenario	Assumption	Year	Peak Parking Demand		
			Staff	Public	Total
1	Travel Plan mode share targets achieved	2026/2027	138	126	264
		2031/2032	224	187	411
4	"Stretch" mode share target achieved	2026/2027	153	126	279
		2031/2032	243	187	430
2	Baseline mode share reduction achieved	2026/2027	157	126	283
		2031/2032	258	187	445
3	No mode share reduction achieved	2026/2027	168	126	294
		2031/2032	295	187	482

[1] Excludes VMOs (as no growth projected) and consideration for shift change over allowance as this relates to existing demand

Table 8.6 indicates that without the credit generated by a reduction in existing demand for car parking, between 411 and 482 parking spaces would need to be provided for the redevelopment in 2031/ 2032.

It is noted that patient/ visitor demand for parking also increased in Table 8.6. This is primarily due to the current higher bed occupancy of 94 per cent in 2019 that generates a higher demand for public parking when compared to the future bed occupancy of 80 per cent in 2026/ 27 and 2031/ 32, outlined in Table 7.1.

8.2. Car Parking Requirements

Scenario 2 of the calibrated parking demand model projects a future baseline demand of 280 additional on-site car parking spaces. This is considered to be the most appropriate scenario for redevelopment planning purposes. A summary of the overall car parking demand projections for CHW based on the calibrated parking demand model for the design horizon of 2026/27 and 2031/32 is outlined in Table 8.7.

Table 8.7: CHW staff and patient/ visitor overall parking demand 2026/ 27 and 2031/ 32

Type	Existing Hospital	Design Year	
	2019[1]	2026/ 27	2031/ 32
Staff[2]	1,336	1,419	1,446
Public (hospital users)[3]	733	842	904
Total Parking Demand[4]	**2,069**	**2,261**	**2,350**
Total additional demand	-	*+ 192*	*+ 280*

[1] Existing demand from calibrated parking demand model (see Section 8.1.2)
[2] Includes demand for 1,010 on-site parking spaces and revised demand for 326 off-site parking spaces (see note [1] and Section 8.1.2)
[3] Includes demand for 505 on-site parking spaces and revised demand for 228 off-site parking spaces (see note [1] and Section 8.1.2)

Table 8.7 indicates that during peak demand for parking, CHW will generate a demand for 2,261 spaces in 2026/27 and 2,350 spaces in 2031/32 for staff and public. This includes a constant demand for 554 off-site spaces in both design years.

A summary of the on-site car parking provision requirements based on the calibrated parking demand model for the design years of 2026/27 and 2031/32 is outlined in Table 8.8. A fundamental assumption of Table 8.8 is that demand for off-site parking remains constant across the design years, primarily to ensure on-street parking demands do not increase with the redevelopment.

Table 8.8: Recommended CHW car parking provision 2026/ 27 and 2031/ 32

Type	Existing Hospital	Design Year	
	2019	2026/ 27	2031/ 32
Staff	975[1]	1,058[1]	1,085[1]
VMO bays	0	0	0
Public (hospital users)	529	638	699
LHD & Fleet parking bays	37[2]	37	37
Emergency/ Patient Transport/ Community Bus	6	6	6
Total Parking Supply	**1,547**	**1,739**	**1,827**
Additional supply for redevelopment		*192*	*280*

[1] Does not include existing stacked parking supply
[2] Includes two authorised spaces at CHW emergency department

Notwithstanding the above, as discussed in Section 4.3, there is a current demand for 35 stacked parking spaces during peak demand for parking (noting that the peak demand for stacked parking is later in the day at 2pm, with 56 stacked parking spaces). While this demand for stacked parking is not expected to increase with the redevelopment, the redevelopment would be required to reinstate any parking removed from the CHW as a result of the new building footprint and ancillary works. Table 8.8 has therefore been updated to include provision for current demand generated by on-site stacked parking.

Table 8.9: Recommended CHW car parking provision 2026/ 27 and 2031/ 32

Type	Existing Hospital	Design Year	
	2019	2026/ 27	2031/ 32
Staff	1,010	1,093	1,120
All other users	572	681	742
Total Parking Supply	**1,582**	**1,774**	**1,862**
Additional supply for redevelopment		*227*	*315*

[1] Includes provision of 35 spaces to accommodate current demand generated by on-site stacked parking.

9. CONCLUSION

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CONCLUSION

Based on the analysis and discussions presented within this report, the following conclusions are made:

1. The existing CHW car parking facilities are located on-site, with access to staff parking provided from Redbank Road and access to visitor parking provided from Hawkesbury Road. The current on-site parking supply is 1,547 spaces, including drop-off and authorised parking spaces.
2. Both staff and patient/ visitor parking demand currently exceed formal capacity, with the demand for the existing hospital (when combining on-site and off-site parking areas) being a total of 1,977 spaces.
3. The parking demand model estimates a demand of 2,029 spaces for the existing hospital. This demand estimate is three percent higher than the observed demand of 1,977 spaces, however is 10 per cent higher for staff and 28 per cent lower for visitors. The parking demand model has been calibrated to account for these variances and is considered appropriate to estimate future demand on this basis.
4. Various options for determining suitable car parking requirements for the proposed redevelopment were assessed, including a review of the *Guide to Traffic Generating Developments* (Roads and Maritime Services, 2002) and the Development Control Plan requirements of nearby Councils. However, the estimated parking demand using these methods were considered low when reviewed against the observed demand from boom gate data.
5. It is recommended that an on-site parking supply of 280 spaces be provided for the redevelopment to service future staff and patient/ visitor demand, in addition to the existing on-site parking supply.

A. STAFF SURVEY COMMENTS

APPENDIX: STAFF SURVEY COMMENTS

Selection of Staff Comments from Travel Survey
Pedestrian and bicycle access in terms of both amenity and safety into and around the Westmead Health campus need improvement; to encourage both active and multi-modal transport. e.g. train/light rail bicycle/walk. Quality end of trip facilities cycling facilities located within buildings and collocated with showers would do same. Thanks
Public transport from the Sutherland Shire is limited slow and unreliable. Multiple modes of transport are required to get the Westmead
I would be willing to use public transport but no good connections from my area - West Pennant hills
making safe available parking for staff who are on call or who stay late is vital
Your survey did not allow me to say why I HAVE to drive. I have chronically ill family member & an elderly mother. I need to be able to get to them to medical care or see them quickly in emergency situations. I cannot do this on public transport.
Traffic is inevitable but lack of enough all hour's access to parking is a real pain. It lengthens my commute by an extra hour each day and means less sleep for shift work + feeling unsafe getting to my car in the dark when parked on the street after 8pm.
Despite many staff living in the Hills area, public transport does not cater for them
Walking around and through the hospital grounds in the dark is a security issue.
Currently, it takes approximately an hour to travel home by Public Transport, including walking. May improve with the light rail, but as an ageing person, would still want to drive
If I could catch a train directly from Emu Plains to Westmead without changing trains or buses Mon-Fri to start work 0730 and finish 1600 I would strongly consider public transport. The current options do not have any direct services and are a waste of time.
Wondering if there will be any facilities for electric cars planned for the future
Public transport cost double than taking my private car
Need more parking spaces closer to hospital for staff
Mobility parking needs to be evaluated in conjunction with the staff who require it, it is currently a shamble.
It would be very much appreciated if there were more motorbike park spots, often we have to share a park spot with two bikes, and it is very narrow.
I work long hours (average 11 hours/day) and adding an additional hour or more to my travel time by using public transport would extend my day to an unacceptable degree.
Redbank road is a nightmare at 5pm. lane to go straight ahead at traffic lights is blocked. BIG traffic jams
Staff parking has made life a great deal easier over the last year - the constant stress of trying to find parking and feeling the need to arrive earlier and earlier made working here difficult at times. Public transport from where I live is possible but takes double the time of driving with bus and train plus walk.
If I had no staff parking or had to take public transport from the Northern Beaches I would have to resign.
my sister and I carpool every day except 1 day per fortnight, yet you charge us both full parking fees. There is no fee reduction for car pooling
it's a nightmare... and makes other jobs more attractive
I am on call for Neonatal intensive care at variable times and need to be able to get in quickly and be able to park safely. Even having to park at the overflow has put me at risk at night and I feel less secure than I used to when this happens.
Needs some type of cover from car parks to hospital. Avoid rain and intense sun
I am finding I am late to work most days due to not being able to park in the multi-story car park. I usually arrive at between 0720 and 0725. But due to having to park on the oval and walk up to the ward, I miss the huddle at the start of the shift. I cannot leave home any earlier as I need to wait for my day-care to open.
Current lighting. lack of CCTV to Oval parking is inadequate in the evening
I would much prefer to take public transport than drive but at the moment this does not fit with school schedule

APPENDIX: STAFF SURVEY COMMENTS

Selection of Staff Comments from Travel Survey
I would love to take the bus/train on a daily basis however Out of hours work requires close access to reliable bus/train services. If I leave at 8 pm, I will get home by 10 pm although I live in the Hills
Motorbike parking is needed
Its currently very difficult. I come 30mins earlier than I need to in the morning to find a street parking. I am on the waiting list for parking. If I leave around 430 or 5pm, its absolute gridlock trying to leave the area at that time, so I also stay back an extra 30-40mins, so I'm not stuck in it. I don't get paid for my extra hours.
People choose to drive because they don't feel safe on public transport late at night as shift workers. But they also don't feel safe walking to the back streets of Redbank road to get free parking.
1: Westmead does not have all trains stopping at the station 2: Safety of walking 3: Cleanliness of public transport 4: Public transport takes more time and that is not a commodity that you are able to get back
parking application has taken over 10 years to get a spot.
I currently don't cycle to work due to the very real risk of being killed or maimed on the way or the way home - I don't even like driving to work for the same reasons
Far more staff parking is needed. I do not feel safe walking alone to my car at night, and the shuttle is a hassle to wait for after being at work for 12-13 hours. The number of years it takes to gain daytime staff parking is insanity. I used to get public transport, however had to wait 1.5 hours for a bus after an evening shift (waiting until after midnight), as three buses in a row were cancelled. I will continue to drive for that reason.
Using public transport working rotating hours/shift work with a family is very difficult. Easier to drive
I would prefer to take public transport but currently there is nothing available from my area which takes less than 2 hours and it would still require me to drive to a station. Also, I have a lot of early starts and late finishes (often a 12-hour day) and adding a long journey on top of that is very tiring results in lack of time with family.
consider eBikes parking facilities as this might be more pertinent in future.
Insufficient mobility parking for staff
I am very happy to use other methods of transport here and home, however I do have to drop off and pick up primary school aged children, so it won't be an option for me for many years
A five-minute car trip would take me over an hour by public transport, so this is not an option.
Having staff parking has made a significant difference to my work satisfaction and general stress levels. It has reduced my commute times and made picking children up on the way home much easier
Public Transport is inconvenient and very expensive. I live 15minutes drive from the hospital. To do the same trip by public transport would take me almost an hour.
As a single parent I have to take my child to before school care and after school care every day on my way to and from work. Although it is in Darcy Road there is no bus from there. The car parking situation here is pretty terrible as well and is too expensive for lower paid staff members.
I need to travel by car due to commitments with my children, public transport is not an option due to time constraints.
Blue Mountains trains no longer stop at Westmead so if catching the training, I have to go to Parramatta and then catch a train back to Westmead.
from Greystanes and surround very difficult
There should be much better lighting outside and on Redbank Rd/ adjacent B streets, many staff use the walkway along the river bank and there is zero cameras/lighting along it as this walkway is not on any maps, it is convenient to use however scary if it is dark, particularly for young female staff (such as myself).
Would love to use public transport more than I do, please provide more direct services from the inner west.
I would love better services from the Hills to the hospital. Castle Hill and Baulkham Hills have poor connectivity to the hospital
Having access to parking is a major factor in deciding where people decide to work.

APPENDIX: STAFF SURVEY COMMENTS

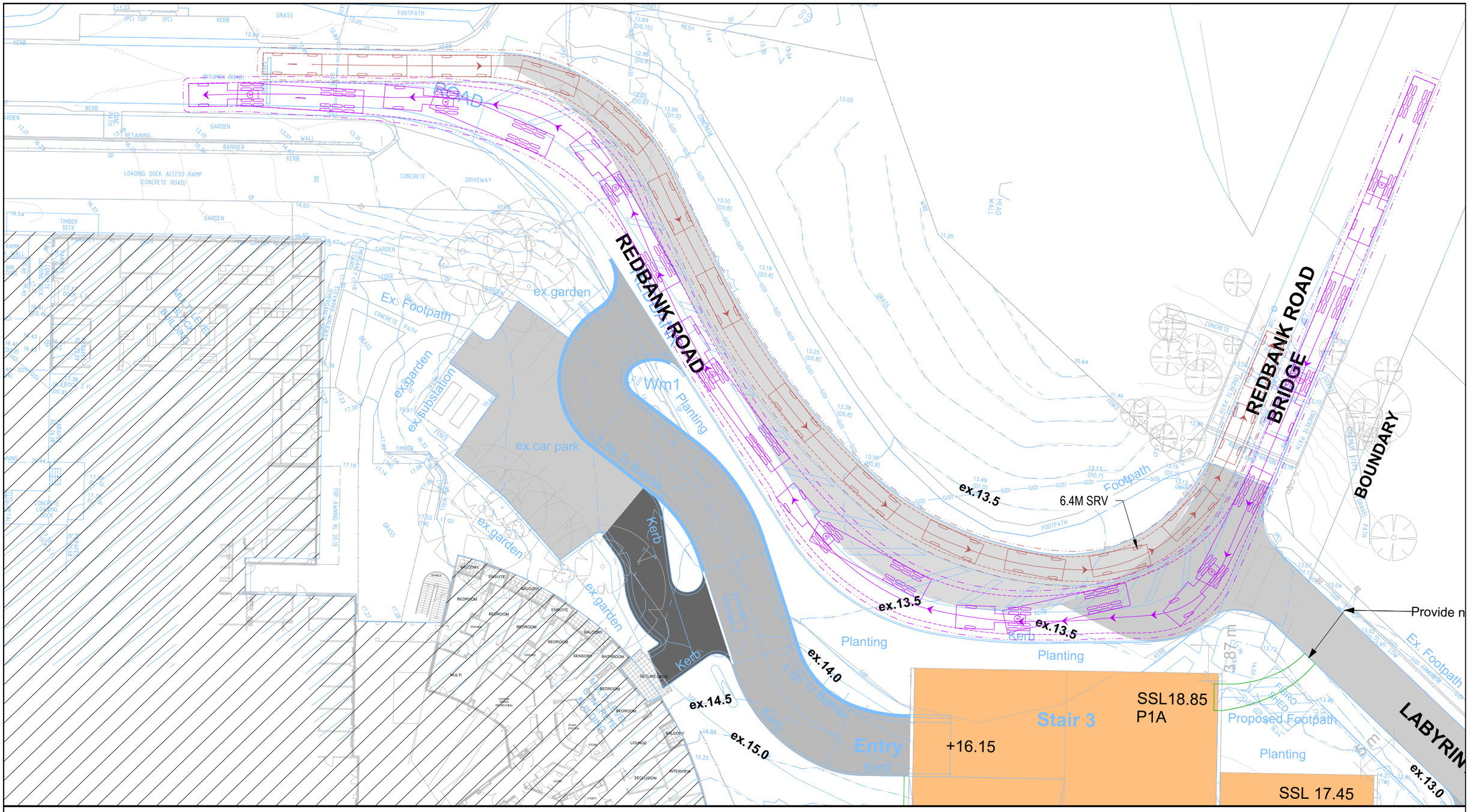
Selection of Staff Comments from Travel Survey
I would think about cycling to work if there were dedicated cycle paths all the way to work where you didn't have to go anywhere near the roads.
I would actually prefer public transport if there was a direct route and it did not take 1.5hrs minimum to do so.
Access to using public transport is limited by ability to be able to park near a railway station. In the inner west, street parking anywhere near railway stations is time restricted and there are minimal options for railway station parking.
Going via Parramatta is so time consuming on public transport (such heavy traffic and unnecessary), services need to go from Westmead and then head north east/east. Would cut down on transport time and encourage more people to catch public transport. All the Westmead buses go west or to Parramatta.
It takes longer to bus/train than to drive. I need the car to pick up children and groceries on the way. Before children I would use public transport, but trains/buses are late, and it is unreliable and expensive.
Need to link the T80 and other bus services from the great western highway that comes from Liverpool direction up the busway straight down Hawkesbury road rather than going to Parramatta and back to the hospital
In order to be convenient for staff and patients Blue Mountains train services should be stopping directly at Westmead
No direct train from Rooty Hill station to Westmead Station. Longer travel time
It would be great if you could talk to companies like Bunnings to use their car parks for staff at a reduced rate as a corporate donation to the hospital (they could put up a sign). Most of the time their car park is empty. Also, the path that runs alongside the creek needs a light...it is pretty scary walking along there in winter.
Parking is a nightmare!!!! More parking should be available to staff.
Difficult transport from the Hills, not enough available parking at hospital, waitlist to access parking is years.
I would be more likely to travel via train if the Mountains train stopped at Westmead. I also travel via Castle Hill in the morning for an appointment pre work
Do not get rid of staff carparks - parking is a necessity. Westmead adults' hospitals has a significant amount of staff parking areas compared to CHW. If CHW were to reduce parking areas a lot of staff including myself will resign
Need to use my car on night shift and late finishes. Do not have staff parking. More on the street long term parking, non-metered would be desirable and much needed for many other staff in a similar position
The walk from the train station to the hospital is poorly lit and long
Redbank Road is very concerning due to the traffic that can back up on this road from staff parking to traffic lights on most days esp. at peak time in the afternoon(attempting to get into right hand turning lane can take many attempts and usually a long wait to turn right).
improve public transport timetable to the hospital
Finishing work in the dark is too risky to take public transport and walking.
I am happy paying to park in the p17/multi storey car park but will be unhappy if we are moved to the outer parking especially when I have trouble walking distances.
You have not included reduced mobility as a reason for driving plus leaving in the dark in winter is not safe with public transport even if Security drives us to the train, we are still getting off the train/bus in the dark at the other end
I cycle every day, so most questions were irrelevant.
Parking is a major problem and will be a determining factor when seeking employment elsewhere.
Very rare to get a direct train from Werrington (Western Sydney) direct to Westmead the walk from CHW to the station is scary at night time when I leave
I used to catch public transport, but it takes about an hour door-to-door rather than 15-20 minutes door-to-door when driving. I changed as my family circumstance changed and I need to do school drop off and pick-up from OOSH.
Although I share the postcode with Westmead, Girraween has no train station and bus timetable does not suit my working hours and pick up to and from school for my child. Hospital parking is very important for me.

GTAconsultants

www.gta.com.au

APPENDIX C

MSCP SWEPT PATH ASSESSMENT AND DESIGN REVIEW



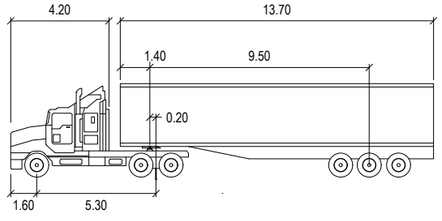
VEHICLE LEGEND

19m SEMI 600mm CLEARANCE

19m SEMI OVERHANG

19m SEMI CENTRELINE

AUSTROADS 19m SEMI



S ARTICULATED 19M — meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.7
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

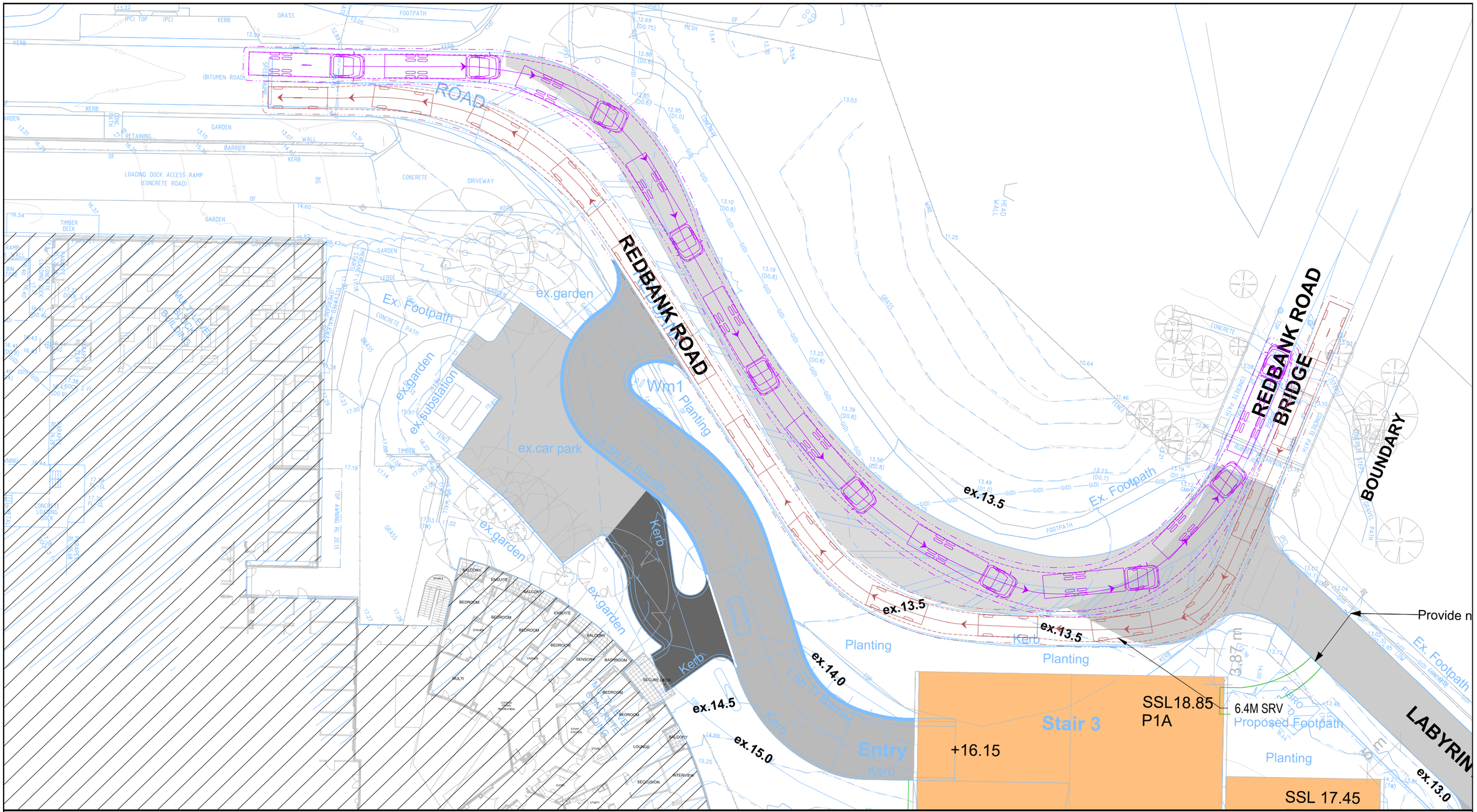
PS118400 SK147

AUSTROADS 19m TRUCK
SITE MANOEUVRE 01
C.W. 04.06.2021

0 10 16m

SCALE 1:400 @A3

wsp



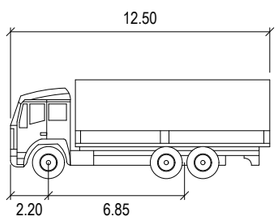
VEHICLE LEGEND

12.5m TRUCK 600mm CLEARANCE

12.5m TRUCK OVERHANG

12.5m TRUCK CENTRELINE

AUSTROADS 12.5m TRUCK



SU TRUCK	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.00
Steering Angle	: 36.60

PS118400 SK148

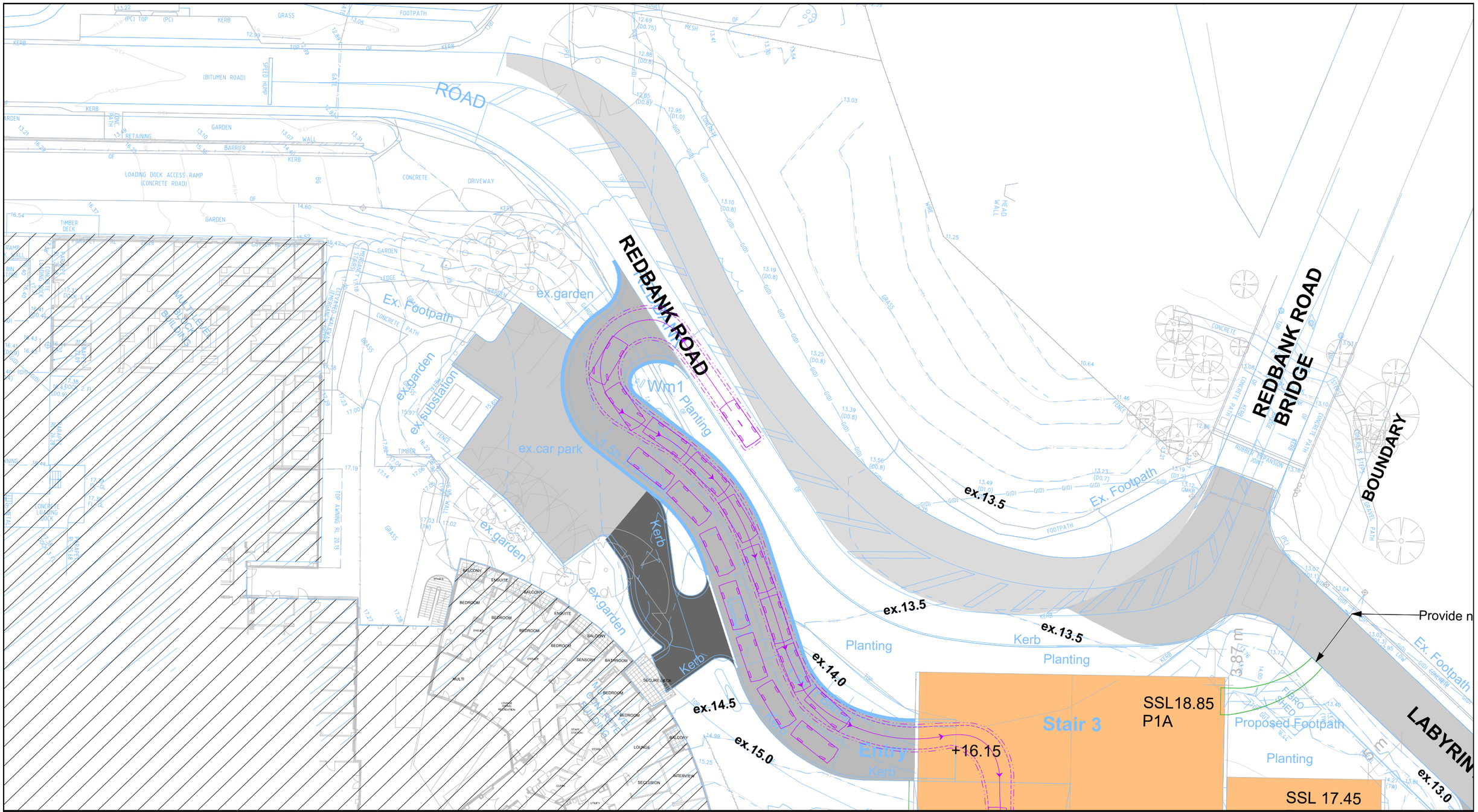
AUSTROADS 12.5m TRUCK
SITE MANOEUVRE 01
C.W. 04.06.2021

0 10 16m

SCALE 1:400 @A3

wsp

NORTH



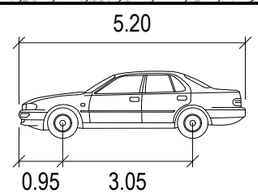
VEHICLE LEGEND

B99CAR 300mm CLEARANCE

B99CAR OVERHANG

B99CAR CENTRELINE

AUSTROADS B99CAR



B99	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.00
Steering Angle	: 33.50

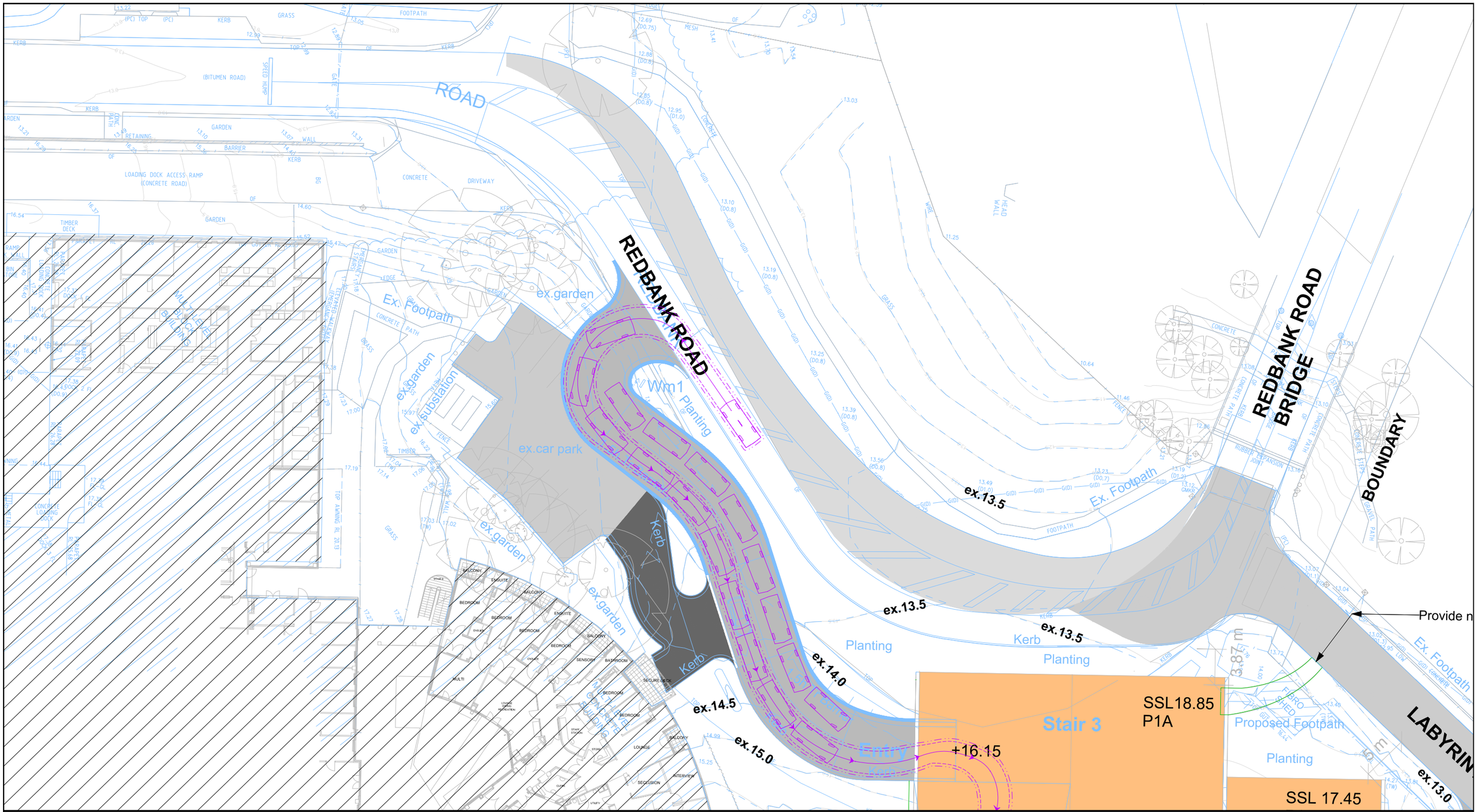
PS118400 SK149

AUSTROADS B99CAR
SITE INGRESS MANOEUVRE 01
C.W. 04.06.2021

0 10 16m

SCALE 1:400 @A3

wsp



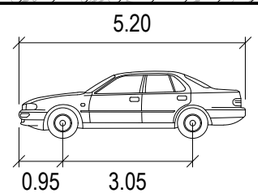
VEHICLE LEGEND

B99CAR 300mm CLEARANCE

B99CAR OVERHANG

B99CAR CENTRELINE

AUSTROADS B99CAR



B99	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.00
Steering Angle	: 33.50

PS118400 SK150

AUSTROADS B99CAR
SITE INGRESS MANOEUVRE 02
C.W. 04.06.2021

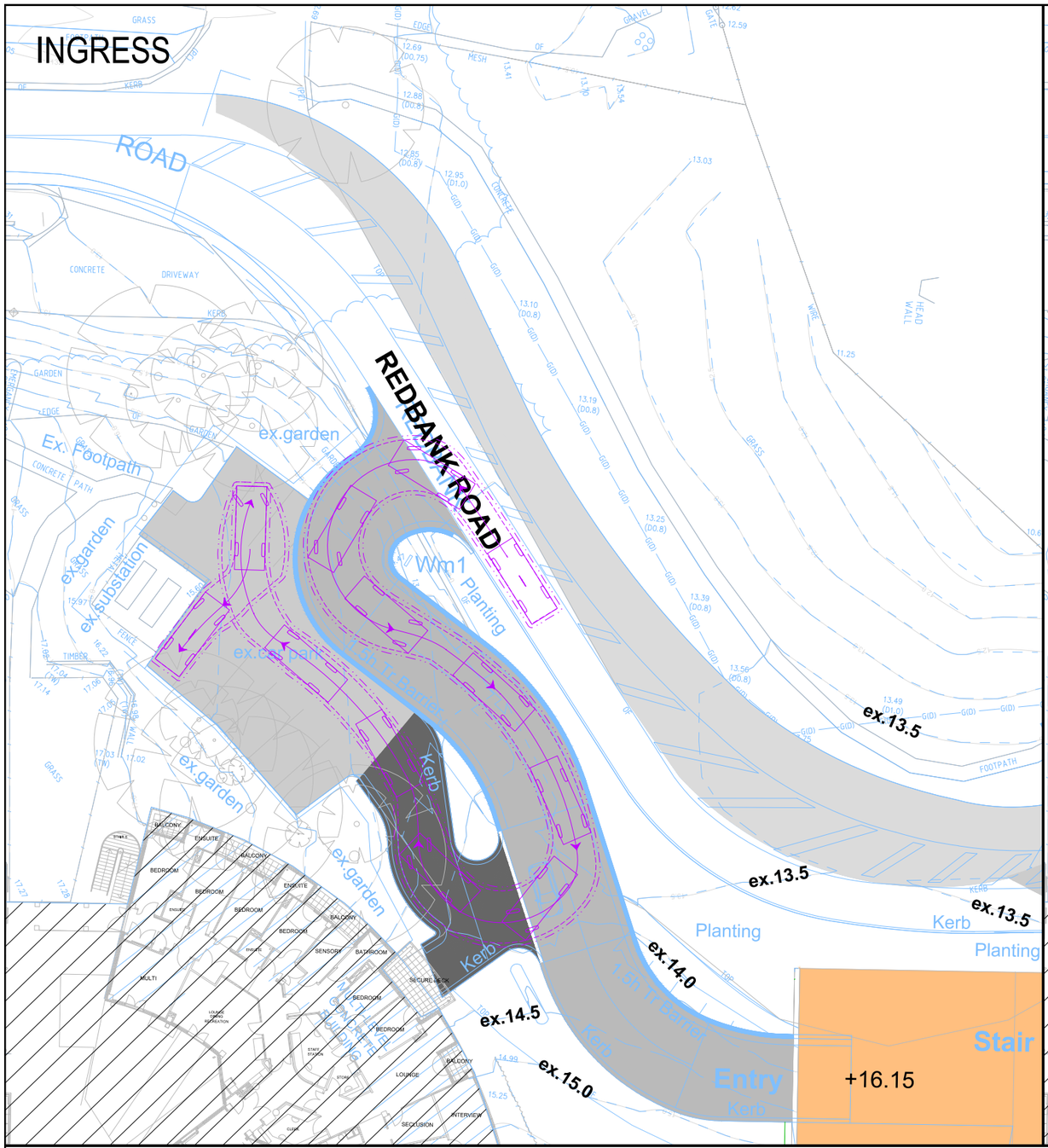
0 10 16m

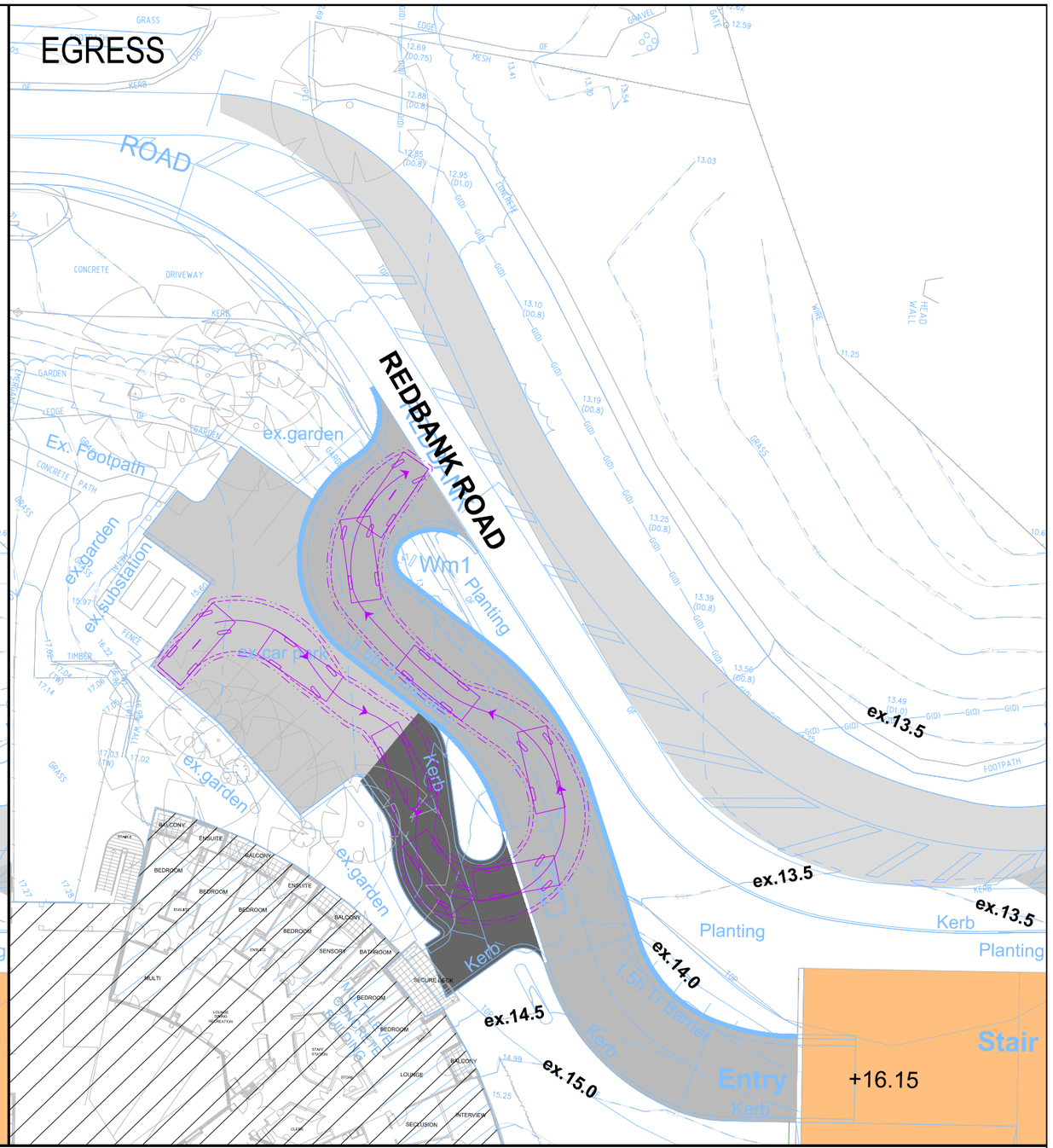
SCALE 1:400 @A3

wsp

INGRESS

EGRESS





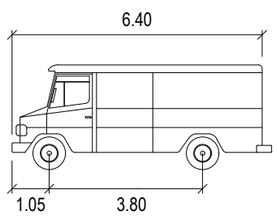
VEHICLE LEGEND

6.4m TRUCK 600mm CLEARANCE

6.4m TRUCK OVERHANG

6.4m TRUCK CENTRELINE

AUSTROADS 6.4m TRUCK



SRV	meters
Width	: 2.30
Track	: 2.30
Lock to Lock Time	: 6.0
Steering Angle	: 38.0

PS118400 SK151

AUSTROADS 6.4m TRUCK
SUBSTATION INGRESS/EGRESS MANOEUVRE
C.W. 04.06.2021

0 10 16m

SCALE 1:400 @A3

wsp

NORTH

INGRESS

EGRESS

CONCEPT PLAN
FOR DISCUSSION PURPOSES ONLY

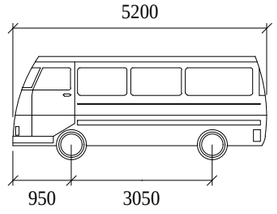
VEHICLE LEGEND

5.2m VAN 300mm CLEARANCE

5.2m VAN OVERHANG

5.2m VAN CENTRELINE

AUSTROADS 5.2m VAN



VAN	mm
Width	: 1940
Track	: 1840
Lock to Lock Time	: 6.0
Steering Angle	: 33.5

PS118400 SK144

AUSTROADS 5.2m B99 CAR / VAN
STORAGE AREA INGRESS/EGRESS MANOEUVRE
C.H. 30.04.2021

0 10 16m

SCALE 1:400 @A3

wsp

NORTH

EXACT RL'S ALONG THIS INTERFACE TO BE CONFIRMS

REDBANK ROAD

ENTRY RAMP TO EXTEND WITHIN MSCP

PS118400 SK152

MSCP SITE ENTRY - RAMP GRADES

C.W. 04.06.2021

0 5 10m

SCALE 1:250 @A3

NORTH

LABYRINTH WAY

EXACT RL'S ALONG THIS INTERFACE TO BE CONFIRMS

EX RL 13.0

ex.13.0

5.0m @ 1:10

RL 12.80

RL 12.80

ex.14.5

10.4m @ 1:6.5

Proposed Brigade Hardstand and Booster

ex.14.0

ex.14.5

RL 14.60

RL 14.85

2.0m @ 1:8

6m @ 1:20

RL 14.60

RL 14.85

RL 15.15

RL 15.15

23.00m @ 1:10

Exit

Proposed Footpath

ex.15.0

ex.15.5

Easement

ex.16.0

Boundary

15.34 m

Proposed Footpath

Driveway

EXIT RAMP TO START WITHIN MSCP

ex.Hedge

ex.Hedge

ex.16.5

16.52

Boundary

GRASS

PAVED

FOOTPATH

TERRACE

Planting

Planting

Planting

FIBRO SHED

Proposed Footpath

Planting

3.87 m

SSL 18.85
P1A

SSL 17.45
P1

SPLIT LINE

SSL 17.45
Exit

RL 17.45

RL 17.45

54.0m @ 1:20

16.15

Stair 2

Ex. Footpath

ex.

PS118400 SK153

MSCP SITE EXIT - RAMP GRADES

C.W. 04.06.2021

0 5 10m

SCALE 1:250 @A3

NORTH

LABYRINTH WAY

LABYRINTH WAY

RECOMMEND KEEPING AREA CLEAR FROM
ANY VISUAL OBSTRUCTIONS.
ANY VEGETATION AND/OR SURFACE GRADES
COULD LEAD TO POTENTIAL OBSTRUCTION.

MINIMUM SIGHT DISTANCE 35

CONSIDERATION ON HOW BOOM GATE SEQUENCING IS TO WORK TO STAGGER EXIT MOVEMENTS

Provide 1.5m w opening in barrier for Egress

5m @ 1:10

10.4m @ 1:6.5
DOWNWARDS

2.0m @ 1:8

6m @ 1:20
DOWNWARDS

23.0m @ 1:10
DOWNWARDS

BOOM GATE

Proposed Brigade Hardstand and Booster

Intercom island

Proposed Exit Ramp to Civil Engineer's Design and Detail

Pedestrian crossing

Proposed Footpath

Retaining Wall under

Kerb

Planting

Fall

1.5h Tr Barrier

Boundary

EASEMENT

5.63 m

ex.13.0
ex.13.5
ex.14.0
ex.14.50
ex.15.0
ex.15.5

+12.80
+14.5
+14.60
+14.85
+15.15
+15.30
+15.70
+17.4

2.5

D1.4
DT1

PS118400 SK146

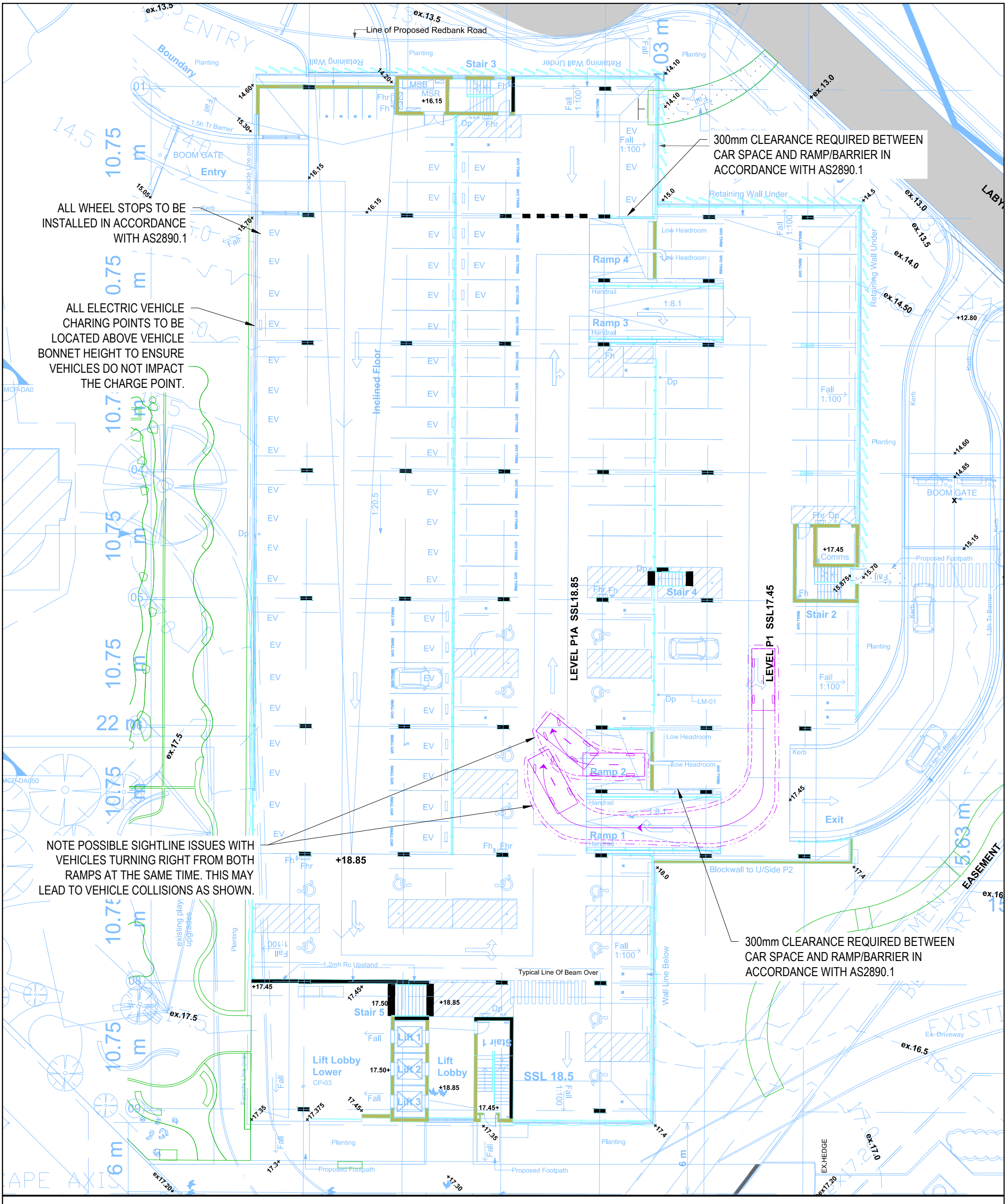
MSCP EXIT RAMP SIGHT DISTANCE

C.W. 06.06.2021

0 5 10m

SCALE 1:250 @A3

NORTH



PS118400 SK173

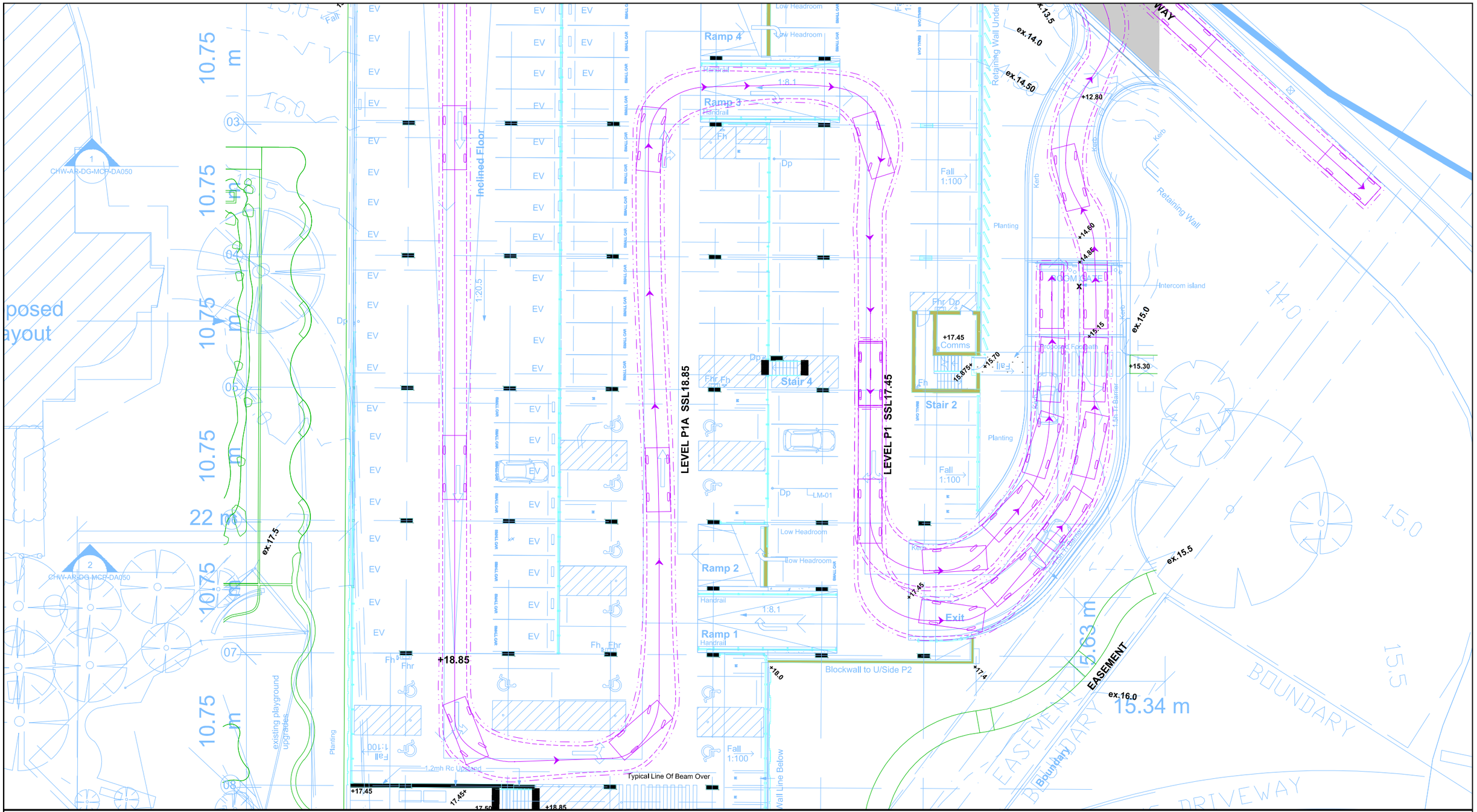
LEVEL P1 & P1A - SITE LAYOUT DETAILS

C.W. 29.06.2021

0 5 10m

SCALE 1:300 @A3

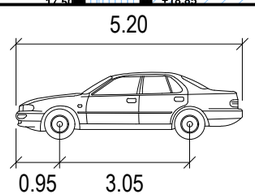
PROPOSED PARKING PROVISION FOR LEVEL P1 & P1A:
- 107 CAR SPACES
- 8 MOTORCYCLE SPACES



VEHICLE LEGEND

- B99CAR 300mm CLEARANCE
- B99CAR OVERHANG
- B99CAR CENTRELINE

AUSTROADS B99CAR



B99	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.00
Steering Angle	: 33.50

PS118400 SK174

LEVEL P1 & P1A - AUSTROADS B99CAR
INTERNAL CIRCULATION AND EXIT MANOEUVRE
C.W. 29.06.2021

0 5 10m

SCALE 1:300 @A3

wsp

NORTH

INGRESS

Proposed Redbank Road

+ex.13.5

Planting

Stair 3

Retaining Wall Under

Fall

4.03 m

+14.10

MSB

MSR

+16.15

Fh

Dp

Fhr

EV

Fall 1:100

SMALL CAR

+14.10

+ex.13.0

Proposed Footpath

REFER PART LOWER GROUND PLAN

Planting

5 m

+15.0

Retaining Wall Under

+14.5

Low Headroom

Ramp 4

Handrail

1:8.1

Ramp 3

Handrail

Fh

Dp

Fall 1:100

Retaining Wall Under

Fhr Dp

EGRESS

Proposed Redbank Road

+ex.13.5

Planting

Stair 3

Retaining Wall Under

Fall

4.03 m

+14.10

MSB

MSR

+16.15

Fh

Dp

Fhr

EV

Fall 1:100

SMALL CAR

+14.10

+ex.13.0

Proposed Footpath

REFER PART LOWER GROUND PLAN

Planting

5 m

+15.0

Retaining Wall Under

+14.5

Low Headroom

Ramp 4

Handrail

1:8.1

Ramp 3

Handrail

Fh

Dp

Fall 1:100

Retaining Wall Under

Fhr Dp

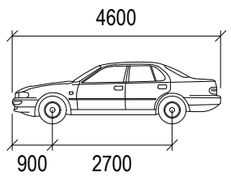
VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE

4.6m VECTRA



4.6m VECTRA

	mm
Width	: 1800
Track	: 1530
Lock to Lock Time	: 6.0
Steering Angle	: 36.5

PS118400 SK175

LEVEL P1 & P1A - 4.6m VECTRA

INGRESS/EGRESS MANOEUVRE 01

C.W. 29.06.2021

0 5 8m

SCALE 1:200 @A3

wsp

NORTH

INGRESS

Proposed Redbank Road

+ex.13.5

Planting

Stair 3

Retaining Wall Under

Fall

4.03 m

+14.10

MSB

MSR

+16.15

Fh

Fall 1:100

SMALL CAR

Dp

Fhr

EV

Proposed Footpath

REFER PART LOWER GROUND PLAN

+ex.13.0

Planting

5 m

+15.0

Retaining Wall Under

+14.5

Low Headroom

Ramp 4

Handrail

1:8.1

Ramp 3

Fall 1:100

Retaining Wall Under

EGRESS

Proposed Redbank Road

+ex.13.5

Planting

Stair 3

Retaining Wall Under

Fall

4.03 m

+14.10

MSB

MSR

+16.15

Fh

Fall 1:100

SMALL CAR

Dp

Fhr

EV

Proposed Footpath

REFER PART LOWER GROUND PLAN

+ex.13.0

Planting

5 m

+15.0

Retaining Wall Under

+14.5

Low Headroom

Ramp 4

Handrail

1:8.1

Ramp 3

Fall 1:100

Retaining Wall Under

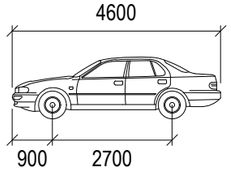
VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE

4.6m VECTRA



4.6m VECTRA

		mm
Width	:	1800
Track	:	1530
Lock to Lock Time	:	6.0
Steering Angle	:	36.5

PS118400 SK176

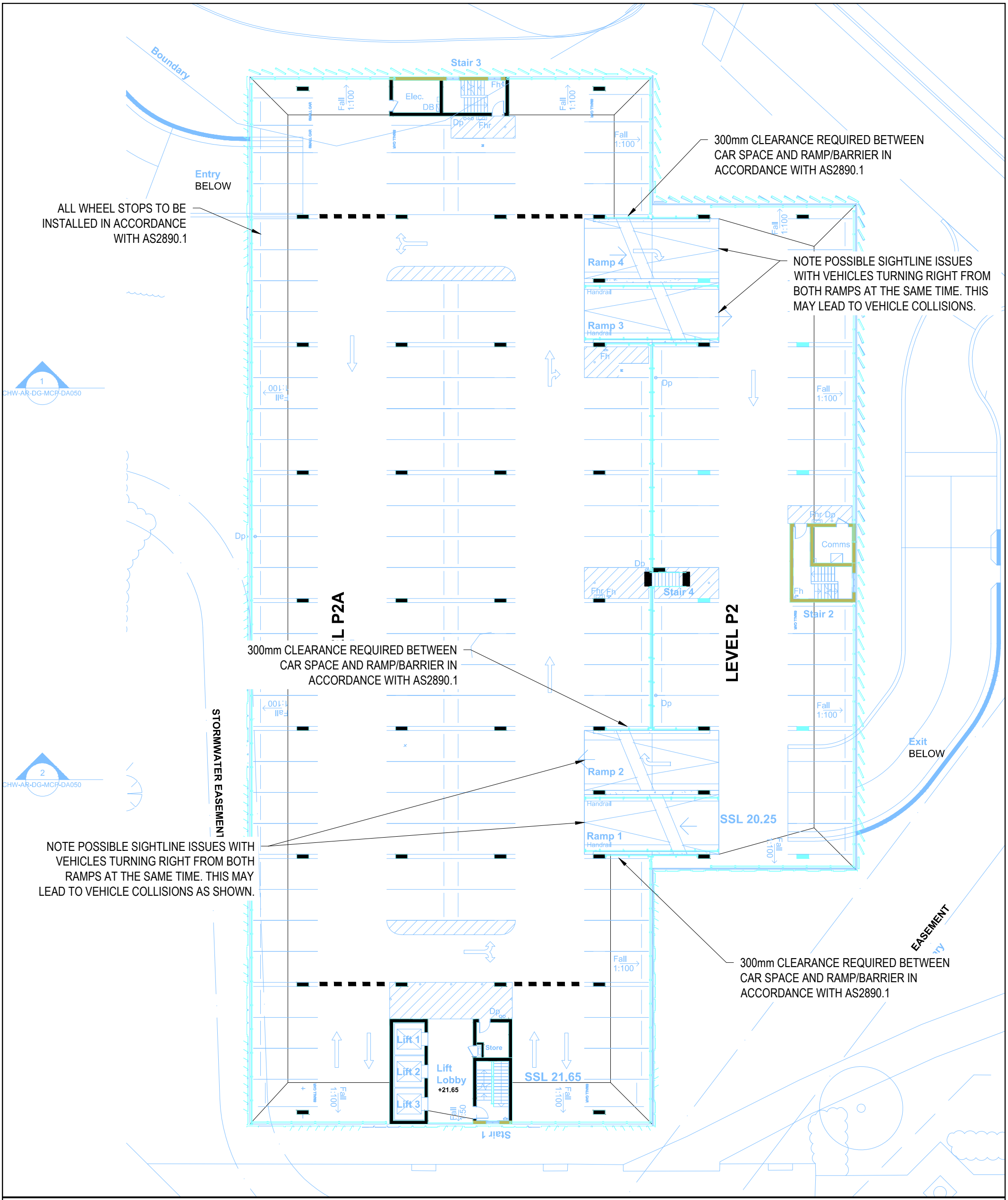
LEVEL P1 & P1A - 4.6m VECTRA
INGRESS/EGRESS MANOEUVRE 02
C.W. 29.06.2021

0 5 8m

SCALE 1:200 @A3

wsp

NORTH



PS118400 SK177

PARKING LEVELS (TYPICAL) - SITE LAYOUT DETAILS

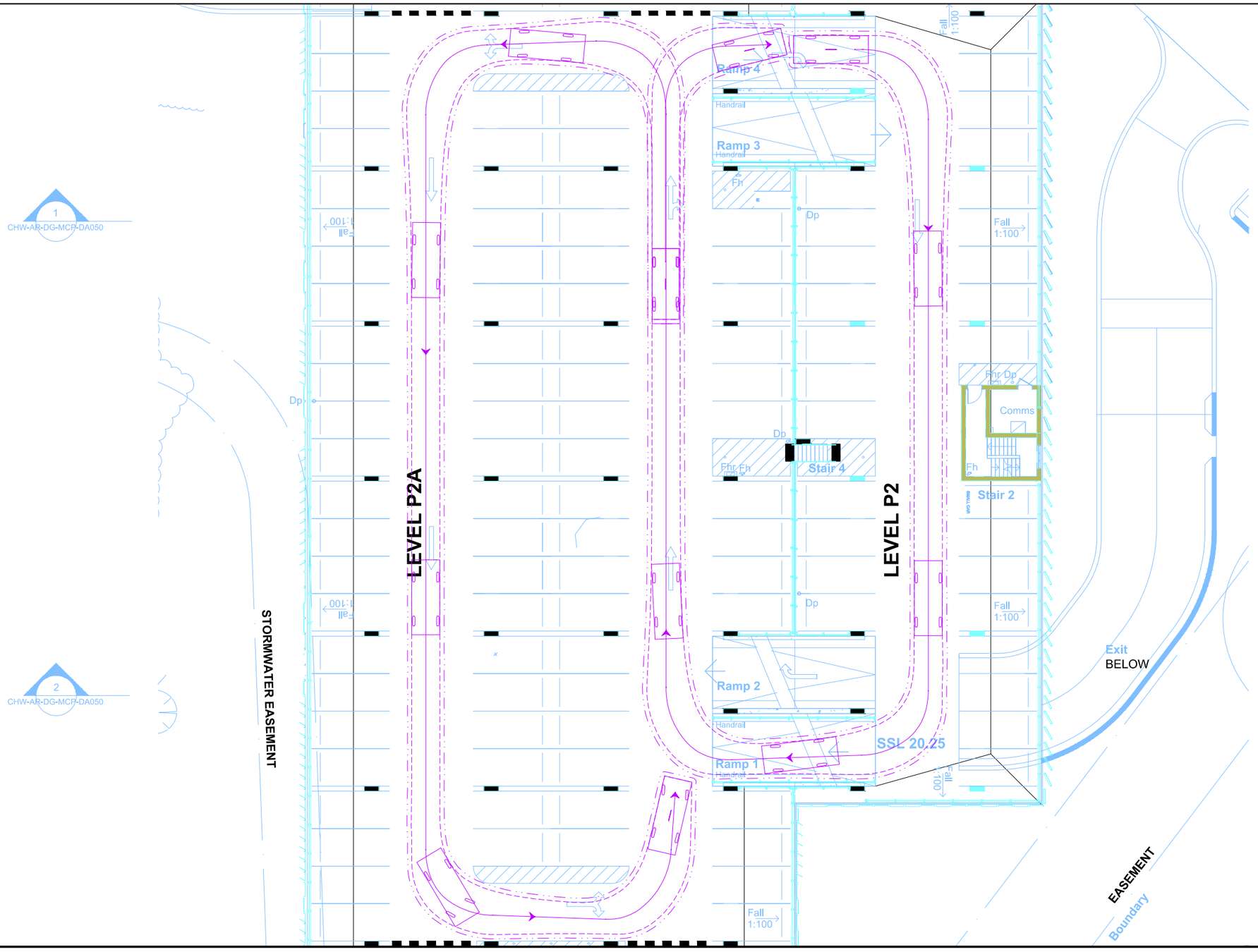
C.W. 30.06.2021

0 5 10m

SCALE 1:300 @A3

NORTH

PROPOSED PARKING PROVISION FOR LEVELS 2 TO 7:
- 127 CAR SPACES PER LEVEL
- 762 VEHICLES TOTAL ACROSS LEVELS 2 TO 7 (128 X 6 = 762)



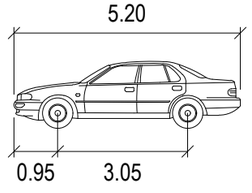
VEHICLE LEGEND

B99CAR 300mm CLEARANCE

B99CAR OVERHANG

B99CAR CENTRELINE

AUSTROADS B99CAR



B99	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.00
Steering Angle	: 33.50

PS118400 SK178

TYPICAL PARKING LEVELS - AUSTROADS B99CAR
INTERNAL CIRCULATION MANOEUVRE
C.W. 30.06.2021

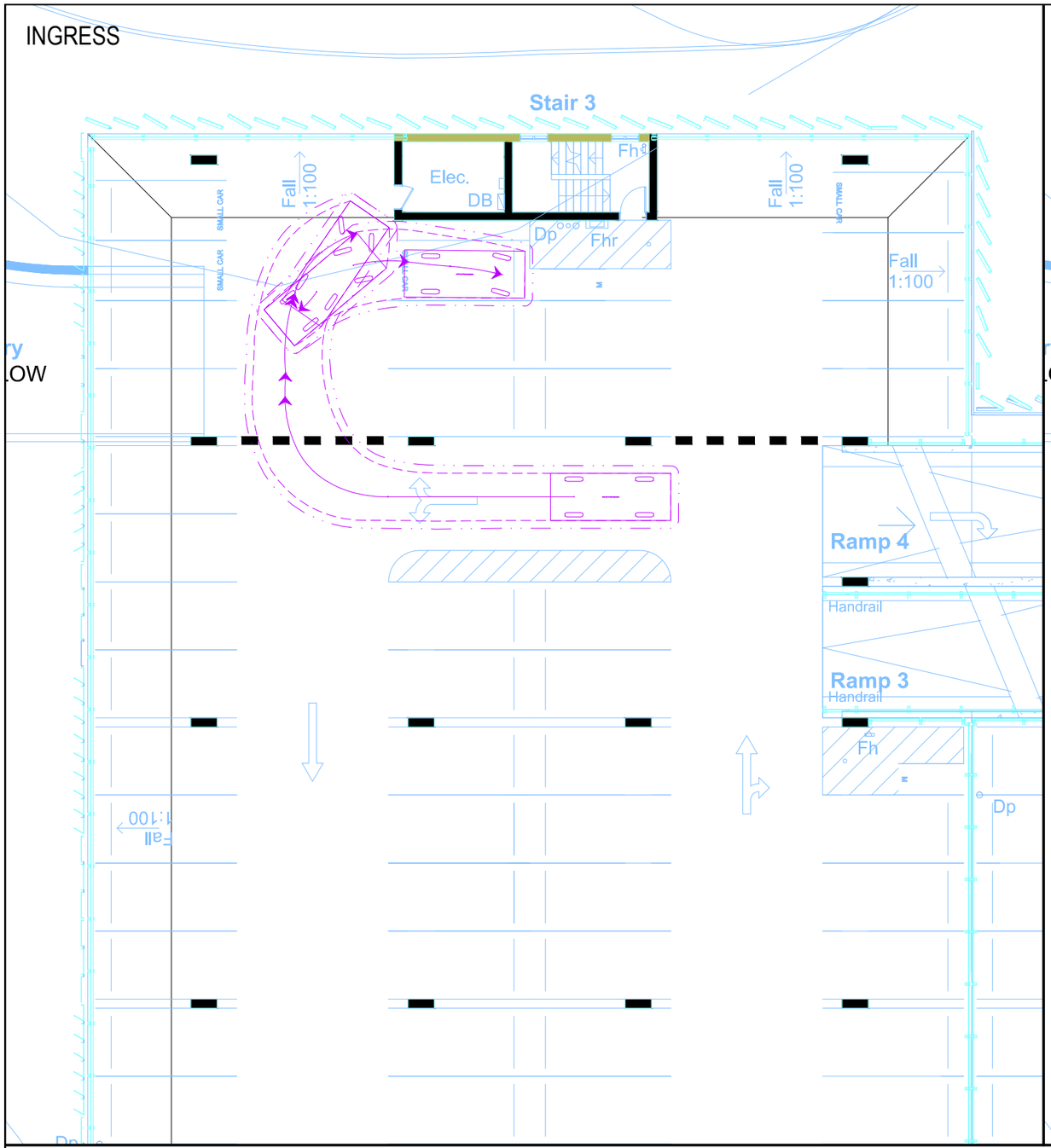
0 5 10m

SCALE 1:300 @A3

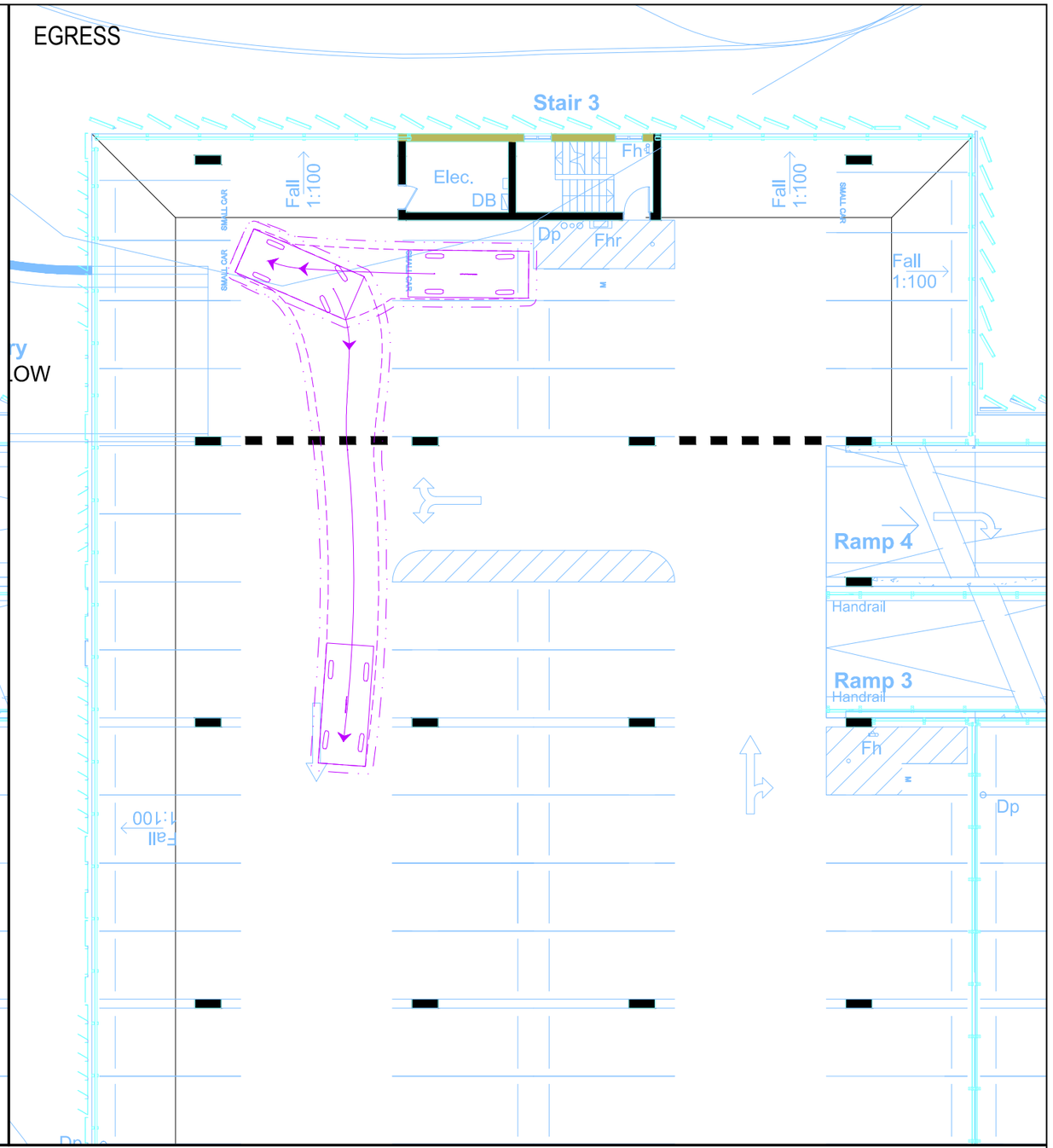
wsp

NORTH

INGRESS



EGRESS

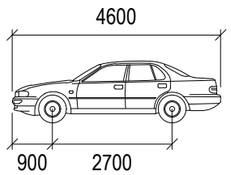


VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE



4.6m VECTRA

	mm
Width	: 1800
Track	: 1530
Lock to Lock Time	: 6.0
Steering Angle	: 36.5

PS118400 SK179

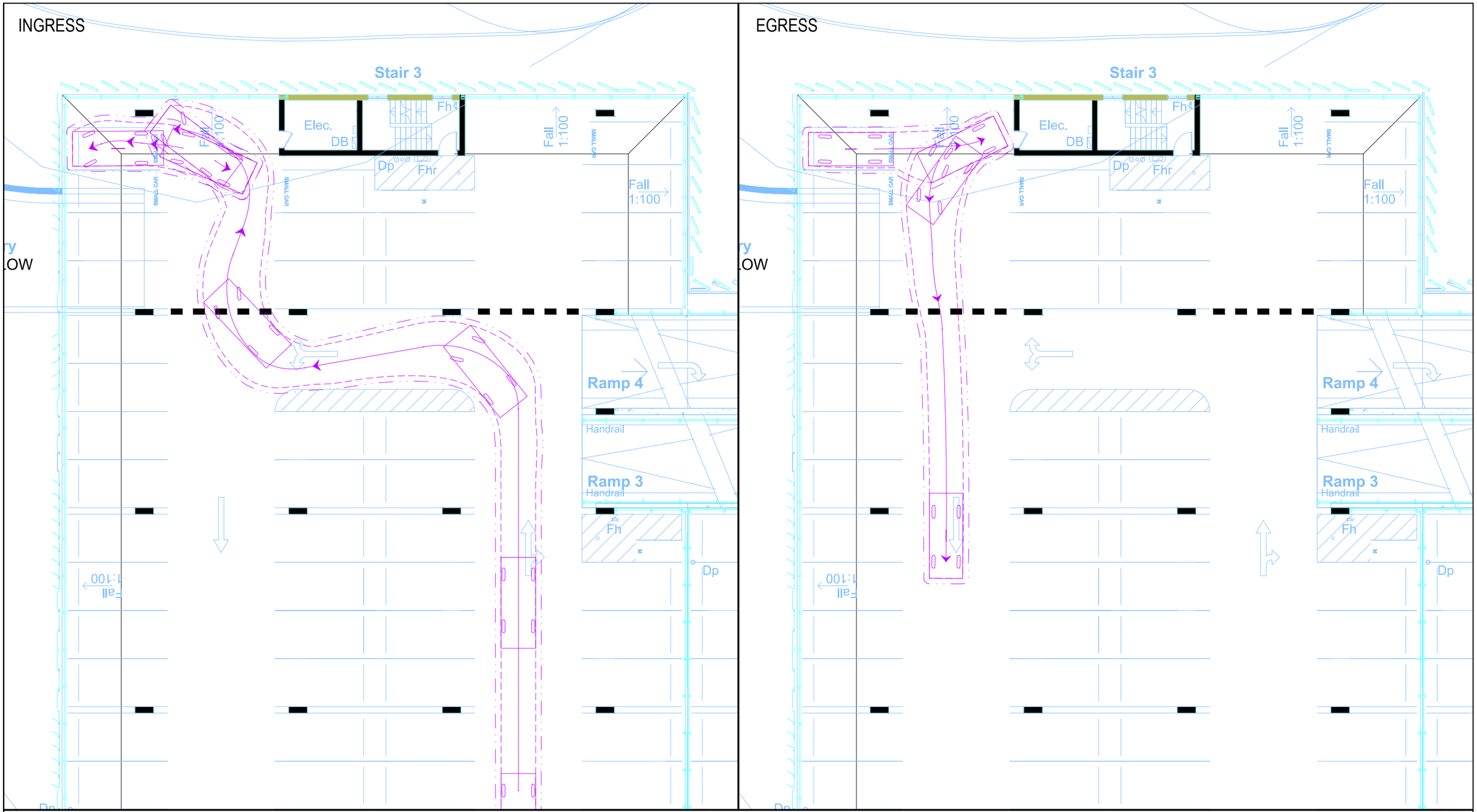
TYPICAL PARKING LEVELS - 4.6m VECTRA
INGRESS/EGRESS MANOEUVRE 01
C.W. 30.06.2021

0 5 8m

SCALE 1:200 @A3

INGRESS

EGRESS

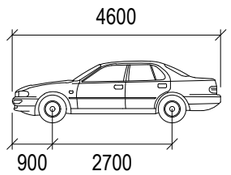


VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE



4.6m VECTRA

		mm
Width	:	1800
Track	:	1530
Lock to Lock Time	:	6.0
Steering Angle	:	36.5

PS118400 SK180

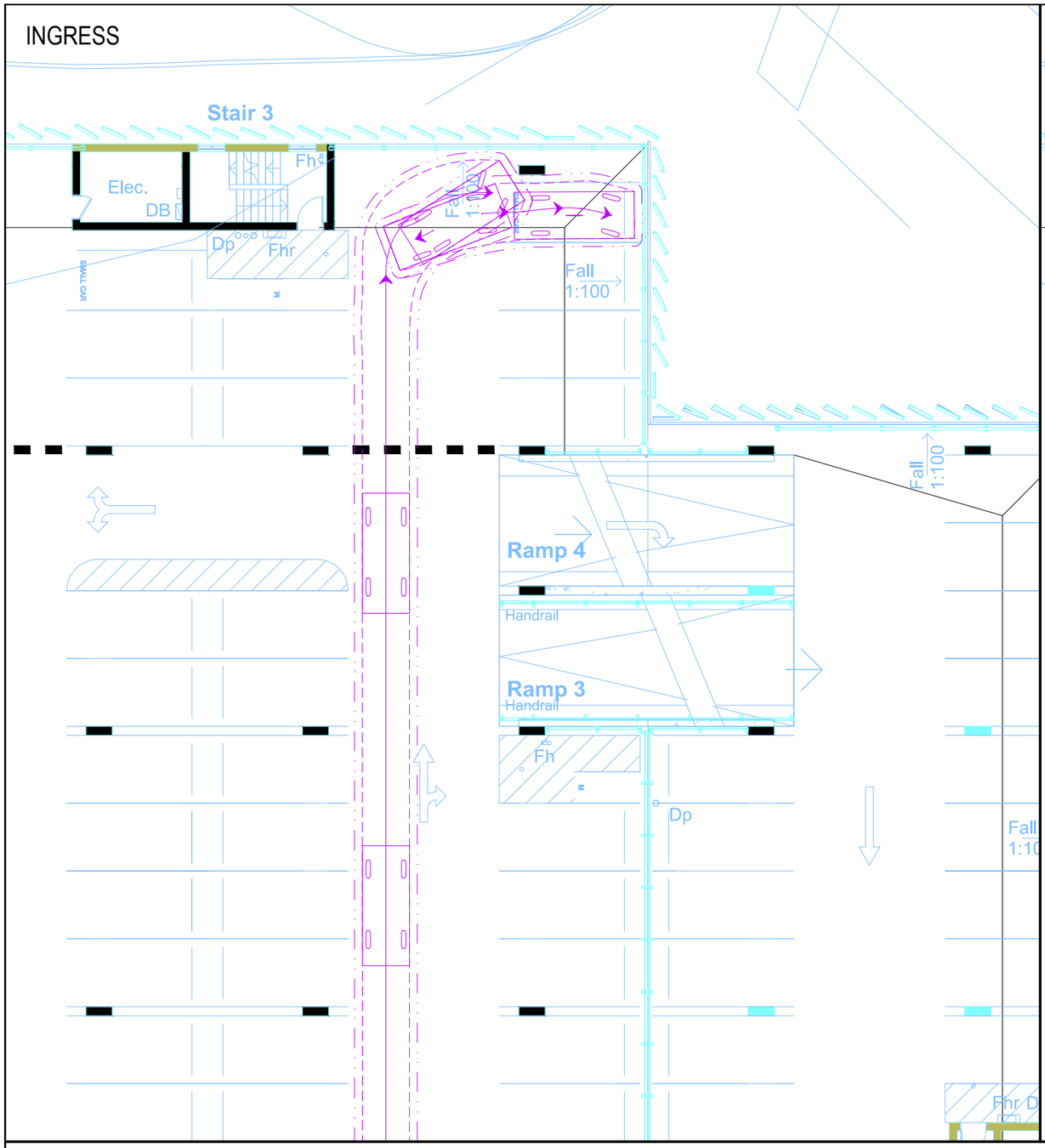
TYPICAL PARKING LEVELS - 4.6m VECTRA
INGRESS/EGRESS MANOEUVRE 02
C.W. 30.06.2021

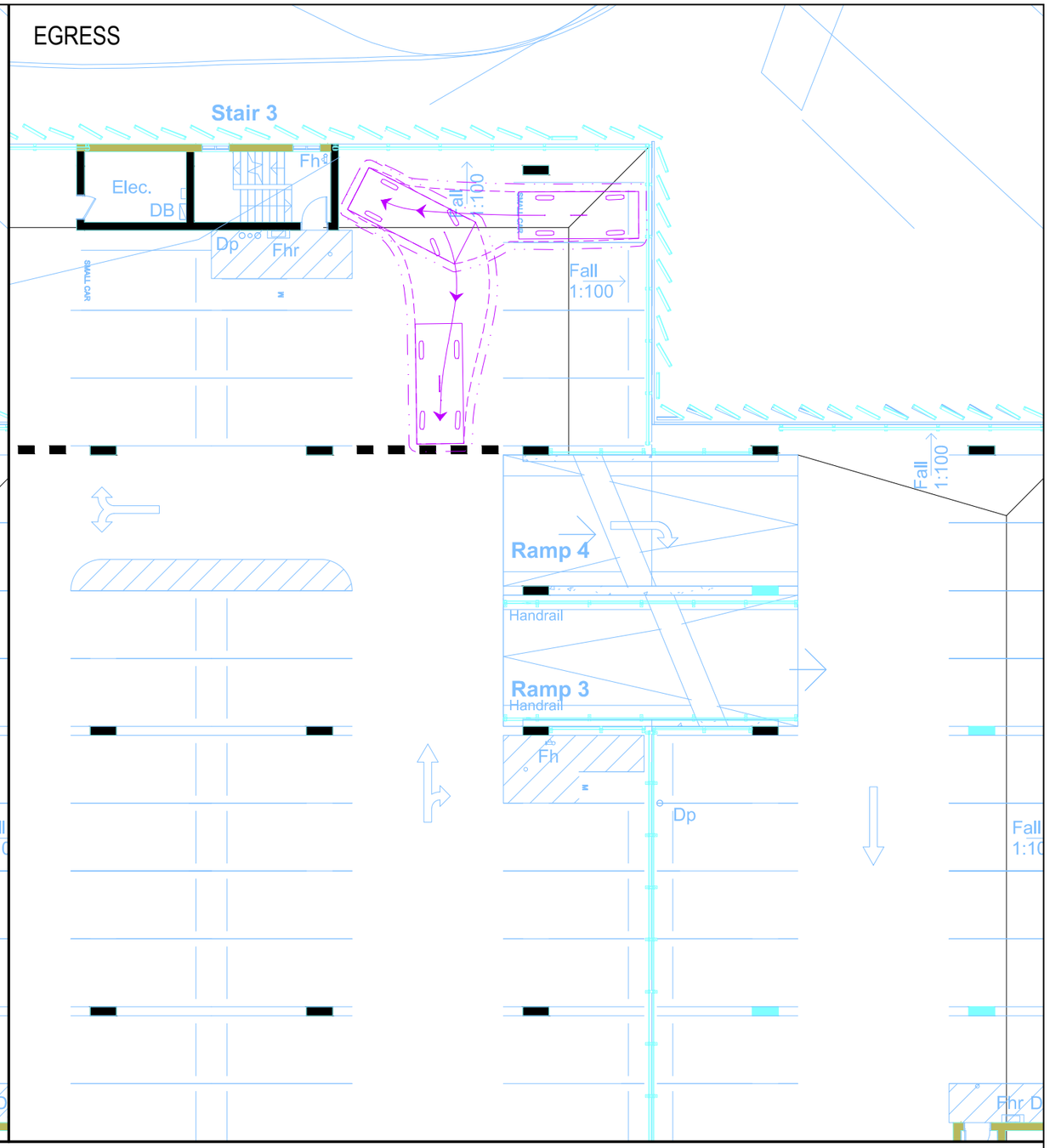
0 5 8m

SCALE 1:200 @A3

INGRESS

EGRESS





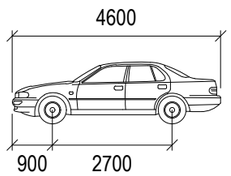
VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE

4.6m VECTRA



4.6m VECTRA

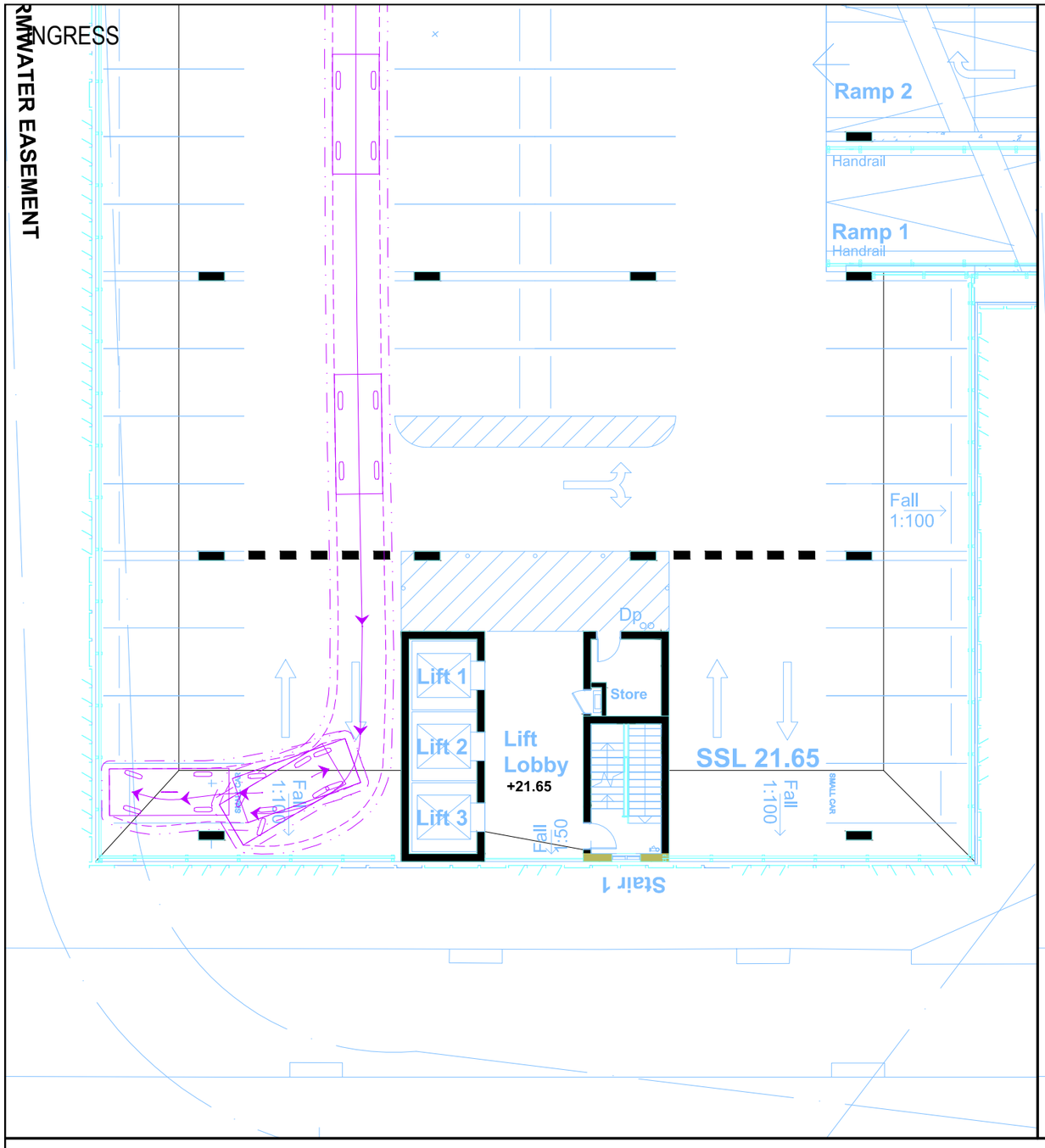
	mm
Width	: 1800
Track	: 1530
Lock to Lock Time	: 6.0
Steering Angle	: 36.5

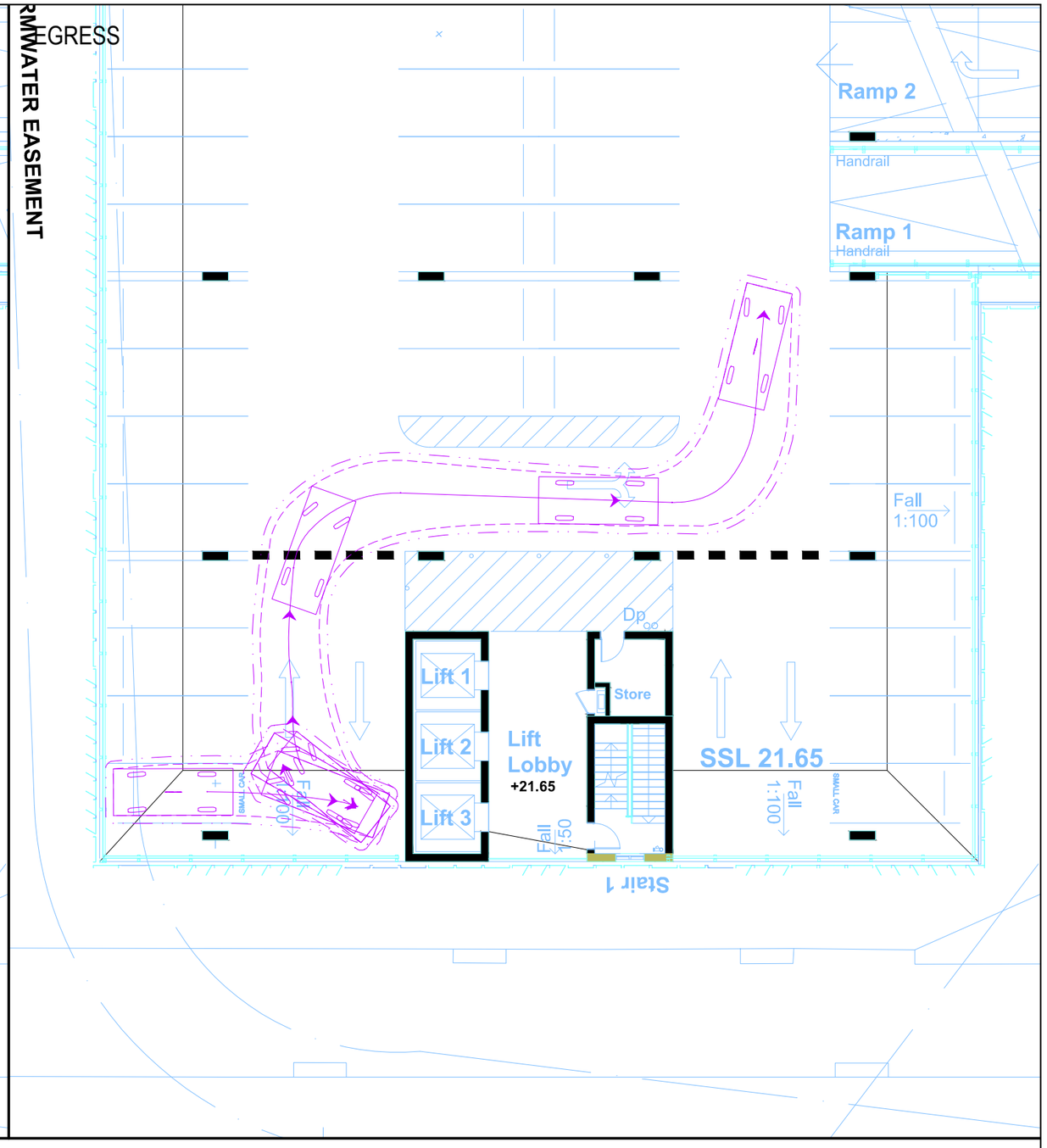
PS118400 SK181

TYPICAL PARKING LEVELS - 4.6m VECTRA
INGRESS/EGRESS MANOEUVRE 03
C.W. 30.06.2021

0 5 8m

SCALE 1:200 @A3





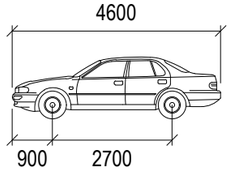
VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE

4.6m VECTRA



4.6m VECTRA

	mm
Width	: 1800
Track	: 1530
Lock to Lock Time	: 6.0
Steering Angle	: 36.5

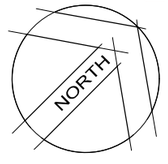
PS118400 SK182

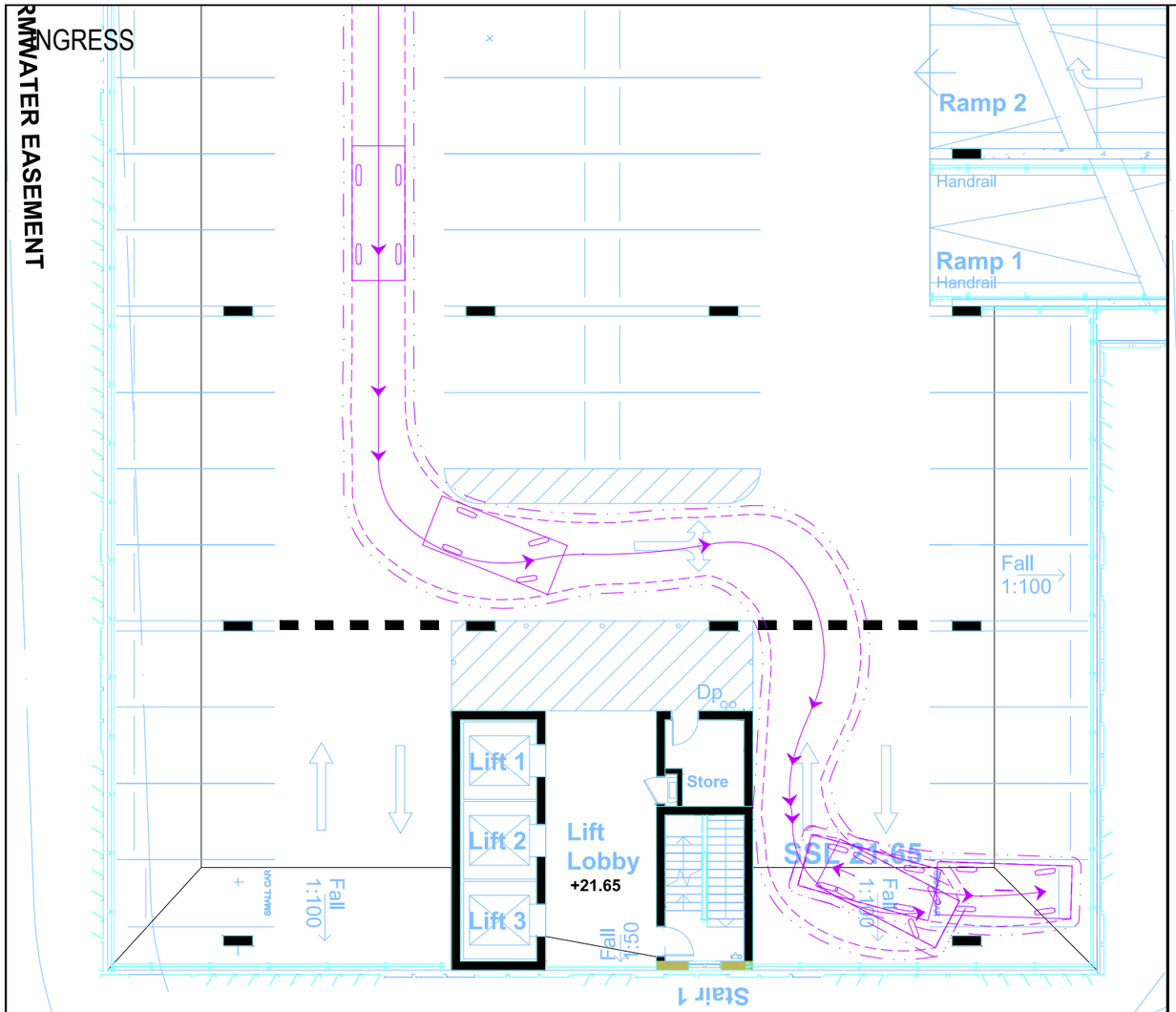
TYPICAL PARKING LEVELS - 4.6m VECTRA
INGRESS/EGRESS MANOEUVRE 04
C.W. 30.06.2021

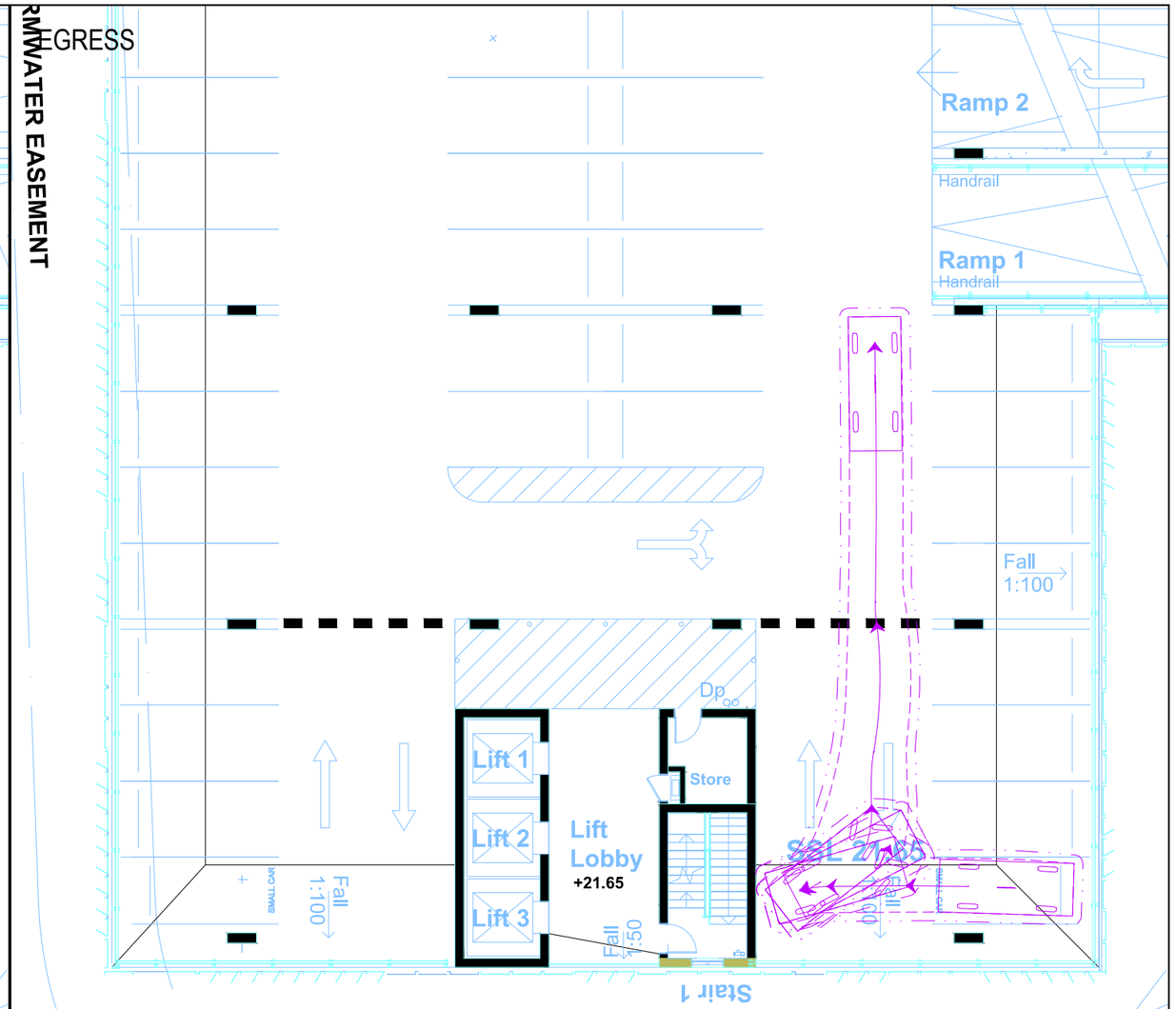
0 5 8m

SCALE 1:200 @A3

wsp







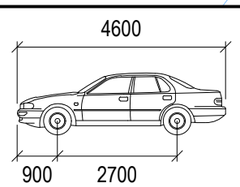
VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE

4.6m VECTRA



4.6m VECTRA

		mm
Width	:	1800
Track	:	1530
Lock to Lock Time	:	6.0
Steering Angle	:	36.5

PS118400 SK183

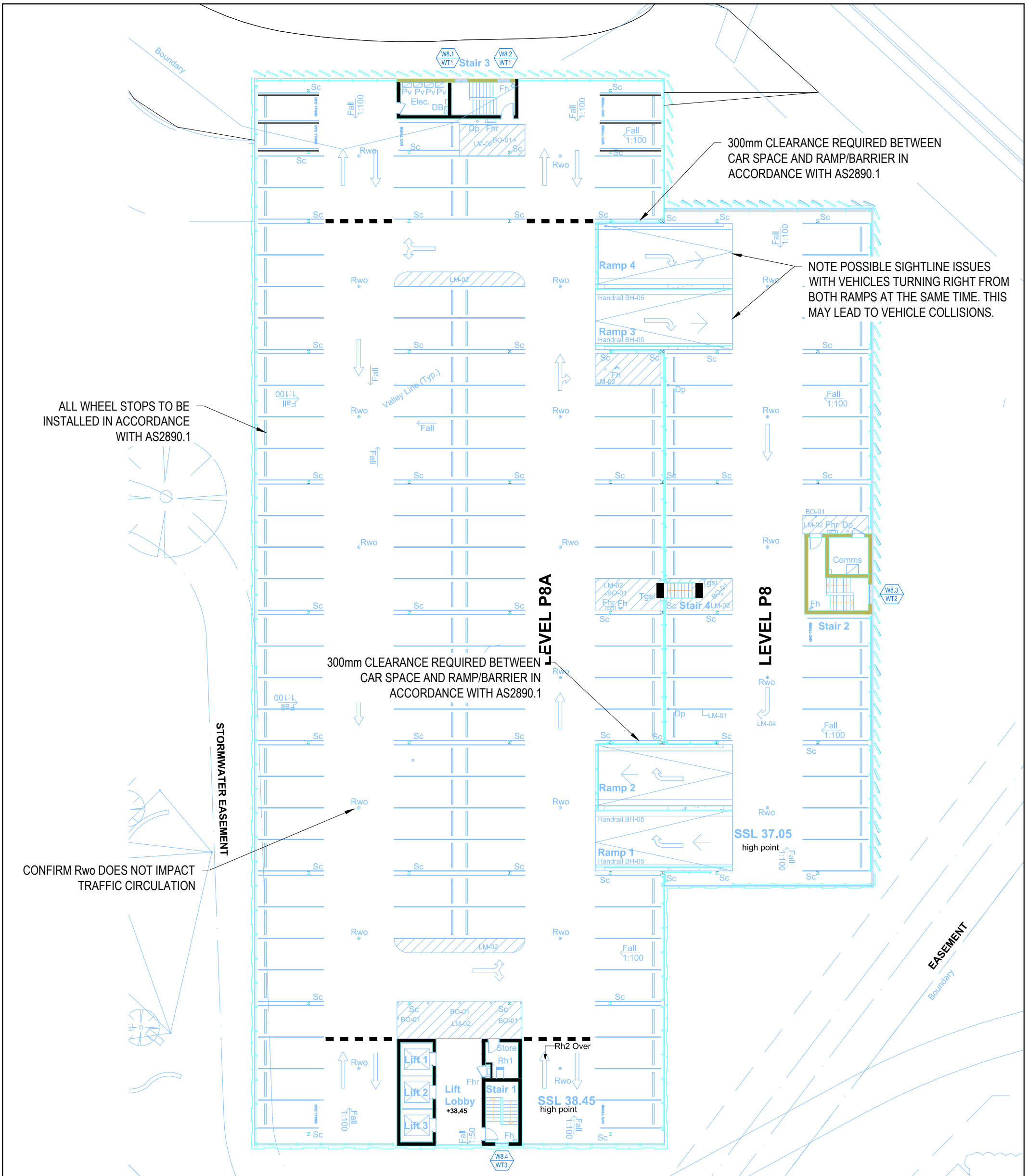
TYPICAL PARKING LEVELS - 4.6m VECTRA
INGRESS/EGRESS MANOEUVRE 05
C.W. 30.06.2021

0 5 8m

SCALE 1:200 @A3

wsp

NORTH



PS118400 SK165

LEVEL P8 & P8A - SITE LAYOUT DETAILS

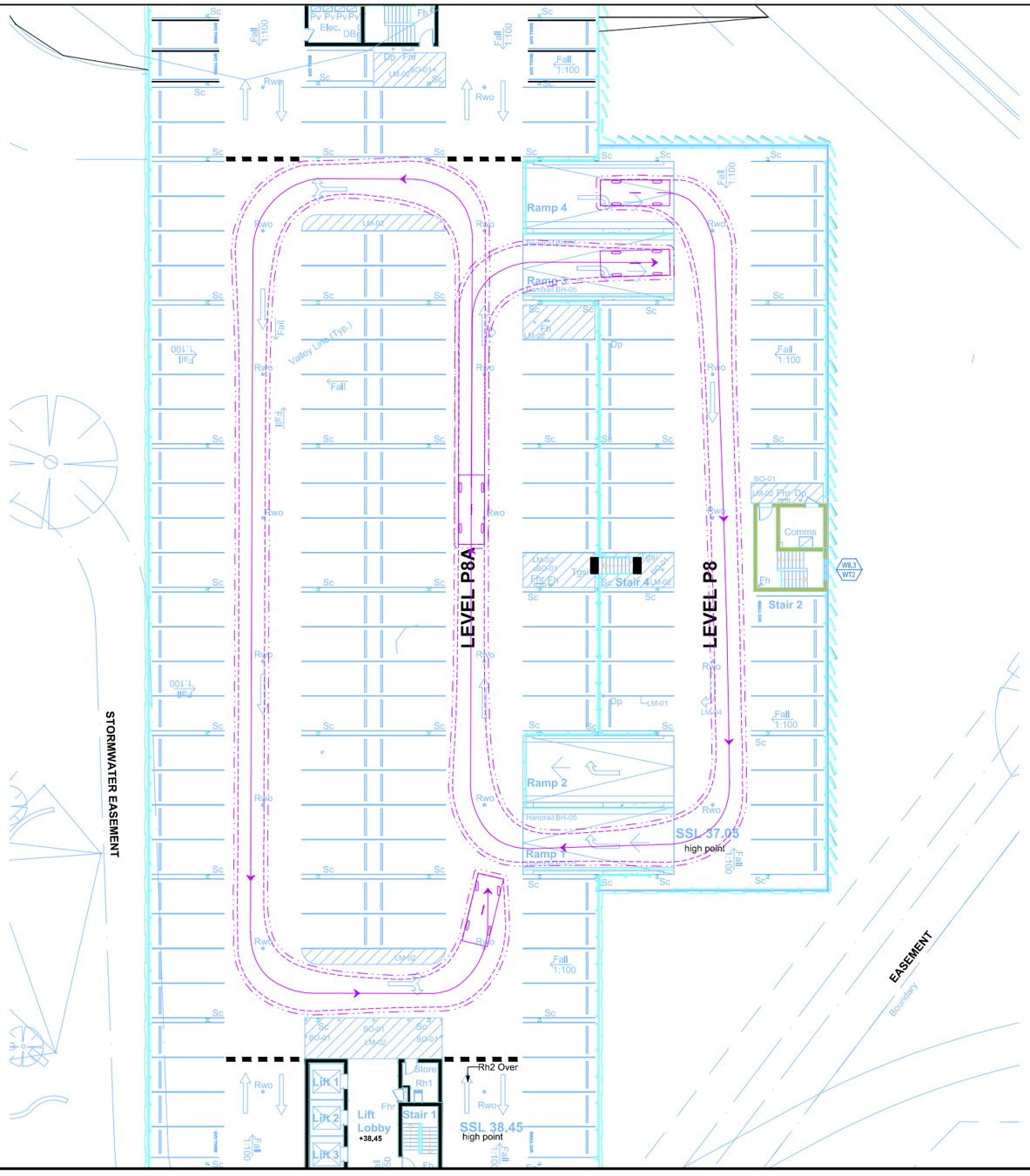
C.W. 06.06.2021

0 5 10m

SCALE 1:300 @A3

NORTH

PROPOSED PARKING PROVISION FOR LEVEL P8 & P8A:
- 127 CAR SPACES



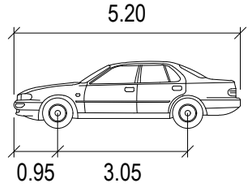
VEHICLE LEGEND

B99CAR 300mm CLEARANCE

B99CAR OVERHANG

B99CAR CENTRELINE

AUSTROADS B99CAR



B99

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.00
Steering Angle	: 33.50

PS118400 SK166

LEVEL P8 & P8A - AUSTROADS B99CAR
INTERNAL CIRCULATION MANOEUVRE
C.W. 06.06.2021

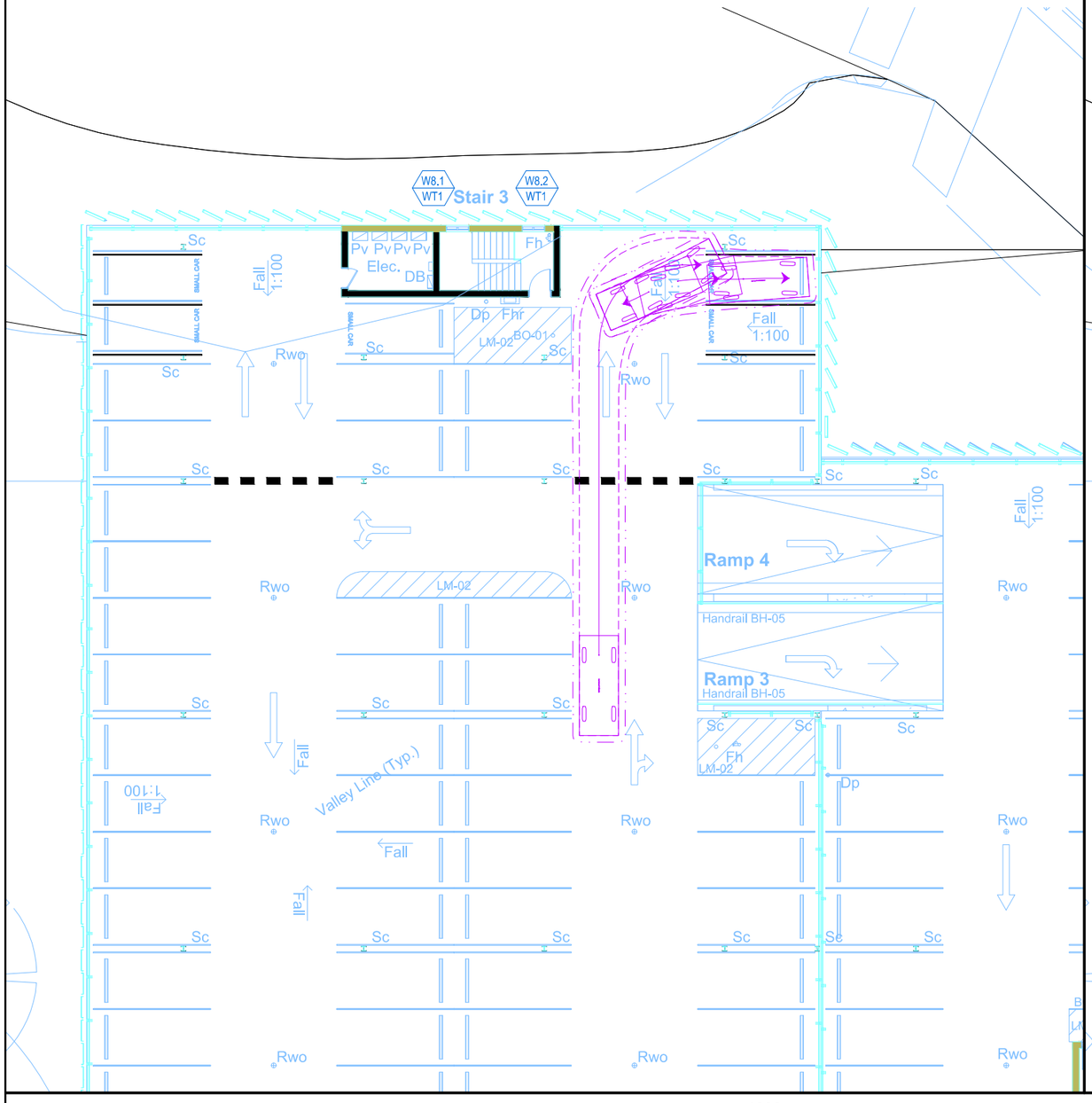
0 10 16m

SCALE 1:400 @A3

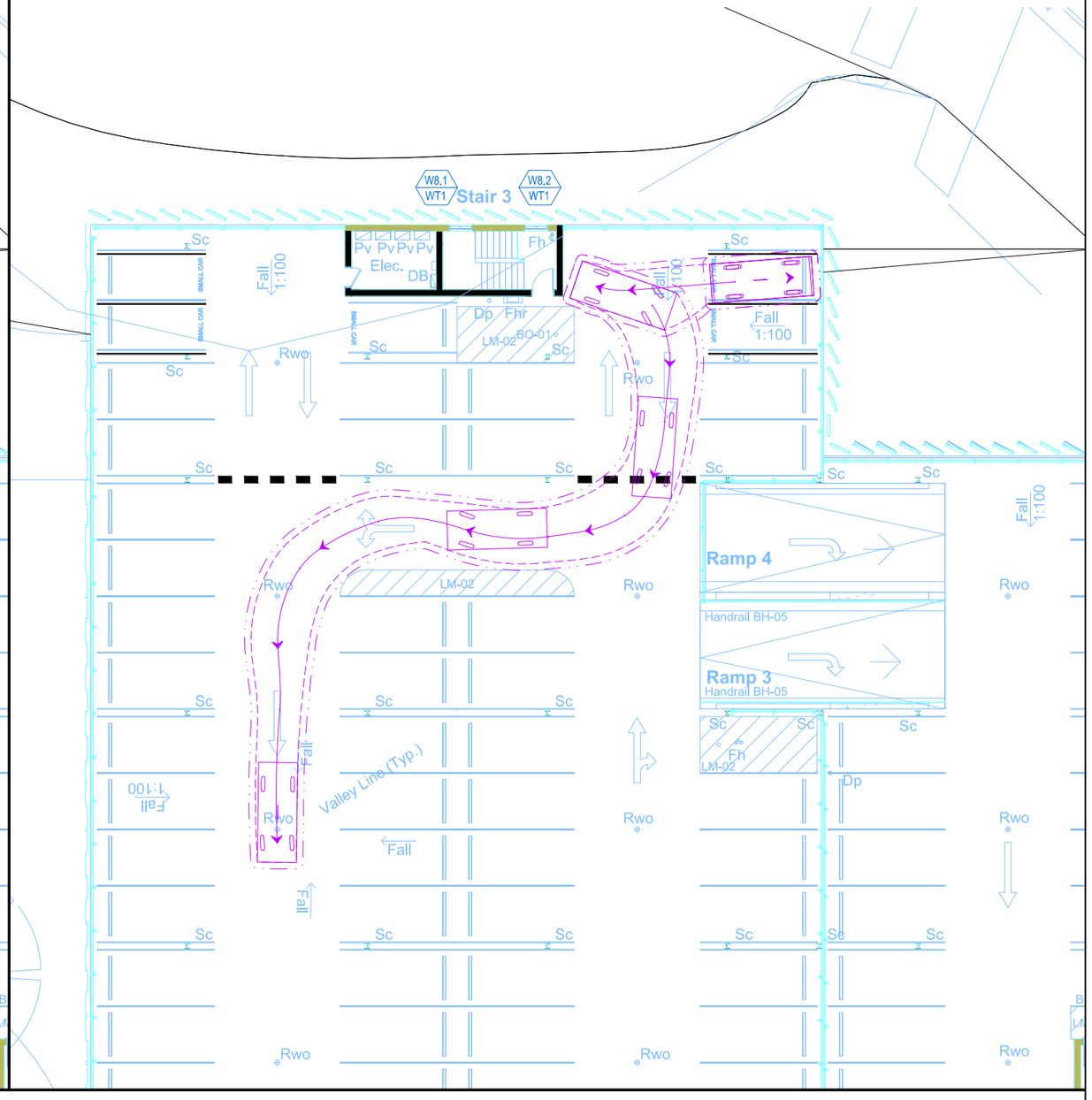
wsp

NORTH

INGRESS



EGRESS

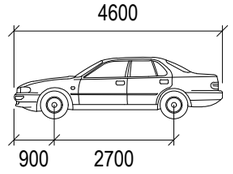


VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE



4.6m VECTRA

	mm
Width	: 1800
Track	: 1530
Lock to Lock Time	: 6.0
Steering Angle	: 36.5

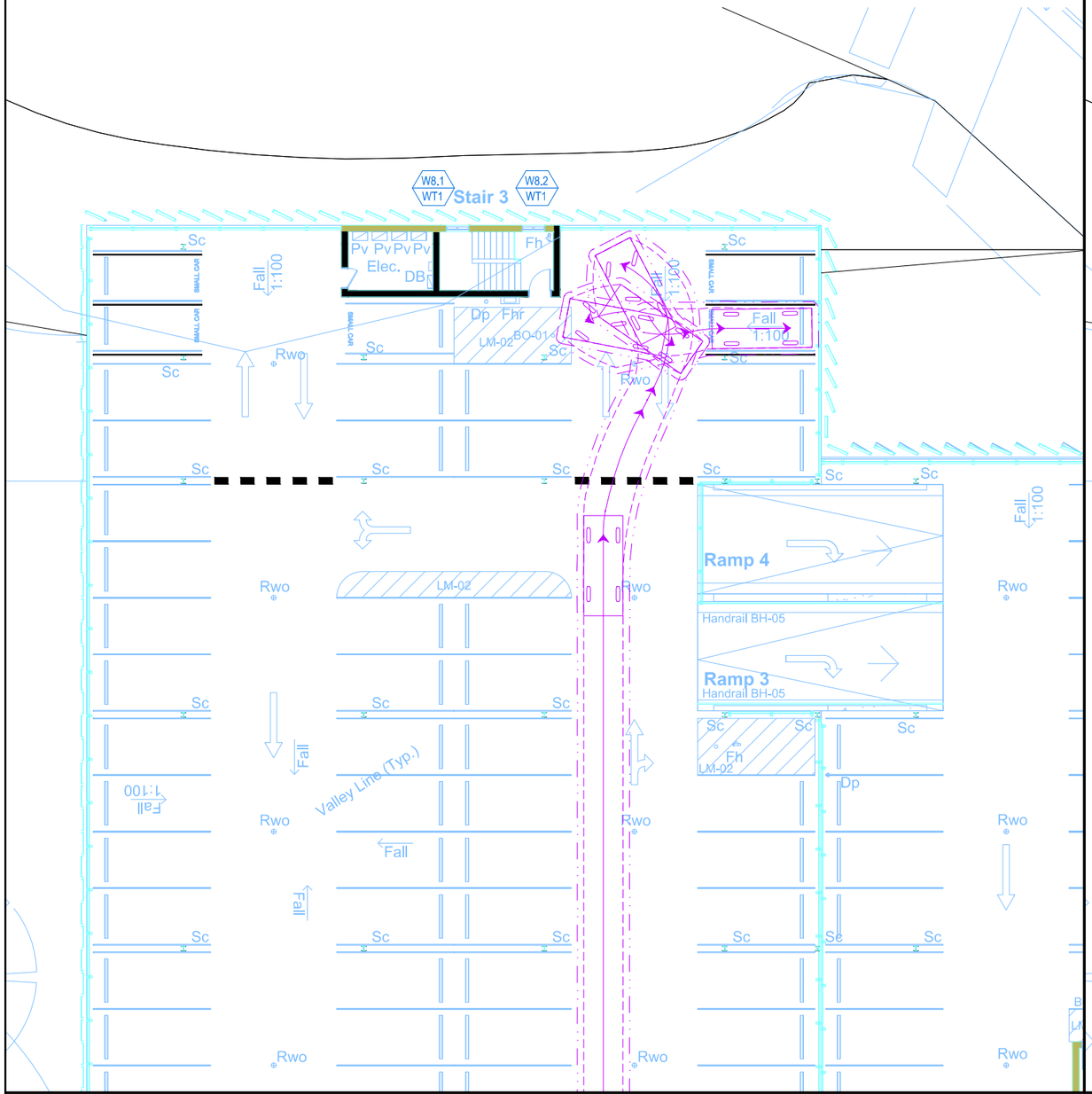
PS118400 SK167

LEVEL P8 & P8A - 4.6m VECTRA
INGRESS/EGRESS MANOEUVRE 01
C.W. 06.06.2021

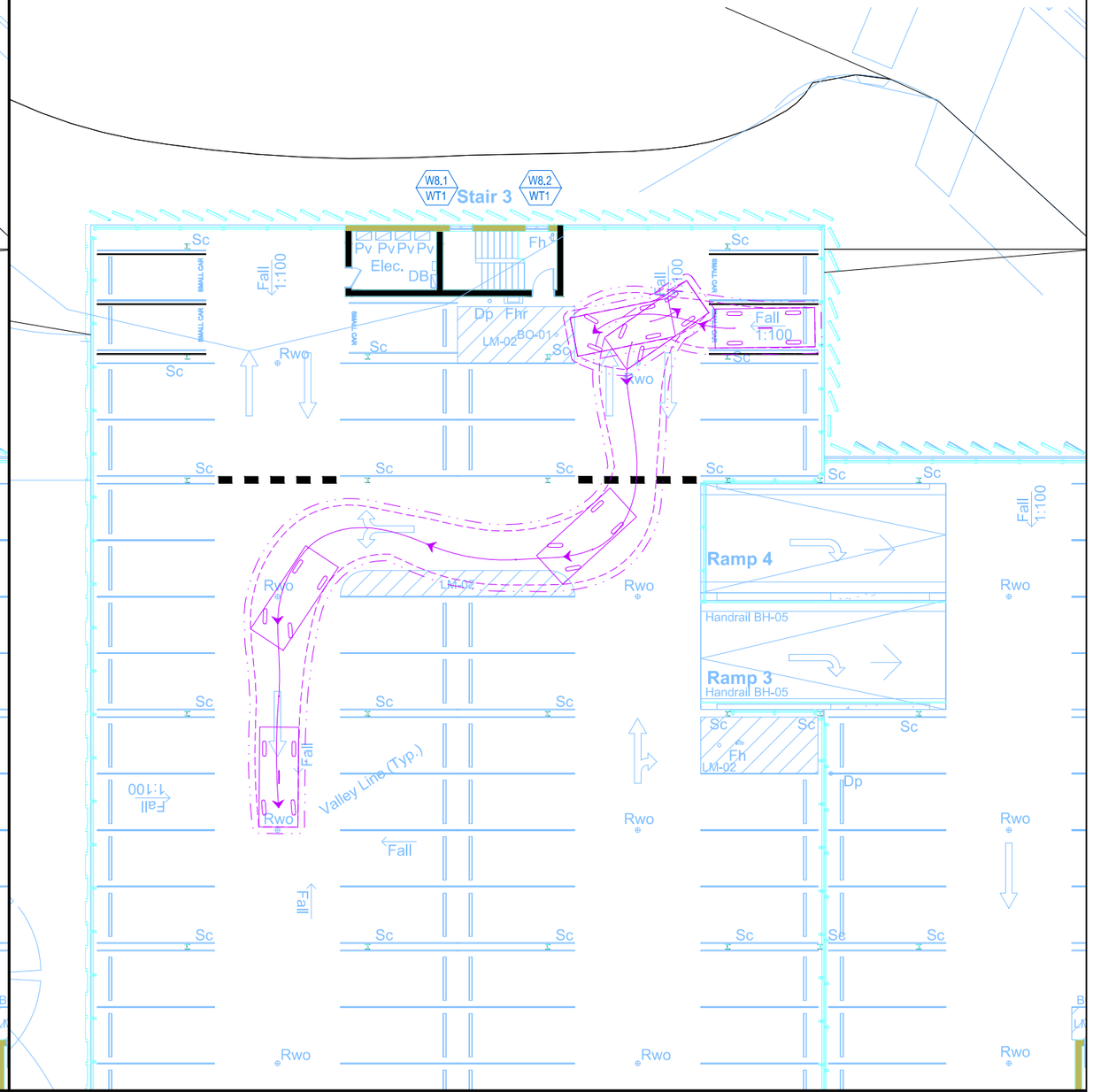
0 5 10m

SCALE 1:250 @A3

INGRESS



EGRESS

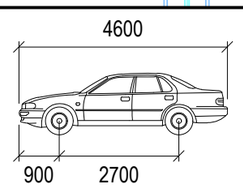


VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE



4.6m VECTRA

	mm
Width	: 1800
Track	: 1530
Lock to Lock Time	: 6.0
Steering Angle	: 36.5

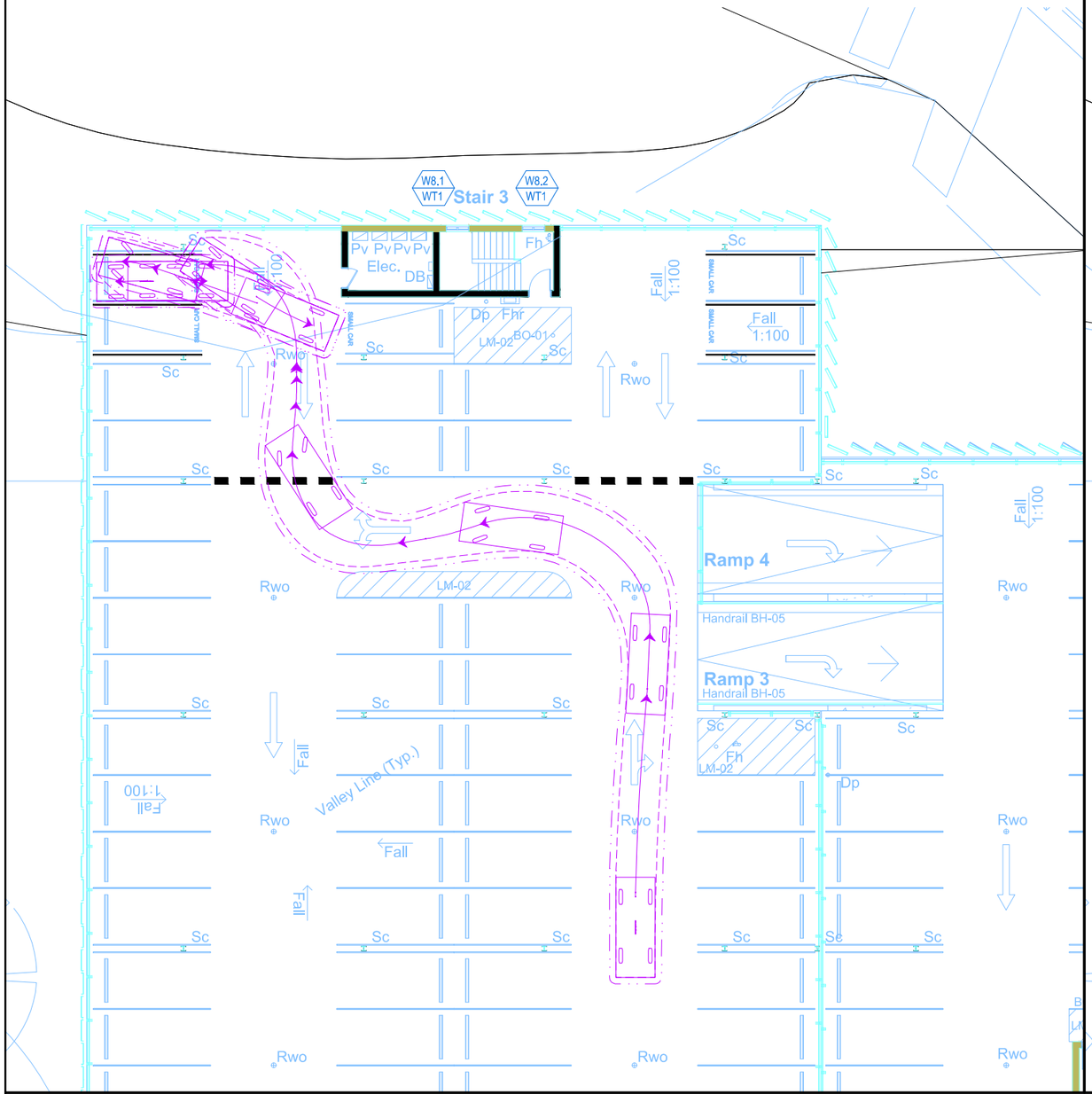
PS118400 SK168

LEVEL P8 & P8A - 4.6m VECTRA
INGRESS/EGRESS MANOEUVRE 02
C.W. 06.06.2021

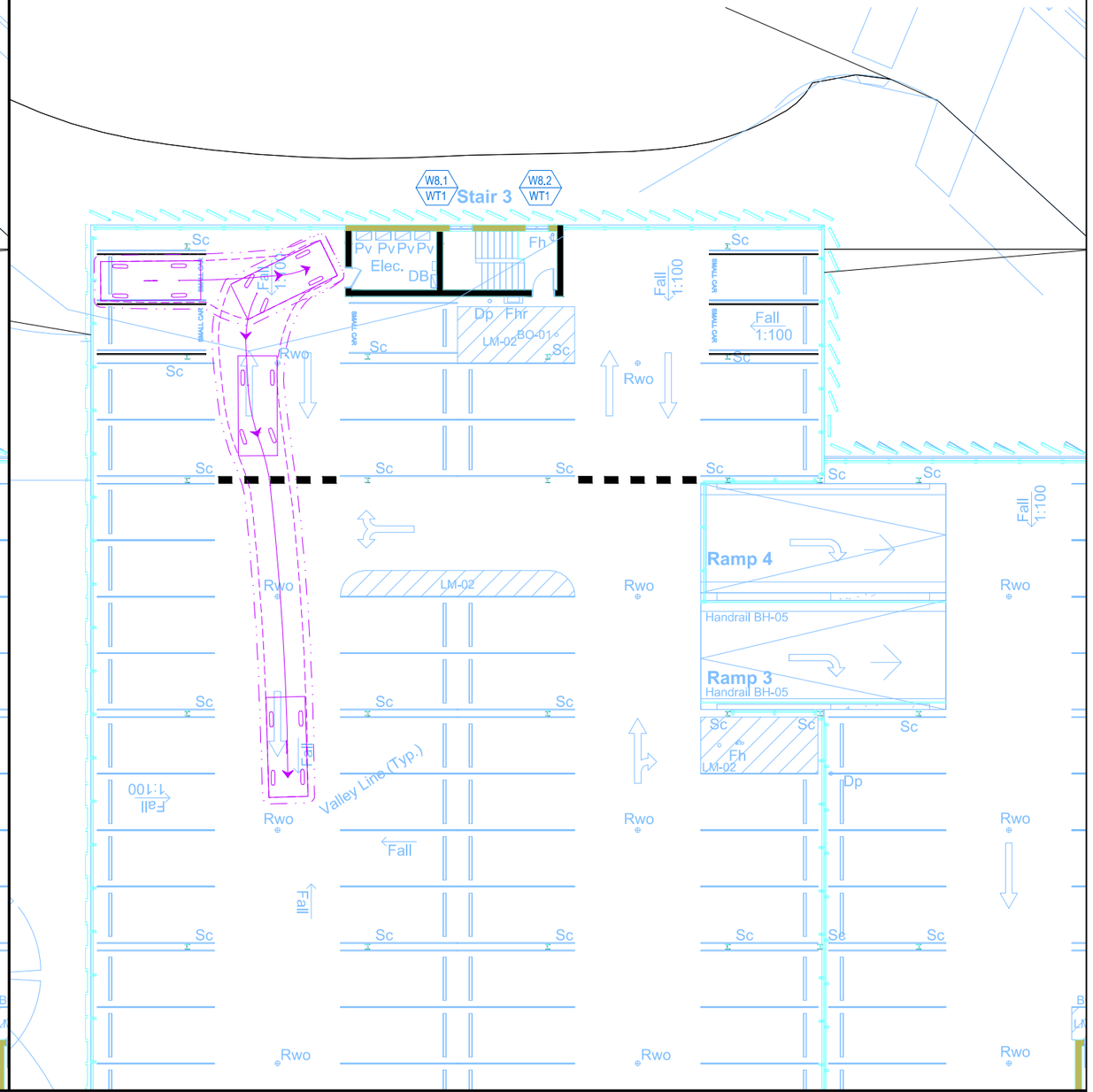
0 5 10m

SCALE 1:250 @A3

INGRESS



EGRESS



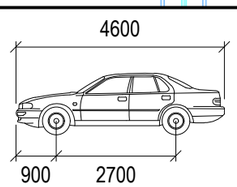
VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE

4.6m VECTRA



4.6m VECTRA

	mm
Width	: 1800
Track	: 1530
Lock to Lock Time	: 6.0
Steering Angle	: 36.5

PS118400 SK169

LEVEL P8 & P8A - 4.6m VECTRA
INGRESS/EGRESS MANOEUVRE 03
C.W. 06.06.2021

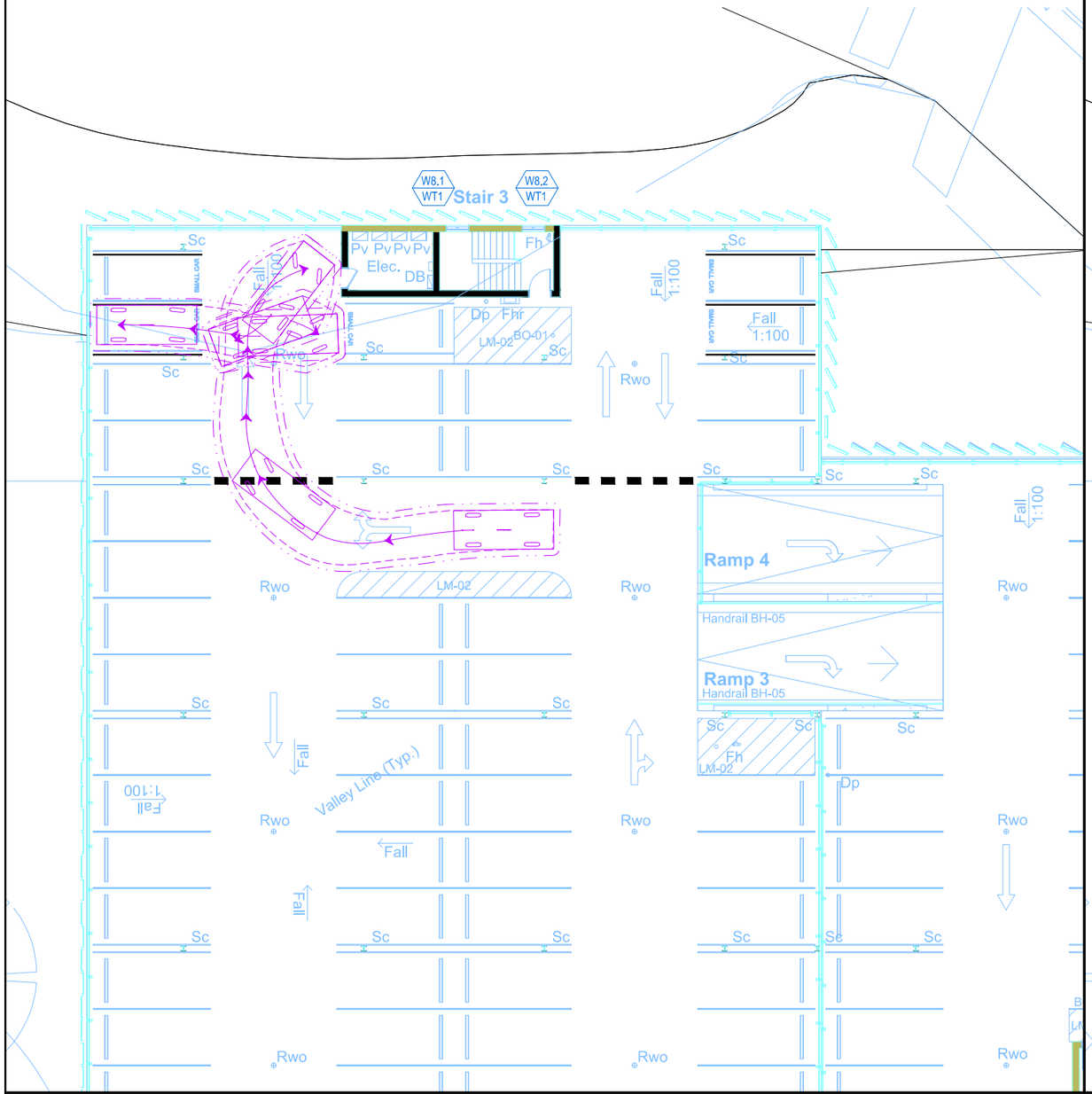
0 5 10m

SCALE 1:250 @A3

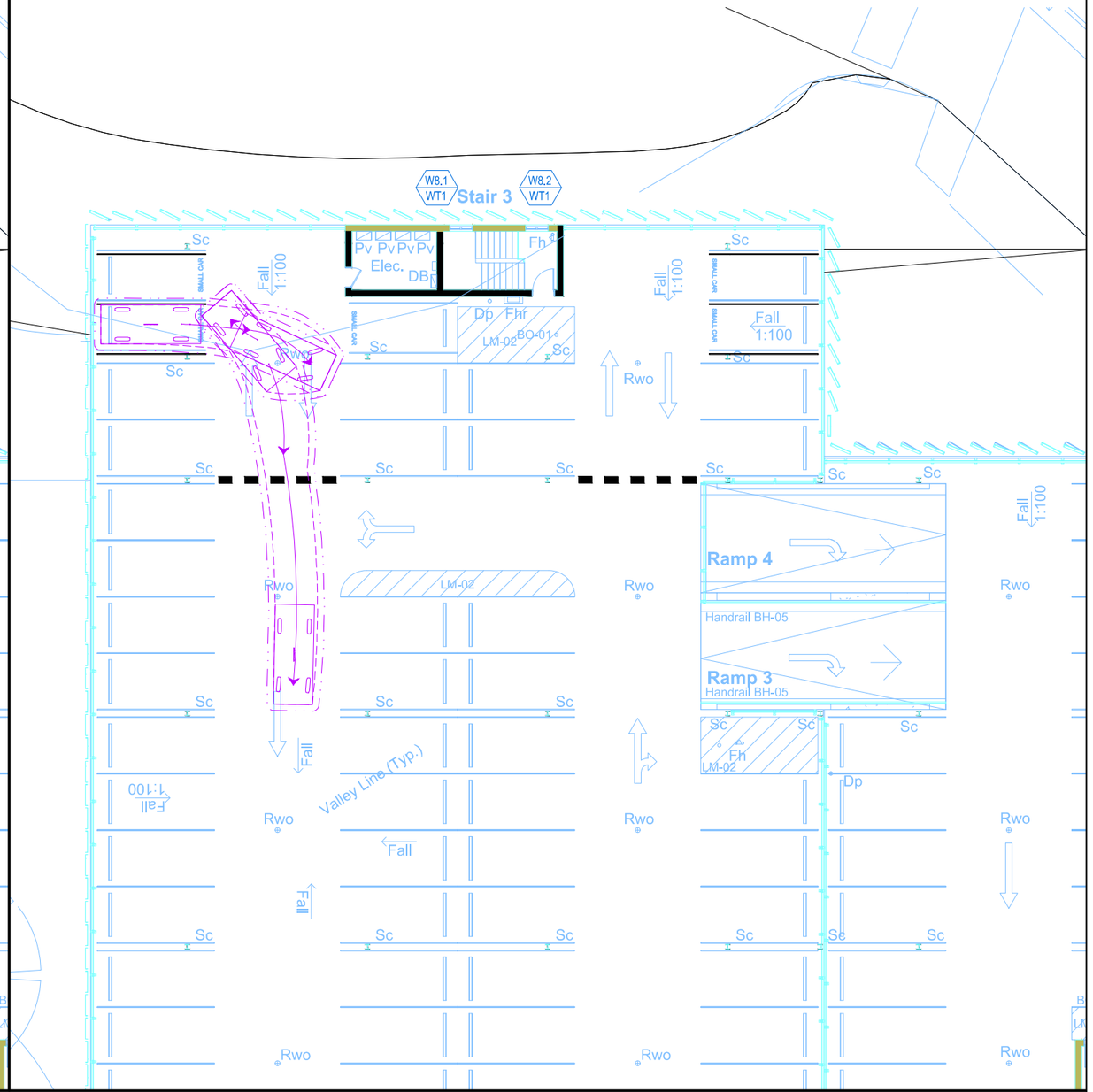
wsp

NORTH

INGRESS



EGRESS



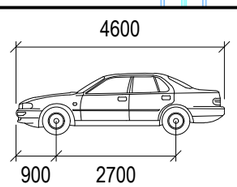
VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE

4.6m VECTRA



4.6m VECTRA

	mm
Width	: 1800
Track	: 1530
Lock to Lock Time	: 6.0
Steering Angle	: 36.5

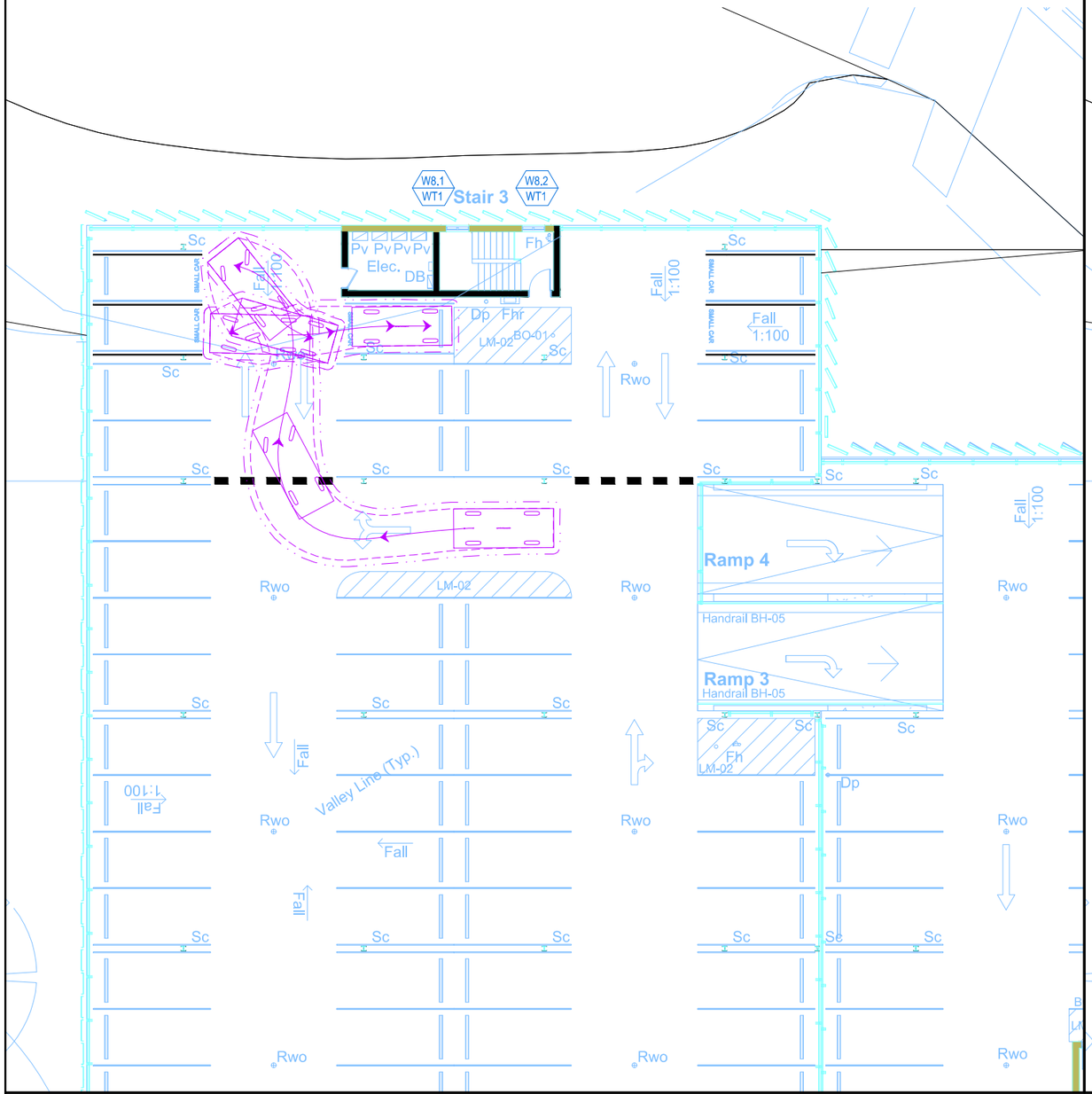
PS118400 SK170

LEVEL P8 & P8A - 4.6m VECTRA
INGRESS/EGRESS MANOEUVRE 04
C.W. 06.06.2021

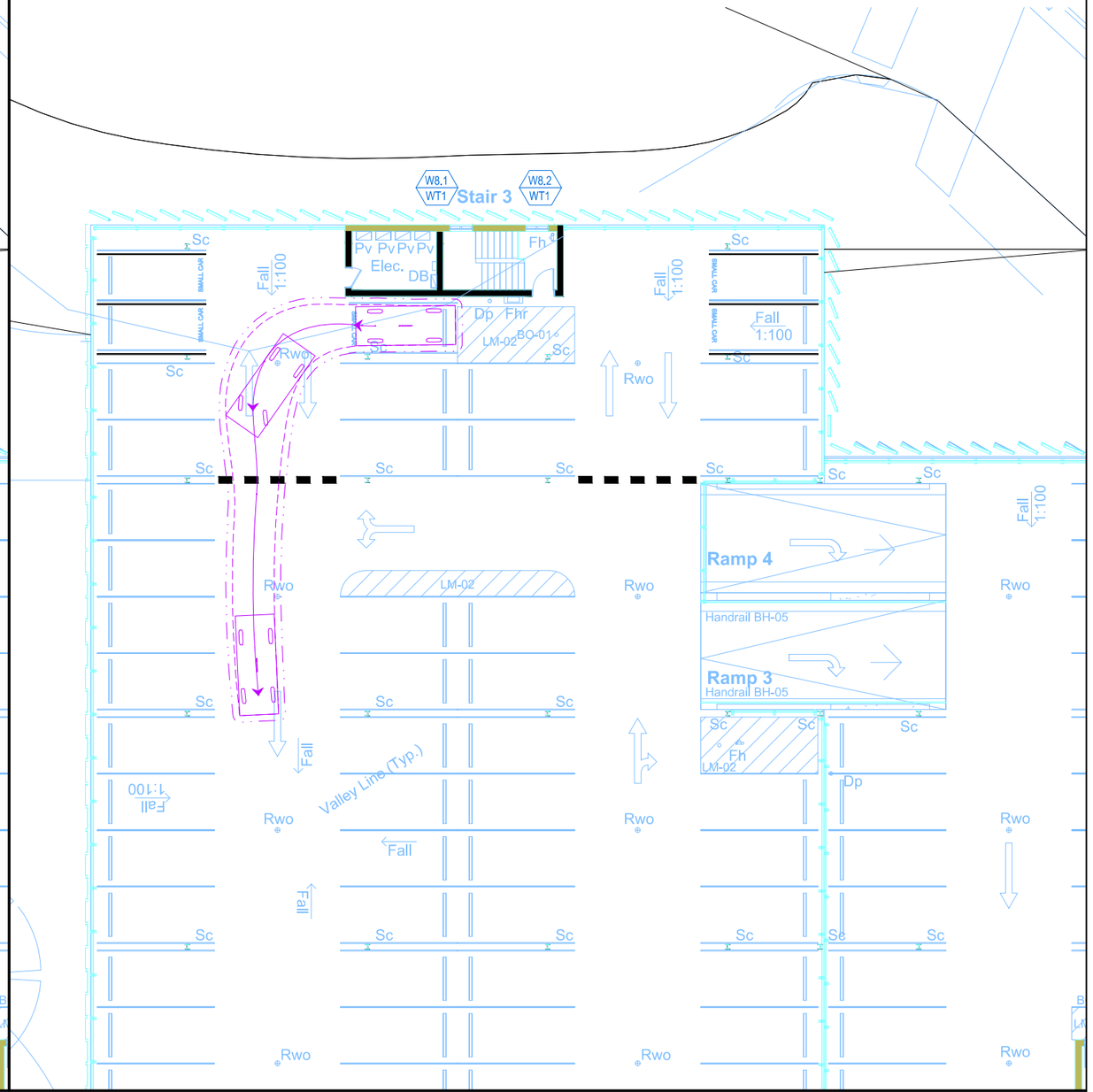
0 5 10m

SCALE 1:250 @A3

INGRESS



EGRESS



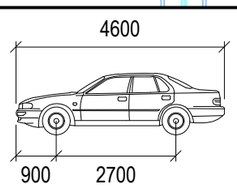
VEHICLE LEGEND

4.6m VECTRA 300mm CLEARANCE

4.6m VECTRA OVERHANG

4.6m VECTRA CENTRELINE

4.6m VECTRA



4.6m VECTRA

	mm
Width	: 1800
Track	: 1530
Lock to Lock Time	: 6.0
Steering Angle	: 36.5

PS118400 SK171

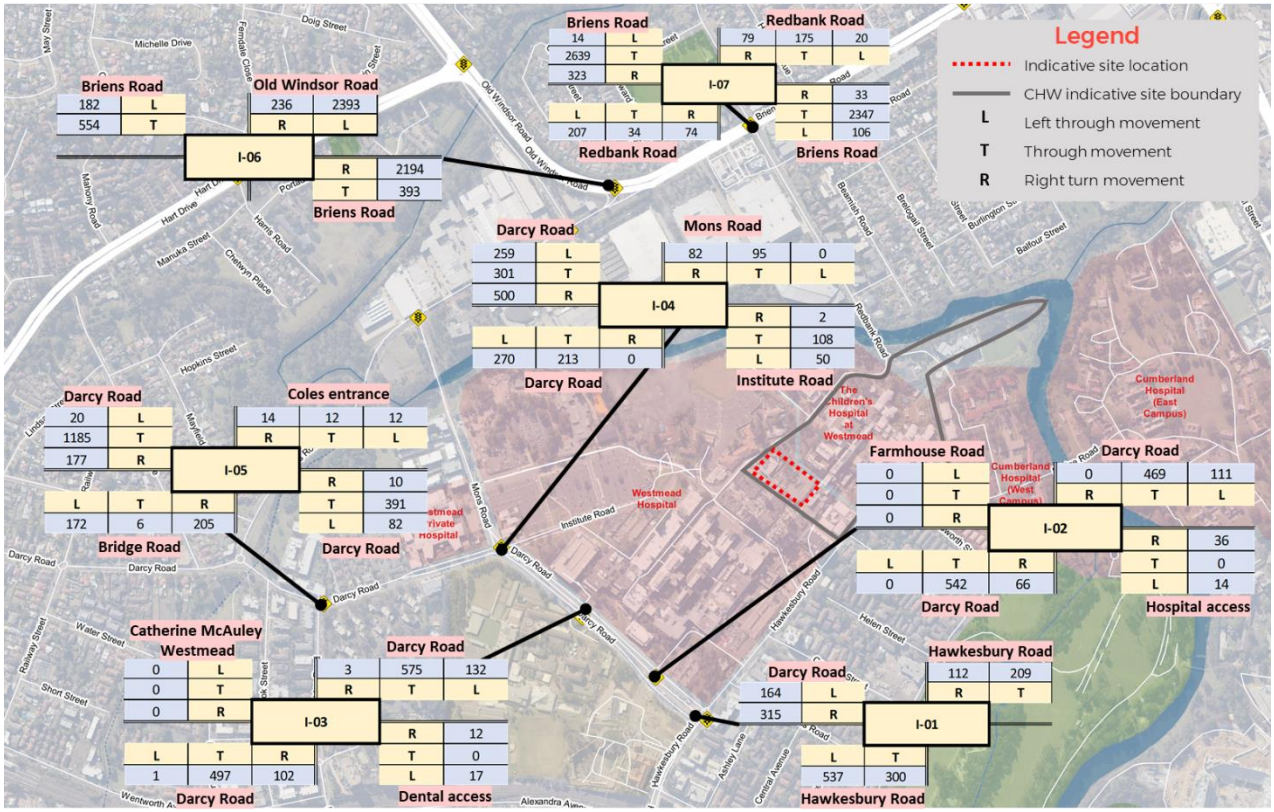
LEVEL P8 & P8A - 4.6m VECTRA
INGRESS/EGRESS MANOEUVRE 04
C.W. 06.06.2021

0 5 10m

SCALE 1:250 @A3

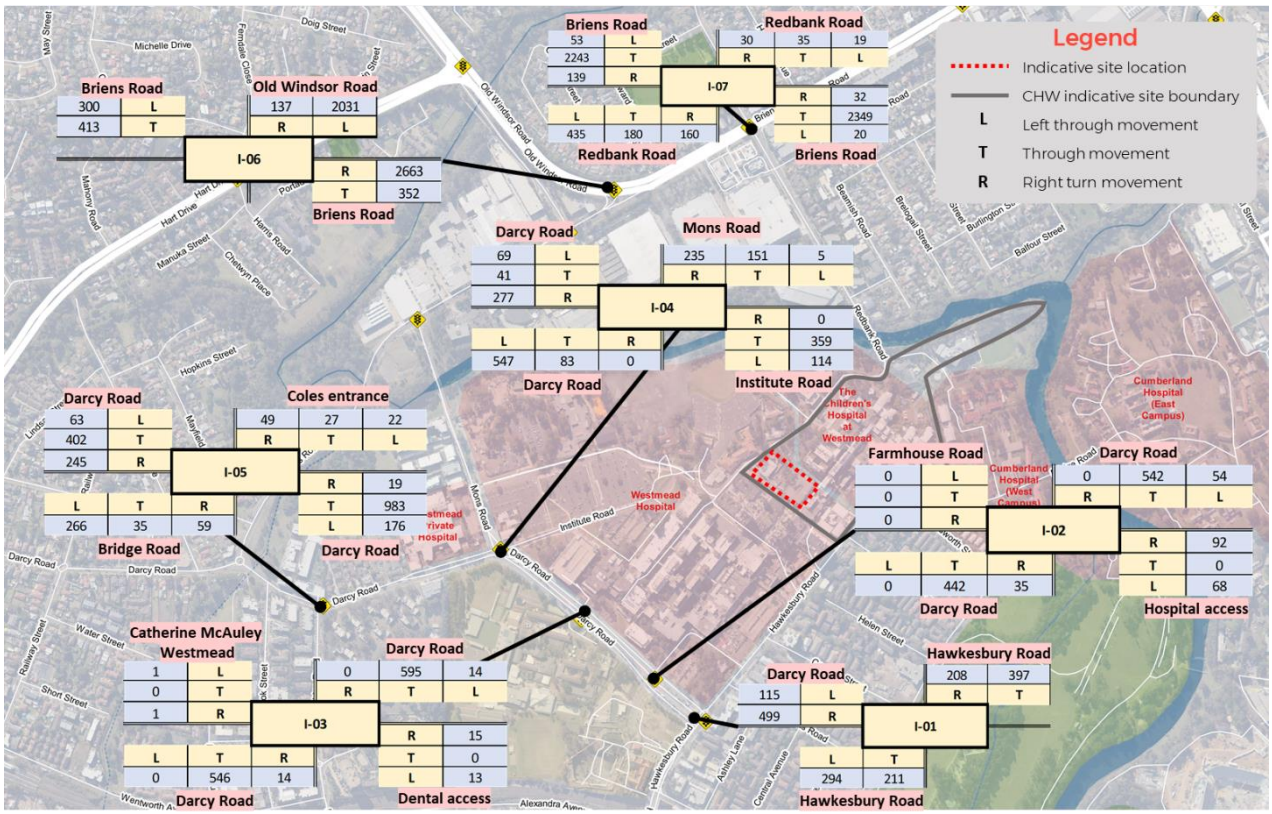
APPENDIX D

FUTURE TRAFFIC VOLUMES ESTIMATES



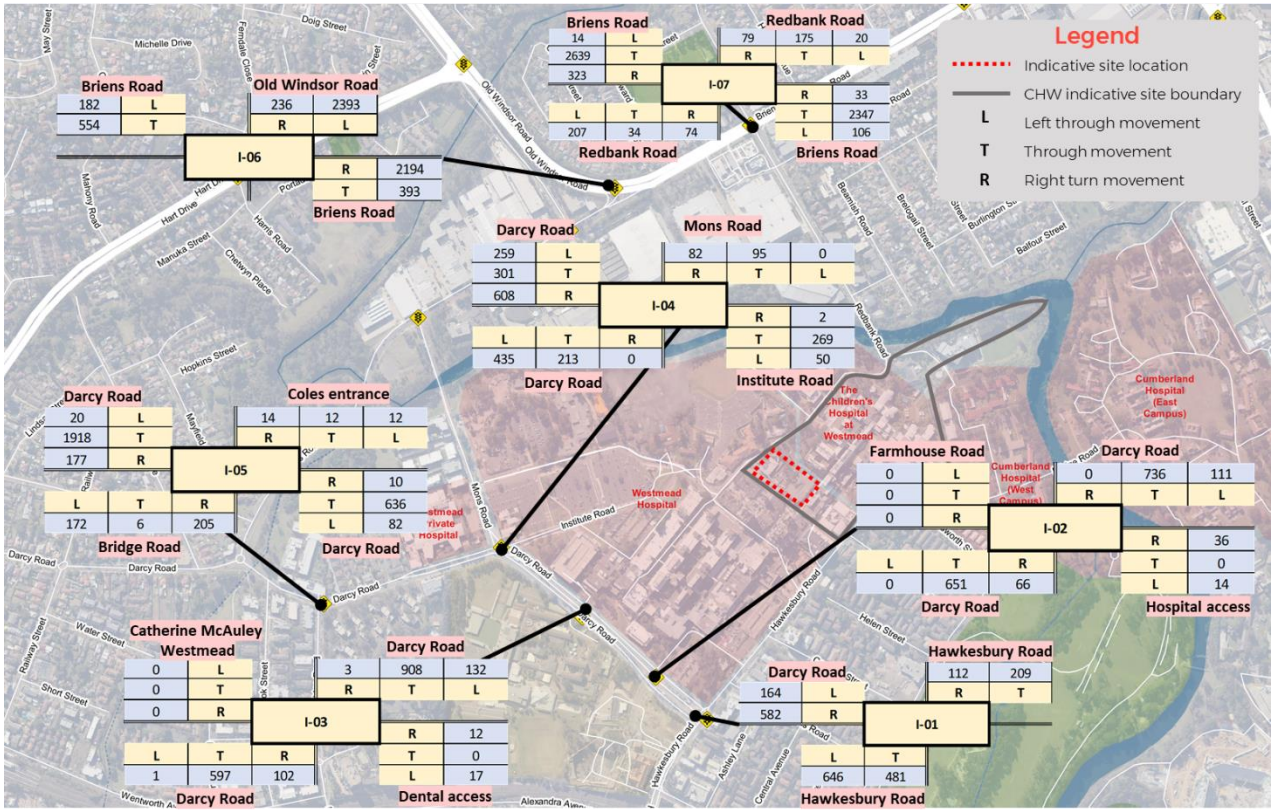
Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure D.1 AM peak 2020 with development traffic volumes



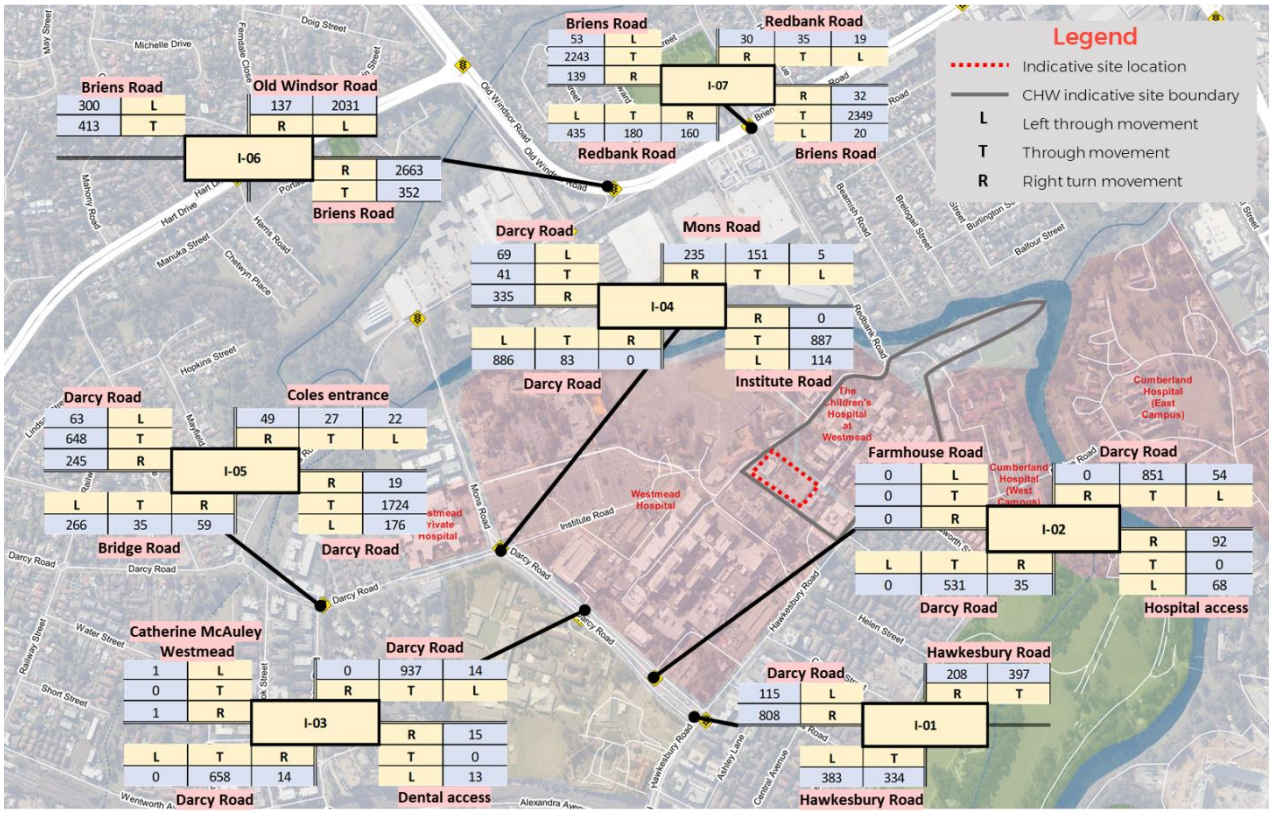
Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure D.2 PM peak 2020 with development traffic volumes



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure D.3 AM peak 2030 with development traffic volumes



Basemap source: *NSW Department of Lands Spatial Information Exchange*

Figure D.4 PM peak 2030 with development traffic volumes

APPENDIX E

SIDRA INTERSECTION MODELLING RESULTS

APPENDIX E-1
2020 AM – WITHOUT DEVELOPMENT

MOVEMENT SUMMARY

Site: I-11 [2020 Base AM I-11 Briens - Redbank]

TCS 3213
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 145 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Redbank Road												
21	L2	215	4.4	0.283	33.8	LOS C	9.8	71.4	0.70	0.75	0.70	32.3
22	T1	36	0.0	0.099	52.3	LOS D	2.1	14.6	0.86	0.64	0.86	29.3
23	R2	77	9.6	0.638	77.8	LOS F	5.6	42.4	1.00	0.82	1.07	25.2
Approach		327	5.1	0.638	46.2	LOS D	9.8	71.4	0.79	0.76	0.80	29.6
East: Briens Road												
24	L2	104	2.0	0.933	61.3	LOS E	68.4	500.3	1.00	1.04	1.16	30.7
25	T1	2471	5.7	0.933	54.7	LOS D	68.9	505.8	1.00	1.04	1.15	29.9
26	R2	35	9.1	0.152	67.3	LOS E	2.2	16.6	0.92	0.73	0.92	28.1
Approach		2609	5.6	0.933	55.1	LOS D	68.9	505.8	1.00	1.04	1.15	29.9
North: Redbank Road												
27	L2	21	15.0	0.885	79.6	LOS F	21.8	154.0	1.00	1.03	1.25	25.8
28	T1	172	0.0	0.885	74.8	LOS F	21.8	154.0	1.00	1.03	1.25	24.5
29	R2	83	0.0	0.885	79.3	LOS F	21.8	154.0	1.00	1.03	1.25	22.1
Approach		276	1.1	0.885	76.5	LOS F	21.8	154.0	1.00	1.03	1.25	24.0
West: Briens Road												
30	L2	15	0.0	0.910	45.5	LOS D	68.2	504.7	0.97	0.97	1.05	31.4
31	T1	2778	6.8	0.910	39.1	LOS C	68.2	505.4	0.94	0.94	1.02	35.8
32	R2	317	1.7	1.043	105.2	LOS F	26.5	188.2	1.00	1.08	1.72	14.3
Approach		3109	6.3	1.043	45.9	LOS D	68.2	505.4	0.94	0.95	1.09	31.0
All Vehicles		6322	5.7	1.043	51.1	LOS D	68.9	505.8	0.96	0.98	1.11	30.0

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	South Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
P6	East Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
P7	North Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	66.8	LOS F			0.96	0.96

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: I-14 [I-14 Bridge - Darcy]

Network: N101 [2020 Base AM Darcy Road Network]

TCS 1630
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Bridge Road														
1	L2	181	2.3	181	2.3	0.266	30.3	LOS C	4.1	29.4	0.74	0.75	0.74	26.3
2	T1	6	0.0	6	0.0	0.912	70.4	LOS E	8.4	59.8	0.99	1.07	1.47	16.2
3	R2	206	2.6	206	2.6	0.912	69.9	LOS E	8.4	59.8	0.99	1.07	1.47	12.6
Approach		394	2.4	394	2.4	0.912	51.7	LOS D	8.4	59.8	0.87	0.92	1.13	17.8
East: Darcy Road														
4	L2	83	7.6	83	7.6	0.280	26.5	LOS B	6.0	43.7	0.79	0.71	0.79	33.4
5	T1	407	3.7	407	3.7	0.280	24.4	LOS B	6.4	46.2	0.84	0.73	0.84	30.0
6	R2	13	16.7	13	16.7	0.042	22.1	LOS B	0.2	1.6	0.85	0.69	0.85	22.5
Approach		503	4.7	503	4.7	0.280	24.7	LOS B	6.4	46.2	0.83	0.72	0.83	30.2
North: Coles Access														
7	L2	17	25.0	17	25.0	0.029	23.2	LOS B	0.3	2.9	0.66	0.48	0.66	16.0
8	T1	13	0.0	13	0.0	0.112	43.0	LOS D	0.8	5.8	0.88	0.65	0.88	18.7
9	R2	15	14.3	15	14.3	0.112	43.0	LOS D	0.8	5.8	0.88	0.65	0.88	16.2
Approach		44	14.3	44	14.3	0.112	35.5	LOS C	0.8	5.8	0.80	0.59	0.80	17.0
West: Darcy Road														
10	L2	21	5.0	21	5.0	0.821	32.3	LOS C	22.5	159.6	0.92	0.87	0.95	18.6
11	T1	1228	1.5	1228	1.5	0.821	27.5	LOS B	22.5	159.6	0.85	0.81	0.91	15.5
12	R2	186	2.3	186	2.3	0.313	13.7	LOS A	2.3	16.6	0.59	0.71	0.59	35.2
Approach		1435	1.6	1435	1.6	0.821	25.8	LOS B	22.5	159.6	0.81	0.80	0.87	18.6
All Vehicles		2376	2.7	2376	2.7	0.912	30.0	LOS C	22.5	159.6	0.83	0.80	0.90	21.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	49.3	LOS E			0.95	0.95

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: I-17 [I-17 Darcy - Mons - Institute]

Network: N101 [2020 Base AM Darcy Road Network]

TCS 2393
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
1	L2	276	2.9	276	2.9	0.137	14.7	LOS B	1.9	13.3	0.41	0.61	0.41	20.5
2	T1	211	14.0	211	14.0	0.720	30.4	LOS C	5.0	35.8	0.81	0.67	0.84	26.7
Approach		487	7.7	487	7.7	0.720	21.5	LOS B	5.0	35.8	0.58	0.63	0.59	24.8
East: Institute Road														
4	L2	53	2.0	53	2.0	0.782	65.7	LOS E	2.9	20.4	1.00	0.91	1.29	16.8
5	T1	108	0.0	108	0.0	0.782	62.1	LOS E	3.0	21.0	1.00	0.91	1.29	17.2
6	R2	2	0.0	2	0.0	0.782	65.5	LOS E	3.0	21.0	1.00	0.91	1.29	24.0
Approach		163	0.6	163	0.6	0.782	63.3	LOS E	3.0	21.0	1.00	0.91	1.29	17.2
North: Mons Road														
7	L2	1	0.0	1	0.0	0.088	23.9	LOS B	1.3	9.7	0.63	0.50	0.63	32.8
8	T1	96	33.0	96	33.0	0.088	20.5	LOS B	1.3	9.7	0.63	0.49	0.63	27.8
9	R2	86	8.5	86	8.5	0.367	46.4	LOS D	2.6	19.2	0.95	0.76	0.95	20.0
Approach		183	21.3	183	21.3	0.367	32.7	LOS C	2.6	19.2	0.78	0.62	0.78	23.6
West: Darcy Road														
10	L2	271	1.2	271	1.2	0.197	4.7	LOS A	1.0	7.4	0.20	0.49	0.20	38.4
11	T1	292	1.2	292	1.2	0.717	44.1	LOS D	10.8	76.6	1.00	0.87	1.01	25.6
12	R2	521	1.6	521	1.6	0.717	37.0	LOS C	14.0	99.3	0.96	0.86	0.96	19.1
Approach		1085	1.4	1085	1.4	0.717	30.8	LOS C	14.0	99.3	0.78	0.77	0.78	26.1
All Vehicles		1917	4.8	1917	4.8	0.782	31.4	LOS C	14.0	99.3	0.75	0.73	0.78	24.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-19 [I-19 Darcy - Dental Hospital - Marist]

Network: N101 [2020 Base AM Darcy Road Network]

TCS 3282
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
4	L2	1	0.0	1	0.0	0.246	6.1	LOS A	0.8	5.9	0.11	0.10	0.11	21.5
5	T1	508	8.2	508	8.2	0.246	3.1	LOS A	1.1	8.2	0.13	0.11	0.13	33.6
6	R2	107	0.0	107	0.0	0.374	55.8	LOS D	3.5	24.7	1.00	0.79	1.00	10.8
Approach		616	6.7	616	6.7	0.374	12.3	LOS A	3.5	24.7	0.28	0.23	0.28	23.0
East: Dental hospital access														
7	L2	18	17.6	18	17.6	0.028	25.9	LOS B	0.4	2.9	0.65	0.63	0.65	7.4
9	R2	13	0.0	13	0.0	0.054	47.5	LOS D	0.4	2.5	0.89	0.67	0.89	4.7
Approach		31	10.3	31	10.3	0.054	34.9	LOS C	0.4	2.9	0.75	0.65	0.75	5.9
North: Darcy Road														
10	L2	139	0.0	139	0.0	0.363	15.1	LOS B	4.3	30.3	0.41	0.47	0.41	16.2
11	T1	592	7.7	592	7.7	0.363	5.4	LOS A	4.3	30.3	0.20	0.21	0.20	29.0
12	R2	3	0.0	3	0.0	0.011	52.3	LOS D	0.1	0.7	1.00	0.64	1.00	10.9
Approach		734	6.2	734	6.2	0.363	7.5	LOS A	4.3	30.3	0.24	0.26	0.24	24.2
West: Marist HS														
1	L2	1	0.0	1	0.0	0.007	42.9	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
3	R2	1	0.0	1	0.0	0.007	42.7	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
Approach		2	0.0	2	0.0	0.007	42.8	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
All Vehicles		1383	6.5	1383	6.5	0.374	10.3	LOS A	4.3	30.3	0.27	0.25	0.27	23.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-23 [I-23 Darcy - Hospital - WSU]

Network: N101 [2020 Base AM Darcy Road Network]

TCS 3281
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
4	L2	43	4.9	43	4.9	0.301	28.6	LOS C	7.2	51.6	0.84	0.74	0.84	21.4
5	T1	555	6.9	555	6.9	0.301	21.6	LOS B	7.2	51.6	0.79	0.68	0.79	12.3
6	R2	69	1.5	69	1.5	0.297	46.2	LOS D	2.0	13.8	0.87	0.73	0.87	8.8
Approach		668	6.2	668	6.2	0.301	24.6	LOS B	7.2	51.6	0.80	0.69	0.80	12.4
East: Westmead Hospital access														
7	L2	15	0.0	15	0.0	0.036	37.7	LOS C	0.4	2.8	0.80	0.65	0.80	4.8
8	T1	1	0.0	1	0.0	0.036	34.5	LOS C	0.4	2.8	0.80	0.65	0.80	15.0
9	R2	38	2.8	38	2.8	0.381	61.0	LOS E	1.3	9.3	1.00	0.73	1.00	3.3
Approach		54	2.0	54	2.0	0.381	54.1	LOS D	1.3	9.3	0.94	0.71	0.94	3.8
North: Darcy Road														
10	L2	117	0.0	117	0.0	0.301	8.6	LOS A	1.8	12.9	0.21	0.34	0.21	22.3
11	T1	480	9.2	480	9.2	0.301	3.3	LOS A	1.8	12.9	0.13	0.16	0.13	33.1
12	R2	1	0.0	1	0.0	0.004	56.0	LOS D	0.0	0.2	1.00	0.60	1.00	15.9
Approach		598	7.4	598	7.4	0.301	4.4	LOS A	1.8	12.9	0.15	0.19	0.15	29.4
West: Car park														
1	L2	25	8.3	25	8.3	0.059	38.1	LOS C	0.6	4.8	0.78	0.70	0.78	13.1
2	T1	1	0.0	1	0.0	0.059	32.4	LOS C	0.6	4.8	0.78	0.70	0.78	15.3
3	R2	1	0.0	1	0.0	0.010	60.1	LOS E	0.0	0.2	0.96	0.59	0.96	9.1
Approach		27	7.7	27	7.7	0.059	38.7	LOS C	0.6	4.8	0.78	0.69	0.78	13.0
All Vehicles		1347	6.6	1347	6.6	0.381	17.1	LOS B	7.2	51.6	0.52	0.47	0.52	17.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P21	South Stage 1	53	49.3	LOS E	0.2	0.2	0.95	0.95
P22	South Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	49.3	LOS E	0.2	0.2	0.95	0.95
P42	North Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	19.2	LOS B	0.1	0.1	0.59	0.59

All Pedestrians	316	44.3	LOS E	0.89	0.89

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: I-30 [I-30 Darcy - Hawkesbury]

Network: N101 [2020 Base AM Darcy Road Network]

TCS 1631
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hawkesbury Road														
8	T1	218	4.3	218	4.3	0.186	9.5	LOS A	3.0	22.0	0.46	0.39	0.46	26.9
9	R2	117	6.3	117	6.3	0.346	25.6	LOS B	1.8	13.0	0.91	0.75	0.91	17.0
Approach		335	5.0	335	5.0	0.346	15.2	LOS B	3.0	22.0	0.62	0.52	0.62	22.4
North: Darcy Road														
10	L2	167	5.7	167	5.7	0.225	18.8	LOS B	2.7	19.4	0.74	0.72	0.74	23.7
12	R2	324	11.0	324	11.0	0.516	51.3	LOS D	4.7	33.5	0.96	0.79	0.96	6.7
Approach		491	9.2	491	9.2	0.516	40.2	LOS C	4.7	33.5	0.89	0.76	0.89	11.2
West: Hawkesbury Road														
1	L2	551	6.2	551	6.2	0.523	13.5	LOS A	6.2	44.1	0.73	0.78	0.73	21.9
2	T1	307	2.5	307	2.5	0.489	30.1	LOS C	6.9	49.3	0.73	0.68	0.73	21.4
Approach		858	4.9	858	4.9	0.523	19.5	LOS B	6.9	49.3	0.73	0.75	0.73	21.6
All Vehicles		1684	6.2	1684	6.2	0.523	24.7	LOS B	6.9	49.3	0.75	0.71	0.75	17.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	21.9	LOS C	0.1	0.1	0.89	0.89
P42	North Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	42.4	LOS E			0.93	0.93

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: I-28 [I-28 Hawkesbury - Railway]

Network: N101 [2020 Base AM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Pde														
4	L2	144	1.5	144	1.5	0.274	26.7	LOS B	3.1	21.9	0.69	0.74	0.69	29.1
6	R2	18	0.0	18	0.0	0.056	45.6	LOS D	0.5	3.5	0.86	0.69	0.86	22.5
Approach		162	1.3	162	1.3	0.274	28.7	LOS C	3.1	21.9	0.71	0.73	0.71	28.2
East: Hawkesbury Rd														
7	L2	71	0.0	71	0.0	0.148	25.6	LOS B	2.3	20.5	0.72	0.66	0.72	32.6
8	T1	426	9.1	426	9.1	0.274	24.6	LOS B	6.3	44.7	0.78	0.66	0.78	14.7
Approach		496	7.8	496	7.8	0.274	24.6	LOS B	6.3	44.7	0.77	0.66	0.77	19.2
West: Hawkesbury Rd														
2	T1	884	4.5	884	4.5	0.539	1.9	LOS A	2.5	17.9	0.14	0.17	0.14	33.6
3	R2	234	0.0	234	0.0	0.539	6.8	LOS A	2.2	15.6	0.25	0.44	0.25	44.1
Approach		1118	3.6	1118	3.6	0.539	3.0	LOS A	2.5	17.9	0.17	0.23	0.17	40.2
All Vehicles		1776	4.6	1776	4.6	0.539	11.4	LOS A	6.3	44.7	0.39	0.40	0.39	28.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-27 [I-27 Hawkesbury - Alexandra]

Network: N101 [2020 Base AM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Alexandra Ave														
4	L2	31	0.0	31	0.0	0.626	53.8	LOS D	5.2	39.0	0.99	0.82	1.00	15.2
5	T1	66	3.2	66	3.2	0.626	49.3	LOS D	5.2	39.0	0.99	0.82	1.00	24.1
6	R2	219	15.4	219	15.4	0.626	54.1	LOS D	5.2	39.0	0.99	0.82	1.01	9.2
Approach		316	11.3	316	11.3	0.626	53.1	LOS D	5.2	39.0	0.99	0.82	1.01	14.1
East: Hawkesbury Road														
7	L2	200	18.9	200	18.9	0.382	19.7	LOS B	6.4	45.6	0.51	0.61	0.51	23.9
8	T1	348	1.5	348	1.5	0.382	21.9	LOS B	6.4	45.6	0.64	0.62	0.64	20.2
9	R2	49	0.0	49	0.0	0.382	29.8	LOS C	4.5	31.6	0.68	0.60	0.68	30.0
Approach		597	7.2	597	7.2	0.382	21.8	LOS B	6.4	45.6	0.60	0.61	0.60	22.4
North: Alexandra Ave														
10	L2	68	0.0	68	0.0	0.110	31.4	LOS C	1.5	10.7	0.72	0.71	0.72	27.1
11	T1	242	0.9	242	0.9	0.624	44.0	LOS D	7.4	52.2	0.97	0.81	0.97	26.1
Approach		311	0.7	311	0.7	0.624	41.2	LOS C	7.4	52.2	0.91	0.79	0.91	26.3
West: Hawkesbury Road														
1	L2	15	7.1	15	7.1	0.612	36.1	LOS C	11.3	80.0	0.88	0.77	0.88	29.8
2	T1	826	0.6	826	0.6	0.612	31.5	LOS C	11.4	80.3	0.88	0.77	0.88	13.8
Approach		840	0.7	840	0.7	0.612	31.5	LOS C	11.4	80.3	0.88	0.77	0.88	14.3
All Vehicles		2064	4.2	2064	4.2	0.626	33.5	LOS C	11.4	80.3	0.82	0.73	0.82	18.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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.

APPENDIX E-2
2020 AM – WITH DEVELOPMENT

MOVEMENT SUMMARY

Site: I-11 [2020 Dev AM I-11 Briens - Redbank]

TCS 3213
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 145 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Redbank Road												
21	L2	218	4.3	0.287	33.9	LOS C	10.0	72.5	0.70	0.75	0.70	32.3
22	T1	36	0.0	0.100	52.4	LOS D	2.1	14.8	0.86	0.65	0.86	29.3
23	R2	78	9.5	0.697	80.7	LOS F	5.8	43.9	1.00	0.84	1.13	24.7
Approach		332	5.1	0.697	46.9	LOS D	10.0	72.5	0.79	0.76	0.82	29.4
East: Briens Road												
24	L2	112	1.9	0.936	62.4	LOS E	69.2	506.1	1.00	1.05	1.16	30.4
25	T1	2471	5.7	0.936	55.8	LOS D	69.7	512.1	1.00	1.05	1.16	29.5
26	R2	35	9.1	0.152	67.3	LOS E	2.2	16.6	0.92	0.73	0.92	28.1
Approach		2617	5.6	0.936	56.2	LOS D	69.7	512.1	1.00	1.04	1.16	29.6
North: Redbank Road												
27	L2	21	15.0	0.922	87.2	LOS F	24.1	170.2	1.00	1.09	1.34	24.5
28	T1	184	0.0	0.922	82.3	LOS F	24.1	170.2	1.00	1.09	1.34	23.4
29	R2	83	0.0	0.922	86.9	LOS F	24.1	170.2	1.00	1.09	1.34	20.9
Approach		288	1.1	0.922	84.0	LOS F	24.1	170.2	1.00	1.09	1.34	22.8
West: Briens Road												
30	L2	15	0.0	0.912	46.1	LOS D	68.9	509.9	0.98	0.98	1.06	31.2
31	T1	2778	6.8	0.912	39.8	LOS C	68.9	510.6	0.94	0.94	1.03	35.5
32	R2	340	1.6	1.117	160.3	LOS F	35.3	250.4	1.00	1.18	2.00	11.2
Approach		3132	6.2	1.117	52.9	LOS D	68.9	510.6	0.94	0.97	1.13	28.7
All Vehicles		6369	5.7	1.117	55.3	LOS D	69.7	512.1	0.96	0.99	1.14	28.7

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	South Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
P6	East Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
P7	North Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	66.8	LOS F			0.96	0.96

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: I-14 [I-14 Bridge - Darcy]

Network: N101 [2020 Dev AM Darcy Road Network]

TCS 1630
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Bridge Road														
1	L2	181	2.3	181	2.3	0.266	30.3	LOS C	4.1	29.4	0.74	0.75	0.74	26.3
2	T1	6	0.0	6	0.0	0.915	70.5	LOS F	8.8	62.6	0.99	1.07	1.47	16.2
3	R2	216	2.4	216	2.4	0.915	70.1	LOS E	8.8	62.6	0.99	1.07	1.47	12.6
Approach		403	2.4	403	2.4	0.915	52.2	LOS D	8.8	62.6	0.88	0.93	1.14	17.6
East: Darcy Road														
4	L2	86	7.4	86	7.4	0.283	26.1	LOS B	6.0	43.6	0.78	0.70	0.78	33.6
5	T1	411	3.7	411	3.7	0.283	24.2	LOS B	6.4	46.6	0.83	0.72	0.83	30.1
6	R2	13	16.7	13	16.7	0.044	22.5	LOS B	0.2	1.6	0.85	0.69	0.85	22.5
Approach		510	4.6	510	4.6	0.283	24.4	LOS B	6.4	46.6	0.82	0.72	0.82	30.4
North: Coles Access														
7	L2	17	25.0	17	25.0	0.029	23.2	LOS B	0.3	2.9	0.66	0.48	0.66	16.0
8	T1	13	0.0	13	0.0	0.106	42.0	LOS C	0.8	5.8	0.88	0.65	0.88	18.9
9	R2	15	14.3	15	14.3	0.106	42.0	LOS C	0.8	5.8	0.88	0.65	0.88	16.3
Approach		44	14.3	44	14.3	0.106	34.8	LOS C	0.8	5.8	0.79	0.58	0.79	17.0
West: Darcy Road														
10	L2	21	5.0	21	5.0	0.831	33.3	LOS C	23.3	165.1	0.93	0.88	0.97	18.4
11	T1	1243	1.5	1243	1.5	0.831	28.5	LOS C	23.3	165.1	0.85	0.83	0.93	15.1
12	R2	186	2.3	186	2.3	0.324	14.2	LOS A	2.4	17.1	0.60	0.71	0.60	34.9
Approach		1450	1.6	1450	1.6	0.831	26.7	LOS B	23.3	165.1	0.82	0.81	0.89	18.1
All Vehicles		2407	2.6	2407	2.6	0.915	30.7	LOS C	23.3	165.1	0.83	0.81	0.91	21.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	49.3	LOS E			0.95	0.95

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: I-17 [I-17 Darcy - Mons - Institute]

Network: N101 [2020 Dev AM Darcy Road Network]

TCS 2393
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
1	L2	277	2.9	277	2.9	0.137	15.3	LOS B	1.9	13.7	0.43	0.61	0.43	20.0
2	T1	224	13.2	224	13.2	0.770	31.3	LOS C	5.6	40.3	0.85	0.72	0.88	26.4
Approach		501	7.5	501	7.5	0.770	22.5	LOS B	5.6	40.3	0.62	0.66	0.63	24.5
East: Institute Road														
4	L2	53	2.0	53	2.0	0.808	66.5	LOS E	3.0	21.3	1.00	0.94	1.34	16.7
5	T1	114	0.0	114	0.0	0.808	62.9	LOS E	3.1	21.9	1.00	0.94	1.34	17.0
6	R2	2	0.0	2	0.0	0.808	66.3	LOS E	3.1	21.9	1.00	0.94	1.33	23.9
Approach		168	0.6	168	0.6	0.808	64.1	LOS E	3.1	21.9	1.00	0.94	1.34	17.1
North: Mons Road														
7	L2	1	0.0	1	0.0	0.093	23.9	LOS B	1.4	10.4	0.64	0.50	0.64	32.8
8	T1	100	31.5	100	31.5	0.093	20.5	LOS B	1.4	10.4	0.63	0.50	0.63	27.8
9	R2	86	8.5	86	8.5	0.367	46.4	LOS D	2.6	19.2	0.95	0.76	0.95	20.0
Approach		188	20.8	188	20.8	0.367	32.4	LOS C	2.6	19.2	0.78	0.62	0.78	23.7
West: Darcy Road														
10	L2	271	1.2	271	1.2	0.199	4.9	LOS A	1.2	8.4	0.22	0.50	0.22	38.3
11	T1	316	1.1	316	1.1	0.740	45.0	LOS D	11.4	80.3	1.00	0.88	1.03	25.4
12	R2	527	1.6	527	1.6	0.740	37.2	LOS C	14.6	103.8	0.96	0.87	0.97	19.0
Approach		1114	1.3	1114	1.3	0.740	31.5	LOS C	14.6	103.8	0.79	0.78	0.80	25.9
All Vehicles		1971	4.7	1971	4.7	0.808	32.1	LOS C	14.6	103.8	0.76	0.75	0.80	24.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-19 [I-19 Darcy - Dental Hospital - Marist]

Network: N101 [2020 Dev AM Darcy Road Network]

TCS 3282
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
4	L2	1	0.0	1	0.0	0.253	6.0	LOS A	0.8	5.9	0.11	0.10	0.11	21.6
5	T1	522	7.9	522	7.9	0.253	3.0	LOS A	1.2	8.3	0.13	0.11	0.13	33.7
6	R2	107	0.0	107	0.0	0.374	55.9	LOS D	3.5	24.8	1.00	0.79	1.00	10.8
Approach		631	6.6	631	6.6	0.374	12.0	LOS A	3.5	24.8	0.28	0.22	0.28	23.2
East: Dental hospital access														
7	L2	18	17.6	18	17.6	0.028	25.9	LOS B	0.4	2.9	0.65	0.63	0.65	7.4
9	R2	13	0.0	13	0.0	0.054	47.5	LOS D	0.4	2.5	0.89	0.67	0.89	4.7
Approach		31	10.3	31	10.3	0.054	34.9	LOS C	0.4	2.9	0.75	0.65	0.75	5.9
North: Darcy Road														
10	L2	139	0.0	139	0.0	0.368	15.3	LOS B	4.4	31.0	0.42	0.47	0.42	16.2
11	T1	602	7.5	602	7.5	0.368	5.5	LOS A	4.4	31.0	0.20	0.21	0.20	28.9
12	R2	3	0.0	3	0.0	0.011	52.3	LOS D	0.1	0.7	1.00	0.64	1.00	10.9
Approach		744	6.1	744	6.1	0.368	7.5	LOS A	4.4	31.0	0.24	0.26	0.24	24.2
West: Marist HS														
1	L2	1	0.0	1	0.0	0.007	42.9	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
3	R2	1	0.0	1	0.0	0.007	42.7	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
Approach		2	0.0	2	0.0	0.007	42.8	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
All Vehicles		1407	6.4	1407	6.4	0.374	10.2	LOS A	4.4	31.0	0.27	0.25	0.27	23.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-23 [I-23 Darcy - Hospital - WSU]

Network: N101 [2020 Dev AM Darcy Road Network]

TCS 3281
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
4	L2	43	4.9	43	4.9	0.309	28.7	LOS C	7.4	53.0	0.84	0.74	0.84	21.4
5	T1	569	6.7	569	6.7	0.309	21.7	LOS B	7.4	53.0	0.79	0.69	0.79	12.2
6	R2	69	1.5	69	1.5	0.297	46.1	LOS D	2.0	13.8	0.87	0.72	0.87	8.8
Approach		682	6.1	682	6.1	0.309	24.6	LOS B	7.4	53.0	0.81	0.69	0.81	12.4
East: Westmead Hospital access														
7	L2	15	0.0	15	0.0	0.036	37.7	LOS C	0.4	2.8	0.80	0.65	0.80	4.8
8	T1	1	0.0	1	0.0	0.036	34.5	LOS C	0.4	2.8	0.80	0.65	0.80	15.0
9	R2	38	2.8	38	2.8	0.381	61.0	LOS E	1.3	9.3	1.00	0.73	1.00	3.3
Approach		54	2.0	54	2.0	0.381	54.1	LOS D	1.3	9.3	0.94	0.71	0.94	3.8
North: Darcy Road														
10	L2	117	0.0	117	0.0	0.306	8.7	LOS A	1.9	13.6	0.22	0.34	0.22	22.2
11	T1	490	9.0	490	9.0	0.306	3.3	LOS A	1.9	13.6	0.13	0.16	0.13	33.0
12	R2	1	0.0	1	0.0	0.004	56.0	LOS D	0.0	0.2	1.00	0.60	1.00	15.9
Approach		608	7.3	608	7.3	0.306	4.4	LOS A	1.9	13.6	0.15	0.20	0.15	29.3
West: Car park														
1	L2	25	8.3	25	8.3	0.059	38.1	LOS C	0.6	4.8	0.78	0.70	0.78	13.1
2	T1	1	0.0	1	0.0	0.059	32.4	LOS C	0.6	4.8	0.78	0.70	0.78	15.3
3	R2	1	0.0	1	0.0	0.010	60.1	LOS E	0.0	0.2	0.96	0.59	0.96	9.1
Approach		27	7.7	27	7.7	0.059	38.7	LOS C	0.6	4.8	0.78	0.69	0.78	13.0
All Vehicles		1371	6.5	1371	6.5	0.381	17.1	LOS B	7.4	53.0	0.52	0.47	0.52	17.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P21	South Stage 1	53	49.3	LOS E	0.2	0.2	0.95	0.95
P22	South Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	49.3	LOS E	0.2	0.2	0.95	0.95
P42	North Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	19.2	LOS B	0.1	0.1	0.59	0.59

All Pedestrians	316	44.3	LOS E	0.89	0.89

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: I-30 [I-30 Darcy - Hawkesbury]

Network: N101 [2020 Dev AM Darcy Road Network]

TCS 1631
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hawkesbury Road														
8	T1	220	4.3	220	4.3	0.188	9.6	LOS A	3.1	22.2	0.46	0.39	0.46	26.9
9	R2	118	6.3	118	6.3	0.349	25.6	LOS B	1.8	13.1	0.91	0.75	0.91	17.0
Approach		338	5.0	338	5.0	0.349	15.2	LOS B	3.1	22.2	0.62	0.52	0.62	22.4
North: Darcy Road														
10	L2	173	5.5	173	5.5	0.232	19.2	LOS B	2.9	20.7	0.76	0.73	0.76	23.5
12	R2	328	10.9	328	10.9	0.516	51.3	LOS D	4.8	34.0	0.97	0.79	0.97	6.7
Approach		501	9.0	501	9.0	0.516	40.3	LOS C	4.8	34.0	0.90	0.77	0.90	11.2
West: Hawkesbury Road														
1	L2	564	6.0	564	6.0	0.545	13.7	LOS A	6.5	45.9	0.74	0.79	0.74	21.7
2	T1	316	2.4	316	2.4	0.502	30.3	LOS C	7.1	51.1	0.73	0.69	0.73	21.4
Approach		880	4.7	880	4.7	0.545	19.6	LOS B	7.1	51.1	0.73	0.75	0.73	21.5
All Vehicles		1718	6.0	1718	6.0	0.545	24.8	LOS B	7.1	51.1	0.76	0.71	0.76	17.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	21.9	LOS C	0.1	0.1	0.89	0.89
P42	North Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	42.4	LOS E			0.93	0.93

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: I-28 [I-28 Hawkesbury - Railway]

Network: N101 [2020 Dev AM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Pde														
4	L2	144	1.5	144	1.5	0.267	25.9	LOS B	3.0	21.5	0.68	0.74	0.68	29.4
6	R2	18	0.0	18	0.0	0.056	45.6	LOS D	0.5	3.5	0.86	0.69	0.86	22.5
Approach		162	1.3	162	1.3	0.267	28.1	LOS B	3.0	21.5	0.70	0.73	0.70	28.5
East: Hawkesbury Rd														
7	L2	71	0.0	71	0.0	0.151	26.1	LOS B	2.3	20.6	0.73	0.67	0.73	32.3
8	T1	426	9.1	426	9.1	0.268	25.0	LOS B	6.4	45.5	0.78	0.67	0.78	14.5
Approach		496	7.8	496	7.8	0.268	25.0	LOS B	6.4	45.5	0.78	0.67	0.78	19.0
West: Hawkesbury Rd														
2	T1	884	4.5	884	4.5	0.537	2.0	LOS A	2.5	17.8	0.15	0.18	0.15	33.5
3	R2	234	0.0	234	0.0	0.537	6.8	LOS A	2.2	15.8	0.25	0.44	0.25	44.1
Approach		1118	3.6	1118	3.6	0.537	3.0	LOS A	2.5	17.8	0.17	0.23	0.17	40.1
All Vehicles		1776	4.6	1776	4.6	0.537	11.5	LOS A	6.4	45.5	0.39	0.40	0.39	28.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-27 [I-27 Hawkesbury - Alexandra]

Network: N101 [2020 Dev AM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Alexandra Ave														
4	L2	31	0.0	31	0.0	0.626	53.8	LOS D	5.2	39.0	0.99	0.82	1.00	15.2
5	T1	66	3.2	66	3.2	0.626	49.3	LOS D	5.2	39.0	0.99	0.82	1.00	24.1
6	R2	219	15.4	219	15.4	0.626	54.1	LOS D	5.2	39.0	0.99	0.82	1.01	9.2
Approach		316	11.3	316	11.3	0.626	53.1	LOS D	5.2	39.0	0.99	0.82	1.01	14.1
East: Hawkesbury Road														
7	L2	200	18.9	200	18.9	0.382	19.7	LOS B	6.4	45.6	0.51	0.61	0.51	23.9
8	T1	348	1.5	348	1.5	0.382	21.9	LOS B	6.4	45.6	0.64	0.62	0.64	20.3
9	R2	49	0.0	49	0.0	0.382	29.8	LOS C	4.5	31.5	0.68	0.60	0.68	30.0
Approach		597	7.2	597	7.2	0.382	21.8	LOS B	6.4	45.6	0.60	0.61	0.60	22.4
North: Alexandra Ave														
10	L2	68	0.0	68	0.0	0.110	31.4	LOS C	1.5	10.7	0.72	0.71	0.72	27.1
11	T1	242	0.9	242	0.9	0.624	44.0	LOS D	7.4	52.2	0.97	0.81	0.97	26.1
Approach		311	0.7	311	0.7	0.624	41.2	LOS C	7.4	52.2	0.91	0.79	0.91	26.3
West: Hawkesbury Road														
1	L2	15	7.1	15	7.1	0.612	36.1	LOS C	11.3	80.0	0.88	0.77	0.88	29.8
2	T1	826	0.6	826	0.6	0.612	31.5	LOS C	11.4	80.3	0.88	0.77	0.88	13.8
Approach		840	0.7	840	0.7	0.612	31.5	LOS C	11.4	80.3	0.88	0.77	0.88	14.3
All Vehicles		2064	4.2	2064	4.2	0.626	33.5	LOS C	11.4	80.3	0.82	0.73	0.82	18.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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.

APPENDIX E-3
2020 PM – WITHOUT DEVELOPMENT

MOVEMENT SUMMARY

Site: I-11 [2020 Base PM I-11 Briens - Redbank]

TCS 3213
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Redbank Road												
21	L2	444	0.7	0.701	47.1	LOS D	26.1	183.8	0.93	0.86	0.93	28.2
22	T1	184	0.0	0.668	53.9	LOS D	11.2	78.7	0.93	0.78	0.95	28.9
23	R2	171	4.3	0.804	69.1	LOS E	11.8	85.5	0.98	0.91	1.17	27.1
Approach		799	1.3	0.804	53.4	LOS D	26.1	183.8	0.94	0.85	0.98	28.1
East: Briens Road												
24	L2	21	10.0	0.785	31.2	LOS C	43.8	322.4	0.84	0.78	0.84	41.4
25	T1	2473	5.9	0.785	24.4	LOS B	43.9	323.1	0.84	0.77	0.84	43.8
26	R2	34	9.4	0.193	70.3	LOS E	2.2	16.4	0.95	0.73	0.95	27.4
Approach		2527	6.0	0.785	25.1	LOS B	43.9	323.1	0.84	0.77	0.84	43.4
North: Redbank Road												
27	L2	20	5.3	0.399	63.2	LOS E	5.5	38.9	0.94	0.77	0.94	28.9
28	T1	36	0.0	0.399	58.6	LOS E	5.5	38.9	0.94	0.77	0.94	27.3
29	R2	32	0.0	0.399	63.1	LOS E	5.5	38.9	0.94	0.77	0.94	25.0
Approach		87	1.2	0.399	61.3	LOS E	5.5	38.9	0.94	0.77	0.94	26.9
West: Briens Road												
30	L2	56	0.0	0.740	29.9	LOS C	40.0	287.4	0.81	0.75	0.81	37.7
31	T1	2361	3.4	0.740	23.5	LOS B	40.2	289.4	0.81	0.75	0.81	44.4
32	R2	143	2.2	0.783	78.4	LOS F	10.3	73.2	1.00	0.87	1.17	22.2
Approach		2560	3.2	0.783	26.7	LOS B	40.2	289.4	0.82	0.75	0.83	41.8
All Vehicles		5974	4.1	0.804	30.1	LOS C	43.9	323.1	0.84	0.77	0.85	39.2

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	South Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P6	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P7	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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: I-14 [I-14 Bridge - Darcy]

Network: N101 [2020 Base PM Darcy Road Network]

TCS 1630
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Bridge Road														
1	L2	280	1.5	280	1.5	0.489	33.3	LOS C	7.3	51.4	0.78	0.78	0.78	25.2
2	T1	38	2.8	38	2.8	0.462	58.6	LOS E	3.3	23.9	0.97	0.78	0.97	17.4
3	R2	58	5.5	58	5.5	0.462	58.1	LOS E	3.3	23.9	0.97	0.78	0.97	14.4
Approach		376	2.2	376	2.2	0.489	39.7	LOS C	7.3	51.4	0.82	0.78	0.82	21.8
East: Darcy Road														
4	L2	178	3.0	178	3.0	0.659	28.5	LOS B	14.8	104.7	0.74	0.71	0.74	32.6
5	T1	1020	1.0	1020	1.0	0.659	23.8	LOS B	14.8	104.7	0.74	0.68	0.74	30.3
6	R2	20	5.3	20	5.3	0.031	10.5	LOS A	0.2	1.1	0.34	0.60	0.34	24.6
Approach		1218	1.3	1218	1.3	0.659	24.3	LOS B	14.8	104.7	0.74	0.69	0.74	30.5
North: Coles Access														
7	L2	23	4.5	23	4.5	0.034	24.4	LOS B	0.5	3.7	0.65	0.48	0.65	15.8
8	T1	28	3.7	28	3.7	0.552	58.4	LOS E	3.0	21.4	1.00	0.78	1.00	17.1
9	R2	54	3.9	54	3.9	0.552	58.4	LOS E	3.0	21.4	1.00	0.78	1.00	14.8
Approach		105	4.0	105	4.0	0.552	50.9	LOS D	3.0	21.4	0.92	0.71	0.92	15.7
West: Darcy Road														
10	L2	67	1.6	67	1.6	0.304	23.9	LOS B	5.9	42.3	0.64	0.60	0.64	19.7
11	T1	424	2.8	424	2.8	0.304	18.9	LOS B	5.9	42.3	0.62	0.56	0.62	19.4
12	R2	258	4.1	258	4.1	0.743	26.7	LOS B	6.0	43.6	0.94	0.89	1.04	27.9
Approach		749	3.1	749	3.1	0.743	22.0	LOS B	6.0	43.6	0.73	0.68	0.77	23.1
All Vehicles		2448	2.1	2448	2.1	0.743	27.1	LOS B	14.8	104.7	0.76	0.70	0.77	25.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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: I-17 [I-17 Darcy - Mons - Institute]

Network: N101 [2020 Base PM Darcy Road Network]

TCS 2393
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
1	L2	569	0.8	569	0.8	0.430	23.9	LOS B	6.4	45.3	0.55	0.67	0.55	15.7
2	T1	89	36.5	89	36.5	0.460	59.5	LOS E	2.3	17.6	1.00	0.75	1.00	20.2
Approach		658	5.7	658	5.7	0.460	28.7	LOS C	6.4	45.3	0.61	0.68	0.61	17.1
East: Institute Road														
4	L2	121	0.9	121	0.9	0.989	98.4	LOS F	11.6	81.5	0.99	1.29	1.69	13.1
5	T1	354	0.0	354	0.0	0.989	94.7	LOS F	11.7	82.2	0.99	1.33	1.68	13.3
6	R2	2	0.0	2	0.0	0.989	98.0	LOS F	11.7	82.2	0.99	1.35	1.68	19.8
Approach		477	0.2	477	0.2	0.989	95.7	LOS F	11.7	82.2	0.99	1.32	1.68	13.2
North: Mons Road														
7	L2	5	0.0	5	0.0	0.163	27.9	LOS B	2.8	20.0	0.68	0.56	0.68	31.6
8	T1	141	15.7	141	15.7	0.163	24.0	LOS B	2.8	20.0	0.67	0.54	0.67	26.4
9	R2	249	2.1	249	2.1	0.637	46.4	LOS D	7.9	56.2	0.96	0.89	1.08	20.0
Approach		396	6.9	396	6.9	0.637	38.1	LOS C	7.9	56.2	0.85	0.76	0.93	22.1
West: Darcy Road														
10	L2	97	0.3	97	0.3	0.068	4.0	LOS A	0.2	1.7	0.13	0.46	0.13	38.7
11	T1	105	0.3	105	0.3	0.338	28.5	LOS C	3.4	24.0	0.66	0.59	0.66	29.1
12	R2	190	2.1	190	2.1	0.338	32.6	LOS C	3.4	24.0	0.68	0.66	0.68	20.4
Approach		392	1.2	392	1.2	0.338	24.4	LOS B	3.4	24.0	0.54	0.59	0.54	28.1
All Vehicles		1923	3.7	1923	3.7	0.989	46.4	LOS D	11.7	82.2	0.74	0.84	0.93	18.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-19 [I-19 Darcy - Dental Hospital - Marist]

Network: N101 [2020 Base PM Darcy Road Network]

TCS 3282
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
4	L2	1	0.0	1	0.0	0.189	3.9	LOS A	0.3	1.8	0.03	0.03	0.03	22.8
5	T1	568	6.1	568	6.1	0.189	0.5	LOS A	0.3	1.8	0.03	0.02	0.03	38.8
6	R2	15	0.0	15	0.0	0.190	68.9	LOS E	0.6	3.9	1.00	0.69	1.00	9.3
Approach		584	6.0	584	6.0	0.190	2.2	LOS A	0.6	3.9	0.05	0.04	0.05	35.1
East: Dental hospital access														
7	L2	17	18.8	17	18.8	0.059	48.1	LOS D	0.5	4.1	0.86	0.68	0.86	4.4
9	R2	16	0.0	16	0.0	0.112	60.1	LOS E	0.5	3.8	0.95	0.69	0.95	3.8
Approach		33	9.7	33	9.7	0.112	53.9	LOS D	0.5	4.1	0.91	0.68	0.91	4.1
North: Darcy Road														
10	L2	15	0.0	15	0.0	0.206	6.9	LOS A	1.9	13.4	0.20	0.19	0.20	20.1
11	T1	601	5.1	601	5.1	0.206	3.0	LOS A	1.9	13.4	0.17	0.16	0.17	33.2
12	R2	3	0.0	3	0.0	0.041	67.3	LOS E	0.1	0.8	1.00	0.63	1.00	9.0
Approach		618	5.0	618	5.0	0.206	3.5	LOS A	1.9	13.4	0.18	0.16	0.18	32.0
West: Marist HS														
1	L2	1	0.0	1	0.0	0.012	54.3	LOS D	0.1	0.5	0.90	0.61	0.90	4.0
3	R2	1	0.0	1	0.0	0.012	54.1	LOS D	0.1	0.5	0.90	0.61	0.90	4.0
Approach		2	0.0	2	0.0	0.012	54.2	LOS D	0.1	0.5	0.90	0.61	0.90	4.0
All Vehicles		1237	5.6	1237	5.6	0.206	4.3	LOS A	1.9	13.4	0.14	0.12	0.14	31.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-23 [I-23 Darcy - Hospital - WSU]

Network: N101 [2020 Base PM Darcy Road Network]

TCS 3281
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
4	L2	43	4.9	43	4.9	0.382	47.9	LOS D	7.6	53.6	0.96	0.81	0.96	15.0
5	T1	459	7.1	459	7.1	0.382	44.1	LOS D	8.0	56.2	0.98	0.82	0.98	7.1
6	R2	38	2.8	38	2.8	0.083	32.6	LOS C	0.8	6.0	0.64	0.64	0.64	11.4
Approach		540	6.6	540	6.6	0.382	43.6	LOS D	8.0	56.2	0.95	0.81	0.95	8.1
East: Westmead Hospital access														
7	L2	72	1.5	72	1.5	0.100	27.0	LOS B	1.6	11.4	0.66	0.67	0.66	6.3
8	T1	1	0.0	1	0.0	0.100	23.8	LOS B	1.6	11.4	0.66	0.67	0.66	18.7
9	R2	98	1.1	98	1.1	0.596	60.7	LOS E	3.5	24.6	0.99	0.79	1.02	3.3
Approach		171	1.2	171	1.2	0.596	46.3	LOS D	3.5	24.6	0.85	0.74	0.86	4.2
North: Darcy Road														
10	L2	57	0.0	57	0.0	0.471	38.1	LOS C	7.8	54.5	0.81	0.71	0.81	12.4
11	T1	545	5.4	545	5.4	0.471	36.6	LOS C	9.1	64.1	0.88	0.75	0.88	12.3
12	R2	1	0.0	1	0.0	0.002	43.9	LOS D	0.0	0.2	0.89	0.60	0.89	18.8
Approach		603	4.9	603	4.9	0.471	36.7	LOS C	9.1	64.1	0.87	0.75	0.87	12.3
West: Car park														
1	L2	25	8.3	25	8.3	0.044	32.9	LOS C	0.6	4.6	0.69	0.68	0.69	14.7
2	T1	1	0.0	1	0.0	0.044	27.3	LOS B	0.6	4.6	0.69	0.68	0.69	17.1
3	R2	1	0.0	1	0.0	0.006	57.9	LOS E	0.0	0.2	0.92	0.59	0.92	9.4
Approach		27	7.7	27	7.7	0.044	33.6	LOS C	0.6	4.6	0.70	0.68	0.70	14.5
All Vehicles		1340	5.2	1340	5.2	0.596	40.7	LOS C	9.1	64.1	0.90	0.77	0.90	9.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P21	South Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95
P22	South Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95
P42	North Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	34.6	LOS D	0.1	0.1	0.76	0.76

All Pedestrians	316	51.0	LOS E	0.92	0.92

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: I-30 [I-30 Darcy - Hawkesbury]

Network: N101 [2020 Base PM Darcy Road Network]

TCS 1631
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hawkesbury Road														
8	T1	416	1.5	416	1.5	0.386	15.8	LOS B	8.2	58.5	0.60	0.53	0.60	22.2
9	R2	218	2.4	218	2.4	0.428	23.4	LOS B	4.0	28.4	0.85	0.76	0.85	17.9
Approach		634	1.8	634	1.8	0.428	18.4	LOS B	8.2	58.5	0.69	0.61	0.69	20.5
North: Darcy Road														
10	L2	121	7.8	121	7.8	0.110	11.7	LOS A	1.1	7.7	0.43	0.60	0.43	28.7
12	R2	505	5.5	505	5.5	0.731	26.2	LOS B	7.2	50.4	0.66	0.70	0.68	11.6
Approach		626	5.9	626	5.9	0.731	23.4	LOS B	7.2	50.4	0.62	0.68	0.63	14.5
West: Hawkesbury Road														
1	L2	304	9.4	304	9.4	0.311	14.5	LOS B	2.9	20.3	0.56	0.70	0.56	21.0
2	T1	216	4.4	216	4.4	0.651	43.5	LOS D	6.8	49.4	0.91	0.78	0.91	17.4
Approach		520	7.3	520	7.3	0.651	26.6	LOS B	6.8	49.4	0.70	0.73	0.70	18.6
All Vehicles		1780	4.9	1780	4.9	0.731	22.6	LOS B	8.2	58.5	0.67	0.67	0.67	17.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	25.8	LOS C	0.1	0.1	0.90	0.90
P42	North Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	47.1	LOS E			0.94	0.94

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: I-28 [I-28 Hawkesbury - Railway]

Network: N101 [2020 Base PM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Pde														
4	L2	284	0.7	284	0.7	0.692	33.0	LOS C	8.2	57.9	0.84	0.83	0.85	26.5
6	R2	37	0.0	37	0.0	0.149	54.9	LOS D	1.2	8.3	0.92	0.72	0.92	20.2
Approach		321	0.7	321	0.7	0.692	35.5	LOS C	8.2	57.9	0.85	0.82	0.86	25.6
East: Hawkesbury Rd														
7	L2	59	0.0	59	0.0	0.153	31.0	LOS C	2.5	22.6	0.78	0.68	0.78	30.4
8	T1	855	4.5	855	4.5	0.742	45.6	LOS D	18.5	130.0	0.97	0.87	0.98	9.3
Approach		914	4.2	914	4.2	0.742	44.6	LOS D	18.5	130.0	0.96	0.86	0.97	11.0
West: Hawkesbury Rd														
2	T1	512	6.8	512	6.8	0.329	2.4	LOS A	3.3	23.8	0.13	0.12	0.13	32.0
3	R2	151	1.4	151	1.4	0.329	19.4	LOS B	3.3	23.8	0.72	0.71	0.72	34.4
Approach		663	5.6	663	5.6	0.329	6.3	LOS A	3.3	23.8	0.26	0.25	0.26	33.7
All Vehicles		1898	4.1	1898	4.1	0.742	29.7	LOS C	18.5	130.0	0.70	0.64	0.70	18.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-27 [I-27 Hawkesbury - Alexandra]

Network: N101 [2020 Base PM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Alexandra Ave														
4	L2	40	7.9	40	7.9	0.512	44.2	LOS D	8.2	58.0	0.90	0.77	0.90	17.8
5	T1	229	0.5	229	0.5	0.512	39.6	LOS C	8.2	58.0	0.90	0.77	0.90	27.3
6	R2	216	18.0	216	18.0	0.477	44.0	LOS D	6.5	52.6	0.89	0.80	0.89	10.8
Approach		485	8.9	485	8.9	0.512	41.9	LOS C	8.2	58.0	0.89	0.78	0.89	20.9
East: Hawkesbury Road														
7	L2	228	15.2	228	15.2	0.777	29.9	LOS C	7.8	55.0	0.73	0.75	0.73	19.6
8	T1	838	0.4	838	0.4	0.777	21.8	LOS B	7.8	55.0	0.72	0.78	0.91	20.5
9	R2	96	0.0	96	0.0	0.777	17.3	LOS B	7.8	55.0	0.58	0.78	0.97	36.8
Approach		1162	3.3	1162	3.3	0.777	23.0	LOS B	7.8	55.0	0.71	0.78	0.88	21.8
North: Alexandra Ave														
10	L2	37	0.0	37	0.0	0.047	25.9	LOS B	0.8	5.3	0.61	0.67	0.61	29.5
11	T1	156	2.7	156	2.7	0.513	50.8	LOS D	5.2	37.4	0.97	0.78	0.97	24.4
Approach		193	2.2	193	2.2	0.513	46.0	LOS D	5.2	37.4	0.90	0.76	0.90	25.0
West: Hawkesbury Road														
1	L2	29	3.6	29	3.6	0.735	60.2	LOS E	7.4	52.5	1.00	0.88	1.09	22.9
2	T1	389	1.2	389	1.2	0.735	55.5	LOS D	7.7	54.3	1.00	0.88	1.08	8.8
Approach		418	1.3	418	1.3	0.735	55.8	LOS D	7.7	54.3	1.00	0.88	1.08	10.3
All Vehicles		2258	4.0	2258	4.0	0.777	35.1	LOS C	8.2	58.0	0.82	0.80	0.92	19.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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.

APPENDIX E-4
2020 PM – WITH DEVELOPMENT

MOVEMENT SUMMARY

Site: I-11 [2020 Dev PM I-11 Briens - Redbank]

TCS 3213
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Redbank Road												
21	L2	457	0.7	0.722	47.6	LOS D	27.1	191.0	0.94	0.86	0.94	28.1
22	T1	190	0.0	0.670	54.1	LOS D	11.6	81.3	0.94	0.78	0.95	28.9
23	R2	175	4.2	0.779	66.9	LOS E	11.7	85.2	0.97	0.88	1.12	27.5
Approach		823	1.3	0.779	53.2	LOS D	27.1	191.0	0.94	0.85	0.98	28.2
East: Briens Road												
24	L2	22	9.8	0.785	31.2	LOS C	43.8	322.5	0.84	0.78	0.84	41.4
25	T1	2473	5.9	0.785	24.4	LOS B	43.9	323.2	0.84	0.77	0.84	43.8
26	R2	34	9.4	0.193	70.3	LOS E	2.2	16.4	0.95	0.73	0.95	27.4
Approach		2528	6.0	0.785	25.1	LOS B	43.9	323.2	0.84	0.77	0.84	43.3
North: Redbank Road												
27	L2	20	5.3	0.829	83.8	LOS F	6.6	46.9	1.00	0.93	1.32	24.9
28	T1	37	0.0	0.829	79.1	LOS F	6.6	46.9	1.00	0.93	1.32	23.7
29	R2	32	0.0	0.829	83.7	LOS F	6.6	46.9	1.00	0.93	1.32	21.2
Approach		88	1.2	0.829	81.8	LOS F	6.6	46.9	1.00	0.93	1.32	23.2
West: Briens Road												
30	L2	56	0.0	0.740	29.9	LOS C	40.0	287.4	0.81	0.75	0.81	37.7
31	T1	2361	3.4	0.740	23.5	LOS B	40.2	289.4	0.81	0.75	0.81	44.4
32	R2	147	2.2	0.801	79.2	LOS F	10.6	75.5	1.00	0.88	1.19	22.0
Approach		2563	3.2	0.801	26.9	LOS B	40.2	289.4	0.82	0.75	0.83	41.8
All Vehicles		6002	4.1	0.829	30.5	LOS C	43.9	323.2	0.85	0.78	0.86	39.0

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	South Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P6	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P7	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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: I-14 [I-14 Bridge - Darcy]

Network: N101 [2020 Dev PM Darcy Road Network]

TCS 1630
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bridge Road														
1	L2	280	1.5	280	1.5	0.495	33.3	LOS C	7.3	51.4	0.78	0.78	0.78	25.2
2	T1	38	2.8	38	2.8	0.489	58.9	LOS E	3.5	25.2	0.97	0.79	0.97	17.3
3	R2	63	5.0	63	5.0	0.489	58.4	LOS E	3.5	25.2	0.97	0.79	0.97	14.4
Approach		381	2.2	381	2.2	0.495	40.0	LOS C	7.3	51.4	0.83	0.78	0.83	21.7
East: Darcy Road														
4	L2	187	2.8	185	2.8	0.664	28.3	LOS B	14.9	105.4	0.74	0.71	0.74	32.6
5	T1	1035	0.9	1023	1.0	0.664	23.8	LOS B	14.9	105.4	0.74	0.69	0.74	30.3
6	R2	20	5.3	20	5.3	0.030	10.1	LOS A	0.1	1.1	0.31	0.59	0.31	24.7
Approach		1242	1.3	1227 N1	1.3	0.664	24.3	LOS B	14.9	105.4	0.74	0.69	0.74	30.5
North: Coles Access														
7	L2	23	4.5	23	4.5	0.034	24.4	LOS B	0.5	3.7	0.65	0.48	0.65	15.8
8	T1	28	3.7	28	3.7	0.552	58.4	LOS E	3.0	21.4	1.00	0.78	1.00	17.1
9	R2	54	3.9	54	3.9	0.552	58.4	LOS E	3.0	21.4	1.00	0.78	1.00	14.8
Approach		105	4.0	105	4.0	0.552	50.9	LOS D	3.0	21.4	0.92	0.71	0.92	15.7
West: Darcy Road														
10	L2	67	1.6	67	1.6	0.352	24.5	LOS B	7.1	50.4	0.66	0.61	0.66	19.6
11	T1	430	2.8	430	2.8	0.352	19.2	LOS B	7.1	50.4	0.63	0.56	0.63	19.3
12	R2	258	4.1	258	4.1	0.743	27.2	LOS B	6.0	43.7	0.94	0.90	1.05	27.6
Approach		755	3.1	755	3.1	0.743	22.4	LOS B	7.1	50.4	0.74	0.68	0.78	22.9
All Vehicles		2483	2.1	2468 N1	2.1	0.743	27.3	LOS B	14.9	105.4	0.76	0.70	0.77	25.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95

All Pedestrians	211	54.3	LOS E	0.95	0.95

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: I-17 [I-17 Darcy - Mons - Institute]

Network: N101 [2020 Dev PM Darcy Road Network]

TCS 2393
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
1	L2	570	0.8	570	0.8	0.431	22.9	LOS B	6.2	44.0	0.53	0.67	0.53	16.1
2	T1	94	34.8	94	34.8	0.490	59.6	LOS E	2.4	18.4	0.99	0.75	0.99	20.2
Approach		664	5.6	664	5.6	0.490	28.1	LOS B	6.2	44.0	0.59	0.68	0.59	17.5
East: Institute Road														
4	L2	121	0.9	121	0.9	1.041	130.8	LOS F	14.7	103.1	1.00	1.45	1.92	10.5
5	T1	378	0.0	378	0.0	1.041	127.2	LOS F	14.9	104.2	1.00	1.51	1.91	10.7
6	R2	2	0.0	2	0.0	1.041	130.5	LOS F	14.9	104.2	1.00	1.53	1.91	16.7
Approach		501	0.2	501	0.2	1.041	128.1	LOS F	14.9	104.2	1.00	1.49	1.91	10.7
North: Mons Road														
7	L2	5	0.0	5	0.0	0.184	27.5	LOS B	3.2	22.8	0.68	0.56	0.68	31.7
8	T1	159	13.9	159	13.9	0.184	23.7	LOS B	3.2	22.8	0.67	0.55	0.67	26.5
9	R2	249	2.1	249	2.1	0.637	46.4	LOS D	7.9	56.2	0.96	0.89	1.08	20.0
Approach		413	6.6	413	6.6	0.637	37.4	LOS C	7.9	56.2	0.85	0.75	0.92	22.3
West: Darcy Road														
10	L2	71	0.3	71	0.3	0.050	4.3	LOS A	0.3	2.0	0.20	0.48	0.20	38.6
11	T1	42	0.2	42	0.2	0.388	33.3	LOS C	4.4	30.8	0.76	0.70	0.76	27.5
12	R2	291	2.1	291	2.1	0.388	41.5	LOS C	5.1	36.6	0.84	0.75	0.84	18.0
Approach		405	1.6	405	1.6	0.388	34.1	LOS C	5.1	36.6	0.72	0.70	0.72	23.1
All Vehicles		1983	3.6	1983	3.6	1.041	56.5	LOS E	14.9	104.2	0.77	0.90	1.02	16.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-19 [I-19 Darcy - Dental Hospital - Marist]

Network: N101 [2020 Dev PM Darcy Road Network]

TCS 3282
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
4	L2	1	0.0	1	0.0	0.191	3.9	LOS A	0.3	1.8	0.03	0.03	0.03	22.8
5	T1	574	6.1	574	6.1	0.191	0.5	LOS A	0.3	1.8	0.03	0.02	0.03	38.9
6	R2	15	0.0	15	0.0	0.190	68.9	LOS E	0.6	3.9	1.00	0.69	1.00	9.3
Approach		589	5.9	589	5.9	0.191	2.2	LOS A	0.6	3.9	0.05	0.04	0.05	35.1
East: Dental hospital access														
7	L2	17	18.8	17	18.8	0.059	48.1	LOS D	0.5	4.1	0.86	0.68	0.86	4.4
9	R2	16	0.0	16	0.0	0.112	60.1	LOS E	0.5	3.8	0.95	0.69	0.95	3.8
Approach		33	9.7	33	9.7	0.112	53.9	LOS D	0.5	4.1	0.91	0.68	0.91	4.1
North: Darcy Road														
10	L2	15	0.0	15	0.0	0.213	5.9	LOS A	1.4	9.8	0.14	0.14	0.14	20.6
11	T1	624	4.9	619	5.0	0.213	2.1	LOS A	1.4	9.8	0.12	0.11	0.12	35.0
12	R2	3	0.0	3	0.0	0.040	67.3	LOS E	0.1	0.8	1.00	0.63	1.00	9.0
Approach		641	4.8	637 N1	4.8	0.213	2.5	LOS A	1.4	9.8	0.12	0.12	0.12	33.7
West: Marist HS														
1	L2	1	0.0	1	0.0	0.012	54.3	LOS D	0.1	0.5	0.90	0.61	0.90	4.0
3	R2	1	0.0	1	0.0	0.012	54.1	LOS D	0.1	0.5	0.90	0.61	0.90	4.0
Approach		2	0.0	2	0.0	0.012	54.2	LOS D	0.1	0.5	0.90	0.61	0.90	4.0
All Vehicles		1266	5.4	1261 N1	5.5	0.213	3.8	LOS A	1.4	9.8	0.11	0.10	0.11	31.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-23 [I-23 Darcy - Hospital - WSU]

Network: N101 [2020 Dev PM Darcy Road Network]

TCS 3281
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
4	L2	43	4.9	43	4.9	0.387	47.5	LOS D	7.6	53.8	0.95	0.81	0.95	15.1
5	T1	464	7.0	464	7.0	0.387	43.9	LOS D	8.1	56.8	0.97	0.82	0.97	7.1
6	R2	38	2.8	38	2.8	0.083	32.6	LOS C	0.8	6.0	0.64	0.64	0.64	11.4
Approach		545	6.6	545	6.6	0.387	43.4	LOS D	8.1	56.8	0.95	0.81	0.95	8.1
East: Westmead Hospital access														
7	L2	72	1.5	72	1.5	0.100	27.0	LOS B	1.6	11.4	0.66	0.67	0.66	6.3
8	T1	1	0.0	1	0.0	0.100	23.8	LOS B	1.6	11.4	0.66	0.67	0.66	18.7
9	R2	98	1.1	98	1.1	0.596	60.7	LOS E	3.5	24.6	0.99	0.79	1.02	3.3
Approach		171	1.2	171	1.2	0.596	46.3	LOS D	3.5	24.6	0.85	0.74	0.86	4.2
North: Darcy Road														
10	L2	57	0.0	56	0.0	0.486	38.3	LOS C	8.8	61.5	0.89	0.77	0.89	12.3
11	T1	568	5.2	564	5.3	0.486	39.6	LOS C	9.8	68.5	0.93	0.80	0.93	11.6
12	R2	1	0.0	1	0.0	0.002	43.9	LOS D	0.0	0.2	0.89	0.60	0.89	18.8
Approach		626	4.7	621 N1	4.8	0.486	39.5	LOS C	9.8	68.5	0.93	0.79	0.93	11.7
West: Car park														
1	L2	25	8.3	25	8.3	0.044	32.9	LOS C	0.6	4.6	0.69	0.68	0.69	14.7
2	T1	1	0.0	1	0.0	0.044	27.3	LOS B	0.6	4.6	0.69	0.68	0.69	17.1
3	R2	1	0.0	1	0.0	0.006	57.9	LOS E	0.0	0.2	0.92	0.59	0.92	9.4
Approach		27	7.7	27	7.7	0.044	33.6	LOS C	0.6	4.6	0.70	0.68	0.70	14.5
All Vehicles		1369	5.1	1364 N1	5.1	0.596	41.8	LOS C	9.8	68.5	0.92	0.79	0.92	9.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P21	South Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95
P22	South Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95
P42	North Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95

P1	West Full Crossing	53	34.6	LOS D	0.1	0.1	0.76	0.76
All Pedestrians		316	51.0	LOS E			0.92	0.92

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: I-30 [I-30 Darcy - Hawkesbury]

Network: N101 [2020 Dev PM Darcy Road Network]

TCS 1631
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hawkesbury Road														
8	T1	418	1.5	418	1.5	0.388	15.8	LOS B	8.3	58.9	0.61	0.53	0.61	22.2
9	R2	219	2.4	219	2.4	0.434	23.5	LOS B	4.1	28.6	0.86	0.77	0.86	17.8
Approach		637	1.8	637	1.8	0.434	18.4	LOS B	8.3	58.9	0.69	0.61	0.69	20.5
North: Darcy Road														
10	L2	126	7.5	126	7.5	0.114	10.8	LOS A	0.9	6.7	0.37	0.58	0.37	29.4
12	R2	523	5.3	519	5.3	0.759	23.3	LOS B	7.0	49.2	0.61	0.69	0.64	12.7
Approach		649	5.7	645 N1	5.7	0.759	20.9	LOS B	7.0	49.2	0.57	0.67	0.59	15.6
West: Hawkesbury Road														
1	L2	308	9.2	308	9.2	0.318	18.3	LOS B	4.5	31.5	0.86	0.79	0.86	18.3
2	T1	224	4.2	224	4.2	0.676	52.8	LOS D	7.8	56.6	1.00	0.85	1.02	15.4
Approach		533	7.1	533	7.1	0.676	32.8	LOS C	7.8	56.6	0.92	0.82	0.93	16.4
All Vehicles		1819	4.8	1815 N1	4.8	0.759	23.5	LOS B	8.3	58.9	0.71	0.69	0.72	17.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	25.8	LOS C	0.1	0.1	0.90	0.90
P42	North Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	47.1	LOS E			0.94	0.94

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: I-28 [I-28 Hawkesbury - Railway]

Network: N101 [2020 Dev PM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Pde														
4	L2	284	0.7	284	0.7	0.692	33.0	LOS C	8.2	57.9	0.84	0.83	0.85	26.5
6	R2	37	0.0	37	0.0	0.149	54.9	LOS D	1.2	8.3	0.92	0.72	0.92	20.2
Approach		321	0.7	321	0.7	0.692	35.5	LOS C	8.2	57.9	0.85	0.82	0.86	25.6
East: Hawkesbury Rd														
7	L2	59	0.0	59	0.0	0.153	31.0	LOS C	2.4	22.6	0.78	0.68	0.78	30.4
8	T1	855	4.5	853	4.5	0.673	43.8	LOS D	18.5	130.0	0.96	0.85	0.96	9.5
Approach		914	4.2	911 N1	4.2	0.673	42.9	LOS D	18.5	130.0	0.95	0.84	0.95	11.4
West: Hawkesbury Rd														
2	T1	512	6.8	512	6.8	0.325	2.3	LOS A	3.2	22.8	0.13	0.12	0.13	32.3
3	R2	151	1.4	151	1.4	0.325	18.0	LOS B	3.2	22.8	0.70	0.70	0.70	35.2
Approach		663	5.6	663	5.6	0.325	5.9	LOS A	3.2	22.8	0.26	0.25	0.26	34.3
All Vehicles		1898	4.1	1895 N1	4.1	0.692	28.8	LOS C	18.5	130.0	0.69	0.63	0.69	18.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-27 [I-27 Hawkesbury - Alexandra]

Network: N101 [2020 Dev PM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Alexandra Ave														
4	L2	40	7.9	40	7.9	0.512	44.2	LOS D	8.2	58.0	0.90	0.77	0.90	17.8
5	T1	229	0.5	229	0.5	0.512	39.6	LOS C	8.2	58.0	0.90	0.77	0.90	27.3
6	R2	216	18.0	216	18.0	0.477	44.0	LOS D	6.5	52.6	0.89	0.80	0.89	10.8
Approach		485	8.9	485	8.9	0.512	41.9	LOS C	8.2	58.0	0.89	0.78	0.89	20.9
East: Hawkesbury Road														
7	L2	228	15.2	228	15.2	0.775	28.3	LOS B	7.8	55.0	0.71	0.74	0.72	20.2
8	T1	838	0.4	835	0.4	0.775	34.1	LOS C	7.8	55.0	0.89	0.92	1.08	15.6
9	R2	96	0.0	96	0.0	0.775	44.0	LOS D	7.8	55.0	0.94	1.06	1.34	24.9
Approach		1162	3.3	1159[N1]	3.3	0.775	33.8	LOS C	7.8	55.0	0.86	0.89	1.03	17.3
North: Alexandra Ave														
10	L2	37	0.0	37	0.0	0.047	25.9	LOS B	0.8	5.3	0.61	0.67	0.61	29.5
11	T1	156	2.7	156	2.7	0.513	50.8	LOS D	5.2	37.4	0.97	0.78	0.97	24.4
Approach		193	2.2	193	2.2	0.513	46.0	LOS D	5.2	37.4	0.90	0.76	0.90	25.0
West: Hawkesbury Road														
1	L2	29	3.6	29	3.6	0.735	60.2	LOS E	7.4	52.5	1.00	0.88	1.09	22.9
2	T1	389	1.2	389	1.2	0.735	55.5	LOS D	7.7	54.3	1.00	0.88	1.08	8.8
Approach		418	1.3	418	1.3	0.735	55.8	LOS D	7.7	54.3	1.00	0.88	1.08	10.3
All Vehicles		2258	4.0	2255[N1]	4.0	0.775	40.7	LOS C	8.2	58.0	0.89	0.86	1.00	17.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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.

APPENDIX E-5
2030 AM – WITHOUT DEVELOPMENT

MOVEMENT SUMMARY

Site: I-11 [2030 Base AM I-11 Briens - Redbank]

TCS 3213
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 145 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Redbank Road												
21	L2	215	4.4	0.283	33.8	LOS C	9.8	71.4	0.70	0.75	0.70	32.3
22	T1	36	0.0	0.099	52.3	LOS D	2.1	14.6	0.86	0.64	0.86	29.3
23	R2	77	9.6	0.638	77.8	LOS F	5.6	42.4	1.00	0.82	1.07	25.2
Approach		327	5.1	0.638	46.2	LOS D	9.8	71.4	0.79	0.76	0.80	29.6
East: Briens Road												
24	L2	104	2.0	0.933	61.3	LOS E	68.4	500.3	1.00	1.04	1.16	30.7
25	T1	2471	5.7	0.933	54.7	LOS D	68.9	505.8	1.00	1.04	1.15	29.9
26	R2	35	9.1	0.152	67.3	LOS E	2.2	16.6	0.92	0.73	0.92	28.1
Approach		2609	5.6	0.933	55.1	LOS D	68.9	505.8	1.00	1.04	1.15	29.9
North: Redbank Road												
27	L2	21	15.0	0.885	79.6	LOS F	21.8	154.0	1.00	1.03	1.25	25.8
28	T1	172	0.0	0.885	74.8	LOS F	21.8	154.0	1.00	1.03	1.25	24.5
29	R2	83	0.0	0.885	79.3	LOS F	21.8	154.0	1.00	1.03	1.25	22.1
Approach		276	1.1	0.885	76.5	LOS F	21.8	154.0	1.00	1.03	1.25	24.0
West: Briens Road												
30	L2	15	0.0	0.910	45.5	LOS D	68.2	504.7	0.97	0.97	1.05	31.4
31	T1	2778	6.8	0.910	39.1	LOS C	68.2	505.4	0.94	0.94	1.02	35.8
32	R2	317	1.7	1.043	105.2	LOS F	26.5	188.2	1.00	1.08	1.72	14.3
Approach		3109	6.3	1.043	45.9	LOS D	68.2	505.4	0.94	0.95	1.09	31.0
All Vehicles		6322	5.7	1.043	51.1	LOS D	68.9	505.8	0.96	0.98	1.11	30.0

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	South Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
P6	East Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
P7	North Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	66.8	LOS F			0.96	0.96

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: I-14 [I-14 Bridge - Darcy]

Network: N101 [2030 Base AM Darcy Road Network]

TCS 1630
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Bridge Road														
1	L2	181	2.3	181	2.3	0.489	41.4	LOS C	5.0	35.4	0.88	0.79	0.88	22.5
2	T1	6	0.0	6	0.0	1.428	441.6	LOS F	24.0	171.4	1.00	2.18	3.74	5.2
3	R2	206	2.6	206	2.6	1.428	441.2	LOS F	24.0	171.4	1.00	2.18	3.74	2.5
Approach		394	2.4	394	2.4	1.428	257.3	LOS F	24.0	171.4	0.94	1.54	2.42	4.9
East: Darcy Road														
4	L2	83	7.6	78	8.0	0.310	15.4	LOS B	5.4	39.0	0.51	0.51	0.51	39.7
5	T1	665	2.6	625	2.7	0.310	12.2	LOS A	6.9	49.4	0.59	0.54	0.59	37.4
6	R2	13	16.7	12	17.1	0.051	28.6	LOS C	0.2	1.8	0.74	0.63	0.74	21.5
Approach		761	3.4	716[N1]	3.5	0.310	12.9	LOS A	6.9	49.4	0.58	0.54	0.58	37.0
North: Coles Access														
7	L2	17	25.0	17	25.0	0.042	33.1	LOS C	0.4	3.5	0.78	0.56	0.78	14.7
8	T1	13	0.0	13	0.0	0.248	56.0	LOS D	0.9	6.8	0.98	0.71	0.98	17.3
9	R2	15	14.3	15	14.3	0.248	56.0	LOS D	0.9	6.8	0.98	0.71	0.98	14.9
Approach		44	14.3	44	14.3	0.248	47.3	LOS D	0.9	6.8	0.91	0.65	0.91	15.6
West: Darcy Road														
10	L2	21	5.0	21	5.0	1.042	104.9	LOS F	70.7	501.4	1.00	1.46	1.66	11.9
11	T1	1998	1.4	1998	1.4	1.042	104.6	LOS F	70.7	501.4	1.00	1.49	1.71	5.2
12	R2	186	2.3	186	2.3	0.339	10.6	LOS A	1.7	12.1	0.51	0.69	0.51	37.6
Approach		2206	1.5	2206	1.5	1.042	96.7	LOS F	70.7	501.4	0.96	1.42	1.61	6.5
All Vehicles		3405	2.2	3359[N1]	2.3	1.428	97.0	LOS F	70.7	501.4	0.88	1.23	1.47	9.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95

All Pedestrians	211	49.3	LOS E	0.95	0.95

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: I-17 [I-17 Darcy - Mons - Institute]

Network: N101 [2030 Base AM Darcy Road Network]

TCS 2393
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
1	L2	450	2.9	402	3.1	0.221	20.8	LOS B	4.2	29.9	0.67	0.71	0.67	17.0
2	T1	211	14.0	187	13.8	0.806	46.1	LOS D	5.5	39.5	0.97	0.82	1.03	22.7
Approach		660	6.5	589[N1]	6.5	0.806	28.8	LOS C	5.5	39.5	0.76	0.75	0.78	20.3
East: Institute Road														
4	L2	53	2.0	53	2.0	0.909	70.0	LOS E	6.3	44.7	1.00	1.13	1.49	16.4
5	T1	278	0.0	278	0.0	0.909	66.4	LOS E	6.4	44.9	1.00	1.13	1.49	16.6
6	R2	2	0.0	2	0.0	0.909	69.7	LOS E	6.4	44.9	1.00	1.13	1.49	23.3
Approach		333	0.3	333	0.3	0.909	67.0	LOS E	6.4	44.9	1.00	1.13	1.49	16.6
North: Mons Road														
7	L2	1	0.0	1	0.0	0.094	25.9	LOS B	1.4	10.2	0.66	0.52	0.66	32.2
8	T1	96	33.0	96	33.0	0.094	22.5	LOS B	1.4	10.2	0.66	0.51	0.66	27.0
9	R2	86	8.5	86	8.5	0.364	46.3	LOS D	2.6	19.2	0.95	0.76	0.95	20.0
Approach		183	21.3	183	21.3	0.364	33.7	LOS C	2.6	19.2	0.79	0.63	0.79	23.3
West: Darcy Road														
10	L2	271	1.2	254	1.2	0.186	4.4	LOS A	0.8	5.9	0.17	0.48	0.17	38.5
11	T1	292	1.2	273	1.2	0.813	38.0	LOS C	11.1	78.8	0.90	0.88	1.03	26.8
12	R2	635	1.5	595	1.5	0.813	42.1	LOS C	15.5	109.9	0.94	0.90	1.02	17.8
Approach		1198	1.4	1122[N1]	1.4	0.813	32.6	LOS C	15.5	109.9	0.76	0.80	0.83	25.2
All Vehicles		2375	4.2	2227[N1]	4.4	0.909	36.8	LOS C	15.5	109.9	0.80	0.82	0.91	22.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-19 [I-19 Darcy - Dental Hospital - Marist]

Network: N101 [2030 Base AM Darcy Road Network]

TCS 3282
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
4	L2	1	0.0	1	0.0	0.243	7.7	LOS A	1.5	10.9	0.19	0.17	0.19	20.6
5	T1	613	7.2	540	7.2	0.243	4.4	LOS A	1.7	11.9	0.20	0.17	0.20	31.4
6	R2	107	0.0	95	0.0	0.467	54.8	LOS D	3.1	21.9	1.00	0.78	1.00	11.0
Approach		721	6.1	636[N1]	6.1	0.467	11.9	LOS A	3.1	21.9	0.32	0.26	0.32	23.3
East: Dental hospital access														
7	L2	18	17.6	18	17.6	0.032	29.4	LOS C	0.4	3.1	0.70	0.64	0.70	6.7
9	R2	13	0.0	13	0.0	0.054	47.5	LOS D	0.4	2.5	0.89	0.67	0.89	4.7
Approach		31	10.3	31	10.3	0.054	36.9	LOS C	0.4	3.1	0.78	0.65	0.78	5.6
North: Darcy Road														
10	L2	139	0.0	134	0.0	0.479	15.3	LOS B	7.1	50.5	0.47	0.49	0.47	16.3
11	T1	943	5.6	908	5.7	0.479	7.1	LOS A	7.1	50.5	0.31	0.30	0.31	26.7
12	R2	3	0.0	3	0.0	0.015	55.3	LOS D	0.1	0.7	1.00	0.63	1.00	10.5
Approach		1085	4.8	1044[N1]	5.0	0.479	8.3	LOS A	7.1	50.5	0.33	0.33	0.33	24.1
West: Marist HS														
1	L2	1	0.0	1	0.0	0.007	42.9	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
3	R2	1	0.0	1	0.0	0.007	42.8	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
Approach		2	0.0	2	0.0	0.007	42.8	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
All Vehicles		1839	5.4	1713[N1]	5.8	0.479	10.2	LOS A	7.1	50.5	0.34	0.31	0.34	23.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-23 [I-23 Darcy - Hospital - WSU]

Network: N101 [2030 Base AM Darcy Road Network]

TCS 3281
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
4	L2	43	4.9	38	5.1	0.283	22.1	LOS B	6.3	44.8	0.70	0.63	0.70	25.1
5	T1	670	6.0	581	6.0	0.283	16.2	LOS B	6.3	44.8	0.68	0.60	0.68	14.8
6	R2	69	1.5	60	1.6	0.451	59.1	LOS E	2.0	14.2	0.99	0.75	0.99	7.3
Approach		783	5.5	679[N1]	5.6	0.451	20.3	LOS B	6.3	44.8	0.71	0.61	0.71	13.9
East: Westmead Hospital access														
7	L2	15	0.0	15	0.0	0.042	40.4	LOS C	0.4	2.9	0.83	0.66	0.83	4.5
8	T1	1	0.0	1	0.0	0.042	37.3	LOS C	0.4	2.9	0.83	0.66	0.83	14.2
9	R2	38	2.8	38	2.8	0.381	61.0	LOS E	1.3	9.3	1.00	0.73	1.00	3.3
Approach		54	2.0	54	2.0	0.381	54.9	LOS D	1.3	9.3	0.95	0.71	0.95	3.8
North: Darcy Road														
10	L2	117	0.0	112	0.0	0.452	6.8	LOS A	2.4	17.2	0.17	0.25	0.17	23.9
11	T1	761	6.7	734	6.8	0.452	2.3	LOS A	2.4	17.2	0.12	0.15	0.12	34.4
12	R2	1	0.0	1	0.0	0.007	60.2	LOS E	0.0	0.2	1.00	0.59	1.00	15.0
Approach		879	5.8	847[N1]	5.9	0.452	3.0	LOS A	2.4	17.2	0.13	0.16	0.13	32.0
West: Car park														
1	L2	25	8.3	25	8.3	0.069	42.4	LOS C	0.7	5.1	0.82	0.70	0.82	12.1
2	T1	1	0.0	1	0.0	0.069	36.8	LOS C	0.7	5.1	0.82	0.70	0.82	14.1
3	R2	1	0.0	1	0.0	0.010	60.1	LOS E	0.0	0.2	0.96	0.59	0.96	9.1
Approach		27	7.7	27	7.7	0.069	42.9	LOS D	0.7	5.1	0.83	0.70	0.83	12.0
All Vehicles		1743	5.6	1607[N1]	6.0	0.452	12.7	LOS A	6.3	44.8	0.41	0.38	0.41	20.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P21	South Stage 1	53	49.3	LOS E	0.2	0.2	0.95	0.95
P22	South Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	49.3	LOS E	0.2	0.2	0.95	0.95
P42	North Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95

P1	West Full Crossing	53	15.9	LOS B	0.1	0.1	0.54	0.54
All Pedestrians		316	43.7	LOS E			0.88	0.88

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: I-30 [I-30 Darcy - Hawkesbury]

Network: N101 [2030 Base AM Darcy Road Network]

TCS 1631
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hawkesbury Road														
8	T1	218	4.3	218	4.3	0.207	13.0	LOS A	3.5	25.7	0.54	0.45	0.54	24.0
9	R2	117	6.3	117	6.3	0.346	25.9	LOS B	1.9	14.0	0.91	0.75	0.91	16.9
Approach		335	5.0	335	5.0	0.346	17.5	LOS B	3.5	25.7	0.67	0.56	0.67	21.0
North: Darcy Road														
10	L2	167	5.7	161	5.8	0.187	15.5	LOS B	1.9	13.5	0.57	0.66	0.57	25.6
12	R2	605	7.0	583	7.2	0.802	44.9	LOS D	9.3	66.0	0.92	0.86	1.00	7.5
Approach		772	6.7	745 N1	6.9	0.802	38.6	LOS C	9.3	66.0	0.84	0.81	0.91	10.5
West: Hawkesbury Road														
1	L2	666	5.4	561	5.4	0.538	14.9	LOS B	6.9	49.1	0.79	0.81	0.79	20.7
2	T1	498	2.0	419	2.0	0.826	46.8	LOS D	13.6	96.7	0.98	0.93	1.08	16.7
Approach		1164	3.9	980 N1	4.0	0.826	28.5	LOS C	13.6	96.7	0.87	0.86	0.92	17.9
All Vehicles		2270	5.0	2060 N1	5.6	0.826	30.4	LOS C	13.6	96.7	0.83	0.79	0.87	15.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	22.5	LOS C	0.1	0.1	0.89	0.89
P42	North Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	42.6	LOS E			0.93	0.93

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: I-28 [I-28 Hawkesbury - Railway]

Network: N101 [2030 Base AM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Pde														
4	L2	144	1.5	144	1.5	0.384	29.6	LOS C	3.4	24.0	0.74	0.76	0.74	27.8
6	R2	18	0.0	18	0.0	0.101	52.6	LOS D	0.5	3.8	0.92	0.70	0.92	20.7
Approach		162	1.3	162	1.3	0.384	32.1	LOS C	3.4	24.0	0.76	0.76	0.76	26.8
East: Hawkesbury Rd														
7	L2	71	0.0	69	0.0	0.139	22.6	LOS B	1.7	14.8	0.53	0.56	0.53	34.0
8	T1	707	6.4	689	6.5	0.541	31.4	LOS C	12.5	88.6	0.93	0.82	0.93	12.4
Approach		777	5.8	757 N1	5.9	0.541	30.5	LOS C	12.5	88.6	0.89	0.80	0.89	15.3
West: Hawkesbury Rd														
2	T1	1536	3.1	1292	3.2	0.734	4.2	LOS A	7.4	53.4	0.33	0.32	0.33	26.2
3	R2	234	0.0	196	0.0	0.734	14.7	LOS B	5.6	40.1	0.72	0.70	0.73	38.1
Approach		1770	2.7	1488 N1	2.8	0.734	5.5	LOS A	7.4	53.4	0.38	0.37	0.38	31.7
All Vehicles		2709	3.5	2408 N1	4.0	0.734	15.2	LOS B	12.5	88.6	0.57	0.53	0.57	22.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-27 [I-27 Hawkesbury - Alexandra]

Network: N101 [2030 Base AM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Alexandra Ave														
4	L2	31	0.0	31	0.0	1.188	237.8	LOS F	12.6	93.5	1.00	1.69	2.77	4.3
5	T1	66	3.2	66	3.2	1.188	233.2	LOS F	12.6	93.5	1.00	1.69	2.77	8.2
6	R2	219	15.4	219	15.4	1.188	237.9	LOS F	12.6	93.5	1.00	1.69	2.77	2.3
Approach		316	11.3	316	11.3	1.188	236.9	LOS F	12.6	99.2	1.00	1.69	2.77	3.9
East: Hawkesbury Road														
7	L2	200	18.9	196	19.1	0.590	12.1	LOS A	7.7	55.0	0.37	0.48	0.37	30.7
8	T1	629	1.9	615	1.9	0.590	18.2	LOS B	7.7	55.0	0.55	0.55	0.57	22.6
9	R2	49	0.0	48	0.0	0.590	59.2	LOS E	5.6	39.5	1.00	0.86	1.11	20.9
Approach		878	5.7	860 N1	5.7	0.590	19.1	LOS B	7.7	55.0	0.54	0.55	0.56	23.6
North: Alexandra Ave														
10	L2	68	0.0	68	0.0	0.276	41.1	LOS C	1.9	13.0	0.84	0.76	0.84	23.7
11	T1	242	0.9	242	0.9	0.858	58.1	LOS E	8.8	61.9	1.00	1.01	1.28	22.7
Approach		311	0.7	311	0.7	0.858	54.4	LOS D	8.8	61.9	0.97	0.96	1.18	22.9
West: Hawkesbury Road														
1	L2	15	7.1	15	7.1	1.193	242.2	LOS F	50.8	358.1	1.00	2.21	2.64	8.2
2	T1	1459	0.6	1459	0.6	1.193	233.2	LOS F	74.5	524.2	1.00	2.19	2.60	2.4
Approach		1474	0.7	1474	0.7	1.193	233.3	LOS F	74.5	524.2	1.00	2.19	2.60	2.5
All Vehicles		2979	3.3	2961 N1	3.3	1.193	152.7	LOS F	74.5	524.2	0.86	1.53	1.88	5.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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.

APPENDIX E-6
2030 AM – WITH DEVELOPMENT

MOVEMENT SUMMARY

Site: I-11 [2030 Dev AM I-11 Briens - Redbank]

TCS 3213
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 145 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Redbank Road												
21	L2	218	4.3	0.287	33.9	LOS C	10.0	72.5	0.70	0.75	0.70	32.3
22	T1	36	0.0	0.100	52.4	LOS D	2.1	14.8	0.86	0.65	0.86	29.3
23	R2	78	9.5	0.697	80.7	LOS F	5.8	43.9	1.00	0.84	1.13	24.7
Approach		332	5.1	0.697	46.9	LOS D	10.0	72.5	0.79	0.76	0.82	29.4
East: Briens Road												
24	L2	112	1.9	0.936	62.4	LOS E	69.2	506.1	1.00	1.05	1.16	30.4
25	T1	2471	5.7	0.936	55.8	LOS D	69.7	512.1	1.00	1.05	1.16	29.5
26	R2	35	9.1	0.152	67.3	LOS E	2.2	16.6	0.92	0.73	0.92	28.1
Approach		2617	5.6	0.936	56.2	LOS D	69.7	512.1	1.00	1.04	1.16	29.6
North: Redbank Road												
27	L2	21	15.0	0.922	87.2	LOS F	24.1	170.2	1.00	1.09	1.34	24.5
28	T1	184	0.0	0.922	82.3	LOS F	24.1	170.2	1.00	1.09	1.34	23.4
29	R2	83	0.0	0.922	86.9	LOS F	24.1	170.2	1.00	1.09	1.34	20.9
Approach		288	1.1	0.922	84.0	LOS F	24.1	170.2	1.00	1.09	1.34	22.8
West: Briens Road												
30	L2	15	0.0	0.912	46.1	LOS D	68.9	509.9	0.98	0.98	1.06	31.2
31	T1	2778	6.8	0.912	39.8	LOS C	68.9	510.6	0.94	0.94	1.03	35.5
32	R2	340	1.6	1.117	160.3	LOS F	35.3	250.4	1.00	1.18	2.00	11.2
Approach		3132	6.2	1.117	52.9	LOS D	68.9	510.6	0.94	0.97	1.13	28.7
All Vehicles		6369	5.7	1.117	55.3	LOS D	69.7	512.1	0.96	0.99	1.14	28.7

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	South Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
P6	East Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
P7	North Full Crossing	53	66.8	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	66.8	LOS F			0.96	0.96

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: I-14 [I-14 Bridge - Darcy]

Network: N101 [2030 Dev AM Darcy Road Network]

TCS 1630
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bridge Road														
1	L2	181	2.3	181	2.3	0.493	41.4	LOS C	5.0	35.4	0.88	0.79	0.88	22.5
2	T1	6	0.0	6	0.0	1.487	493.2	LOS F	26.5	189.5	1.00	2.28	3.95	4.8
3	R2	216	2.4	216	2.4	1.487	492.8	LOS F	26.5	189.5	1.00	2.28	3.95	2.2
Approach		403	2.4	403	2.4	1.487	289.9	LOS F	26.5	189.5	0.94	1.61	2.57	4.4
East: Darcy Road														
4	L2	86	7.4	81	7.7	0.314	15.6	LOS B	5.5	39.9	0.52	0.51	0.52	39.6
5	T1	669	2.6	631	2.7	0.314	12.3	LOS A	7.0	50.1	0.59	0.54	0.59	37.3
6	R2	13	16.7	12	17.0	0.051	29.5	LOS C	0.2	1.8	0.76	0.64	0.76	21.4
Approach		768	3.4	724 N1	3.5	0.314	13.0	LOS A	7.0	50.1	0.59	0.54	0.59	36.9
North: Coles Access														
7	L2	17	25.0	17	25.0	0.042	33.1	LOS C	0.4	3.5	0.78	0.56	0.78	14.7
8	T1	13	0.0	13	0.0	0.248	56.0	LOS D	0.9	6.8	0.98	0.71	0.98	17.3
9	R2	15	14.3	15	14.3	0.248	56.0	LOS D	0.9	6.8	0.98	0.71	0.98	14.9
Approach		44	14.3	44	14.3	0.248	47.3	LOS D	0.9	6.8	0.91	0.65	0.91	15.6
West: Darcy Road														
10	L2	21	5.0	21	5.0	1.051	111.1	LOS F	73.2	518.9	1.00	1.50	1.71	11.5
11	T1	2014	1.4	2014	1.4	1.051	110.8	LOS F	73.2	518.9	1.00	1.52	1.75	5.0
12	R2	186	2.3	186	2.3	0.341	10.7	LOS A	1.7	12.1	0.51	0.69	0.51	37.6
Approach		2221	1.5	2221	1.5	1.051	102.4	LOS F	73.2	518.9	0.96	1.45	1.65	6.1
All Vehicles		3436	2.2	3392 N1	2.2	1.487	104.9	LOS F	73.2	518.9	0.88	1.27	1.52	8.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95

All Pedestrians	211	49.3	LOS E	0.95	0.95

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: I-17 [I-17 Darcy - Mons - Institute]

Network: N101 [2030 Dev AM Darcy Road Network]

TCS 2393
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
1	L2	451	2.9	401	3.1	0.221	21.0	LOS B	4.2	30.4	0.67	0.72	0.67	16.9
2	T1	224	13.2	198	13.0	0.858	47.7	LOS D	6.0	43.3	0.98	0.85	1.07	22.4
Approach		675	6.3	600[N1]	6.4	0.858	29.8	LOS C	6.0	43.3	0.78	0.76	0.81	20.2
East: Institute Road														
4	L2	53	2.0	53	2.0	0.938	75.6	LOS F	6.8	47.6	1.00	1.19	1.59	15.7
5	T1	284	0.0	284	0.0	0.938	72.1	LOS F	6.8	47.8	1.00	1.19	1.59	15.8
6	R2	2	0.0	2	0.0	0.938	75.4	LOS F	6.8	47.8	1.00	1.19	1.59	22.5
Approach		338	0.3	338	0.3	0.938	72.6	LOS F	6.8	47.8	1.00	1.19	1.59	15.8
North: Mons Road														
7	L2	1	0.0	1	0.0	0.100	25.9	LOS B	1.5	10.9	0.67	0.53	0.67	32.2
8	T1	100	31.5	100	31.5	0.100	22.5	LOS B	1.5	10.9	0.66	0.52	0.66	27.0
9	R2	86	8.5	86	8.5	0.364	46.3	LOS D	2.6	19.2	0.95	0.76	0.95	20.0
Approach		188	20.8	188	20.8	0.364	33.5	LOS C	2.6	19.2	0.79	0.63	0.79	23.3
West: Darcy Road														
10	L2	271	1.2	251	1.2	0.186	4.6	LOS A	0.9	6.5	0.18	0.49	0.18	38.4
11	T1	316	1.1	292	1.1	0.827	39.3	LOS C	11.6	82.2	0.90	0.90	1.05	26.5
12	R2	640	1.5	592	1.5	0.827	43.1	LOS D	16.1	113.9	0.95	0.91	1.04	17.6
Approach		1228	1.3	1136[N1]	1.3	0.827	33.6	LOS C	16.1	113.9	0.77	0.81	0.85	24.9
All Vehicles		2428	4.1	2262[N1]	4.4	0.938	38.4	LOS C	16.1	113.9	0.81	0.84	0.94	22.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-19 [I-19 Darcy - Dental Hospital - Marist]

Network: N101 [2030 Dev AM Darcy Road Network]

TCS 3282
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
4	L2	1	0.0	1	0.0	0.247	7.7	LOS A	1.5	11.0	0.19	0.17	0.19	20.6
5	T1	627	7.0	549	7.1	0.247	4.4	LOS A	1.7	12.0	0.20	0.17	0.20	31.4
6	R2	107	0.0	94	0.0	0.464	54.8	LOS D	3.1	21.8	1.00	0.78	1.00	11.0
Approach		736	6.0	644[N1]	6.0	0.464	11.7	LOS A	3.1	21.8	0.31	0.26	0.31	23.4
East: Dental hospital access														
7	L2	18	17.6	18	17.6	0.032	29.4	LOS C	0.4	3.1	0.70	0.64	0.70	6.7
9	R2	13	0.0	13	0.0	0.054	47.5	LOS D	0.4	2.5	0.89	0.67	0.89	4.7
Approach		31	10.3	31	10.3	0.054	36.9	LOS C	0.4	3.1	0.78	0.65	0.78	5.6
North: Darcy Road														
10	L2	139	0.0	133	0.0	0.480	15.2	LOS B	7.1	50.3	0.47	0.49	0.47	16.3
11	T1	953	5.5	911	5.7	0.480	7.1	LOS A	7.1	50.3	0.31	0.30	0.31	26.8
12	R2	3	0.0	3	0.0	0.015	55.3	LOS D	0.1	0.7	1.00	0.63	1.00	10.5
Approach		1095	4.8	1047[N1]	4.9	0.480	8.3	LOS A	7.1	50.3	0.33	0.32	0.33	24.2
West: Marist HS														
1	L2	1	0.0	1	0.0	0.007	42.9	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
3	R2	1	0.0	1	0.0	0.007	42.8	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
Approach		2	0.0	2	0.0	0.007	42.8	LOS D	0.1	0.4	0.84	0.60	0.84	5.0
All Vehicles		1863	5.4	1723[N1]	5.8	0.480	10.1	LOS A	7.1	50.3	0.33	0.31	0.33	23.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-23 [I-23 Darcy - Hospital - WSU]

Network: N101 [2030 Dev AM Darcy Road Network]

TCS 3281
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
4	L2	43	4.9	37	5.1	0.287	22.1	LOS B	6.4	45.6	0.70	0.63	0.70	25.1
5	T1	685	5.9	590	5.9	0.287	16.2	LOS B	6.4	45.6	0.69	0.60	0.69	14.8
6	R2	69	1.5	60	1.6	0.449	59.1	LOS E	2.0	14.1	0.99	0.75	0.99	7.3
Approach		797	5.4	688[N1]	5.5	0.449	20.3	LOS B	6.4	45.6	0.71	0.61	0.71	13.9
East: Westmead Hospital access														
7	L2	15	0.0	15	0.0	0.042	40.4	LOS C	0.4	2.9	0.83	0.66	0.83	4.5
8	T1	1	0.0	1	0.0	0.042	37.3	LOS C	0.4	2.9	0.83	0.66	0.83	14.2
9	R2	38	2.8	38	2.8	0.381	61.0	LOS E	1.3	9.3	1.00	0.73	1.00	3.3
Approach		54	2.0	54	2.0	0.381	54.9	LOS D	1.3	9.3	0.95	0.71	0.95	3.8
North: Darcy Road														
10	L2	117	0.0	112	0.0	0.457	6.8	LOS A	2.5	17.8	0.18	0.25	0.18	23.9
11	T1	771	6.6	739	6.8	0.457	2.4	LOS A	2.5	17.8	0.12	0.15	0.12	34.3
12	R2	1	0.0	1	0.0	0.007	60.2	LOS E	0.0	0.2	1.00	0.59	1.00	15.0
Approach		889	5.7	851[N1]	5.9	0.457	3.0	LOS A	2.5	17.8	0.13	0.16	0.13	32.0
West: Car park														
1	L2	25	8.3	25	8.3	0.069	42.4	LOS C	0.7	5.1	0.82	0.70	0.82	12.1
2	T1	1	0.0	1	0.0	0.069	36.8	LOS C	0.7	5.1	0.82	0.70	0.82	14.1
3	R2	1	0.0	1	0.0	0.010	60.1	LOS E	0.0	0.2	0.96	0.59	0.96	9.1
Approach		27	7.7	27	7.7	0.069	42.9	LOS D	0.7	5.1	0.83	0.70	0.83	12.0
All Vehicles		1767	5.5	1620[N1]	6.0	0.457	12.7	LOS A	6.4	45.6	0.42	0.38	0.42	20.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P21	South Stage 1	53	49.3	LOS E	0.2	0.2	0.95	0.95
P22	South Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	49.3	LOS E	0.2	0.2	0.95	0.95
P42	North Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95

P1	West Full Crossing	53	15.9	LOS B	0.1	0.1	0.54	0.54
All Pedestrians		316	43.7	LOS E			0.88	0.88

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: I-30 [I-30 Darcy - Hawkesbury]

Network: N101 [2030 Dev AM Darcy Road Network]

TCS 1631
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hawkesbury Road														
8	T1	220	4.3	220	4.3	0.206	12.5	LOS A	3.5	25.4	0.53	0.45	0.53	24.4
9	R2	118	6.3	118	6.3	0.349	25.8	LOS B	1.9	13.9	0.91	0.75	0.91	16.9
Approach		338	5.0	338	5.0	0.349	17.1	LOS B	3.5	25.4	0.66	0.55	0.66	21.2
North: Darcy Road														
10	L2	173	5.5	165	5.6	0.195	15.9	LOS B	2.0	14.5	0.59	0.66	0.59	25.4
12	R2	609	6.9	584	7.1	0.840	47.5	LOS D	9.7	69.4	0.94	0.89	1.05	7.1
Approach		782	6.6	750 N1	6.8	0.840	40.5	LOS C	9.7	69.4	0.86	0.84	0.95	10.1
West: Hawkesbury Road														
1	L2	679	5.3	571	5.3	0.548	14.7	LOS B	7.0	49.6	0.79	0.80	0.79	20.9
2	T1	506	2.0	425	2.0	0.810	45.1	LOS D	13.5	95.8	0.97	0.91	1.05	17.1
Approach		1185	3.9	996 N1	3.9	0.810	27.7	LOS B	13.5	95.8	0.86	0.85	0.90	18.3
All Vehicles		2305	5.0	2084 N1	5.5	0.840	30.6	LOS C	13.5	95.8	0.83	0.80	0.88	15.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	22.3	LOS C	0.1	0.1	0.89	0.89
P42	North Stage 2	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	42.5	LOS E			0.93	0.93

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: I-28 [I-28 Hawkesbury - Railway]

Network: N101 [2030 Dev AM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Pde														
4	L2	144	1.5	144	1.5	0.384	29.6	LOS C	3.4	24.0	0.74	0.76	0.74	27.8
6	R2	18	0.0	18	0.0	0.104	52.7	LOS D	0.5	3.8	0.92	0.70	0.92	20.7
Approach		162	1.3	162	1.3	0.384	32.1	LOS C	3.4	24.0	0.76	0.76	0.76	26.8
East: Hawkesbury Rd														
7	L2	71	0.0	68	0.0	0.139	22.5	LOS B	1.6	14.7	0.53	0.56	0.53	34.0
8	T1	707	6.4	686	6.5	0.538	31.3	LOS C	12.4	88.2	0.93	0.82	0.93	12.4
Approach		777	5.8	754 N1	6.0	0.538	30.4	LOS C	12.4	88.2	0.89	0.80	0.89	15.4
West: Hawkesbury Rd														
2	T1	1536	3.1	1292	3.2	0.738	4.2	LOS A	7.5	54.2	0.33	0.32	0.33	26.2
3	R2	234	0.0	196	0.0	0.738	14.9	LOS B	5.6	40.1	0.72	0.71	0.73	37.9
Approach		1770	2.7	1489 N1	2.8	0.738	5.6	LOS A	7.5	54.2	0.38	0.37	0.39	31.6
All Vehicles		2709	3.5	2405 N1	4.0	0.738	15.2	LOS B	12.4	88.2	0.57	0.53	0.57	22.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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: I-27 [I-27 Hawkesbury - Alexandra]

Network: N101 [2030 Dev AM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Alexandra Ave														
4	L2	31	0.0	31	0.0	1.195	244.4	LOS F	12.7	94.4	1.00	1.71	2.81	4.2
5	T1	66	3.2	66	3.2	1.195	239.8	LOS F	12.7	94.4	1.00	1.71	2.81	8.0
6	R2	219	15.4	219	15.4	1.195	244.4	LOS F	12.8	101.4	1.00	1.71	2.81	2.3
Approach		316	11.3	316	11.3	1.195	243.5	LOS F	12.8	101.4	1.00	1.71	2.81	3.8
East: Hawkesbury Road														
7	L2	200	18.9	196	19.2	0.588	12.1	LOS A	7.7	55.0	0.37	0.48	0.37	30.6
8	T1	629	1.9	613	1.9	0.588	18.2	LOS B	7.7	55.0	0.55	0.55	0.57	22.6
9	R2	49	0.0	48	0.0	0.588	59.1	LOS E	5.6	39.4	1.00	0.85	1.11	21.0
Approach		878	5.7	857 N1	5.7	0.588	19.1	LOS B	7.7	55.0	0.53	0.55	0.56	23.6
North: Alexandra Ave														
10	L2	68	0.0	68	0.0	0.284	41.2	LOS C	1.9	13.1	0.84	0.76	0.84	23.7
11	T1	242	0.9	242	0.9	0.858	58.1	LOS E	8.8	61.9	1.00	1.01	1.28	22.7
Approach		311	0.7	311	0.7	0.858	54.4	LOS D	8.8	61.9	0.97	0.96	1.18	22.8
West: Hawkesbury Road														
1	L2	15	7.1	15	7.1	1.206	253.9	LOS F	51.3	361.5	1.00	2.26	2.71	7.9
2	T1	1459	0.6	1459	0.6	1.206	244.8	LOS F	77.2	543.0	1.00	2.24	2.67	2.3
Approach		1474	0.7	1474	0.7	1.206	244.9	LOS F	77.2	543.0	1.00	2.24	2.67	2.4
All Vehicles		2979	3.3	2958 N1	3.3	1.206	159.3	LOS F	77.2	543.0	0.86	1.56	1.92	5.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

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.

APPENDIX E-7
2030 PM – WITHOUT DEVELOPMENT

MOVEMENT SUMMARY

Site: I-11 [2030 Base PM I-11 Briens - Redbank]

TCS 3213
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Redbank Road												
21	L2	444	0.7	0.701	47.1	LOS D	26.1	183.8	0.93	0.86	0.93	28.2
22	T1	184	0.0	0.639	53.5	LOS D	11.2	78.2	0.93	0.77	0.93	29.0
23	R2	171	4.3	0.744	65.2	LOS E	11.2	81.3	0.97	0.86	1.07	27.8
Approach		799	1.3	0.744	52.5	LOS D	26.1	183.8	0.94	0.84	0.96	28.3
East: Briens Road												
24	L2	21	10.0	0.785	31.2	LOS C	43.8	322.4	0.84	0.78	0.84	41.4
25	T1	2473	5.9	0.785	24.4	LOS B	43.9	323.1	0.84	0.77	0.84	43.8
26	R2	34	9.4	0.193	70.3	LOS E	2.2	16.4	0.95	0.73	0.95	27.4
Approach		2527	6.0	0.785	25.1	LOS B	43.9	323.1	0.84	0.77	0.84	43.4
North: Redbank Road												
27	L2	20	5.3	0.828	83.7	LOS F	6.6	46.5	1.00	0.93	1.32	24.9
28	T1	36	0.0	0.828	79.1	LOS F	6.6	46.5	1.00	0.93	1.32	23.7
29	R2	32	0.0	0.828	83.6	LOS F	6.6	46.5	1.00	0.93	1.32	21.2
Approach		87	1.2	0.828	81.8	LOS F	6.6	46.5	1.00	0.93	1.32	23.2
West: Briens Road												
30	L2	56	0.0	0.740	29.9	LOS C	40.0	287.4	0.81	0.75	0.81	37.7
31	T1	2361	3.4	0.740	23.5	LOS B	40.2	289.4	0.81	0.75	0.81	44.4
32	R2	143	2.2	0.783	78.4	LOS F	10.3	73.2	1.00	0.87	1.17	22.2
Approach		2560	3.2	0.783	26.7	LOS B	40.2	289.4	0.82	0.75	0.83	41.8
All Vehicles		5974	4.1	0.828	30.3	LOS C	43.9	323.1	0.84	0.77	0.86	39.1

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	South Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P6	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P7	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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: I-14 [I-14 Bridge - Darcy]

Network: N101 [2030 Base PM Darcy Road Network]

TCS 1630
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bridge Road														
1	L2	280	1.5	280	1.5	0.489	33.3	LOS C	7.3	51.4	0.78	0.78	0.78	25.2
2	T1	38	2.8	38	2.8	0.462	58.6	LOS E	3.3	23.9	0.97	0.78	0.97	17.4
3	R2	58	5.5	58	5.5	0.462	58.1	LOS E	3.3	23.9	0.97	0.78	0.97	14.4
Approach		376	2.2	376	2.2	0.489	39.7	LOS C	7.3	51.4	0.82	0.78	0.82	21.8
East: Darcy Road														
4	L2	178	3.0	138	3.8	0.826	32.4	LOS C	22.6	160.4	0.87	0.82	0.89	31.2
5	T1	1799	0.6	1381	0.8	0.826	28.3	LOS B	22.6	160.4	0.86	0.81	0.88	28.4
6	R2	20	5.3	16	6.8	0.031	14.4	LOS A	0.1	1.0	0.48	0.62	0.48	23.8
Approach		1997	0.9	1535 N1	1.2	0.826	28.5	LOS B	22.6	160.4	0.86	0.81	0.88	28.6
North: Coles Access														
7	L2	23	4.5	23	4.5	0.034	24.4	LOS B	0.5	3.7	0.65	0.48	0.65	15.8
8	T1	28	3.7	28	3.7	0.552	58.4	LOS E	3.0	21.4	1.00	0.78	1.00	17.1
9	R2	54	3.9	54	3.9	0.552	58.4	LOS E	3.0	21.4	1.00	0.78	1.00	14.8
Approach		105	4.0	105	4.0	0.552	50.9	LOS D	3.0	21.4	0.92	0.71	0.92	15.7
West: Darcy Road														
10	L2	67	1.6	67	1.6	0.488	26.3	LOS B	10.8	76.8	0.72	0.66	0.72	19.4
11	T1	683	1.7	683	1.7	0.488	20.7	LOS B	10.8	76.8	0.68	0.61	0.68	18.5
12	R2	258	4.1	258	4.1	0.849	51.6	LOS D	7.2	52.4	0.97	1.04	1.43	19.9
Approach		1008	2.3	1008	2.3	0.849	29.0	LOS C	10.8	76.8	0.76	0.73	0.88	19.2
All Vehicles		3487	1.5	3024 N1	1.8	0.849	30.8	LOS C	22.6	160.4	0.82	0.77	0.87	24.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95

All Pedestrians	211	54.3	LOS E	0.95	0.95

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: I-17 [I-17 Darcy - Mons - Institute]

Network: N101 [2030 Base PM Darcy Road Network]

TCS 2393
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
1	L2	926	0.8	926	0.8	0.700	26.4	LOS B	12.5	88.3	0.71	0.76	0.71	14.7
2	T1	89	36.5	89	36.5	0.460	59.5	LOS E	2.3	17.2	0.99	0.75	0.99	20.2
Approach		1016	4.0	1016	4.0	0.700	29.3	LOS C	12.5	88.3	0.73	0.76	0.73	15.9
East: Institute Road														
4	L2	121	0.9	121	0.9	2.138	1072.8	LOS F	89.1	625.1	1.00	3.91	5.12	1.6
5	T1	911	0.0	911	0.0	2.138	1069.4	LOS F	89.8	628.7	1.00	3.99	5.12	1.7
6	R2	2	0.0	2	0.0	2.138	1072.7	LOS F	89.8	628.7	1.00	4.05	5.12	3.1
Approach		1034	0.1	1034	0.1	2.138	1069.8	LOS F	89.8	628.7	1.00	3.98	5.12	1.7
North: Mons Road														
7	L2	5	0.0	5	0.0	0.163	27.9	LOS B	2.8	20.0	0.68	0.56	0.68	31.6
8	T1	141	15.7	141	15.7	0.163	24.0	LOS B	2.8	20.0	0.67	0.54	0.67	26.4
9	R2	249	2.1	249	2.1	0.637	46.4	LOS D	7.9	56.2	0.96	0.89	1.08	20.0
Approach		396	6.9	396	6.9	0.637	38.1	LOS C	7.9	56.2	0.85	0.76	0.93	22.1
West: Darcy Road														
10	L2	71	0.3	71	0.3	0.050	4.7	LOS A	0.4	3.0	0.31	0.53	0.31	38.3
11	T1	37	0.3	37	0.3	0.459	42.5	LOS D	5.4	38.2	0.84	0.75	0.84	25.4
12	R2	348	1.8	348	1.8	0.459	39.9	LOS C	5.4	38.2	0.79	0.74	0.79	18.3
Approach		455	1.4	455	1.4	0.459	34.6	LOS C	5.4	38.2	0.72	0.71	0.72	22.5
All Vehicles		2901	2.6	2901	2.6	2.138	402.1	LOS F	89.8	628.7	0.84	1.90	2.32	3.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-19 [I-19 Darcy - Dental Hospital - Marist]

Network: N101 [2030 Base PM Darcy Road Network]

TCS 3282
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
4	L2	1	0.0	1	0.0	0.230	4.1	LOS A	0.4	3.0	0.04	0.04	0.04	22.7
5	T1	686	5.2	686	5.2	0.230	0.6	LOS A	0.4	3.0	0.03	0.03	0.03	38.6
6	R2	15	0.0	15	0.0	0.190	68.9	LOS E	0.6	3.9	1.00	0.69	1.00	9.3
Approach		702	5.1	702	5.1	0.230	2.0	LOS A	0.6	3.9	0.05	0.04	0.05	35.5
East: Dental hospital access														
7	L2	17	18.8	17	18.8	0.117	50.3	LOS D	0.5	4.3	0.87	0.70	0.87	4.2
9	R2	16	0.0	16	0.0	0.110	60.0	LOS E	0.5	3.8	0.95	0.69	0.95	3.8
Approach		33	9.7	33	9.7	0.117	55.0	LOS D	0.5	4.3	0.91	0.69	0.91	4.0
North: Darcy Road														
10	L2	15	0.0	14	0.0	0.615	8.7	LOS A	4.9	34.5	0.33	0.31	0.33	19.2
11	T1	960	3.4	897	3.5	0.615	5.0	LOS A	4.9	34.5	0.32	0.29	0.32	30.0
12	R2	3	0.0	3	0.0	0.038	67.2	LOS E	0.1	0.8	1.00	0.62	1.00	9.0
Approach		978	3.3	914 N1	3.5	0.615	5.3	LOS A	4.9	34.5	0.32	0.30	0.32	29.4
West: Marist HS														
1	L2	1	0.0	1	0.0	0.018	56.4	LOS D	0.1	0.5	0.91	0.62	0.91	3.9
3	R2	1	0.0	1	0.0	0.018	56.3	LOS D	0.1	0.5	0.91	0.62	0.91	3.9
Approach		2	0.0	2	0.0	0.018	56.4	LOS D	0.1	0.5	0.91	0.62	0.91	3.9
All Vehicles		1715	4.1	1650 N1	4.3	0.615	4.9	LOS A	4.9	34.5	0.22	0.20	0.22	30.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-23 [I-23 Darcy - Hospital - WSU]

Network: N101 [2030 Base PM Darcy Road Network]

TCS 3281
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
4	L2	43	4.9	43	4.9	0.458	40.0	LOS C	7.8	54.8	0.82	0.72	0.82	17.1
5	T1	552	6.0	552	6.0	0.458	39.1	LOS C	9.2	64.7	0.90	0.77	0.90	7.9
6	R2	38	2.8	38	2.8	0.083	38.9	LOS C	0.9	6.3	0.68	0.65	0.68	10.0
Approach		633	5.7	633	5.7	0.458	39.2	LOS C	9.2	64.7	0.88	0.76	0.88	8.7
East: Westmead Hospital access														
7	L2	72	1.5	72	1.5	0.199	28.7	LOS C	1.7	12.2	0.69	0.70	0.69	6.0
8	T1	1	0.0	1	0.0	0.199	25.6	LOS B	1.7	12.2	0.69	0.70	0.69	18.0
9	R2	98	1.1	98	1.1	0.674	61.7	LOS E	3.5	25.0	0.99	0.84	1.10	3.3
Approach		171	1.2	171	1.2	0.674	47.6	LOS D	3.5	25.0	0.86	0.78	0.92	4.1
North: Darcy Road														
10	L2	57	0.0	53	0.0	1.329	363.0	LOS F	23.5	165.0	1.00	2.52	3.12	2.0
11	T1	870	3.6	814	3.8	1.329	349.4	LOS F	23.5	165.0	1.00	2.48	3.05	2.1
12	R2	1	0.0	1	0.0	0.002	42.5	LOS D	0.0	0.2	0.86	0.60	0.86	19.2
Approach		928	3.4	868[N1]	3.6	1.329	349.9	LOS F	23.5	165.0	1.00	2.48	3.05	1.8
West: Car park														
1	L2	25	8.3	25	8.3	0.044	32.9	LOS C	0.6	4.6	0.69	0.68	0.69	14.7
2	T1	1	0.0	1	0.0	0.044	27.3	LOS B	0.6	4.6	0.69	0.68	0.69	17.1
3	R2	1	0.0	1	0.0	0.006	57.9	LOS E	0.0	0.2	0.92	0.59	0.92	9.4
Approach		27	7.7	27	7.7	0.044	33.6	LOS C	0.6	4.6	0.70	0.68	0.70	14.5
All Vehicles		1760	4.1	1700[N1]	4.2	1.329	198.7	LOS F	23.5	165.0	0.93	1.64	1.99	2.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P21	South Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95
P22	South Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95
P42	North Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95

P1	West Full Crossing	53	34.6	LOS D	0.1	0.1	0.76	0.76
All Pedestrians		316	51.0	LOS E			0.92	0.92

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: I-30 [I-30 Darcy - Hawkesbury]

Network: N101 [2030 Base PM Darcy Road Network]

TCS 1631
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hawkesbury Road														
8	T1	416	1.5	416	1.5	0.550	18.2	LOS B	9.1	64.3	0.69	0.62	0.69	20.6
9	R2	218	2.4	218	2.4	0.550	24.3	LOS B	4.6	32.8	0.89	0.79	0.89	17.6
Approach		634	1.8	634	1.8	0.550	20.3	LOS B	9.1	64.3	0.76	0.68	0.76	19.5
North: Darcy Road														
10	L2	121	7.8	90	9.9	0.081	12.7	LOS A	1.0	7.2	0.54	0.63	0.54	28.2
12	R2	830	3.5	611	4.7	1.085	138.0	LOS F	12.8	90.0	1.00	1.42	1.87	2.7
Approach		952	4.0	701 N1	5.3	1.085	121.9	LOS F	12.8	90.0	0.94	1.32	1.70	3.6
West: Hawkesbury Road														
1	L2	397	7.2	397	7.2	0.426	16.4	LOS B	5.3	37.2	0.77	0.78	0.77	19.5
2	T1	346	2.7	346	2.7	1.032	86.3	LOS F	17.0	121.7	1.00	1.20	1.47	10.8
Approach		743	5.1	743	5.1	1.032	48.9	LOS D	17.0	121.7	0.88	0.97	1.09	12.6
All Vehicles		2329	3.8	2078 N1	4.2	1.085	64.8	LOS E	17.0	121.7	0.86	1.00	1.20	8.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	25.8	LOS C	0.1	0.1	0.90	0.90
P42	North Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	47.1	LOS E			0.94	0.94

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: I-28 [I-28 Hawkesbury - Railway]

Network: N101 [2030 Base PM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Pde														
4	L2	284	0.7	284	0.7	0.953	88.4	LOS F	14.4	101.4	1.00	1.14	1.55	14.8
6	R2	37	0.0	37	0.0	0.326	61.3	LOS E	1.3	9.1	0.96	0.75	0.96	18.9
Approach		321	0.7	321	0.7	0.953	85.3	LOS F	14.4	101.4	1.00	1.09	1.48	15.2
East: Hawkesbury Rd														
7	L2	59	0.0	46	0.0	0.103	21.9	LOS B	1.8	16.9	0.65	0.60	0.65	34.6
8	T1	1181	3.4	925	4.2	0.829	39.0	LOS C	17.1	120.2	0.94	0.92	1.03	10.5
Approach		1240	3.2	971 N1	4.0	0.829	38.1	LOS C	17.1	120.2	0.93	0.91	1.01	12.0
West: Hawkesbury Rd														
2	T1	907	4.0	907	4.0	0.579	2.9	LOS A	5.1	36.0	0.13	0.12	0.14	30.6
3	R2	151	1.4	151	1.4	0.579	33.9	LOS C	5.1	36.0	0.94	0.88	1.08	27.7
Approach		1058	3.7	1058	3.7	0.579	7.3	LOS A	5.1	36.0	0.25	0.23	0.28	28.8
All Vehicles		2619	3.1	2350 N1	3.4	0.953	30.7	LOS C	17.1	120.2	0.63	0.63	0.75	16.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-27 [I-27 Hawkesbury - Alexandra]

Network: N101 [2030 Base PM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Alexandra Ave														
4	L2	40	7.9	40	7.9	0.813	61.4	LOS E	10.2	72.2	1.00	0.95	1.15	14.1
5	T1	229	0.5	229	0.5	0.813	56.7	LOS E	10.2	72.2	1.00	0.95	1.15	22.8
6	R2	216	18.0	216	18.0	0.813	63.1	LOS E	10.2	72.2	1.00	0.93	1.20	8.1
Approach		485	8.9	485	8.9	0.813	60.0	LOS E	10.2	72.2	1.00	0.95	1.17	16.7
East: Hawkesbury Road														
7	L2	228	15.2	193	17.9	0.657	21.1	LOS B	7.8	55.0	0.58	0.65	0.58	23.8
8	T1	1163	0.4	951	0.5	0.657	16.8	LOS B	7.8	55.0	0.61	0.65	0.72	23.7
9	R2	96	0.0	78	0.0	0.657	16.3	LOS B	7.7	53.9	0.50	0.63	0.73	37.5
Approach		1487	2.7	1222[N1]	3.2	0.657	17.4	LOS B	7.8	55.0	0.60	0.65	0.70	25.0
North: Alexandra Ave														
10	L2	37	0.0	37	0.0	0.047	25.9	LOS B	0.8	5.3	0.61	0.67	0.61	29.5
11	T1	156	2.7	156	2.7	0.610	54.3	LOS D	5.4	38.8	0.99	0.80	0.99	23.5
Approach		193	2.2	193	2.2	0.610	48.9	LOS D	5.4	38.8	0.92	0.78	0.92	24.3
West: Hawkesbury Road														
1	L2	29	3.6	29	3.6	0.823	55.5	LOS D	14.4	101.6	1.00	0.96	1.12	24.0
2	T1	727	1.0	727	1.0	0.823	51.2	LOS D	14.4	101.6	1.00	0.96	1.12	9.5
Approach		756	1.1	756	1.1	0.823	51.4	LOS D	14.4	101.6	1.00	0.96	1.12	10.3
All Vehicles		2921	3.3	2655[N1]	3.6	0.823	37.1	LOS C	14.4	101.6	0.81	0.80	0.92	17.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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.

APPENDIX E-8
2030 PM – WITH DEVELOPMENT

MOVEMENT SUMMARY

Site: I-11 [2030 Dev PM I-11 Briens - Redbank]

TCS 3213
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Redbank Road												
21	L2	457	0.7	0.722	47.6	LOS D	27.1	191.0	0.94	0.86	0.94	28.1
22	T1	190	0.0	0.670	54.1	LOS D	11.6	81.3	0.94	0.78	0.95	28.9
23	R2	175	4.2	0.779	66.9	LOS E	11.7	85.2	0.97	0.88	1.12	27.5
Approach		823	1.3	0.779	53.2	LOS D	27.1	191.0	0.94	0.85	0.98	28.2
East: Briens Road												
24	L2	22	9.8	0.785	31.2	LOS C	43.8	322.5	0.84	0.78	0.84	41.4
25	T1	2473	5.9	0.785	24.4	LOS B	43.9	323.2	0.84	0.77	0.84	43.8
26	R2	34	9.4	0.193	70.3	LOS E	2.2	16.4	0.95	0.73	0.95	27.4
Approach		2528	6.0	0.785	25.1	LOS B	43.9	323.2	0.84	0.77	0.84	43.3
North: Redbank Road												
27	L2	20	5.3	0.829	83.8	LOS F	6.6	46.9	1.00	0.93	1.32	24.9
28	T1	37	0.0	0.829	79.1	LOS F	6.6	46.9	1.00	0.93	1.32	23.7
29	R2	32	0.0	0.829	83.7	LOS F	6.6	46.9	1.00	0.93	1.32	21.2
Approach		88	1.2	0.829	81.8	LOS F	6.6	46.9	1.00	0.93	1.32	23.2
West: Briens Road												
30	L2	56	0.0	0.740	29.9	LOS C	40.0	287.4	0.81	0.75	0.81	37.7
31	T1	2361	3.4	0.740	23.5	LOS B	40.2	289.4	0.81	0.75	0.81	44.4
32	R2	147	2.2	0.801	79.2	LOS F	10.6	75.5	1.00	0.88	1.19	22.0
Approach		2563	3.2	0.801	26.9	LOS B	40.2	289.4	0.82	0.75	0.83	41.8
All Vehicles		6002	4.1	0.829	30.5	LOS C	43.9	323.2	0.85	0.78	0.86	39.0

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	South Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P6	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P7	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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: I-14 [I-14 Bridge - Darcy]

Network: N101 [2030 Dev PM Darcy Road Network]

TCS 1630
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bridge Road														
1	L2	280	1.5	280	1.5	0.495	33.3	LOS C	7.3	51.4	0.78	0.78	0.78	25.2
2	T1	38	2.8	38	2.8	0.489	58.9	LOS E	3.5	25.2	0.97	0.79	0.97	17.3
3	R2	63	5.0	63	5.0	0.489	58.4	LOS E	3.5	25.2	0.97	0.79	0.97	14.4
Approach		381	2.2	381	2.2	0.495	40.0	LOS C	7.3	51.4	0.83	0.78	0.83	21.7
East: Darcy Road														
4	L2	187	2.8	143	3.7	0.828	33.3	LOS C	23.1	163.3	0.88	0.83	0.90	30.8
5	T1	1815	0.6	1379	0.8	0.828	29.1	LOS C	23.1	163.3	0.87	0.82	0.90	28.0
6	R2	20	5.3	15	6.8	0.031	14.5	LOS A	0.1	1.0	0.48	0.62	0.48	23.8
Approach		2022	0.9	1538 N1	1.2	0.828	29.3	LOS C	23.1	163.3	0.86	0.82	0.89	28.2
North: Coles Access														
7	L2	23	4.5	23	4.5	0.034	24.4	LOS B	0.5	3.7	0.65	0.48	0.65	15.8
8	T1	28	3.7	28	3.7	0.552	58.4	LOS E	3.0	21.4	1.00	0.78	1.00	17.1
9	R2	54	3.9	54	3.9	0.552	58.4	LOS E	3.0	21.4	1.00	0.78	1.00	14.8
Approach		105	4.0	105	4.0	0.552	50.9	LOS D	3.0	21.4	0.92	0.71	0.92	15.7
West: Darcy Road														
10	L2	67	1.6	67	1.6	0.492	26.3	LOS B	10.9	77.6	0.72	0.66	0.72	19.4
11	T1	689	1.7	689	1.7	0.492	20.7	LOS B	10.9	77.6	0.69	0.61	0.69	18.5
12	R2	258	4.1	258	4.1	0.852	52.2	LOS D	7.3	52.7	0.97	1.05	1.44	19.7
Approach		1014	2.3	1014	2.3	0.852	29.1	LOS C	10.9	77.6	0.76	0.73	0.88	19.1
All Vehicles		3522	1.5	3038 N1	1.8	0.852	31.3	LOS C	23.1	163.3	0.83	0.78	0.88	23.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95

All Pedestrians	211	54.3	LOS E	0.95	0.95

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: I-17 [I-17 Darcy - Mons - Institute]

Network: N101 [2030 Dev PM Darcy Road Network]

TCS 2393
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Darcy Road														
1	L2	927	0.8	927	0.8	0.701	26.1	LOS B	12.5	88.0	0.70	0.75	0.70	14.8
2	T1	94	34.8	94	34.8	0.490	59.6	LOS E	2.4	18.2	0.99	0.75	0.99	20.2
Approach		1021	3.9	1021	3.9	0.701	29.2	LOS C	12.5	88.0	0.73	0.75	0.73	16.0
East: Institute Road														
4	L2	121	0.9	121	0.9	2.186	1116.2	LOS F	92.5	648.8	1.00	3.97	5.20	1.6
5	T1	934	0.0	934	0.0	2.186	1112.7	LOS F	93.2	652.5	1.00	4.05	5.20	1.6
6	R2	2	0.0	2	0.0	2.186	1116.1	LOS F	93.2	652.5	1.00	4.11	5.20	3.0
Approach		1057	0.1	1057	0.1	2.186	1113.1	LOS F	93.2	652.5	1.00	4.04	5.20	1.6
North: Mons Road														
7	L2	5	0.0	5	0.0	0.184	27.5	LOS B	3.2	22.8	0.68	0.56	0.68	31.7
8	T1	159	13.9	159	13.9	0.184	23.7	LOS B	3.2	22.8	0.67	0.55	0.67	26.5
9	R2	249	2.1	249	2.1	0.637	46.4	LOS D	7.9	56.2	0.96	0.89	1.08	20.0
Approach		413	6.6	413	6.6	0.637	37.4	LOS C	7.9	56.2	0.85	0.75	0.92	22.3
West: Darcy Road														
10	L2	71	0.3	71	0.3	0.050	4.8	LOS A	0.4	3.0	0.32	0.53	0.32	38.3
11	T1	42	0.2	42	0.2	0.474	42.6	LOS D	5.6	39.4	0.85	0.75	0.85	25.4
12	R2	353	1.8	353	1.8	0.474	41.6	LOS C	5.6	39.4	0.82	0.75	0.82	17.9
Approach		466	1.4	466	1.4	0.474	36.0	LOS C	5.6	39.7	0.75	0.72	0.75	22.1
All Vehicles		2958	2.5	2958	2.5	2.186	418.8	LOS F	93.2	652.5	0.85	1.92	2.36	3.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-19 [I-19 Darcy - Dental Hospital - Marist]

Network: N101 [2030 Dev PM Darcy Road Network]

TCS 3282
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
4	L2	1	0.0	1	0.0	0.232	4.1	LOS A	0.4	3.0	0.04	0.04	0.04	22.7
5	T1	691	5.1	691	5.1	0.232	0.6	LOS A	0.4	3.0	0.03	0.03	0.03	38.6
6	R2	15	0.0	15	0.0	0.190	68.9	LOS E	0.6	3.9	1.00	0.69	1.00	9.3
Approach		707	5.0	707	5.0	0.232	2.0	LOS A	0.6	3.9	0.05	0.04	0.05	35.5
East: Dental hospital access														
7	L2	17	18.8	17	18.8	0.117	50.3	LOS D	0.5	4.3	0.87	0.70	0.87	4.2
9	R2	16	0.0	16	0.0	0.110	60.0	LOS E	0.5	3.8	0.95	0.69	0.95	3.8
Approach		33	9.7	33	9.7	0.117	55.0	LOS D	0.5	4.3	0.91	0.69	0.91	4.0
North: Darcy Road														
10	L2	15	0.0	14	0.0	0.630	8.9	LOS A	5.3	37.1	0.35	0.33	0.35	19.1
11	T1	983	3.3	919	3.4	0.630	5.1	LOS A	5.3	37.1	0.33	0.30	0.33	29.8
12	R2	3	0.0	3	0.0	0.038	67.2	LOS E	0.1	0.8	1.00	0.62	1.00	9.0
Approach		1001	3.2	936 N1	3.4	0.630	5.4	LOS A	5.3	37.1	0.33	0.31	0.33	29.2
West: Marist HS														
1	L2	1	0.0	1	0.0	0.018	56.4	LOS D	0.1	0.5	0.91	0.62	0.91	3.9
3	R2	1	0.0	1	0.0	0.018	56.3	LOS D	0.1	0.5	0.91	0.62	0.91	3.9
Approach		2	0.0	2	0.0	0.018	56.4	LOS D	0.1	0.5	0.91	0.62	0.91	3.9
All Vehicles		1743	4.1	1677 N1	4.2	0.630	5.0	LOS A	5.3	37.1	0.23	0.20	0.23	30.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-23 [I-23 Darcy - Hospital - WSU]

Network: N101 [2030 Dev PM Darcy Road Network]

TCS 3281
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Darcy Road														
4	L2	43	4.9	43	4.9	0.463	40.1	LOS C	7.8	55.0	0.82	0.71	0.82	17.1
5	T1	558	5.9	558	5.9	0.463	39.1	LOS C	9.3	65.2	0.90	0.77	0.90	7.9
6	R2	38	2.8	38	2.8	0.083	39.0	LOS C	0.9	6.3	0.68	0.65	0.68	10.0
Approach		639	5.6	639	5.6	0.463	39.2	LOS C	9.3	65.2	0.88	0.76	0.88	8.7
East: Westmead Hospital access														
7	L2	72	1.5	72	1.5	0.199	28.7	LOS C	1.7	12.2	0.69	0.70	0.69	6.0
8	T1	1	0.0	1	0.0	0.199	25.6	LOS B	1.7	12.2	0.69	0.70	0.69	18.0
9	R2	98	1.1	98	1.1	0.674	61.7	LOS E	3.5	25.0	0.99	0.84	1.10	3.3
Approach		171	1.2	171	1.2	0.674	47.6	LOS D	3.5	25.0	0.86	0.78	0.92	4.1
North: Darcy Road														
10	L2	57	0.0	53	0.0	1.364	393.3	LOS F	23.5	165.0	1.00	2.62	3.26	1.8
11	T1	893	3.5	836	3.7	1.364	379.1	LOS F	23.5	165.0	1.00	2.59	3.18	1.9
12	R2	1	0.0	1	0.0	0.002	42.5	LOS C	0.0	0.2	0.86	0.60	0.86	19.2
Approach		951	3.3	890 N1	3.5	1.364	379.5	LOS F	23.5	165.0	1.00	2.59	3.18	1.6
West: Car park														
1	L2	25	8.3	25	8.3	0.044	32.9	LOS C	0.6	4.6	0.69	0.68	0.69	14.7
2	T1	1	0.0	1	0.0	0.044	27.3	LOS B	0.6	4.6	0.69	0.68	0.69	17.1
3	R2	1	0.0	1	0.0	0.006	57.9	LOS E	0.0	0.2	0.92	0.59	0.92	9.4
Approach		27	7.7	27	7.7	0.044	33.6	LOS C	0.6	4.6	0.70	0.68	0.70	14.5
All Vehicles		1788	4.0	1727 N1	4.1	1.364	215.4	LOS F	23.5	165.0	0.93	1.70	2.07	2.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P21	South Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95
P22	South Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95
P42	North Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95

P1	West Full Crossing	53	34.6	LOS D	0.1	0.1	0.76	0.76
All Pedestrians		316	51.0	LOS E			0.92	0.92

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: I-30 [I-30 Darcy - Hawkesbury]

Network: N101 [2030 Dev PM Darcy Road Network]

TCS 1631
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hawkesbury Road														
8	T1	418	1.5	418	1.5	0.528	17.2	LOS B	8.8	62.2	0.66	0.58	0.66	21.3
9	R2	219	2.4	219	2.4	0.528	24.1	LOS B	4.5	31.6	0.88	0.78	0.88	17.6
Approach		637	1.8	637	1.8	0.528	19.6	LOS B	8.8	62.2	0.73	0.65	0.73	19.9
North: Darcy Road														
10	L2	126	7.5	92	9.6	0.083	12.7	LOS A	1.0	7.3	0.54	0.63	0.54	28.2
12	R2	848	3.4	610	4.7	0.960	66.2	LOS E	12.7	89.8	0.99	1.07	1.33	5.3
Approach		974	4.0	701 N1	5.3	0.960	59.2	LOS E	12.7	89.8	0.93	1.01	1.23	6.9
West: Hawkesbury Road														
1	L2	402	7.1	402	7.1	0.432	16.5	LOS B	5.4	37.8	0.77	0.78	0.77	19.5
2	T1	354	2.7	354	2.7	1.057	103.2	LOS F	18.2	130.0	1.00	1.29	1.59	9.4
Approach		756	5.0	756	5.0	1.057	57.1	LOS E	18.2	130.0	0.88	1.02	1.15	11.2
All Vehicles		2368	3.7	2094 N1	4.2	1.057	46.4	LOS D	18.2	130.0	0.85	0.91	1.05	11.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P41	North Stage 1	53	25.8	LOS C	0.1	0.1	0.90	0.90
P42	North Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	47.1	LOS E			0.94	0.94

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: I-28 [I-28 Hawkesbury - Railway]

Network: N101 [2030 Dev PM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Pde														
4	L2	284	0.7	284	0.7	0.935	80.7	LOS F	13.7	96.6	1.00	1.11	1.48	15.8
6	R2	37	0.0	37	0.0	0.366	62.1	LOS E	1.3	9.2	0.97	0.75	0.97	18.7
Approach		321	0.7	321	0.7	0.935	78.5	LOS F	13.7	96.6	1.00	1.07	1.43	16.1
East: Hawkesbury Rd														
7	L2	59	0.0	44	0.0	0.103	22.2	LOS B	1.7	16.6	0.65	0.60	0.65	34.5
8	T1	1181	3.4	894	4.3	0.829	38.9	LOS C	16.3	114.3	0.93	0.92	1.03	10.6
Approach		1240	3.2	938[N1]	4.1	0.829	38.0	LOS C	16.3	114.3	0.92	0.91	1.01	12.0
West: Hawkesbury Rd														
2	T1	907	4.0	907	4.0	0.581	2.9	LOS A	4.9	34.8	0.13	0.12	0.14	30.8
3	R2	151	1.4	151	1.4	0.581	34.0	LOS C	4.9	34.8	0.93	0.87	1.07	27.7
Approach		1058	3.7	1058	3.7	0.581	7.3	LOS A	4.9	34.8	0.24	0.23	0.27	28.9
All Vehicles		2619	3.1	2317[N1]	3.5	0.935	29.6	LOS C	16.3	114.3	0.62	0.62	0.73	16.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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: I-27 [I-27 Hawkesbury - Alexandra]

Network: N101 [2030 Dev PM Darcy Road Network]

TCS 1571
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [TCS 1571]

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Alexandra Ave														
4	L2	40	7.9	40	7.9	0.780	58.7	LOS E	9.9	70.5	1.00	0.92	1.11	14.6
5	T1	229	0.5	229	0.5	0.780	54.1	LOS D	9.9	70.5	1.00	0.92	1.11	23.4
6	R2	216	18.0	216	18.0	0.780	60.3	LOS E	9.9	70.5	1.00	0.91	1.14	8.4
Approach		485	8.9	485	8.9	0.780	57.2	LOS E	9.9	70.5	1.00	0.92	1.12	17.2
East: Hawkesbury Road														
7	L2	228	15.2	192	18.0	0.666	21.7	LOS B	7.8	55.0	0.61	0.66	0.61	23.5
8	T1	1163	0.4	946	0.5	0.666	18.1	LOS B	7.8	55.0	0.65	0.69	0.76	22.9
9	R2	96	0.0	78	0.0	0.666	18.1	LOS B	7.8	55.0	0.55	0.67	0.79	36.3
Approach		1487	2.7	1216[N1]	3.2	0.666	18.7	LOS B	7.8	55.0	0.64	0.68	0.74	24.1
North: Alexandra Ave														
10	L2	37	0.0	37	0.0	0.048	26.5	LOS B	0.8	5.4	0.62	0.67	0.62	29.2
11	T1	156	2.7	156	2.7	0.610	54.3	LOS D	5.4	38.8	0.99	0.80	0.99	23.5
Approach		193	2.2	193	2.2	0.610	49.0	LOS D	5.4	38.8	0.92	0.78	0.92	24.2
West: Hawkesbury Road														
1	L2	29	3.6	29	3.6	0.827	55.8	LOS D	14.5	102.5	1.00	0.96	1.12	23.9
2	T1	727	1.0	727	1.0	0.827	51.6	LOS D	14.5	102.5	1.00	0.97	1.13	9.4
Approach		756	1.1	756	1.1	0.827	51.7	LOS D	14.5	102.5	1.00	0.97	1.13	10.3
All Vehicles		2921	3.3	2649[N1]	3.6	0.827	37.4	LOS C	14.5	102.5	0.83	0.81	0.93	17.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P1	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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.