GTAconsultants

Westmead Redevelopment
Multi-Storey Car Park
Transport Impact Assessment

Client // Health Infrastructure
Office // NSW
Reference // 15S1337400
Date // 11/11/15

Westmead Redevelopment

Multi-Storey Car Park

Transport Impact Assessment

Issue: B 11/11/15

Client: Health Infrastructure
Reference: 15S1337400
GTA Consultants Office: NSW

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	30/10/15	Final	Brigette Humphrey-Robinson Cameron Ward Rhys Hazell	Rhys Hazell	Brett Maynard	Brett Maynard
B	11/11/15	Updated carpark layout	Brigette Humphrey-Robinson Cameron Ward Rhys Hazell	Rhys Hazell	Brett Maynard	

GTAconsultants
Melbourne | Sydney | Brisbane
Canberra | Adelaide | Perth
Gold Coast | Townsville

Table of Contents

Appendices

Figures

Tables

1. Introduction

1.1 Background

Health Infrastructure is proposing to construct a Multi-Storey Car Park (MSCP) at Westmead Hospital, on the corner of Darcy Road and Institute Road, Westmead. The car park would support future growth of the Westmead Health Precinct, as well as future development associated with the broader Westmead Redevelopment.

A State Significant Development Application is to be lodged with the Department of Planning and Environment (DPE). Health Infrastructure engaged GTA Consultants in October 2015 to complete a transport impact assessment for the proposed MSCP.

The proposed MSCP follows the recently approved Early Works package which facilitates key development sites, including the MSCP. Construction of the Early Works car parking (initial works and demolition) commenced in October 2015 and would likely overlap with construction of the proposed MSCP.

1.2 Scope of Works

The proposal seeks development consent for the construction of an eight storey, 1,254 space, car park. This will involve:

- Demolition of the following existing items and/or structures:
  - On-grade car park number 7;
  - Existing column lighting;
  - Fire services building;
  - Former Coroner's Court building slab;
  - Eastern part of Institute Road; and
  - Trees.
- Construction of a 1,254 space multi-storey car park (MSCP) (8 levels) at the corner of Institute and Darcy Road, associated access and egress, and pedestrian bridge link to Dental Building;
- New at-grade car parking area (47 car spaces) east of the MSCP;
- Extension of Institute Road to the east to connect to new road approved under Part 5 (for ambulances only);
- Widening of Institute Road on approach to Darcy Road to provide two traffic lanes (55m long second lane) for intersection improvements; and
- Landscaping works including creation of park and new pathway connections.

1.3 Purpose of this Report

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

i existing traffic and parking conditions surrounding the site
ii suitability of the proposed parking in terms of supply (quantum) and layout
iii suitability of the proposed access arrangements for the car parks
iv service vehicle and pedestrian requirements

v the traffic generating characteristics of the proposed MSCP
vi the transport impact of the development proposal on the surrounding road network.

This study has also considered the Secretary's Environmental Assessment Requirements (SEAR's) for the Environmental Assessment of the proposed MSCP. The SEAR's were issued by DPE for the construction of a multi-storey car park at Westmead Hospital (SSD 7262) on 1 October 2015. Section 5 of 'Key Issues', addresses the transport and accessibility requirements, as detailed in Table 1.1.

Table 1.1: Secretary's Environmental Assessment Requirements (SEARs)

Project Phase	SEAR Description	Relevant Section
5. Transport and Accessibility	Include a transport and accessibility assessment, with details:	
	An estimate of the total daily and peak hour vehicle trips generated by the proposal, including details of assumptions made to determine/justify the amount of spaces sought to service the future hospital redevelopment, including estimated trip generation, car modal split, duration of stay etc.	Section 8
	The impact on the road network, nearby intersections, public transport services and infrastructure (existing and planned) and active transport access and facilities, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for upgrading or road improvement works (if required)	Section 8
	The proposed access arrangements and measures to mitigate any associated impacts on road safety, active transport, transport services and traffic flows	Section 8
	Traffic, transport and road safety impacts during construction and how these impacts will be mitigated for any associated traffic, pedestrian, cyclists, parking (including the temporary loss of parking on the site) and public transport impacts. Detailed information should be provided on existing bus services and bus stops and measures to avoid impacts during the construction period. A draft Construction Traffic Management Plan should be included to demonstrate the proposed management of the impacts. This Plan should also provide details of vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures for all construction activities.	Section 8.5

1.4 Stakeholder Consultation

In addition to several informal discussions, Health Infrastructure and GTA presented the proposal to RMS, TfNSW and Parramatta City Council on the following dates:

- Consultation with Parramatta City Council on 1 October 2015
- Consultation with TfNSW and RMS on 22 October 2015.

Key matters raised and recommendations made as part of stakeholder consultation are summarised in Table 1.2. Further details relating to relevant items addressed during the stakeholder consultation process has been discussed within this report.

Table 1.2: Stakeholder Consultation Summary

Stakeholder	Consultation Outcomes and Comments
TfNSW	○ The MSCP design should consider the usability for all users, in particular, less ambulant users. ○ Pedestrian integration with the remainder of the Campus should be considered. ○ Recommendations made relating to network improvements require further consideration from the appropriate personnel in RMS and TfNSW.
RMS	○ The MSCP should be designed to minimise vehicle queuing into the external road network during peak periods. ○ Active travel and transport management measures should be implemented in conjunction with the completion of the MSCP. ○ Recommendations made relating to network improvements require further consideration from the appropriate personnel in RMS and TfNSW.
Parramatta City Council	○ Council is generally supportive of the need to provide a left turn slip lane on Darcy Road on approach to Mons Road and noted the additional boundary setbacks to accommodate such measures. ○ Adequate setbacks to the frontage roads should be maintained.

1.5 References

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

- several inspections of the Campus and its surrounds
- Parramatta Development Control Plan (DCP) 2011
- Parramatta Local Environmental Plan (LEP) 2011
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2002
- Australian Standard / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- various traffic and car parking surveys as referenced in the context of this report
- plans for the proposed development prepared by HDR Rice Daubney, Drawing Number MSC-HDR-AR-DG-0301, 1001, 1201-1208, Issue 7, MSC-HDR-AR-DG-1000, Issue 2, MSC-HDR-AR-DG-0604, Issue 7, dated 21/10/15
- other documents and data as referenced in this report.

2. Site Context

2.1 Westmead Health Precinct

The Westmead Health Precinct (the Precinct) is located in Westmead directly west of Parramatta CBD and plays a significant role in Sydney's Greater Metropolitan area. It has been identified as a key influence for the growth of Western Sydney while it is also a key contributor to Parramatta continuing to develop into Sydney's second CBD.

The Precinct includes the following key services, as shown in Figure 2.1:

- Westmead Hospital
- The Children's Hospital at Westmead (CHW)
- Ageing, Disability and Home Care (ADHC)
- Institute of Clinical Pathology and Medical Research (ICPMR)
- The Westmead Centre for Oral Health
- Cumberland Hospital
- Westmead Private Hospital
- Westmead Millennium Institute (WMI)
- Children's Medical Research Institute (CMRI).

Figure 2.1: Westmead Health Precinct

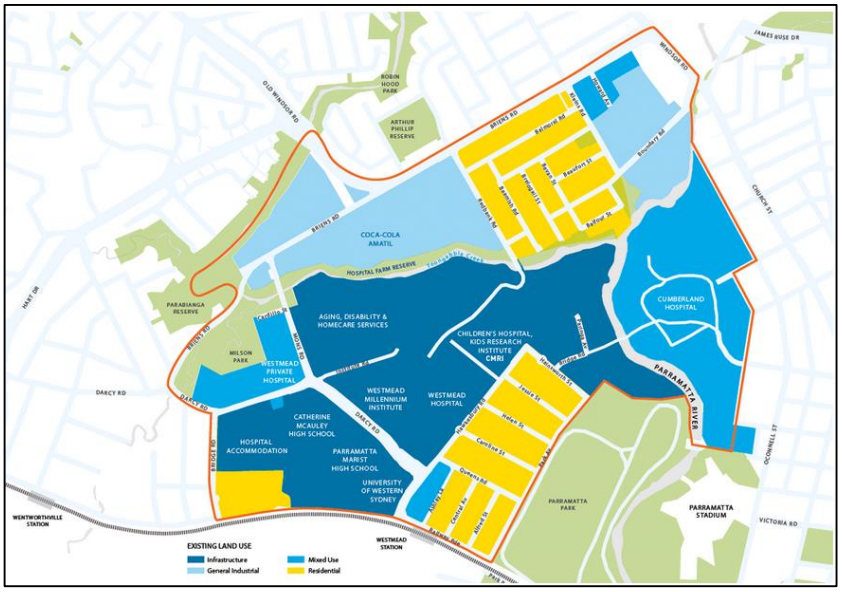
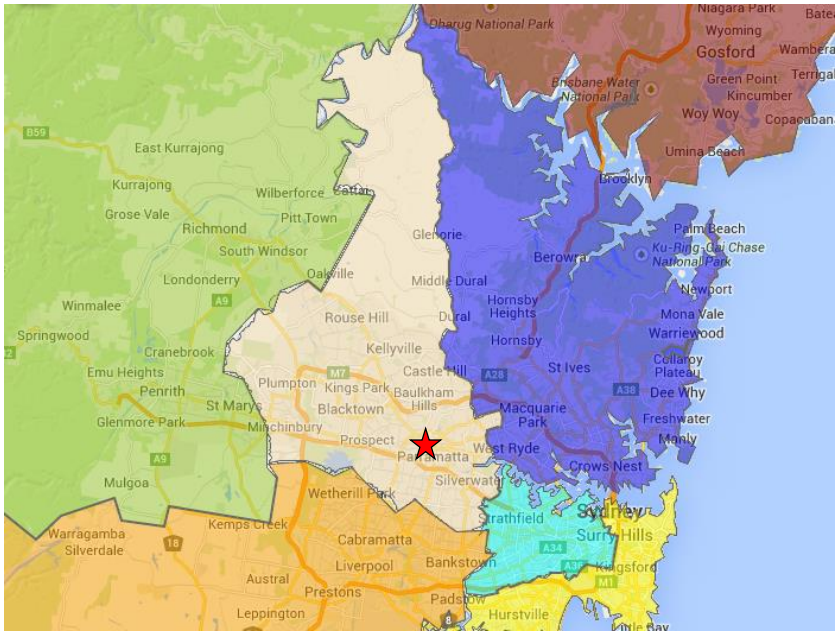


Image source: Westmead Alliance

The Precinct is located in the south-east section of the Western Sydney Local Area Health District (WSLHD), with the associated primary health catchment currently extending to the west and north, as shown in Figure 2.2.

An increasing number of specialist services and expanding state-of-the-art research and teaching facilities planned for the Precinct would attract staff, students and visitors from a broader catchment, including areas on a regional, national, and global scale.

Figure 2.2: Western Sydney Local Health District

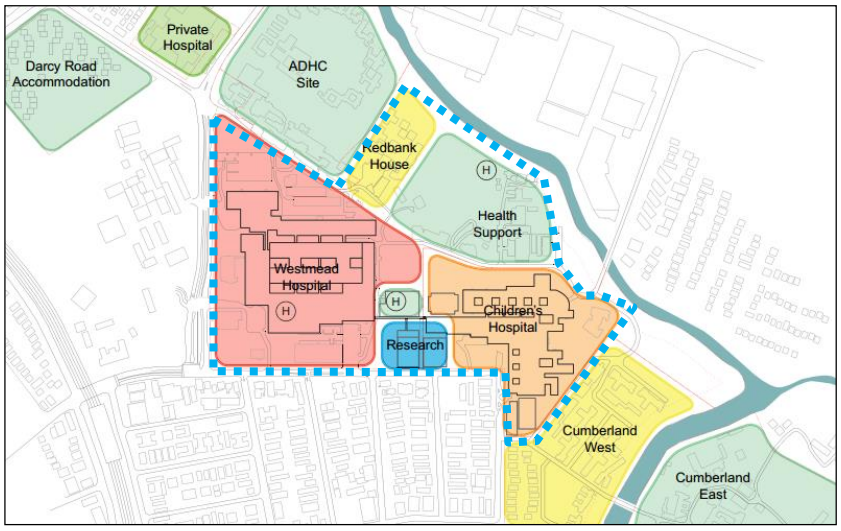


Basemap source: http://www.health.nsw.gov.au/lhd/pages/default.aspx

2.2 Westmead Health Campus

For the purpose of this assessment, the Westmead Health Campus (the Campus) is considered to comprise Westmead Hospital and CHW amongst other specialty health services (indicatively shown by the blue outline in Figure 2.3) representing a significant portion of the Precinct.

Figure 2.3: Westmead Health Campus



Basemap source: Westmead Alliance

The Campus does not include Cumberland Hospital or the Westmead Private Hospital given that these services are physically and functionally separated from the remainder of the Campus.

The broader Westmead Redevelopment aims to incorporate the ADHC site into the Campus for the future utilisation of Campus stakeholders.

The Campus layout is shown in Figure 2.4, with key features discussed further below.

Figure 2.4: Westmead Health Campus Map

Base image source: WSLHD

2.2.1 Campus Wide Staff Activity

The Campus currently employs 9,987 full time equivalent (FTE) staff, with a breakdown shown in Table 2.1.

Table 2.1: Existing Staff Breakdown

Westmead Health Campus Facility	Full-time Staff (2014)
Westmead Hospital	4,626
CHW	4,268
ICPMR	500
WMI	255
CMRI	255
Education/ University	83
Total	**9,987**

Much like other hospitals, staff shift times vary for each health department across the Campus. However, collectively the staff shifts can be grouped into the day shift, afternoon shift and evening shift.

Based on detailed site observations and a thorough assessment of existing traffic and parking conditions, a proportional distribution of staff has been applied across the three primary staff shift times, as summarised in Table 2.2.

Table 2.2: Existing Staff Profile

Shift Time	% of Total Staff	Full Time Equivalent (FTE)
Day	50%	4,993
Afternoon	25%	2,497
Evening	10%	999
Not on-site (leave etc.)	15%	1,498
Total	**100%**	**9,987**

The peak staff arrival and departure periods for the three primary shift times have also been summarised in Table 2.3.

Table 2.3: Existing Staff Shifts

Shift Time	Peak Arrival Period	Peak Departure Period	Key Observations
Day	6:30am-8:30am	3:00pm-6:00pm	○ Staff arrivals generally concentrated around the 7:00am-8:00am weekday peak hour ○ Staff departures more dispersed across the afternoon period given the various department shift times as well as shift changeover requirements typical to the majority of hospitals
Afternoon	2:30pm-6:00pm	9:30pm-10:30pm	○ Staff typically arrive well before the shift start time which is likely attributable to external traffic conditions and the extent of staff parking demand ○ Staff departures assumed to occur across a relatively brief period, primarily associated with a reduced level of variation across different departments
Night	9:30pm-10:30pm	7:30am-9:30am	○ Staff arrivals are concentrated around the 10:00pm typical shift start time ○ Staff departures dispersed across the morning period as a result of staff shift changeover requirements typical to the majority of hospitals

2.2.2 Campus Wide Patient Activity and Facilities

Based on information provided in the Westmead Hospital Redevelopment Final Business Case (2014), a summary of the patient activity 2013-2014 as well as the number of beds is included in Table 2.4.

Table 2.4: Existing Patient Activity

Westmead Health Campus Facility	Annual Outpatient Occasions of Service (Approximately)	Annual ED Presentations (Approximately)	Number of Beds
Westmead Hospital	573,065	66,857	743
CHW	228,768 [1]	52,000	276 [1]
Total	**809,000**	**118,900**	**1,030**

[1] Adopted from the Car Parking Demand Study – Westmead health Campus Addendum to report dated 4th May 2013, Parking and Traffic Consultants, 28/03/14

Similar to the staff shift times, the visiting hours vary for each department across the Campus. However, the relevant patient information directories advertise the visiting hours highlighted in Table 2.5.

Table 2.5: Visiting Hours

Campus Facility	Department	Hours
Westmead Hospital	General Wards	12:00pm-2:00pm 4:00pm-8:00pm
	Maternity & Gynaecology Wards	8:00am-8:00pm
CHW	-	10:00am-12:00pm 2:00pm-7:00pm

The outpatient services opening hours also vary across the departments noting that site observations identified an influx of visitor/ outpatient arrivals between 9:00am and 10:00am, which would largely be associated with outpatient activity.

2.3 Car Park Location

The proposed MSCP and at-grade car park are proposed to be located on the corner of Darcy Road and Institute Road, as shown in Figure 2.5.

An existing at-grade staff and visitor car park, known as CP7 occupies the site. CP7 provides parking for 80 visitors (including 4 midwifery spaces) and 170 staff.

The site currently consists of an at-grade car park including approximately 186 staff spaces primarily accessed via Institute Road. 77 visitor spaces are also accessed via a signalised intersection with Darcy Road. These spaces are primarily used by visitors to the Westmead Centre for Oral Health.

The existing site conditions are shown in Figure 2.6 to Figure 2.8, with the site layout and extent of works illustrated in Figure 2.9.

Figure 2.5: Proposed MSCP and Surrounds

Basemap source: Sydway

Figure 2.6: Existing Site Conditions

Basemap source: Sydway

Figure 2.7: Existing Staff Car Park

Figure 2.8: Existing Visitor Car Park

Figure 2.9: Extent of Works

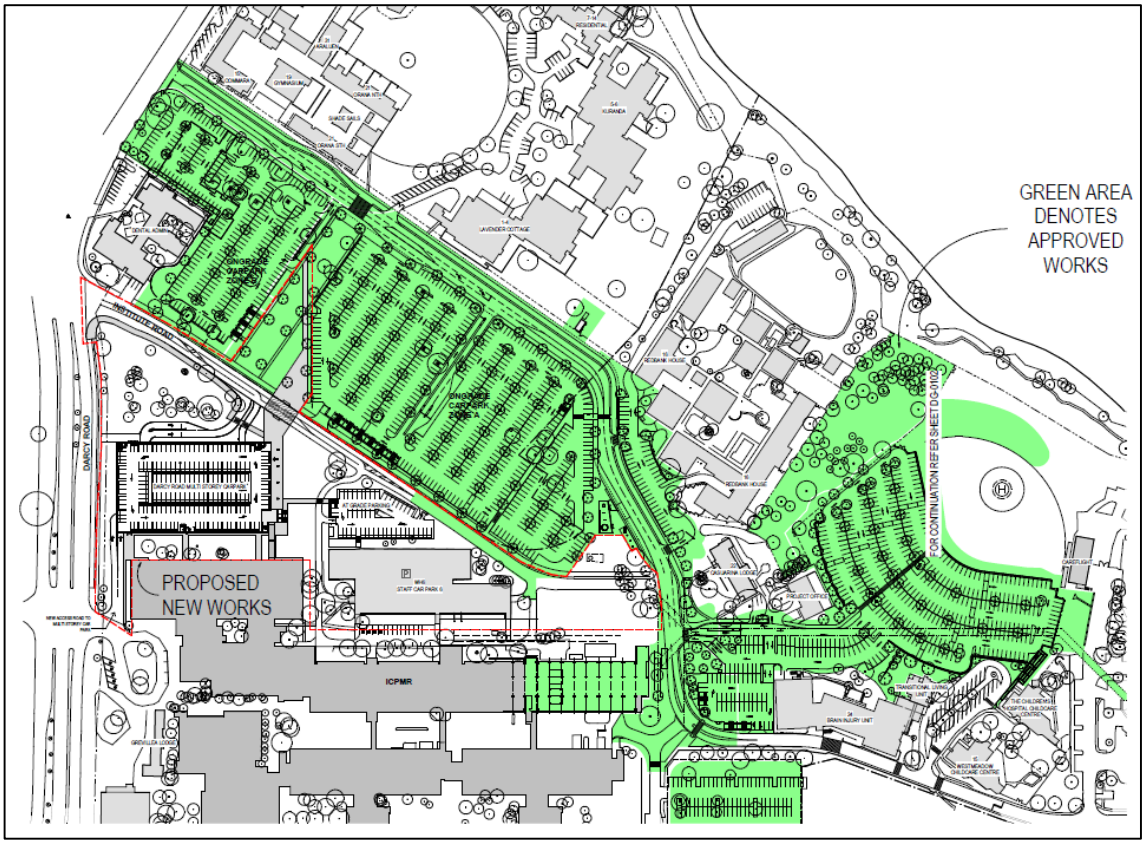


Image source: HDR Rice Daubney

2.4 Westmead Redevelopment

A Plan for Growing Sydney recognises the importance of the expansion of the Precinct to support the surrounding growth areas as well as employment, particularly as Parramatta continues its development to becoming Sydney's second CBD. The NSW Government is committed to the following actions relevant to the Westmead Health Precinct:

- Improve public spaces and renewal.
- Investigate public transport and active travel opportunities between Westmead and Rydalmere, through the Parramatta CBD.
- Develop planning controls to encourage expansion of health facilities (in consultation with Parramatta City Council).
- Improve connectivity between the Westmead Health Precinct and Westmead Railway Station, as well as future growth areas including Parramatta North.

With consideration for this and given the anticipated growth in Western Sydney, it is critical that the Western Sydney Local Health District expand in a manner that ensures future services and resources will continue to be able to cater for the needs of the community. The Westmead Redevelopment would occur through a series of stages, with a future multi-storey Acute Services Building (ASB) to be centrally located between the Westmead Hospital and CHW proposed for the first stage.

To support the Stage 1 Redevelopment, new at-grade car parking will be built on the Campus. The at-grade car parking will form part of the Early Works scope, which has been approved under a

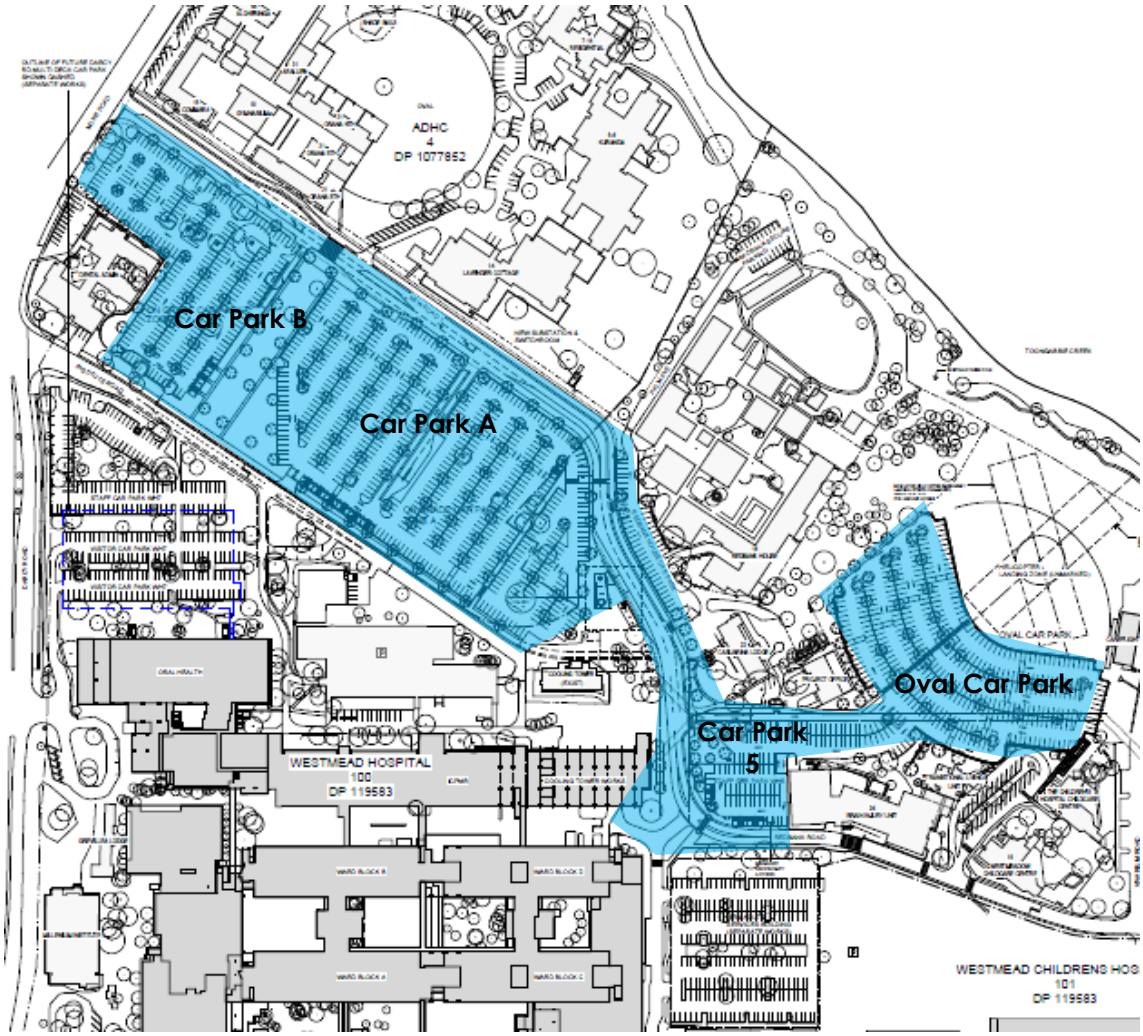
separate planning application (Part 5 Review of Environmental Factors (REF)) and includes the following:

- new at-grade car parking on the existing ADHC land, along the northern alignment of Institute Road
- new at-grade car parking on the oval.

Construction of the Early Works car parking (initial works and demolition) commenced in October 2015 and would likely overlap with construction of the proposed MSCP.

The approved Early Works car parking layout is shown in Figure 2.10 and represents a minor net increase in on-site parking supply.

Figure 2.10: Early Works Car Parking



Basemap source: HDR Rice Daubney

3. Strategic Context

3.1 State Planning Context

Given the significance of the Precinct, reference to the relevant state planning context is important with the key reference documents and policies highlighted in the following sections.

3.1.1 A Plan for Growing Sydney

A Plan for Growing Sydney was released in December 2014, identifying four goals required to deliver the 20 year vision outlined in the LTTMP. The Plan identifies a range of actions and directions to achieve the above, which include the following relevant actions:

- expansion of the Global Economic Corridor to Parramatta
- growing Parramatta as Sydney's second CBD by connecting and integrating Parramatta CBD, Westmead, Parramatta North, Rydalmere and Camellia
- growing the specialised health and education precincts at Westmead and Rydalmere.

Figure 3.1 presents an overview of the major transport projects, which are expected to assist in the successful growth of Sydney.

With this in mind, the MSCP is an essential element of the broader Westmead Redevelopment which provides health infrastructure for the rapidly growing Western Sydney region.

Figure 3.1: A Plan for Growing Sydney – Major Transport Projects

Source: A Plan for Growing Sydney, p 14 (Dec 2014), NSW Planning & Environment website

3.1.2 NSW Long Term Transport Master Plan

The NSW Long Term Transport Master Plan 2012 (LTTMP) presents a 20 year vision for transport planning through to 2031. The final version of the LTTMP was released in December 2012 and sets out 220 short, medium and long term actions to integrate, grow, modernise and manage the transport network across NSW.

The LTTMP provides integrated advice with regards to transport policy; identifying solutions to develop and manage the NSW's transport system. Forming part of the LTTMP is Sydney's Rail Future, a long-term plan to increase the capacity of Sydney's rail network and update existing infrastructure.

The importance of Westmead as part of the broader Parramatta region was recognised, with the following relevant transport actions identified:

- Improved cycleways and better connections developed through or around Cumberland Hospital to Westmead.
- Better public transport links to Westmead Hospital and Cumberland Hospital and Heritage Precinct.
- Improved frequency of public transport services between Parramatta CBD and Westmead.

The above actions have significant emphasis on non-car travel modes, with the overall intention to improve the competitiveness of public transport compared to car travel.

3.1.3 Sydney's Bus Future: Rapid Bus Routes

Sydney's Bus Future, December 2013 outlines the NSW Government's long term plan for the bus network to meet customer needs.

The proposed upgrade for the Sydney bus network will include the addition of new rapid bus routes while maintaining and improving elements of the existing bus network, such as cross-city services on Metro bus routes.

Rapid bus routes will offer faster and more reliable bus travel for commuters between major city centres as extra services are planned to be implemented and bus stops to be further dispersed along routes (generally spaced 800 metres to one kilometre apart).

Existing suburban and local service routes will continue to provide commuter access to local, neighbourhood destinations. An additional 20 suburban routes are to be introduced. Proposed network upgrades would fill the gaps in the heavy rail network, strengthening links from the Parramatta region to areas including Norwest, Castle Hill, Macquarie Park, Ryde, Bankstown, and Liverpool.

The proposed rapid bus routes include:

- Castle Hill to Liverpool via Parramatta
- Parramatta to the CBD via Ryde
- Rouse Hill to Hurstville via Parramatta and Bankstown
- Mona Vale to the CBD
- Maroubra Junction to the CBD
- North Bondi to the CBD
- Castle Hill to the CBD.

The proposed rapid bus routes connecting with Parramatta are shown in Figure 3.2.

Further to the above, recent consultation with TfNSW indicated that future bus timetabling is expected to include significant increases to the number of bus services along the North-West T-way, in-line with the BRT vision for this route.

Figure 3.2: Parramatta Rapid and Suburban Bus Routes

Image source: Sydney's Bus Future 2013

3.2 Local Context

The local and Campus wide planning context is detailed as follows.

3.2.1 Integrated Transport Plan for Parramatta City Centre

The Integrated Transport Plan (ITP) for Parramatta City Centre was prepared by Parramatta City Council in 2010. The ITP responds to the Parramatta City Centre Plan (2007), identifying travel demand opportunities and transport infrastructure improvements, which may be required to support future growth of Parramatta City Centre.

The ITP indicates that the existing Parramatta Transport Interchange may not be capable of accommodating the anticipated growth, particularly given the level of interchanging currently occurring. As such, the ITP suggests that current bus services be extended to nearby destinations, including Westmead and Rydalmere, to reduce the level of interchanging required in the City Centre. This proposal would significantly enhance connectivity between Westmead and Rydalmere, potentially increasing the number of local trips made by bus.

3.2.2 Westmead Integrated Transport Strategy (SKM, 2010)

The Westmead Integrated Transport Strategy was prepared in 2010 for Parramatta City Council and provides a guide for the future transport needs in Westmead. The strategy concludes that in order to accommodate the expected growth and development, there needs to be a shift away from the use of private vehicles and a focus on walking, cycling and public transport, with a target to increase their mode share from 12% in 2010 to 35%. Recommendations to achieve this target were provided with the objective of improving public transport services and infrastructure for pedestrians and cyclists.

The Westmead Integrated Transport Strategy had consideration for the West Metro railway project which was planned to connect Westmead to the Sydney CBD. However, it is understood Parramatta City Council maintains that the mode split targets are still achievable, with increased bus services anticipated to compensate for the cancellation of the West Metro project. Provision of these increased services would include extending a number of bus services that currently terminate at Parramatta to Westmead.

3.2.3 Westmead Health & Medical Research Precinct – A Plan for the Future

The Westmead Alliance, including Parramatta City Council and the major health, medical research and educational institutes of Westmead, prepared *A Plan For The Future* to develop a future vision for the Westmead Health Precinct, including potential infrastructure requirements.

Key transport challenges identified include significant traffic congestion, poor connectivity to the surrounding road network and parking constraints.

Key transport opportunities identified as part of *A Plan for the Future* include the following:

- consolidate parking across the Westmead Health Campus, replacing with peripheral parking at the rear of the hospital
- widen the Mons Road Bridge to improve staff access to/ from the north (Briens Road)
- upgrade key intersections surrounding The Campus
- create a high amenity transit boulevard along Hawkesbury Road
- provide a pedestrian/ cycle Shareway between Hawkesbury Road and Toongabbie Creek through Westmead Hospital
- improve public open space.

Many of the above have been considered as part of the Westmead Hospital Redevelopment, with further consideration in the context of this report.

3.3 Surrounding Development

Given the strategic context of Westmead in the growth of Parramatta as Sydney's second CBD, there is significant growth and development anticipated for the area. Several key developments and their interaction with The Campus are discussed below.

3.3.1 Parramatta North Urban Transformation (PNUT)

The Parramatta North Urban Transformation (PNUT) precinct is located to the west and north-west of the Parramatta CBD and east of The Campus, separated by the Parramatta River.

It is understood that the Urban Growth development would include a mixed-use development across the Cumberland sub-precinct and part of the Sports and leisure sub-precinct, which border Parramatta Park.

The PNUT Program website[1] notes that the proposed development is expected to incorporate the following:

- *"a village centre with up to 4,000sqm of retail floor space*
- *approximately 3,000 new homes for different types of households*
- *approximately 28,000sqm of floor space through adaptive use of retained heritage items*
- *approximately 34,000sqm of floor space for mixed use (predominantly commercial) development.*

PNUT is expected to generate a reasonable increase to regional traffic, including additional trips along Old Windsor Road, Cumberland Highway and Briens Road, in the vicinity of the Campus.

It is also understood that vehicular access across the Parramatta River via Bridge Road would be restricted to public transport services, resulting in a minor impact to vehicle accessibility between The Campus and the PNUT precinct, however with improved public transport accessibility.

3.3.2 WSU Westmead Campus Redevelopment

It is understood that the proposed WSU Westmead Campus Redevelopment would include a "Transit-oriented mixed-use town centre (122,000m^2) including Education, Commercial, Retail and Residential uses. Stage One works were expected to commence in June 2015, with completion in 2016.

The site is located south of Westmead on the corner of Darcy Road and Hawkesbury Road, with proposed access via Darcy Road (opposite the Westmead Hospital Main Entry) and Hawkesbury Road (via the existing site access).

An Urban Design and Master Plan Report was prepared for the WSU Westmead Campus Subdivision in 2014, including a Transport Assessment. The Transport Assessment included localised modelling of the Darcy Road/ Westmead Hospital/ New WSU Access intersection and noted that no road network upgrades other than the proposed access would be required.

Overall, it is anticipated that the WSU Westmead Campus Redevelopment would increase traffic volumes surrounding The Campus during the AM and PM peak periods, particularly along Darcy Road and Hawkesbury Road.

The Transport Assessment also identified the following pedestrian infrastructure items:

- Underpass under Hawkesbury Road, linking the WSU site to Westmead Railway Station
- Pedestrian footbridge across Darcy Road, linking the WSU site to Westmead Hospital.

The above pedestrian infrastructure items should be Further considered, in consultation with the appropriate stakeholders.

[1] http://www.urbangrowthnsw.com.au/work/urban-transformation-projects/parramatta-north-urban-transformation-program.aspx, visited 08/07/15

3.4 Western Sydney Light Rail

The State Government has allocated $400 million to accelerate work on the proposed Western Sydney Light Rail network. Four options are currently under investigation as shown in Figure 3.3. It is understood that an announcement regarding the preferred option is imminent.

It is also understood that it is likely that the preferred alignment would travel along Hawkesbury Road, with one stop provided outside CHW and another near Darcy Road, adding significant potential for future public transport mode share, with all four options having relevance to Westmead Hospital.

Parramatta City Council conducted separate investigations with respect to the Western Sydney Light Rail, including linking Parramatta CBD with both Macquarie Park (to the east) and Castle Hill (to the north). Expansion to include Sydney Olympic Park in a future stage was also identified with a through link to Rhodes and beyond.

TfNSW will likely incorporate Council's assessments into its own feasibility studies, however it is understood that no preferred routes and/ or extent have been finalised to date.

Figure 3.3: Western Sydney Light Rail Proposed Routes

Source: www.smh.com.au/nsw/businesses-put-their-money-and-muscle-behind-parramattasydney-olympic-park-light-rail

3.5 Western Sydney Regional Ring Road

The Western Sydney Regional Ring Road is Parramatta City Council's proposal to improve traffic flow in the region and support the continued growth of the city of Parramatta by reducing car and freight congestion resulting from the eight strategic road corridors that converge on Parramatta and Westmead. The Regional Ring Road would reduce through traffic in Westmead and assist in improving public transport reliability within the precinct.

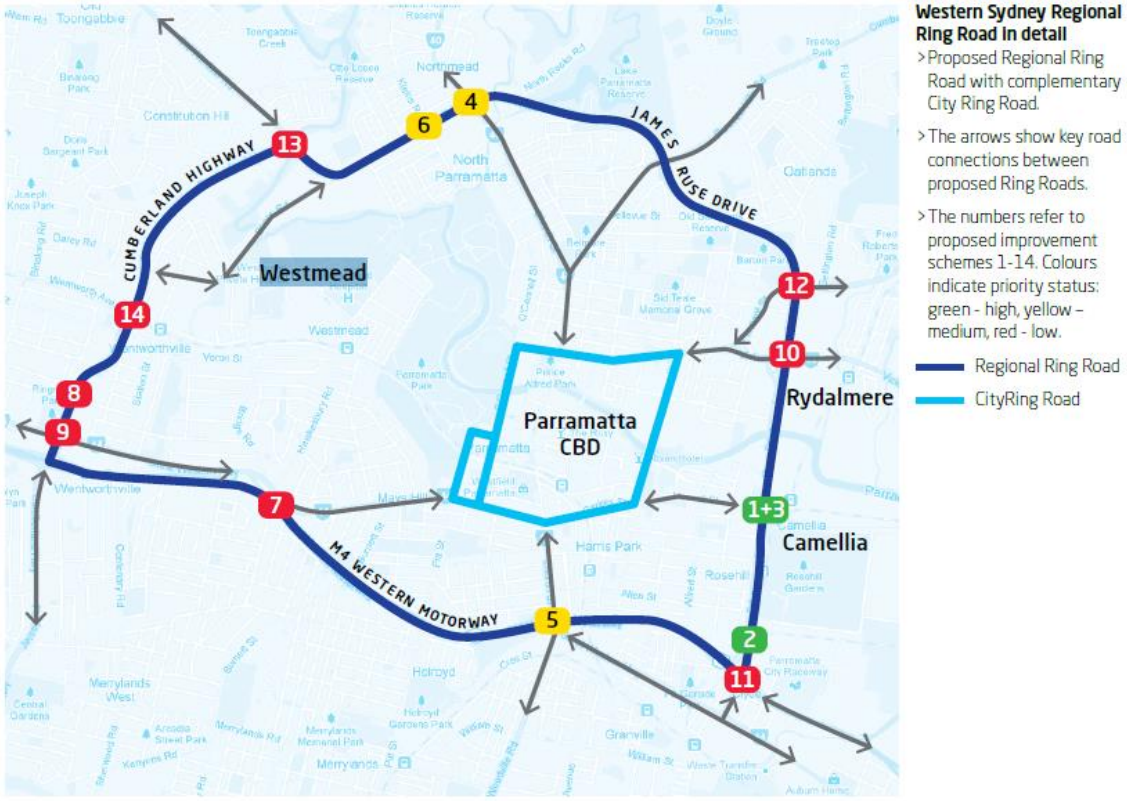
The Regional Ring Road (see Figure 3.4) would help deliver the following NSW 2021 State goals for Western Sydney:

- *"Reduce travel time by minimising public transport waiting time for customers" (Goal 7) – by reducing congestion in and around Parramatta and Westmead and improving cross-regional traffic flow.*

- *"Improving road safety by targeting black spots" (Goal 10) – by reducing accidents by separating intersections and pedestrians.* [2]

A series of intersection upgrades are proposed along the M4 Motorway, James Ruse Drive and Cumberland Highway to create a free flowing arterial road network and allow traffic to circumnavigate Parramatta quickly and efficiently. Parramatta City Council is also developing a City Ring Road to complement the Regional Ring Road.

Figure 3.4: Western Sydney Regional Ring Road



Source: www.parracity.nsw.gov.au/data/assetsWestern_Sydney_Regional_Ring_Road.pdf

[2] Western Sydney Regional Ring Road 2011, Parramatta City Council

4. Existing Conditions

4.1 Travel Characteristics

4.1.1 Journey to Work Data

The ABS Census *Journey to Work* (JTW) data 2011 is regarded as the most robust picture of existing travel patterns to/ from the Campus and the broader Precinct. The smallest geographical area for which JTW data is available is a Travel Zone (TZ). JTW data was analysed for the Precinct (TZ 1045) to better understand the current mode share distribution for trips to work, as presented in Figure 4.1.

Figure 4.1: 2011 JTW Data – Commuters to the Westmead Health Precinct

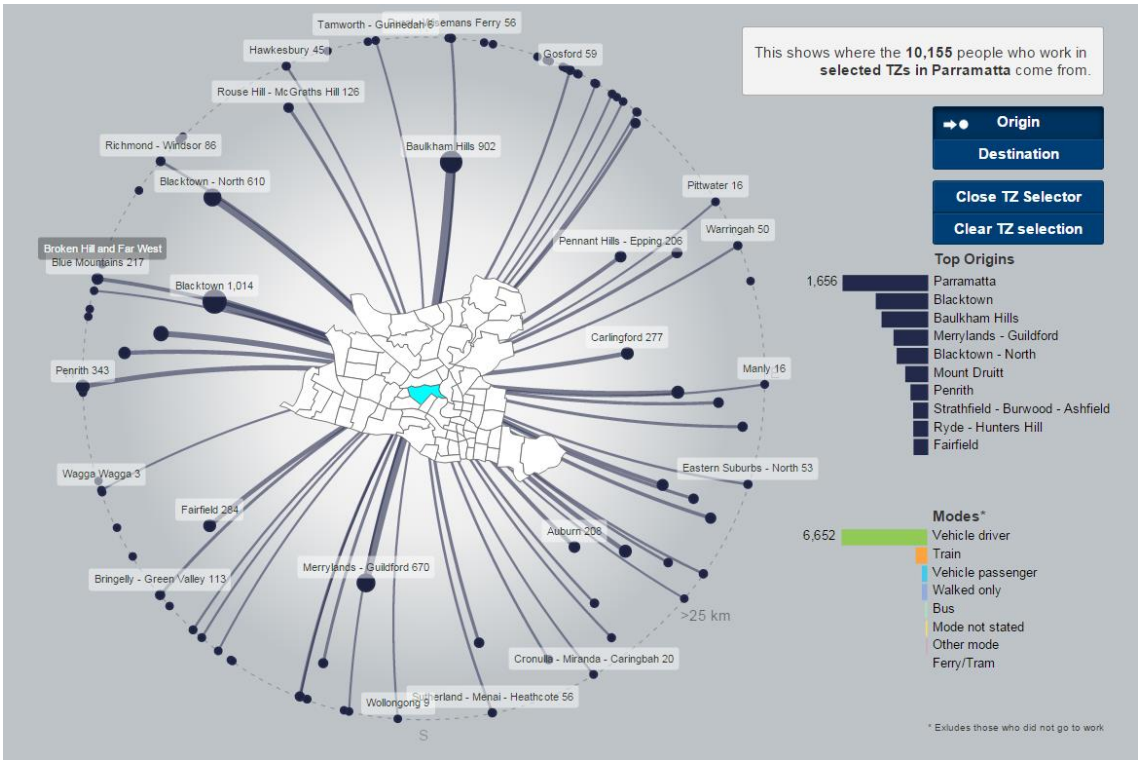


Image source: Bureau of Transport Statistics

The JTW data indicates that nearly 8,800 daily commuter trips are made to the Precinct. More than 80% of trips (approximately 7,000) were made by car (as a driver or passenger), 12% via public transport and 5% via walking.

A significant proportion of the trips had origins within a relatively local catchment, with the five most common origins (approximately 70% of all trips) including the following:

- Parramatta
- Blacktown
- Baulkham Hills (722)
- Merrylands, Guildford
- Blacktown North.

Approximately 55% of the trips generated by these five local origins were made by vehicle.

Figure 4.2 also shows that staff journey to work trips are largely from 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.

Figure 4.2: Westmead Health Precinct Staff Origin Heat Map

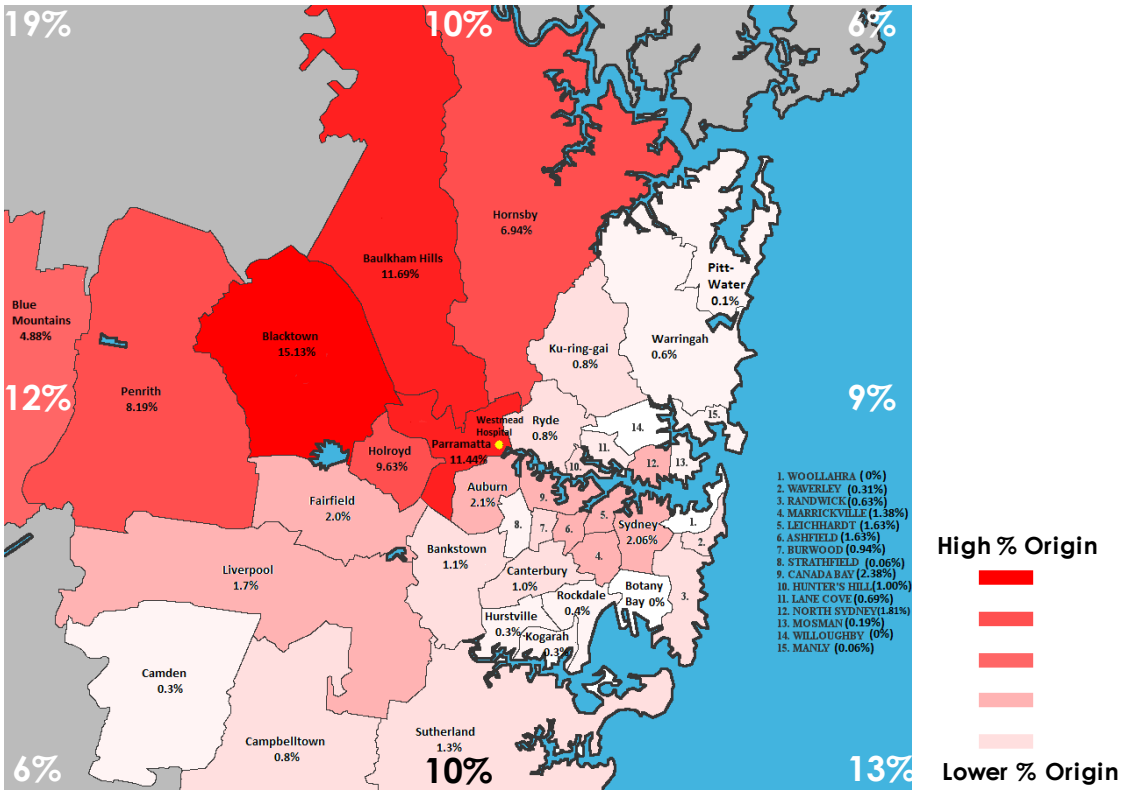


Image source: Health Infrastructure

4.1.2 Travel Questionnaire (PTC, 2013)

The results of the staff and visitor travel surveys for existing mode share splits are detailed in Table 4.1. The surveys received a strong response rate with over 3,200 staff responses, 1,000 outpatients and 400 visitors/ students. The results are generally consistent with the JTW data as discussed above, albeit with a 5-10% higher vehicle staff mode share split.

The public transport mode share for visitors at the CHW is approximately 10% higher than visitors to Westmead Hospital, despite lower accessibility to high frequency bus services and longer walking distances between the CHW and Westmead Railway Station.

Table 4.1: Travel Questionnaire Results - Mode Share[3]

Category	Travel Mode		
	Car	Public Transport	Walk/ Bicycle/ Motorcycle/ Taxi
Westmead Hospital			
Staff	87%	10%	3%
Outpatients	80%	15%	5%
Visitors	85%	10%	5%
The Children's Hospital at Westmead			
Staff	90%	7%	3%
Outpatients	84%	11%	5%
Visitors	71%	20%	9%

It is also worth noting that the Westmead Hospital Redevelopment Final Business Case indicates that nearly 20% of all acute adult activity across the WSLHD is for residents outside of the District.

4.1.3 Mode Share Summary

Based on the above discussions, for the purpose of this report and associated assessment, the adopted mode share splits are summarised in Table 4.2.

Table 4.2: Westmead Health Campus Existing Mode Share

Category	Travel Mode	
	Drive	Sustainable Transport
Staff	85%	15%
Outpatients	80%	20%
Visitors	85%	10%

4.2 Road Network

The Campus is accessed via several key traffic routes with key access points located along Darcy Road, Hawkesbury Road and Redbank Road.

Table 4.3 provides a summary of the characteristics of the surrounding key roads.

[3] Car Parking Demand Study – Westmead Health Campus, Parking and Traffic Consultants, May 2015

Table 4.3: Surrounding Road Network

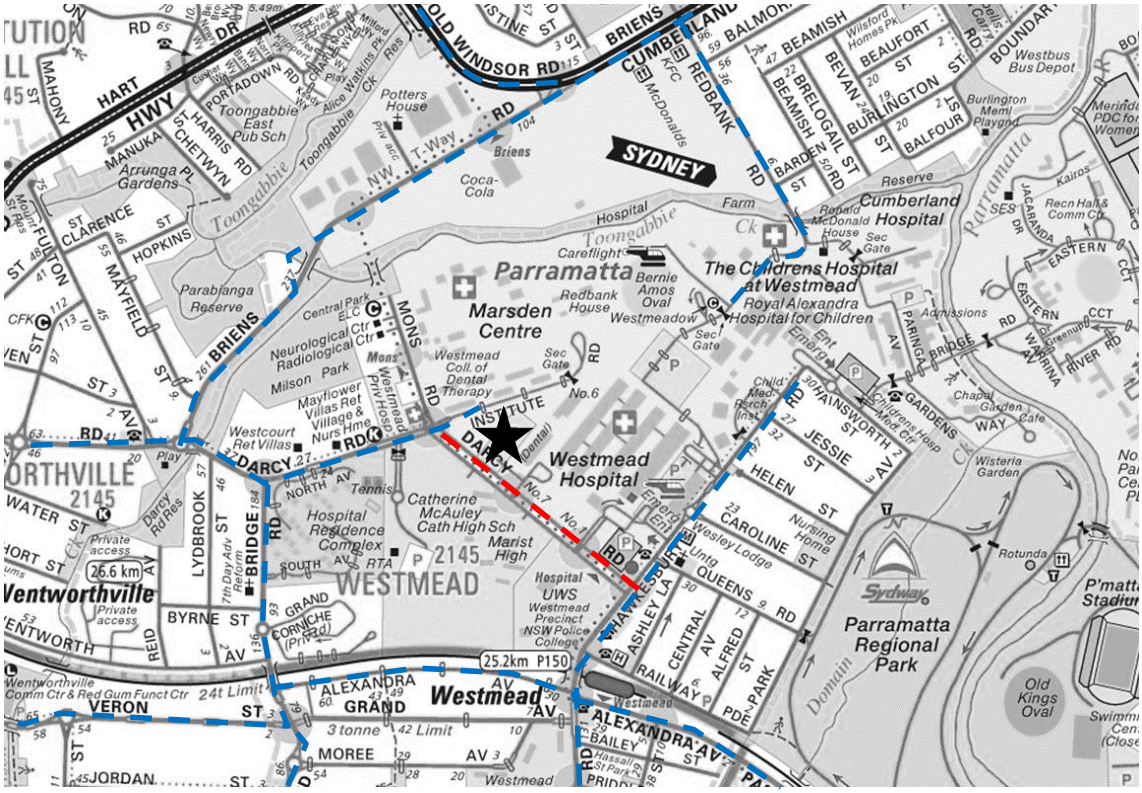
Road	Classification	Authority	Characteristics
Darcy Road	Regional Road	RMS	Two-way, 4-lane road with an additional Transit Way (T-Way) running through the median. It connects to Hawkesbury Road to the south.
Mons Road	Local Road	Council RMS - T-Way and Bus Lanes	Two-way, 2-lane road with marked kerbside 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 Street to the south.
Institute Road	Private Access Road	HI/ LHD	Provides local access into a Hospital staff car park with boom gates limiting access.
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.
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.
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.

The surrounding local road network connects with the broader arterial network, including connections to the Cumberland Highway, Great Western Highway, 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 to allow access to Campbelltown, Canberra and southern regional centres. The M2 and M7 also combine more broadly to provide a convenient north-south link.

The location of the proposed MSCP and its surrounds as well as key access routes to the Campus are shown in Figure 4.3.

Figure 4.3: Surrounding Road Network and Key Access Routes



Basemap source: Google Maps

4.3 Ambulance Routes

The Westmead Hospital main entry and the Emergency Department (ED) is located at the southern corner of the main building, with access via Darcy Road and Hawkesbury Road.

The CHW main entry and ED is located at the southern corner of the building with access via Hawkesbury Road.

Ambulances typically use Darcy Road, Hawkesbury Road and Mons Road (including T-Way) to access the Campus emergency facilities.

4.4 Traffic Volumes

Referencing the Westmead Redevelopment Stage 1 Early Works Revised Transport Impact Assessment (GTA, 2015), it is noted that the majority of existing traffic will be redistributed from Institute Road to New Road (proposed as part of the Early Works), with the vehicular connection between Institute Road and Redbank Road restricted to ambulances only (via signage and linemarking).

For the purpose of this assessment and given that the Stage 1 Early Works are currently under construction with expected completion by September 2016, the base case traffic volumes have been assumed to incorporate the traffic distribution and generation as a result of the Stage 1 Early Works.

These are considered to be representative of existing conditions at the time of the opening of the MSCP.

The weekday AM and PM peak hour traffic volumes for the external and internal and road network are summarised Figure 4.4 and Figure 4.5 respectively. It is noted that the assessed peak hours relate to the staff traffic movements, given that staff activity is relatively concentrated, particularly in the weekday AM peak period.

Figure 4.4: AM and PM Internal Base Case Traffic Volumes

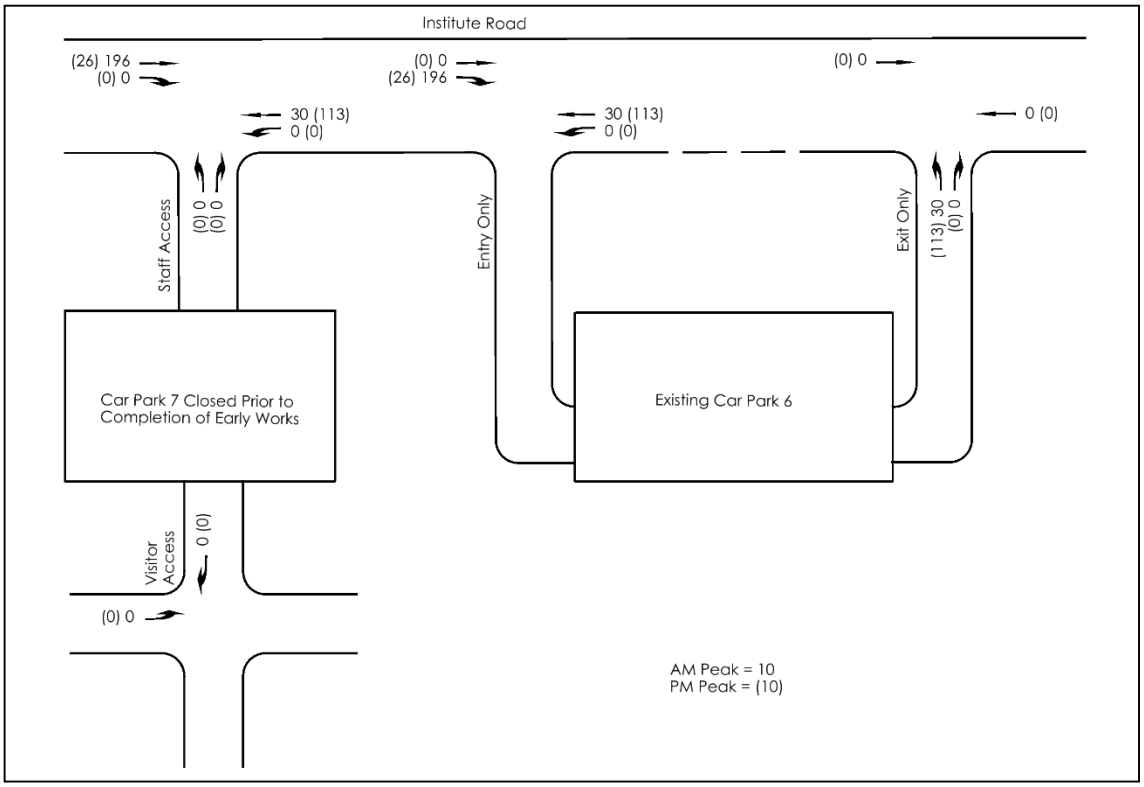
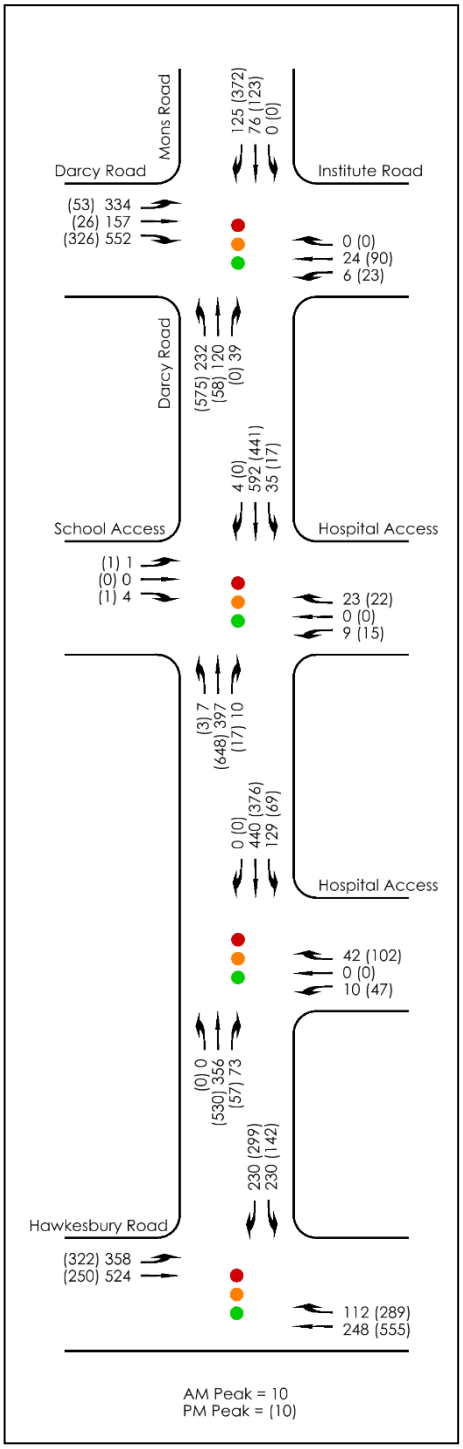


Figure 4.5: AM and PM External Base Case Traffic Volumes



4.1 Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION4, a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the RMS, is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 4.4 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

Table 4.4: SIDRA INTERSECTION Level of Service Criteria

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Table 4.5 presents a summary of the base case operation of the intersections, with full results presented in Appendix B of this report. As discussed, SIDRA modelling assumes the base case to be representative of existing conditions at the time of the opening of the MSCP.

On-site observations indicated that the Darcy Road/ Mons Road/ Institute Road intersection currently operates with a cycle time of between 90 seconds and 150 seconds. Given this and with consideration for a historical review of signal timings at this intersection, an average cycle time of 120 seconds has been adopted for this assessment.

Table 4.5: Base Case Operating Conditions

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Darcy Road/ Mons Road/ Institute Road	AM	South	0.65	29	59	C
		East	0.17	50	7	D
		North	0.66	57	55	D
		West	0.63	23	137	B
		Total	**0.66**	**29**	**20**	**C**
	PM	South	0.53	43	93	C
		East	0.50	52	24	D
		North	0.56	30	123	C
		West	0.57	50	79	D
		Total	**0.57**	**41**	**123**	**C**

[4] Program used under license from Akcelik & Associates Pty Ltd.

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Darcy Road/ Hospital Access (Dental)	AM	South	0.17	7	18	A
		East	0.09	33	9	C
		North	0.28	7	30	A
		West	0.03	43	3	C
		Total	**0.28**	**8**	**30**	**A**
	PM	South	0.27	8	30	A
		East	0.09	28	9	B
		North	0.20	6	20	A
		West	0.01	42	1	C
		Total	**0.27**	**8**	**5**	**A**
Darcy Road/ Hospital Access (Main)	AM	South	0.32	18	30	B
		East	0.14	42	16	C
		North	0.29	13	44	A
		Total	**0.32**	**17**	**44**	**B**
	PM	South	0.27	16	39	B
		East	0.38	42	40	C
		North	0.22	12	30	A
		Total	**0.38**	**17**	**40**	**B**
Darcy Road/ Hawkesbury Road	AM	East	0.41	28	83	B
		North	0.44	42	53	C
		West	0.90	40	276	C
		Total	**0.90**	**38**	**276**	**C**
	PM	East	0.84	52	209	D
		North	0.60	50	75	D
		West	0.44	25	92	B
		Total	**0.84**	**43**	**209**	**D**

On the basis of the above assessment, the majority of the assessed intersections are expected to generally operate with an acceptable LOS during the weekday AM and PM peak hours. Queue lengths of up to 280m on Hawkesbury Road and up to 140m on Darcy Road (eastbound) at Mons Road are expected. This is generally consistent with the current intersection operation.

It is worth noting that the most notable impact of the Stage 1 Early Works, as anticipated, is to the Mons Road northern approach on account of the significant increase in traffic exiting via New Road onto Mons Road to turn right onto Darcy Road. This queue would extend north to the approximate location of New Road and existing Private Hospital access during the weekday PM peak hour. However, vehicle delay would be marginally improved given the additional allocated green time for this approach. As such, it is not expected that the increased queue would significantly affect the operation of the Mons Road T-way. In addition, the overall LOS for the Darcy Road/ Mons Road/ Institute Road intersection is expected to largely be consistent with current intersection operation.

4.2 Existing Car Parking Supply

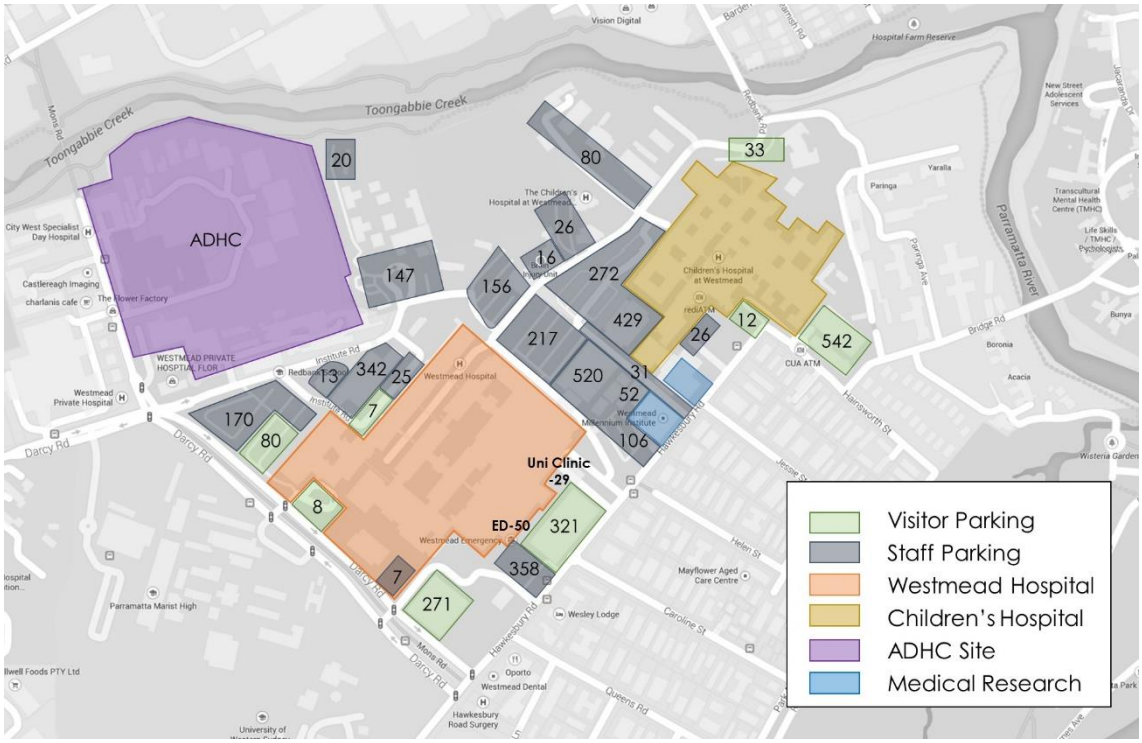
GTA completed a review of all on-campus car parking in late October 2015 and is supported by previous detailed parking supply and demand counts as detailed in the Car Parking Demand Study - Westmead Health Campus (Parking and Traffic Consultants, 2013)5.

The definitive staff, visitor and defined user car parking supply across the Westmead Health Campus is summarised in Table 4.6 and shown graphically in Figure 4.6.

Table 4.6: Existing Westmead Health Campus Parking Supply

Location	Staff	Visitor	Total
Westmead Hospital	2,179	748	2,927
CHW	762	548	1,310
Other (e.g. vivarium, Careflight, child care, Ronald McDonald House)	127	12	139
Total	**3,068**	**1,308**	**4,376**

Figure 4.6: Current Parking Supply



Basemap source: Nearmap

As discussed in Section 2.4, new at-grade car parking will be built on the Campus as part of the Stage 1 Early Works. However, given that the construction of the MSCP would overlap with the Stage 1 Early Works, as well as other construction activities (subject to separate planning approvals), the total number of spaces on-site before the completion of the MSCP would likely vary, with a net increase of no more than 50 spaces expected across the Precinct.

5 Car Parking Demand Study – Westmead Health Campus, Parking and Traffic Consultants, May 2015

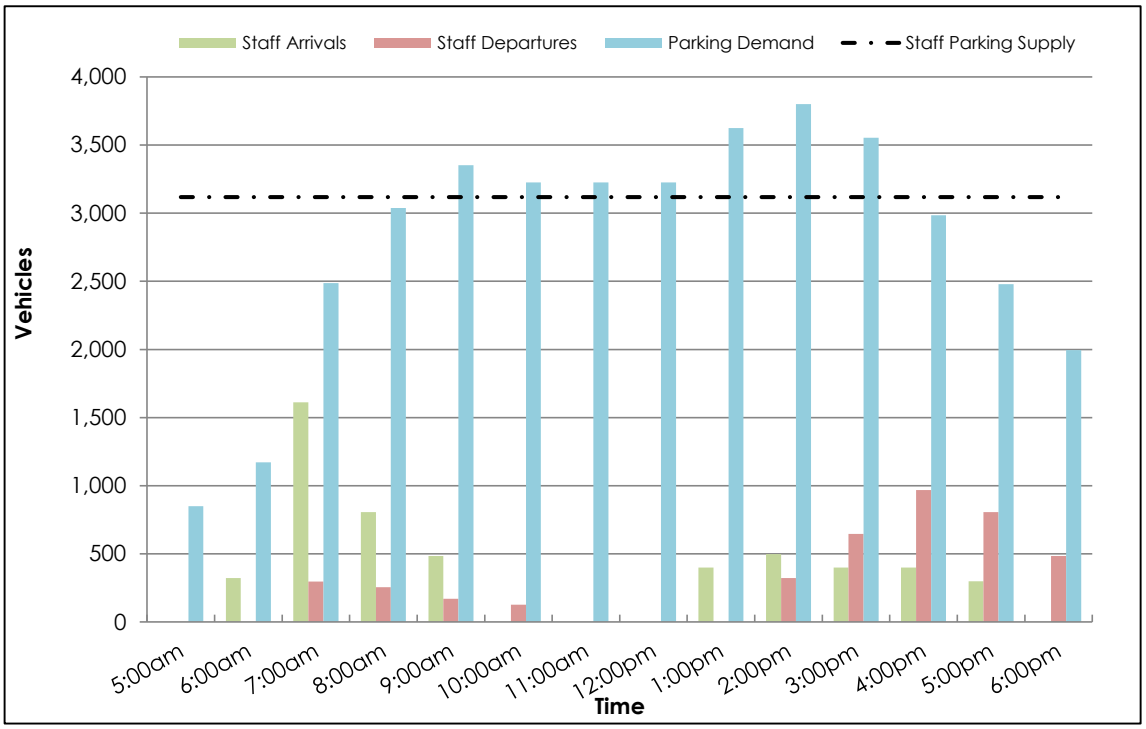
4.3 Staff Car Parking Demand

As discussed in Section 2.2.1, the staff arrival/ departure profile varies across the day, with the peak arrival concentrated around 7:00am. Staff departures are generally more evenly distributed across a typical weekday afternoon.

The estimated arrival/ departure profile is shown in Figure 4.7, conservatively estimating the following:

- vehicle occupancy rate of 1.2 people per vehicle
- 85% vehicle mode share, 15% public transport mode share (or walking and cycling).

Figure 4.7: Staff Parking Demand Profile



Based on the arrival and departure profile, the staff parking demand occurs at around 2:00pm, with approximately 3,800 vehicles, as per the breakdown included in Table 4.7.

Table 4.7: Staff Parking Breakdown

Staff Parking Location	Approximate Peak Staff Parking Demand (2:00pm)
On-Campus (formal parking supply)	3,130
On-Campus (valet, managed and informal)	100-150
Off-Campus parking	400-500
Total	**3,600-3,800**

Adopting the estimated peak parking demand of 3,600 to 3,800 vehicles to the 9,987 existing FTE staff equates to 0.35-0.40 spaces per FTE staff with 80%-85% of this demand accommodated by the existing Campus parking supply.

4.3.1 Visitor Parking Demand

The existing visitor activity on the Campus (as summarised in Table 4.8), as well as the surveyed visitor traffic generation for the Campus have been used to estimate the visitor parking demand profiles for Westmead Hospital and CHW, shown in Figure 4.8 and Figure 4.9 respectively.

Table 4.8: Existing Visitor Parking Demand

	Outpatients	Visitors to Inpatients	ED	Total
Westmead Hospital				
Beds		743		743
Annual Patients	573,000	0	66,857	639,857
Daily Patients/ Visitors	2,265	1,486 [1]	183 [2]	3,937
Vehicle Mode Share	80%	85%	100%	-
Daily Parked Vehicles [3]	1,631	1,000	183	2,814
Peak Parking Demand	-	-	-	**915**
Children's Hospital Westmead				
Beds		276		276
Annual Patients	228,768	0	52,000	280,768
Daily Patients/ Visitors	904	552 [1]	142 [2]	1601
Vehicle Mode Share	80%	85%	100%	-
Daily Parked Vehicles [3]	651	371	142	1164
Peak Parking Demand	-	-	-	**510**

[1] Assumes 100% occupancy of beds and an average of 2 visitors per bed per day
[2] Assumes 1 visitor for all patients arriving via ambulance
[3] Assumes a reduction for set-down/ pick-up activity amongst

Figure 4.8: Westmead Hospital Visitor Parking Demand Profile

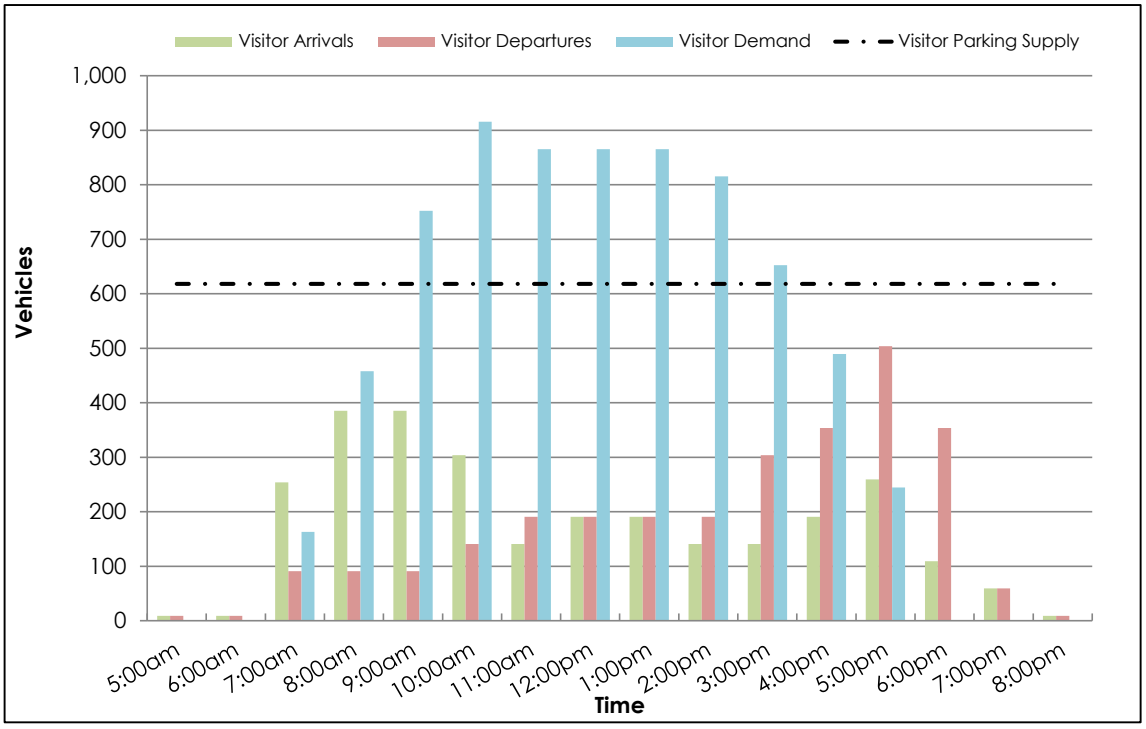
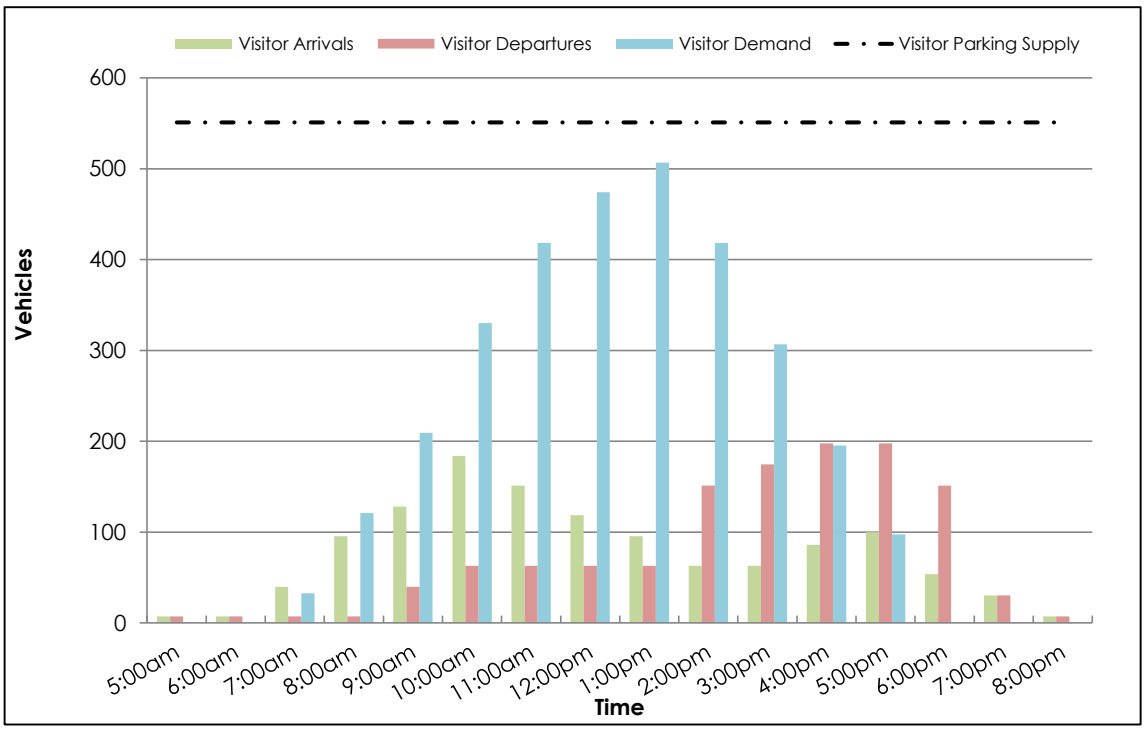


Figure 4.9: CHW Visitor Parking Demand Profile



The results confirm that the peak visitor parking demand for Westmead Hospital typically occurs at 10:00am, resulting in approximately 915 vehicles. The peak parking demand for CHW typically occurs at 1:00pm, with demand for up to 510 vehicles.

The peak visitor parking demand for Westmead Hospital is in excess of the hospitals current parking supply. Therefore, up to 300 vehicles are accommodated across the surrounding road network. The CHW peak parking demand is typically accommodated by the existing parking supply in the Hainsworth Street car park, albeit it is understood that staff often use this car park, reducing the availability of parking for visitors.

The key results of a staff and visitor questionnaire (Parking and Traffic Consultants, 2013) have been referenced to further understand the existing parking demand for the Campus. In particular, the questionnaire identified the following key off-campus parking locations used by staff and visitors of The Campus:

- University of Western Sydney (WSU) Westmead Campus car park
- On-street within a typical walking catchment
- On-street beyond the typical walking distance, including Briens Road, Lydbrook Street, Bridge Road.

4.4 Car Park Pricing

It is understood that the weekly cost of parking for staff at the Campus is $2-$3 per week, with staff typically issued a parking permit that allows them to park on-campus (without priority). It is anticipated that the low parking prices are a key contributor to the high proportion of staff who drive, as well as the impact to the surrounding public parking availability.

Visitor parking prices on the Campus vary, with the typical casual parking fees summarised in Table 4.9. The Hawkesbury Road multi-storey car park has a flat fee of $8, which must be paid by gold coins on entry.

Table 4.9: Casual Parking Fees[6]

Time Period	Fee
0-30 mins	Free
30 mins-1 hour	$5
1-2 hours	$8
2-3 hours	$10-11
3-4 hours	$12-13
4-5hours	$14-15
5+ hours	$16-17

4.5 Public Transport

The Campus is generally located within a 500m walk from Westmead Railway Station, well within the typical 800m capture radius of a 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 Campus 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 Campus originate or terminate at Parramatta Railway Station with the exception of the 808 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, inter alia Blacktown and Constitution Hill.

The existing public transport services in the vicinity of the Campus are summarised in Table 4.10 and presented in Figure 4.14.

Table 4.10: Existing Public Transport Services

Mode	Route	Location of Stop	Distance	Route	Peak Hour Frequency
Train	T1	Westmead	500m	Penrith/Richmond to Epping/Hornsby	5-10 mins
	T5		500m	Schofields to Campbelltown	30 mins
	Blue Mountains	Parramatta	2.3km	Sydney to Lithgow	Hourly
	Regional		2.3km	Sydney to Dubbo	Daily
Bus	T60, T61, T62, T63, T64, T65, T66	Mons Road T-Way	50m	Parramatta to Castle Hill/ Rouse Hill/Bella Vista	5-15 mins
	818	Darcy Road/ Hawkesbury Road	50m	Parramatta to Northmead, Merrylands, Castle Hill/ Cherrybrook Hornsby/ Glenwood	Hourly
	708	Darcy Road T-Way	50m	Constitution Hill to Parramatta	2 services per day (1 during AM peak)
	711		50m	Blacktown to Parramatta	30 min

[6] WSLHD, http://www.wslhd.health.nsw.gov.au/Westmead-Hospital/Patient---Visitor-Information/Transport---Parking, visited 3/7/15

4.6 Pedestrians

In general, pedestrians in Sydney experience a low level of priority on the transport network. Pedestrian spaces regularly conflict with driveways and loading zones, and signalised intersections cause lengthy delays in pedestrian journeys.

Such conditions are also common across the Campus and the broader area, particularly noting the low level of pedestrian priority at the intersection of Darcy Road and Hawkesbury Road and poor internal connectivity. That said, high quality pedestrian footpaths are provided along the Hawkesbury Road and Darcy Road frontages. This is best illustrated by the 4m wide footpath along the southern side of Hawkesbury Road that serves the key pedestrian desire line between Westmead Railway Station and the Campus.

Examples of the existing pedestrian infrastructure are shown in Figure 4.10 and Figure 4.11.

Figure 4.10: Hawkesbury Road Footpath

Figure 4.11: Hawkesbury Road Footpath

4.7 Bicycles

High quality shared paths are provided along Briens Road and Mons Road with a separated cycle path along the Darcy Road frontage. A shared path is also provided along the Hawkesbury Road frontage.

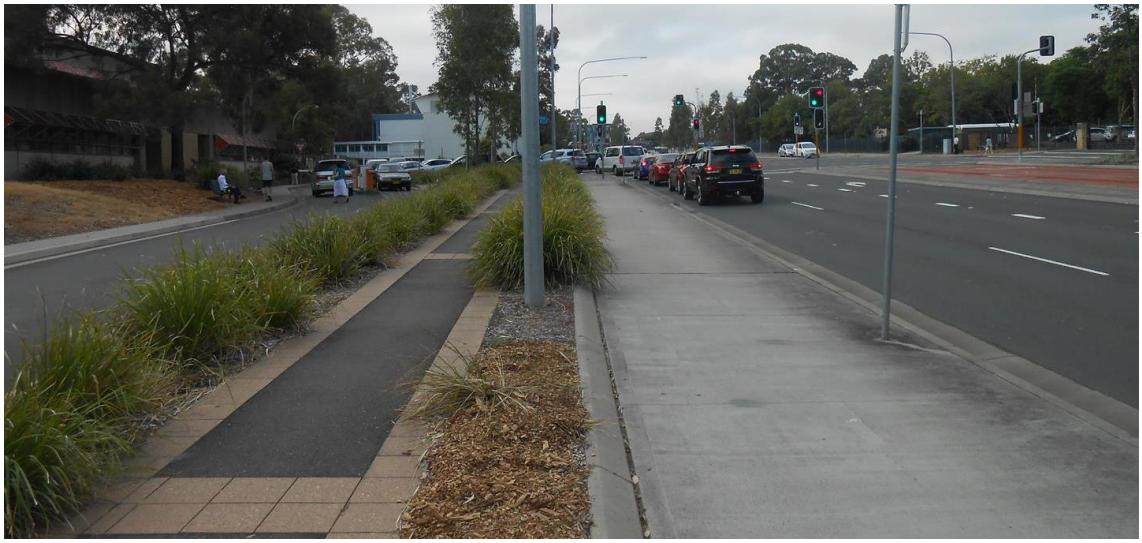
Site investigations found that poor signage and several obstructions and pinch points are present along the Hawkesbury Road shared path.

Bicycle storage facilities are provided across the Campus, including a secure bicycle cage for staff, located in an undesirable location on the lower level of the Visiting Medical Officers (VMO) car park. In addition, a small amount of unsecure bicycle parking spaces are provided at the key entry points, including at the Main Entry and Dental access.

The existing cycling facilities are shown in Figure 4.12 and Figure 4.13.

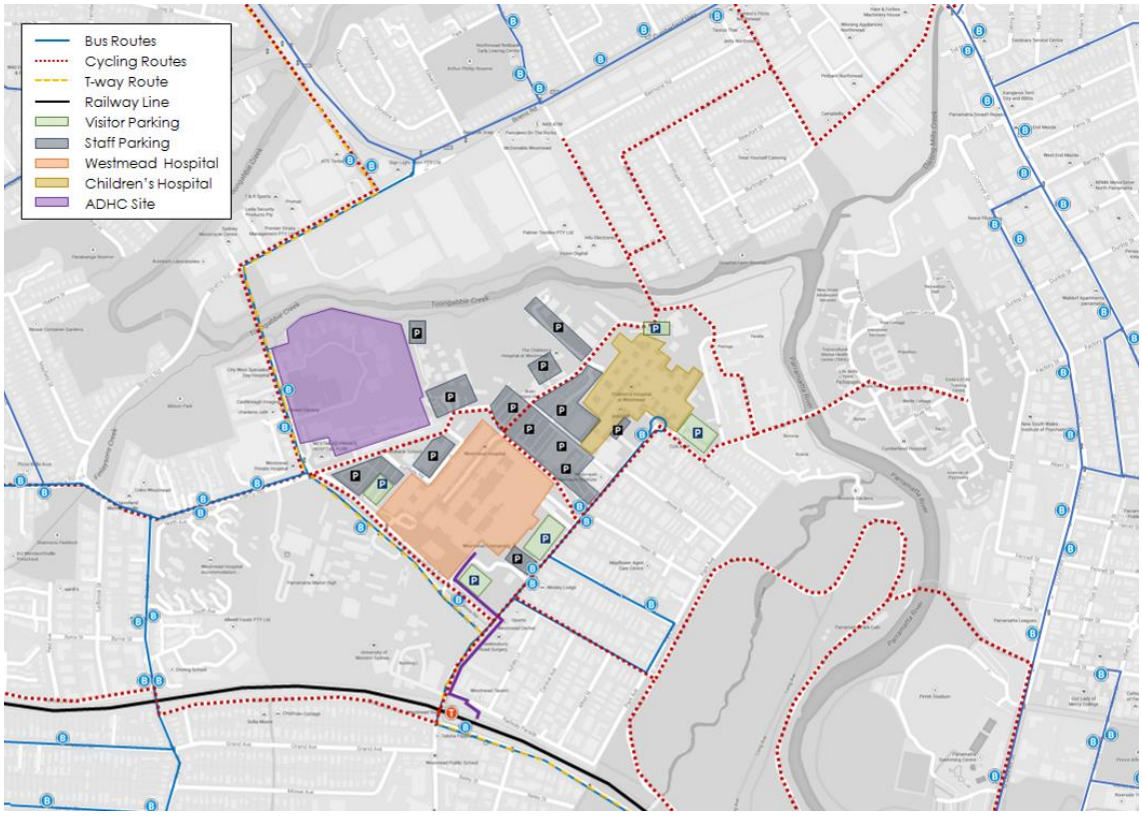
Figure 4.12: Bicycle Storage at the Main Entry

Figure 4.13: Darcy Road Pedestrian Path and Separated Cycle Path



The existing transport network is summarised in Figure 4.14.

Figure 4.14: Existing Transport Conditions



Basemap source: Google Maps

5. Proposed Development

5.1 Overview

The proposal includes the construction of an eight storey multi-storey car park on the corner of Darcy Road and Institute Road. The car park would accommodate 1,254 car spaces for use by staff and visitors, including 12 disabled parking spaces.

The car park would have access via the signalised intersection of Darcy Road (otherwise known as the Dental access), as well as Institute Road. Further details relating to the access arrangements are included in Table 5.1.

Table 5.1: Proposed MSCP Access Arrangements

Direction	Description		
	Darcy Road (Dental Access)	Institute Road	Summary
Entry	Two entry lanes and boom gates providing access to level 1	One entry lane and boom gate providing access to level 0	Three entry lanes distributed across two access points
Exit	No exit lanes or boom gates	Two exit lanes and boom gates providing access to level 0	Two exit lanes from one access point

The proposal also includes a small at-grade car park (Coroners Court) adjacent to the MSCP, with entry to be via the existing access to Car Park 6 and exit directly to Institute Road. The Coroners Court car park would accommodate 47 car spaces for use by staff.

The proposed MSCP and Coroners Court car park are shown in Figure 5.1.