Health Infrastructure

Randwick Campus Redevelopment

Traffic and Transport Assessment - Sydney Children's Hospital Stage 1/ Children's Comprehensive Cancer Centre

Issue | 7 May 2021

Job number 257913-00

Arup Pty Ltd ABN 18 000 966 165

Arup
Level 5
151 Clarence Street
Sydney NSW 2000
Australia
www.arup.com

ARUP

Document verification

ARUP

Job title		Randwick Campus Redevelopment			**Job number** 257913-00
Document title		Traffic and Transport Assessment - Sydney Children's Hospital Stage 1/ Children's Comprehensive Cancer Centre			**File reference**
Document ref					
Revision	**Date**	**Filename**	SCH1_CCCC_Traffic and Transport - SSDA.docx		
Draft 1	8 Dec 2020	Description	First draft		
			Prepared by	Checked by	Approved by
		Name	Aimy Nguyen	Suan Guo	Suan Guo
		Signature			
Draft 2	8 Mar 2021	Filename	SCH1_CCCC_Traffic and Transport – SSDA v4.docx		
		Description	Second draft		
			Prepared by	Checked by	Approved by
		Name	Aimy Nguyen	James R. Turner	James R. Turner
		Signature			
Draft 3	10 Mar 2021	Filename	SCH1_CCCC_Traffic and Transport – SSDA v5.docx		
		Description	Third draft		
			Prepared by	Checked by	Approved by
		Name	Aimy Nguyen	James R. Turner	James R. Turner
		Signature			
Draft 4	12 Mar 2021	Filename	SCH1_CCCC_Traffic and Transport – SSDA v5.docx		
		Description	Fourth draft		
			Prepared by	Checked by	Approved by
		Name	Aimy Nguyen	James R. Turner	James R. Turner
		Signature			
			Issue Document verification with document		✓

Document Verification

Job title		Randwick Campus Redevelopment			**Job number** 257913-00
Document title		Traffic and Transport Assessment - Sydney Children's Hospital Stage 1/ Children's Comprehensive Cancer Centre			**File reference**
Document ref					
Revision	**Date**	**Filename**	SCH1_CCCC_Traffic and Transport -		
Draft 5	17 Mar 2021	**Description**			
			Prepared by	Checked by	Approved by
		Name	Aimy Nguyen	James R. Turner	James R. Turner
		Signature			
Draft 6	23 Apr 2021	**Filename**	SCH1_CCCC_Traffic and Transport – SSDA v6.docx		
		Description	Update to report following comments received from PwC and DPIE on 21/04/21.		
			Prepared by	Checked by	Approved by
		Name	Aimy Nguyen	James R. Turner	James R. Turner
		Signature			
Issue	7 May 2021	**Filename**			
		Description			
			Prepared by	Checked by	Approved by
		Name	James R. Turner	James R. Turner	James R. Turner
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document Verification with Document	✓

Contents

Executive Summary

The Randwick Hospitals Campus (RHC) sits within the South East Sydney region. In order to improve the transport experience within the area, the Government published a strategy for South East Sydney known as the South East Sydney Transport Strategy 2056 in August 2020. Within South East Sydney, the RHC is situated within the heart of the Randwick Collaboration Area. The Place Strategy for this collaboration area was approved by the Greater Sydney Commission (GSC) in 2018 and included key objectives to guide future projects in the area towards a common vision. To respond to the GSC's strategy for the Eastern Harbour City, a long-term masterplan has been developed known as the Greater Randwick Urban Masterplan (GRUM). This framework provides guidance to prioritise future investments in health and education services in the Greater Randwick Area.

Review of existing transport behaviours highlighted that at least 38% of staff live within the Eastern Suburbs. The majority of those accessing the RHC use private vehicles (59%) parking both on and off the RHC. This is followed by public transport (25%), which when benchmarked against other health campuses was shown to be comparatively higher. The RHC is bound to the east by Avoca Street, a state-owned arterial road. Barker Street sits along the south of the RHC and primarily functions as a collector road linking the main hospital access roads (Hospital Road and Easy Street) to the arterial road network. High Street (northern boundary of the site) plays a similar role. The existing intersection operations indicate that the Barker Street/ Avoca Street intersection is operating over capacity in both the AM and PM peak periods.

A number of public transport options are available near the RHC including the CBD and South East Light Rail (CSELR), a number of bus routes with the majority of these buses provide all-day services to the CBD Some buses also provide access to surrounding areas, including Wolli Creek, Mascot, Bondi Junction and Maroubra Junction.

The Project will include a new emergency department, short stay unit, Children's Comprehensive Cancer Centre (CCCC) and relocated SCH clinical spaces. The proposed vehicle access to the Project includes the following facilities – main entry, drop-off/ pick-up areas, an ambulance bay, a logistics area and a new visitor car park. It is expected that the number of beds at the RHC will increase by 40 beds to 2025 and 70 beds to 2031. Assuming no changes to visitor travel behaviours, this would equate to 34 parking spaces needed by 2025 and 60 parking spaces by 2031.

The Project is currently investigating three scenarios in order to determine the range of impacts associated with either providing additional parking for staff or no additional staff parking. This varies mode shift requirements from 0% to 2.2%. The total trips generated by the project in the future year 2031 is summarised in Table 1. The assessment includes the trips generated by the IASB and proposed HTH to determine the combined traffic impact.

Table 1: Combined daily and peak hour trip generation for the Project, IASB and HTH

Traffic Source	2031 Daily Trips (two-way)	2031 Peak Hour Trips (two-way)
Visitor/ outpatient (visitor car park)	464	32
Visitor/ outpatient (existing main car park)	52	4
Visitor/ outpatient (general drop-off at porte-cochere)	166	11
Staff	284	86
SCH1/CCCC ED	360	14
SCH1/CCCC logistics	178	20
Total SCH1/CCCC	**1,504**	**167**
UNSW HTH	130	20
IASB drop-off	1,720*	160
Total (SCH1/CCCC, IASB and HTH)	**3,354**	**347**

*The majority of the IASB volumes consist of redistribution of trips from the Easy Street drop off.

By 2031, the project is expected to generate 167 peak hour trips (two-way). From this, 64 peak hour trips are expected to travel via Botany Street. The traffic assessment indicated that it is likely the project will have a minimal impact on the road network as the traffic volumes represent a 6 –7% proportion of the existing northbound and southbound traffic on Botany Street respectively. Furthermore, the trip generation (peak hour trips two-way) is below the capacity provided in the IASB transport assessment which allowed for an additional 360 two-way at the intersection for future expansion. Therefore, the intersection is anticipated to operate within practical capacity and therefore no further analysis has been undertaken for this assessment.

Table 2: Traffic distribution of Project traffic

Road	Direction	Existing traffic (2019) – AM peak (veh/ hour)	Trip generation associated with the Project	Proportion of existing 2019 traffic
Botany Street	Northbound	476	+32	6.7%
	Southbound	537	+32	6.0%

As a general principle, construction of any proposed enabling works will be staged to minimise impacts to traffic and other modes of transport. Some key principles for traffic management will likely include but not limited to maintaining access to properties, limiting interaction of construction traffic with hospital traffic (especially ambulance routes) and maintaining capacity on the surrounding road network.

Any construction work being carried out along the surrounding road network should make sure two-way traffic flow is maintained and existing on-street parking supply is retained where possible. This includes minimising the use of works zones and conducting any road closures outside of peak periods and

construction traffic should be separated from hospital operations where possible. Further assessment of construction traffic impacts will be conducted as part of the ongoing development of the CTPMP in consultation with relevant authorities.

Introduction

Arup was engaged by Health Infrastructure (HI) via PricewaterhouseCoopers (PwC) to provide transport consultancy services for the proposed development of Sydney Children's Hospital Stage 1 and Children's Comprehensive Cancer Centre (the Project).

The report has been produced to address the Secretary's Environmental Assessment Requirements (SEARs) associated with State Significant Development Application (SSDA) No. 10831778 issued on the 2nd December 2020.

1.1 Study area

The Randwick Campus Redevelopment (RCR) is situated approximately 7.2km south east of the Sydney CBD and is bounded by High Street to the north, Avoca Street to the east, Barker Street to the south and Hospital Road to the west. The Sydney Children's Hospital Stage 1 and Children's Comprehensive Cancer Centre herein known as the Project is within the RCR site.

The Project is situated west of the existing RHC as shown in Figure 1.

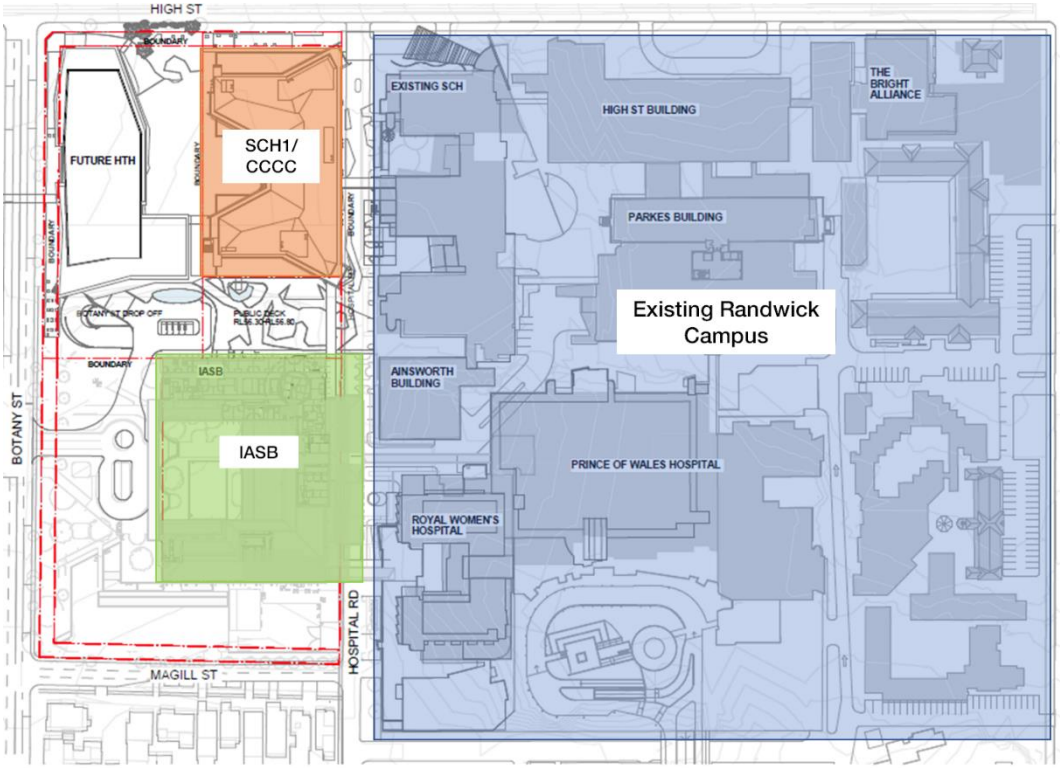

Figure 1: Existing Randwick Hospitals Campus and RCR site including proposed SCH1/CCCC Project

1.2 Report objectives

This report provides a transport assessment to address the SEARs associated with SSDA No. 10831778.

1.3 Secretary's Environmental Assessment Requirements (SEARs)

The key transport and accessibility issues outlined in Section 5 of the SEARs are outlined in Table 3. The respective responses or relevant section(s) of the report that addresses each item has also been added.

Table 3: Traffic and Transport SEARs

Condition	Section
Analysis of the existing transport network, including:	
road hierarchy;	3.2
pedestrian, cycle and public transport infrastructure;	3.9, 3.10, 3.11
details of current daily and peak hour vehicle movements based on traffic surveys and / or existing traffic studies relevant to the locality; and	3.3
existing performance levels of nearby intersections utilising appropriate traffic modelling methods (such as SIDRA network modelling).	3.4
Details of the proposed development, including:	
a map of the proposed access which identifies public roads, bus routes, footpaths and cycleways;	4
vehicular access arrangements, including for service and emergency vehicles and loading/unloading, 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;	4.2
car parking, bicycle parking and end-of-trip facilities;	4.2, 4.3, 4.4
drop-off / pick-up zone(s)/arrangements;	4.2.2
pedestrian or road infrastructure improvements or safety measures; and	4.3

Condition	Section
loading and service facilities.	4.2.4
Analysis of the impacts due to the operation of the proposed development, including:	
proposed modal split for all users of the development including vehicle, pedestrian, cyclist, public transport and other sustainable travel modes	6.5
estimated total daily and peak hour vehicle, public transport, freight, service vehicle, cyclist and pedestrian trip generation for staff and visitors	7.1
a clear explanation and justification of the: • assumed growth rate applied • volume and distribution of proposed trips to be generated • type and frequency of vehicles accessing the site.	7.1
details of performance of nearby key 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 or similar traffic model as required by TfNSW)	7
cumulative traffic impacts from any surrounding planned and approved development(s).	7.2
traffic and safety impacts of the proposed development on public transport (light rail and buses), pedestrian and cyclists, including at the proposed access and drop off / drop off zone(s)	6,7
adequacy of pedestrian, bicycle and public transport infrastructure (including bus network and Sydney light rail) to meet forecast demand of the development	4,6

Condition	Section
adequacy of car parking and bicycle parking provisions for staff and visitors when assessed against the relevant car / bicycle parking codes and standards	5,6
adequacy of the drop-off / pick-up zone(s), including any related queuing	4.2.2
adequacy of the existing / proposed pedestrian infrastructure to enable convenient and safe access to and from the site for all users	4.3
adequacy and loading and servicing provisions to meet estimated daily and peak hour freight and servicing demand.	4.2.4
Measures to ameliorate any adverse traffic and transport impacts due to the development based on the above analysis, including:	
travel demand management measures to encourage sustainable transport (such as a Green Travel Plan and / or specific Workplace Travel Plan)	6.6
infrastructure improvements, including details of timing and method of delivery	4
freight and servicing management measures to minimise transport network impacts (such as a preliminary Delivery and Servicing Management Plan).	4.2.4
A preliminary operational traffic and access management plan	4
Analysis of the impacts of the traffic generated during construction of the proposed development, including:	
construction vehicle routes, types, volumes and swept path	8, Appendix A
construction program (duration and milestones)	

Condition	Section
on-site car parking and access arrangements for construction, emergency and construction worker vehicles	
cumulative impacts associated with other construction activities in the locality	
road safety at identified intersections near the site due to conflicts between construction vehicles and existing traffic, public transport (light rail and buses), pedestrians and cyclists in the locality	
measures to mitigate impacts, including to ensure the safety of pedestrian and cyclists during construction.	
A preliminary Construction Traffic and Pedestrian Management Plan.	Appendix A

2 Strategic Transport Context

The RHC and RCR sits within the South East Sydney region which includes the Eastern Suburbs to the south of Bondi Junction, extending north to Central Station, west to the T4 Illawarra rail line and south to include Rockdale and Brighton Le Sands. This area indicates the potential for continual growth as a result of the increase in population, employment and investments in transport infrastructure in the area.

To improve the transport experience for all users interchanging within the area and to maximise on the benefits afforded by its strategic location, the State Government published a strategy for South East Sydney known as the South East Sydney Transport Strategy 2056 in August 2020. This document was developed in collaboration with Councils, Sydney Airport, NSW Ports, Port Authority of NSW, other NSW Government agencies, and the University of NSW. The Strategy outlines a number of initiatives, listed in proposed priority for delivery. These initiatives are expected to be delivered across two timeframes – the interim scenario (2041) and ultimate scenario (2056):

- Rapid bus routes;
- Delivery of the Principal Bicycle Network;
- Sydney Metro West extension to Malabar/ La Perouse;
- Sydney Gateway extension to Port Botany; and
- Metro from Kogarah to Randwick.

These initiatives are currently in the process of transitioning to the business case stage.

Within South East Sydney, the RHC is situated within the heart of the Randwick Collaboration Area. It resides within the Eastern Harbour City as outlined in the Greater Sydney Commission's (GSC) Greater Sydney Regional Plan: A Metropolis of Three Cities (Greater Sydney (GSC, 2018). The Place Strategy for this collaboration area was approved by the GSC in 2018 and included key objectives to guide future projects in the area towards a common vision. Notably some of these objectives included:

- Creating one of Australia's premier health, education and innovation districts;
- Making sure it is well connected to the rest of Greater Sydney by public transport; and
- Prioritising walking and cycling connections and vibrant centres of activity.

To respond to the GSC's strategy for the Eastern Harbour City, a long-term masterplan has been developed known as the Greater Randwick Urban Masterplan (GRUM). This framework provides guidance to prioritise future investments in health and education services in the Greater Randwick Area, particularly for the Randwick Health and Innovation Precinct (RHIP) which consists of the existing RHC and RCR including the IASB (currently under construction) and the proposed SCH1/CCCC and proposed HTH developments.

The document has been developed in consideration of key planning documents which include the "A Plan for Growing Sydney" (NSW Government, 2014), 'Towards our Greater Sydney 2056 (Greater Sydney Commission (GSC), 2016) and the Eastern City District Plan (GSC, 2018). The GRUM has outlined four key principles as part of the aspirational masterplan for the Precinct – green and healthy, connected, integrated and responsive.

The NSW Government's vision for the Precinct looks to physically connect the RHC with UNSW, encouraging the strengthening of relationships within the collaboration area and integration of health services with research and teaching facilities.

3 Existing Transport Conditions

3.1 Current travel behaviour

The RHC Travel Census 2019 report was provided to Arup by PwC. This census was managed by the Redevelopment team which also included members from HI, South Eastern Sydney Local Health District (SESLHD) and Cattell Cooper. It sought to establish a baseline of existing travel behaviour for staff and visitor/patients to inform future access planning for the RHC.

Staff postcode data provided in the census indicated that at least 38% of staff live within the Eastern Suburbs, which is the region immediately surrounding the site as shown in Figure 2. The high proportion of staff living near the RHC and significant investment (existing and future) in public transport in the area indicate potential opportunities to further shift travel to more sustainable modes of transport (walking, cycling and public transport).

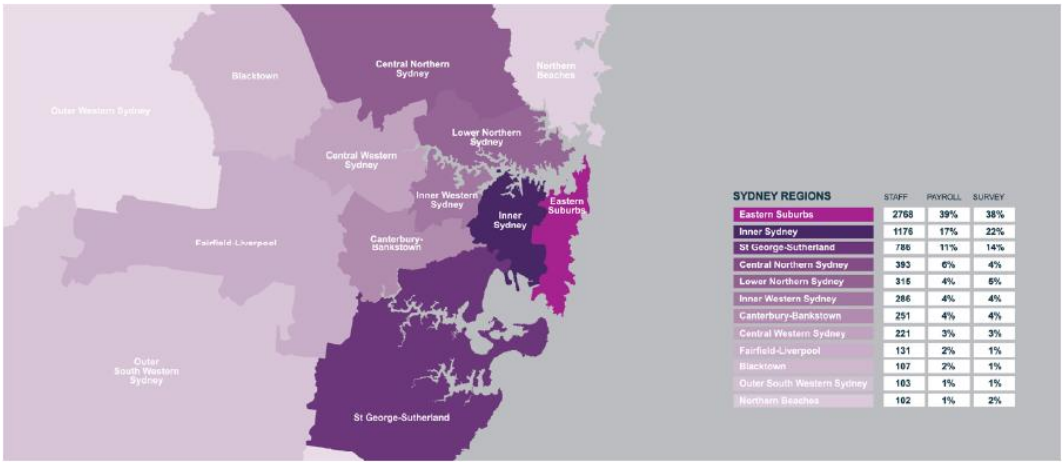

Figure 2: Staff residential location by Sydney region (Source: RHC Travel Census 2019)

As part of the census, a survey was undertaken to identify current staff and visitor mode share. Analysis of the survey data has shown that the majority of staff access the RHC as a driver or passenger, accounting for 59% of the mode share. This was followed by public transport at 25%, walking at 11%, cycling at 3% and 2% for access to the RHC via uber/ride share (including motorcycle/ moped and taxi).

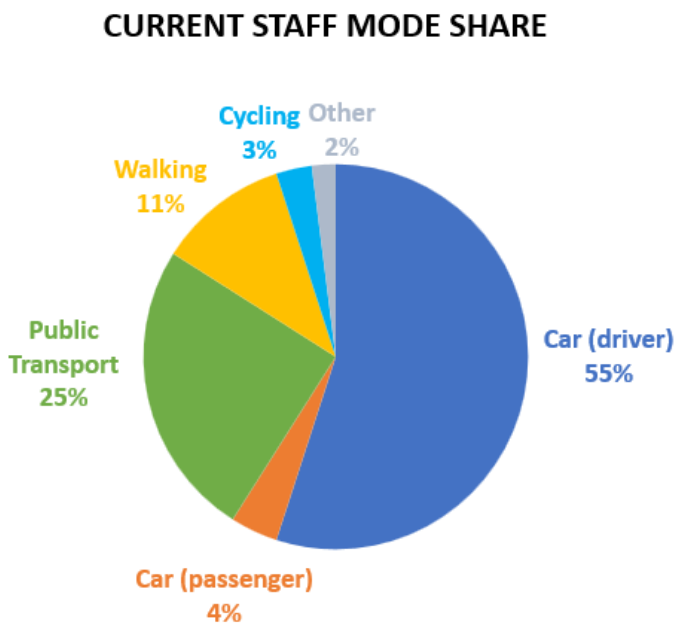

Figure 3: Staff mode share (RHC Travel Census 2019)

Staff driver mode share was compared against other hospitals in Sydney as shown in Figure 4. This benchmarking exercise showed staff at the RHC use a higher proportion of non-private vehicle mode, such as public transport and walking as a primary method of commuting to their place of employment. This is further supported by the findings from the travel census which highlighted that the proportion of RHC staff using public transport and walking modes is relatively higher when compared to many other non-CBD locations.

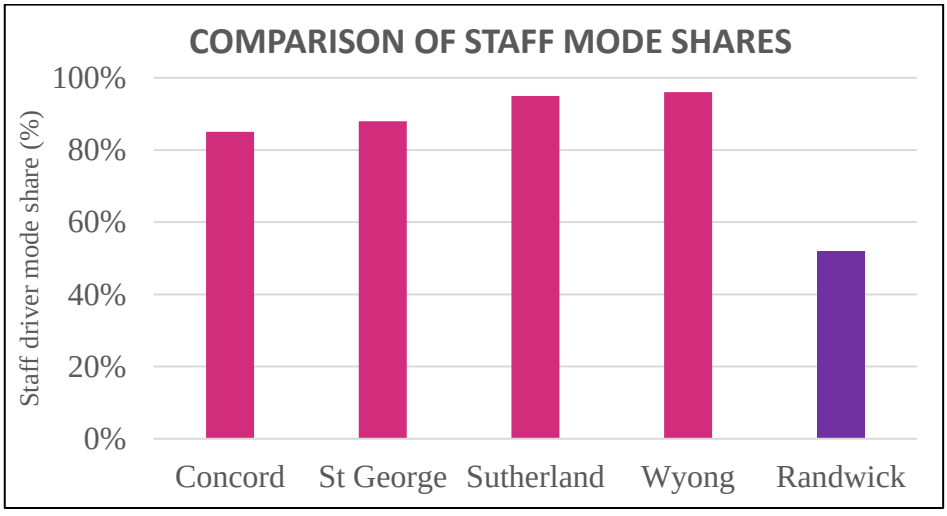

Figure 4: Comparison of staff driver mode shares for hospitals (Source: Various previous Arup projects, 2012 – 2017)

The survey has also indicated that although 82% of the workforce have access to a car, only 67% choose to drive with 7% of those carrying a passenger whom primarily are family or other colleagues. This has indicated the potential for organised ride-sharing as a means to decrease single occupancy trips.

The travel behaviour of visitor and outpatients display that the majority (74%) access the RHC as a car driver or passenger (59% driver, 15% as a passenger) as displayed in Figure 5. The next highest mode is shown to be public transport (17%) with a high proportion using the bus. With the opening of the CSELR L2 Randwick Line in December 2019 and the L3 Kingsford Line in April 2020, a proportion of bus users (and those from other modes) is likely to have shifted to using the light rail, which is currently not reflected in the travel behaviours shown in the 2019 RHC travel census.

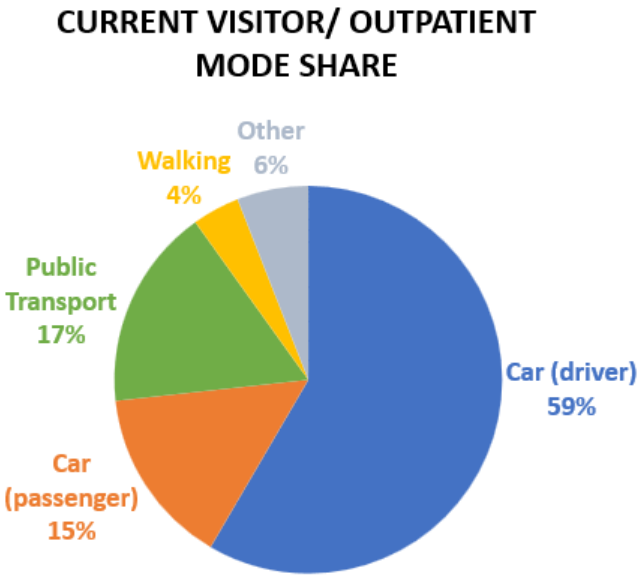

Figure 5: Visitor/ outpatient mode share (RHC Travel Census 2019)

3.2 Road network

The Project is bounded by High Street to the north, Hospital Road to the east, Magill Street to the south and Botany Street to the west. The development of the project will shift the overall boundary of the existing RHC to the west.

The existing function of these key roads is outlined below:

- High Street acts as a collector road and provides access to the existing Sydney Children's Hospital's drop-off facility as well as the respective emergency department. High Street also provides a secondary drop-off facility for the Prince of Wales Hospital. The CSELR currently travels on High Street which operates two-way via a one-way lane to the north and south of the light rail track west of Clara Street. To the east of Clara Street, High Street operates as an eastbound only lane. As part of the operation of the CSELR a number of movement restrictions have been implemented on High Street as shown in Figure 6. The movements restrictions shown with a dotted line indicates turn bans with vehicles under 9m excepted, those shown in a solid line outline turn bans for all vehicle types. The left turn ban from Wansey Road permits bus movements only.

- Hospital Road is a private road which currently acts as a local access street, attracting a low proportion of through traffic. As part of the IASB project this road is currently being lowered, noting any further lowering and works associated with Hospital Road are subject to a separate planning approval pathway. Due to the current construction activities, the road has been closed to through-traffic north of Francis Martin Drive, with two-way access available south of the hospital to the carpark entrance.
- With the opening of the IASB, Magill Street is open to the east, improving network connectivity. The function of Magill Street will likely change with access to the adults emergency department and secondary access to the main RHC car park during day time periods.
- Though Barker Street doesn't border the development site, it sits to the south of the RHC. It acts as a collector road and functions to link traffic from the arterial road network to the main campus entry road (Easy Street) for the general public. Easy Street provides direct access to the primary drop-off area and car parking for the Prince of Wales Hospital, Royal Hospital for Women and the Prince of Wales Private Hospital. Easy Street also provides access to the current Prince of Wales Hospital emergency department.
- Botany Street acts as a north-south collector road linking the arterial roads of Alison Road to the north and Barker Street to the south. The new signalised intersection at UNSW Gate 11 (Library Walk)/ Botany Street will provide an eastern access to the university campus and access to the existing RHC and RCR including the IASB (currently under construction) and the proposed SCH1/CCCC and HTH developments.

The existing road network surrounding the RHC and nearby signalised intersections are displayed in Figure 7.

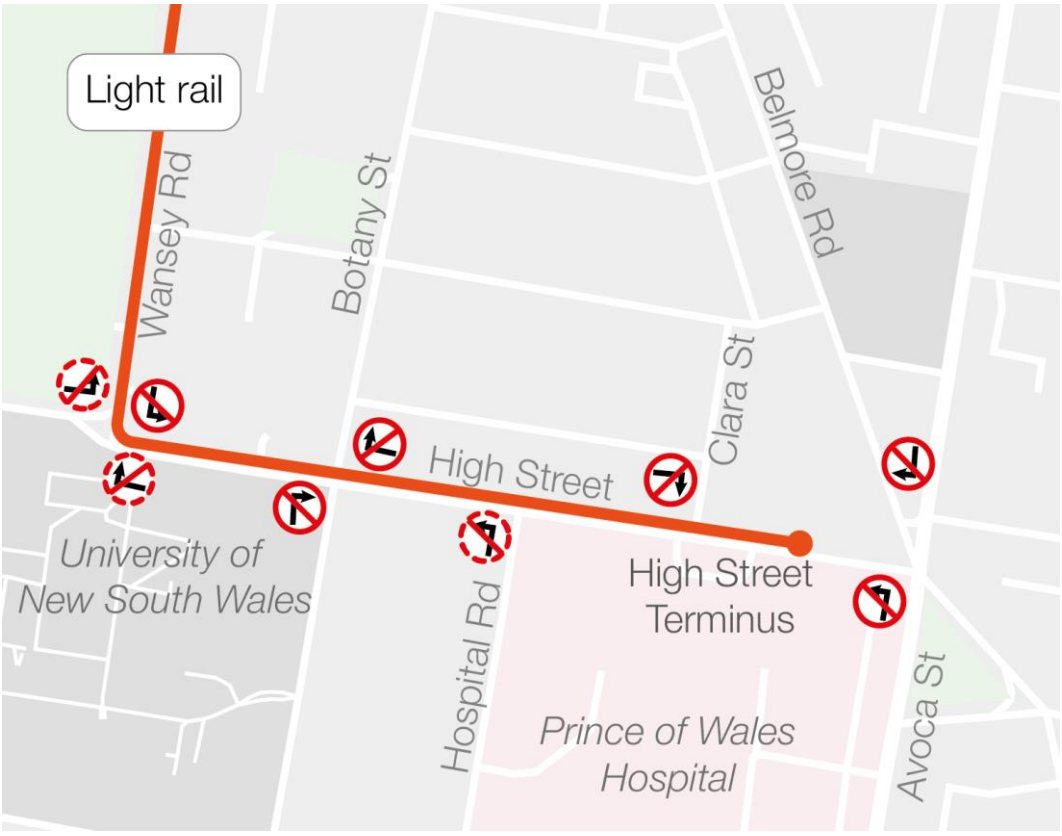

Figure 6: Existing movement restrictions on High Street

Figure 7: Existing road hierarchy and signalised intersections nearby the RHC

3.3 Traffic volumes

Traffic surveys were undertaken by Arup in 2017 and 2019 in order to understand the current performance of road and intersections proximate to the site.

A comparison of the midblock volumes (two-way) on Botany Street and Barker Street between the two years has demonstrated there is generally a decrease in traffic volumes as outlined in Table 4 and Table 5. This trend is likely to reflect future travel behaviours on the wider road network considering the GRUM focuses on the promotion of walking and physical activities and a shift from car to public and active modes of transport.

Therefore, to be conservative no background growth has been assumed as part of this assessment.

Table 4: Midblock volumes (two-way) comparison AM peak (2017-2019)

Road	2017 AM Peak (vehicles/hr)	2019 AM Peak (vehicles/hr)	Difference (relative)	Difference (%)
Botany Street	1,100	1,013	-87	-8.0
Barker Street	1,200	1,157	-43	- 3.5

Table 5: Midblock volumes (two-way) comparison PM peak (2017-2019)

Road	2017 PM Peak (vehicles/hr)	2019 PM Peak (vehicles/hr)	Difference (relative)	Difference (%)
Botany Street	1,200	968	-232	-19.0
Barker Street	1,300	1,337	+37	+2.8%

For this assessment, the survey data from 2019 has been utilised as High Street functions with two-way traffic, reflective of current conditions with the light rail. The intersections which were included in the survey were as follows:

- High Street / Botany Street (signalised);
- High Street / Hospital Road (signalised);
- Avoca Street / Nurses Drive;
- Avoca Street / Barker Street (signalised);
- Barker Street / Easy Street;
- Barker Street / Hospital Road;
- Barker Street / Botany Street (signalised); and
- Botany Street/ Magill Street.

The surveys were undertaken on Tuesday 14th May 2019. From this, the network peak was identified as follows:

- AM peak: 7:45 – 8:45am; and
- PM peak: 4:30 – 5:30pm.

Figure 8 and Figure 9 provides a summary of the peak hour traffic volumes at key mid-block locations near the site area. A high proportion of traffic is identified through the intersections along Avoca Street. As previously outlined in Section 3.2, Avoca Street is a State Road providing a major north-south traffic movement through the area. Total midblock volumes are identified as exceeding 1,500 vehicular movements per hour along Avoca Street in both peak periods.

Barker Street is a key collector road through the study area, carrying a high volume of vehicular traffic to local roads from the state roads such as Alison Road and Avoca Street. Intersection volumes along Barker Street have also been shown to account for a range between 1200 – 1350 vehicles per hour in the peak periods.

Details regarding existing intersection capacity and operation of the intersections surrounding the site is detailed in section 3.4.

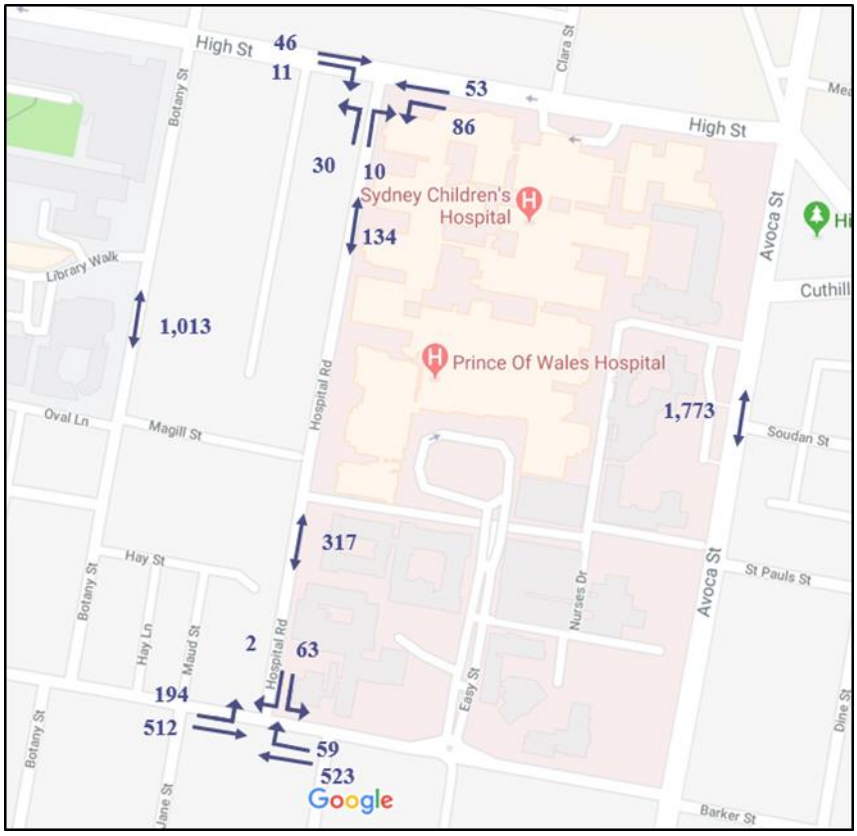

Figure 8: AM peak mid-block traffic volumes

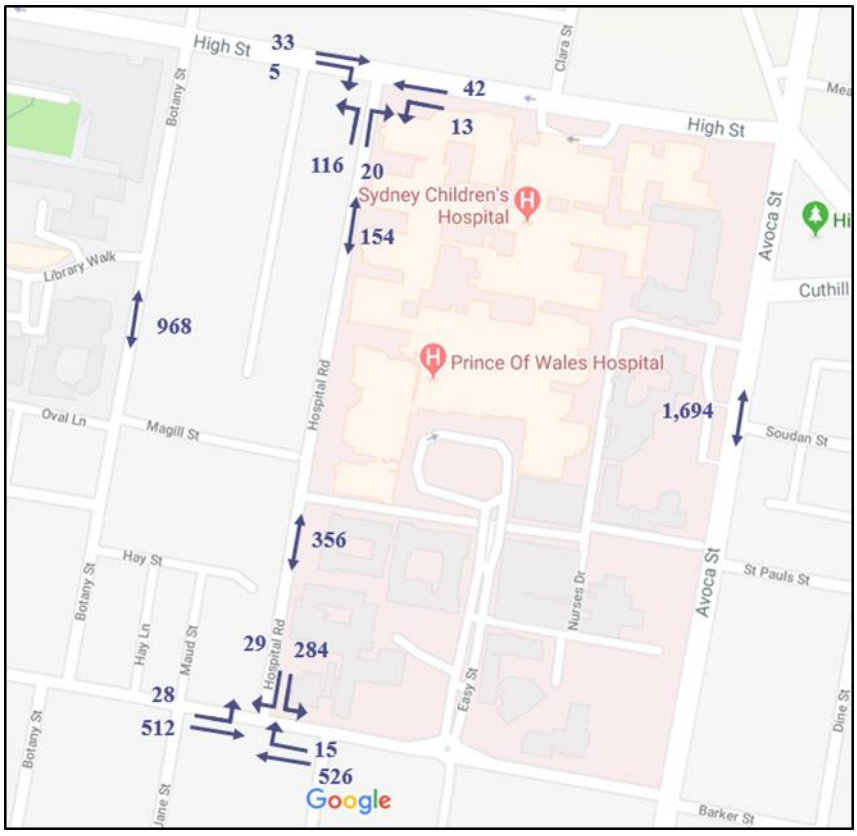

Figure 9: PM peak mid-block traffic volumes

3.4 Existing intersection performance

The key intersections have been modelled using SIDRA intersection analysis to determine the current performance based on the following modelling parameters:

Level of Service (LoS) - a measure that uses the average delay experienced by vehicles to categorically assign each approach and movement with a qualitative ordinal grade (A through F, with A being the best and F being the worst). *Roads and Maritime Services Traffic Modelling Guidelines 2013* indicate the average delay relating to each grade. This is outlined in Table 6. Generally, it is desirable to aim at achieving a LoS C or greater at all major road intersections. However, in practice, it is reasonable for some intersections to operate at LoS D at peak times.

Table 6: Level of service grades / description

Grade	Level of Service (seconds/vehicle)	Average Delay per Vehicle (s)
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity. At signals, incidents will cause excessive delays.
F	Greater than 71	Unsatisfactory with excessive queuing

Degree of Saturation (DoS) - a ratio of demand to capacity. A DoS of 1.0 indicates that the demand and capacity at an approach or intersection are equal. The *RMS Traffic Modelling Guidelines* outlines practical DoS for different intersection types. The desirable maximum DoS for different types of intersections are as follows:

- Signalised intersection – 0.9;
- Roundabout – 0.85; and
- Priority intersection – 0.8.

95th percentile queue length – this is the queue length that only has a 5% probability of being exceeded during the analysis time period. This parameter is used to calculate lane lengths but is not representative of a queue a normal driver would experience.

A summary of existing intersection performance is provided in Table 7. The analysis was based on traffic volumes recorded in the traffic survey undertaken in 2019 and the AM and PM network outlined in Section 3.3.

Table 7: Existing intersection performance (Source: 2019 Matrix traffic surveys)

Intersection	AM Peak hour			PM Peak hour		
	DoS	LoS	Delay (Seconds)	DoS	LoS	Delay (Seconds)
Botany St / High St	0.89	D	37	0.91	D	44
Botany St / Magill St	0.22	N/A	1	0.28	N/A	1
Hospital Rd / High St	0.40	B	16	0.44	B	16
Avoca St / Nurses Dr	0.39	N/A	0	0.48	N/A	0
Barker St / Botany St	0.66	C	26	0.66	C	30
Barker St / Hospital Rd	0.39	N/A	2	0.87	N/A	6
Barker St / Easy St	0.66	A	7	> 1.0	E	63
Barker St / Avoca St	> 1.0	E	70	> 1.0	E	> 70

The existing intersection operations are shown in Table 7 which indicate that the Barker Street/ Avoca Street intersection is operating over capacity in both the AM and PM peak period as shown in Figure 10 and Figure 11. In the PM peak, traffic queuing along Barker Street from the Avoca Street intersection affects the operation of the Easy Street roundabout.

Figure 10: AM peak hour total intersection vehicular volumes

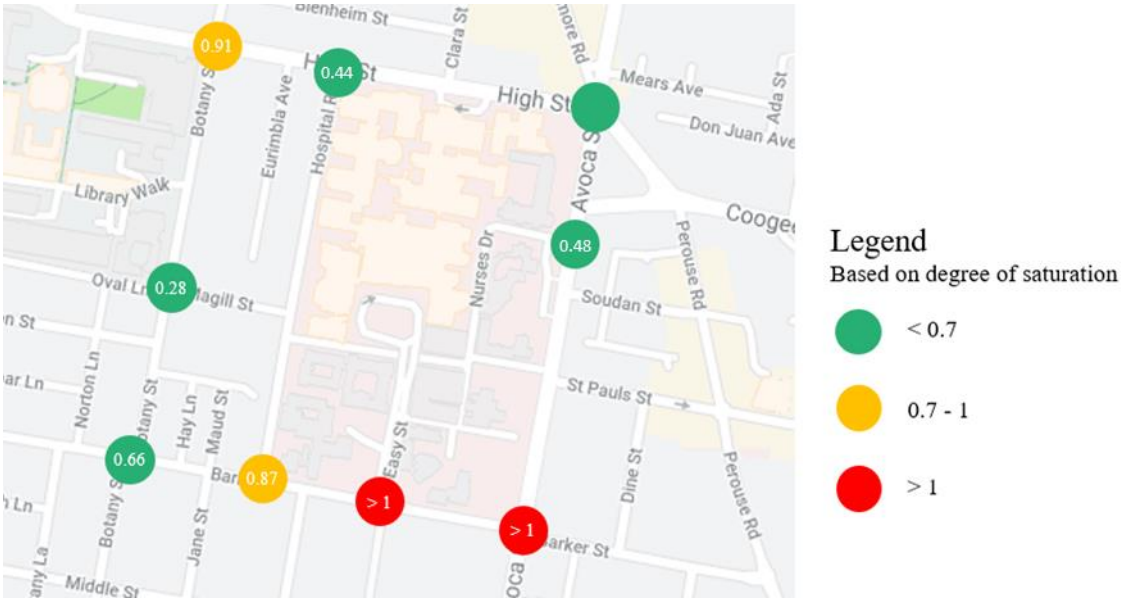

Figure 11: PM peak hour total intersection vehicular volumes

3.5 Existing porte-cochere operation

The porte-cochere along High Street currently facilitates drop off for the existing SCH. The drop-off provisions includes seven 15 minute time restricted parking bays on the northern and southern side of the porte-cochere.

A traffic survey was undertaken between 7am-7pm on Thursday 17 December 2020 to understand the current operation of the porte-cochere, including occupancy rates of the 7 parking bays.

Considering the porte-cochere can theoretically accommodate 336 vehicles during a 12-hour period and based on 4 vehicles per hour/ bay (15 minute time restriction). The survey indicated that 95 vehicles accessed the seven bays during the surveyed time. This corresponds to an operational capacity of approximately 30%.

Table 8 outlines the numbers of vehicles using the parking bays during the surveyed period and from those, vehicles parking longer than the 15-minute time restriction.

Table 8: Vehicles observed beyond 15 minute time restriction

Bay number	Total vehicles stopped during surveyed period	Vehicles observed beyond 15 minute restriction	Proportion of total stopped vehicles
1	12	6	50%
2	13	6	46%
3	5	3	60%
4	10	5	50%
5	21	9	43%
6	14	7	50%
7	20	9	45%
Total	95	45	

3.6 Crash analysis

Historic crash data for a 5-year period (2015 – 2019) was obtained from the Centre for Road Safety for the Randwick Local Government Area (LGA). This data was used to determine trends in the surrounding road network of the site and identify potential safety concerns.

Key findings from the crash analysis are summarised below:

- There was a total of 108 crashes identified within the study area between the five-year period (2015 – 2019);
- The intersections where more than five crashes (i.e. crash cluster) typically occurred at include Avoca Street and Barker Street (12 crashes) and Avoca Street and High Street (9 crashes);
- The three most common crash types that were identified were:
    - 29% same direction crashes;
    - 18% manoeuvring crashes; and
    - 18% off path (while on a straight section of road) crashes.

The majority of same direction crashes identified resulted from the high level of vehicular activity along Avoca Street. This results in rear end crashes (19 of the 31 same direction crashes) along with lane changing and sideswipe crashes. Avoca Street is also shown to have the highest amount of crashes occurring with 37 out of a total 108 crashes occurring on the State road, with more than half consisting of same direction crashes. A heat map displaying crash hot spots is shown in Figure 12.

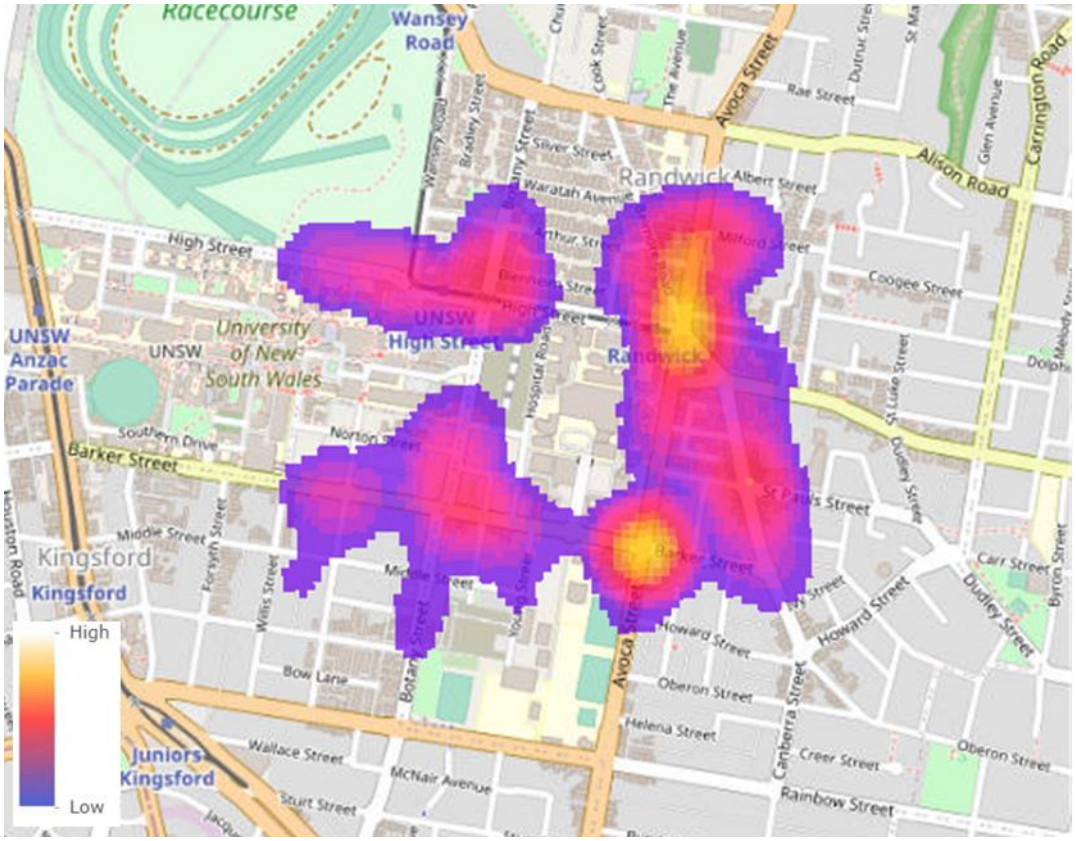

Figure 12: Crash analysis - heat map (Source: RMS 2015-2019)

3.7 Car parking

3.7.1 Existing parking supply

Based on surveys undertaken by Arup in 2017, there are an estimated 2,302 parking spaces available on the RHC for staff and visitors. The split between both user groups are as follows:

- Staff: 1,483 spaces; and
- Visitors: 819 spaces.

This provision of on-site parking corresponds to a rate of 1.56 spaces/ 100 m² GFA or 2.2 spaces/ bed. This amount is low when benchmarked against other health campuses as shown in Figure 13.

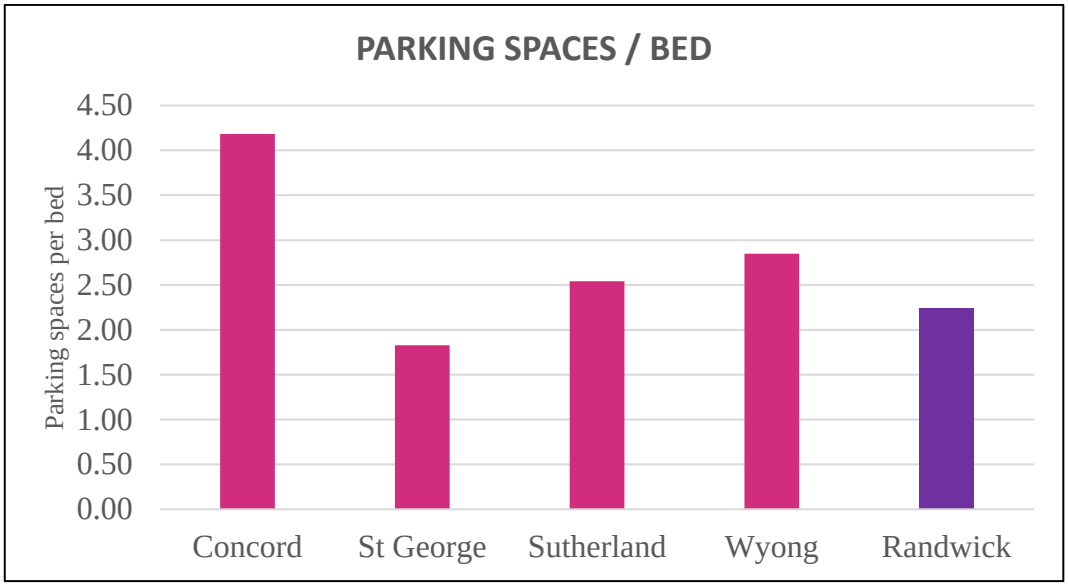

Figure 13: Parking rates at NSW Hospital campuses (Source: Various previous Arup projects, 2012 – 2017)

3.7.2 Existing parking demand

Parking occupancy surveys were undertaken for a period of 5-days (Wednesday 26 June 2019 – Tuesday 2 July 2019) at the RHC main car park as part of the travel census.

The data has shown consistently high occupancy rates of greater than 85% between 9:00am to 3:00pm, Monday to Thursday with peak occupancy rates occurring during a three-hour period (11:00am to 2:00pm) as shown in Figure 14. Based on this, an average peak occupancy rate of 91% for the weekday was determined.

It is typically considered that parking occupancy of 85% represents the practical capacity of a car park where drivers have difficulty in locating parking spaces. Therefore, the existing car park is considered to be operating at maximum capacity during the peak periods of a typical weekday.

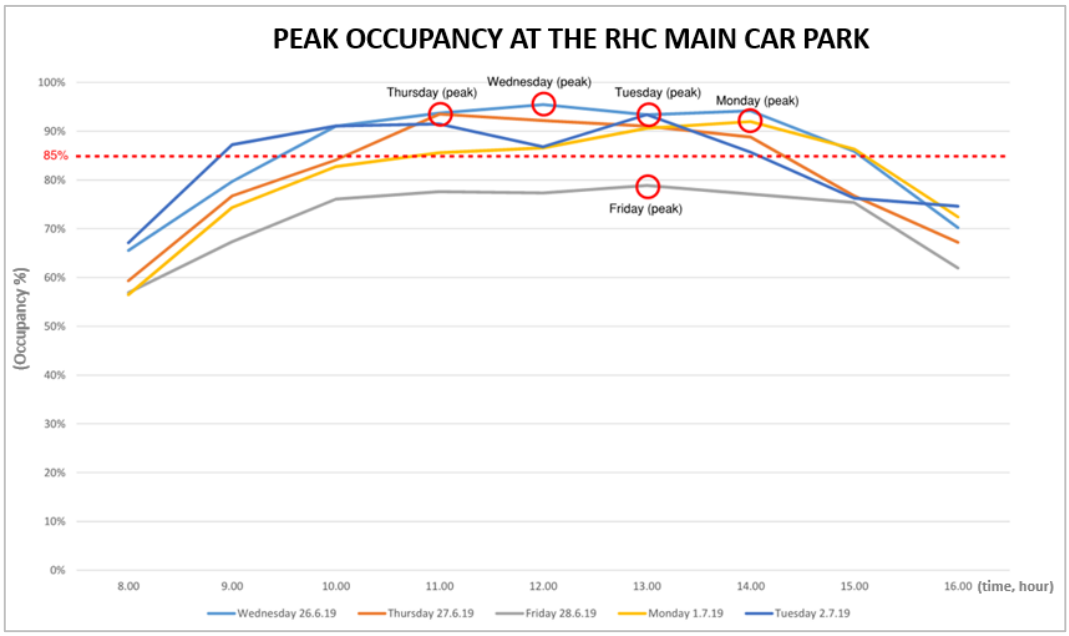

Figure 14: Peak occupancy at the RHC main car park (Source: RHC Travel Census 2019)

As outlined in section 3.7.1, the parking demand can also be expressed as a ratio of total gross floor area (GFA) and beds as follows:

- 1.90 spaces/ 100 m² GFA
- 2.60 spaces/ bed

These rates have been based on occupancy surveys undertaken by PTC (2014) and accounts for the day which had the highest peak occupancy across the surveyed week.

In addition to the existing parking demand, the parking study conducted by PTC (2014) estimated that there is potentially a suppressed demand of between 350 to 450 spaces due to the constraints on and off-site parking environment. For the purposes of this report, suppressed parking is the difference between staff and visitors that currently park at the RHC compared with those that would park if there was available parking. This is reflective of the low staff car driver mode share compared to other hospital campuses, as shown previously in Figure 4.

3.8 On-street parking

On-street car parking in the vicinity of the RHC and UNSW provides a mix of unrestricted and time restricted spaces. Randwick City Council has introduced some time restricted parking with resident parking schemes where a balance is needed between the needs of residents and their visitors and operation of the precinct. Restrictions often apply on one side of the street only leaving the other side available for all day parking. It is expected that current usage trends for on street parking will continue

3.9 Public transport

3.9.1 Bus

The RHC is in proximity to Sydney's Eastern Suburbs bus hub located on the southern end of Belmore Road. The bus routes within the vicinity of the project are outlined below and illustrated in Figure 15.

- All-day services connecting the south-eastern suburbs with the Sydney CBD via Moore Park – routes 372, 373, 374, 376 and 377;
- A range of express service variants of these routes that operate during peak hours – routes X73, X74 and X77;
- North-south services that connect centres in the Eastern Suburbs, including Bondi Junction, Coogee, Eastgardens and Maroubra Junction – routes 314, 316, 317 and 400N (night service);
- East-west services that connect Randwick with Bondi Junction, Wolli Creek and Mascot – routes 348, 357 and 400; and
- Leichhardt to Coogee – route 370.

The majority of bus routes traverse through Belmore Road with a number of services also using High Street, Alison Road and Avoca Street.

Figure 15: Existing bus services and CSELR servicing the RHC

3.9.2 CBD and South East Light Rail (CSELR)

The CSELR is a 12km route with 19 stops, extending from Circular Quay along George Street to Central Station, through Surry Hills to Moore Park, then to Kensington and Kingsford via Anzac Parade and Randwick via Alison Road and High Street. The L2 Randwick Line commenced operations in December 2019 with the L3 Kingsford Line opening in April 2020. This is shown in Figure 16.

The eastern end of High Street, which forms the northern boundary of the RHC site, features the terminus for the CSELR (L2 Randwick Line). Light rail services terminate at the stop on High Street immediately west of the Belmore Road and Avoca Street intersection. Light rail services travel from High Street towards the Sydney CBD every eight minutes between 7am and 7pm on weekdays.

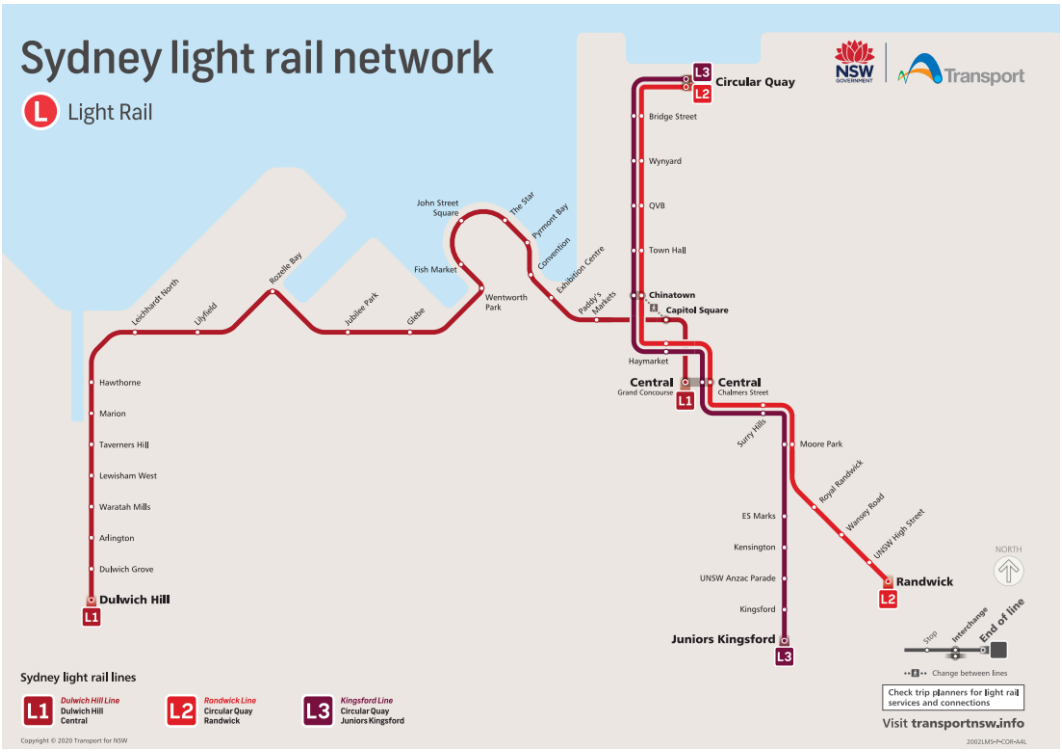

Figure 16: CSELR alignment (source: TfNSW, Sydney light rail network map)

3.10 Walking

Currently walking accounts for 11% of staff travel mode share for the RHC. As outlined previously in Section 3.1, at least 38% of campus staff reside in the Eastern Suburbs. Due to the proximity of the RHC and the limited availability of on-site parking, staff residing in these suburbs have a high uptake of walking (26%) when compared to staff living in other areas as shown in Figure 17. The high proportion of staff residing in the Eastern Suburbs outlines a potential opportunity to further shift towards more sustainable modes of travel.

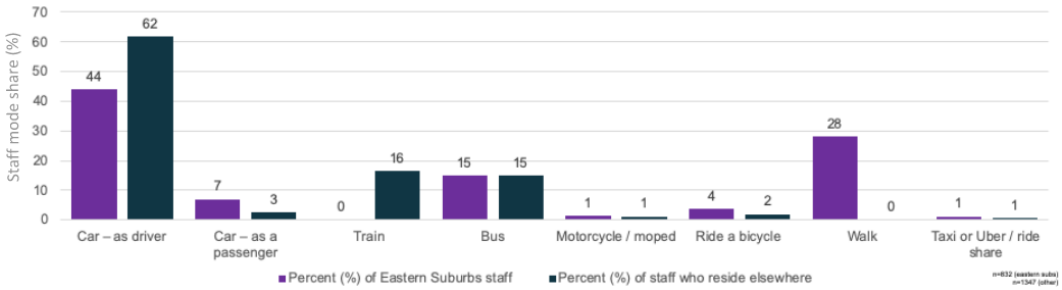

Figure 17: Main staff travel mode, Eastern Suburbs vs. other areas (Source: RHC Travel Census 2019)

Figure 18 displays the 5, 10, 15 and 20 minute walking isochrones to and from the RHC.

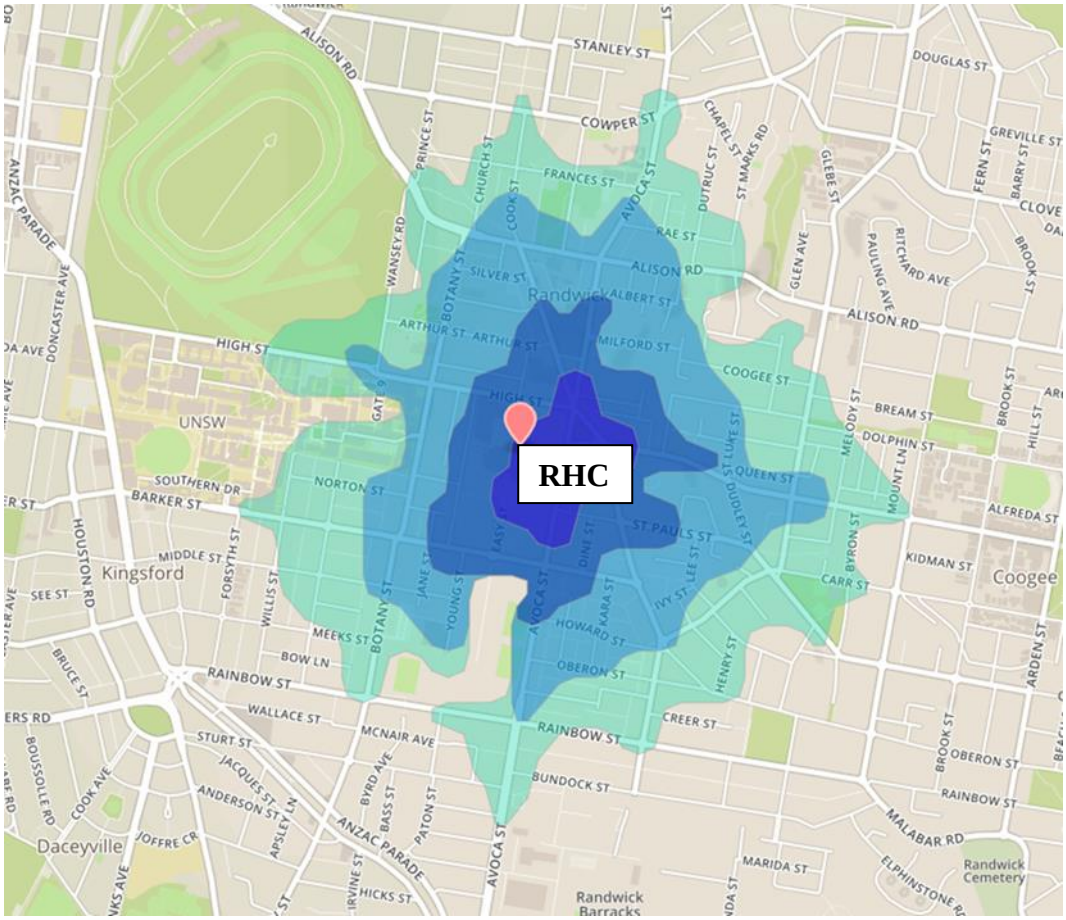

Figure 18: Walking isochrones to/from RHC (Source: Arup 2017)

3.11 Cycling

The cycling mode share accounts for 3% of staff travel to and from the RHC. Figure 19 displays the 5, 10, 15 and 20 minute cycling isochrones to and from the RHC.

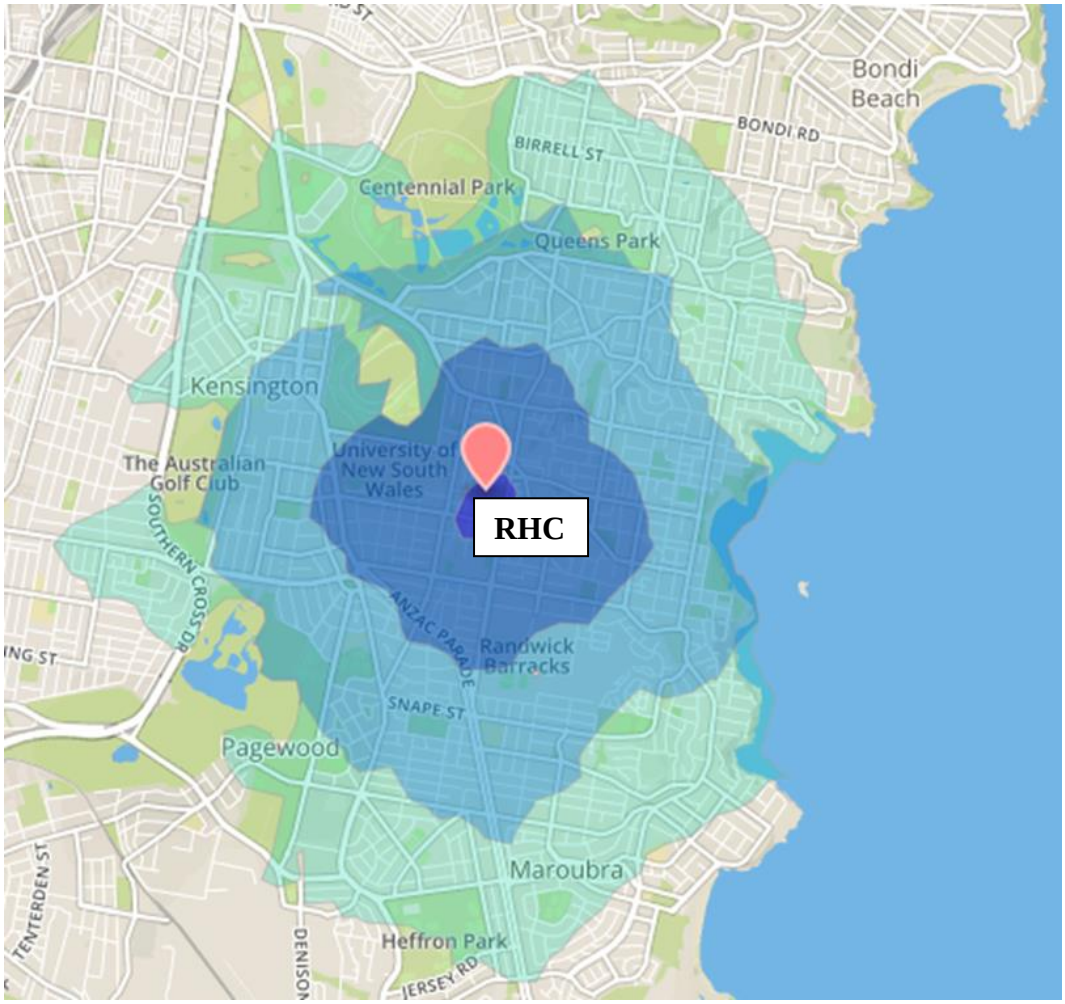

Figure 19: Cycling isochrones to/from RHC (Source: Arup 2017)

The current uptake of cycling in comparison to walking may be attributed to a number of key pain points which include:

- Lack of bicycle parking. A bicycle parking audit was undertaken by RHC in 2019 as shown in Table 9. This audit has shown existing provisions are at or above full capacity. Consequently, a third of all bikes are currently being stored at informal locations such as hospital buildings and offices;
- Limited or no access to any form of EoT facilities including secure bicycle parking and lockers, with almost a quarter of surveyed cyclists reporting they did not have access to any facilities; and
- Lack of bicycle infrastructure including lanes, paths and routes.

The provision of shared access to the proposed Campus wide EoT facilities and improvements in the cycling network around the site proposed by the Randwick City Council (RCC) can deliver significant boosts in the uptake of cycling for staff and visitors within the catchment area.

Table 9: Summary of bicycle parking audit

Bike Rack Locations	Count (based on survey respondents)	Peak Audit	Occupancy
Rack near the Volunteers Cade/ Hyperbaric Unit	10	15	>100%
Rack at the High Street entry to Prince of Wales	7	7	100%
Rack out of the back of Sunny's Café	5	6	>100%
Rack behind Black Dog Institute	4	3	75%
Rack in front of the Bright Building	3	3	100%
Rack near Security Office	3	2	67%
Against a pole/ rail or other fixture somewhere on campus	9	20	-
Inside a building/ office	19	19	-
Total bikes	60	75	

3.12 COVID-19 impacts

Due to the COVID-19 pandemic, travel behaviours for staff and visitors accessing the RHC were significantly impacted throughout 2020. As a result, the RHC staff travel census conducted in 2019 was used as the basis of this assessment due to the difficulty in quantifying short-term or long-term behavioural changes as a result of the pandemic.

However, it is important to be cognisant of the impact of COVID-19 on the operation of the RHC. Key findings from the 2020 RHC staff travel are summarised below:

- Car driver mode share has increased by only 1% despite free and discounted parking incentives provided during COVID-19;
- Public transport usage showed a decline of 6% when compared to the previous year. Staff have opted for walking or cycling as a means to access the RHC;
- The introduction of the light rail has removed the challenge of interchanging at Central station with approximately two-thirds or respondents satisfied/ very satisfied with their experience;
- Increase in cycling uptake; and
- Awareness of the RHC Green Travel Plan (GTP) is low amongst staff. This is likely due to the changed priorities during the pandemic resulting in reduced staff focus on non-COVID issues and promotional activity.

4 Proposed development

4.1 Development description

Sydney Children's Hospital Stage 1 will deliver:

- A new children's emergency department and emergency short-stay unit, accessible from Botany Street with direct links to new and existing services;
- A new children's intensive care unit;
- New inpatient units for medical and surgical specialities;
- A new medical short-stay unit;
- New front of house and High Street drop-off;
- A new pharmacy; and
- Back of house and logistics services.

The site will be bound by High Street to the north, Hospital Road to the east, Magill Street to the south and Botany Street to the west as displayed in Figure 20.

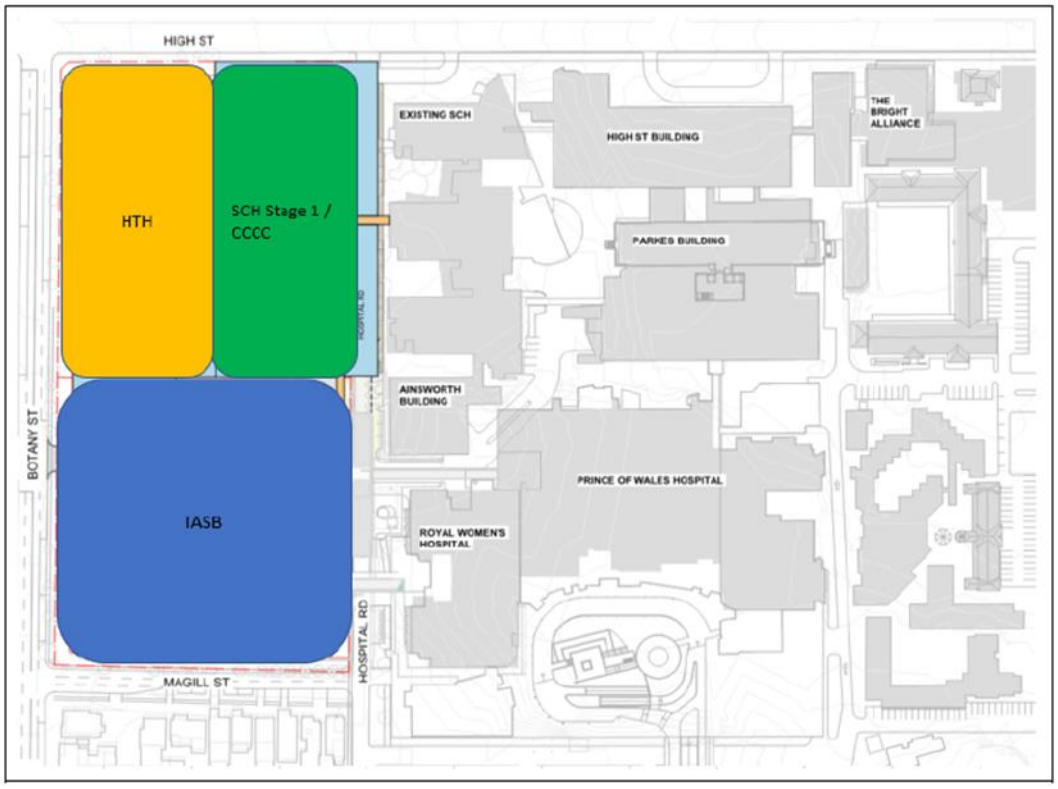

Figure 20: Proposed indicative project site area including neighbouring developments

4.2 Vehicle access and circulation

The schematic design of the Project was developed in consideration of the largest design vehicle proposed for access to the various facilities of the project (emergency drop-off/ pick-up, ambulance bay, logistics area and car park). The

design vehicle and the associated facility is detailed below in Table 10. Figure 21 displays the location of the Project transport facilities and the associated vehicle access points.

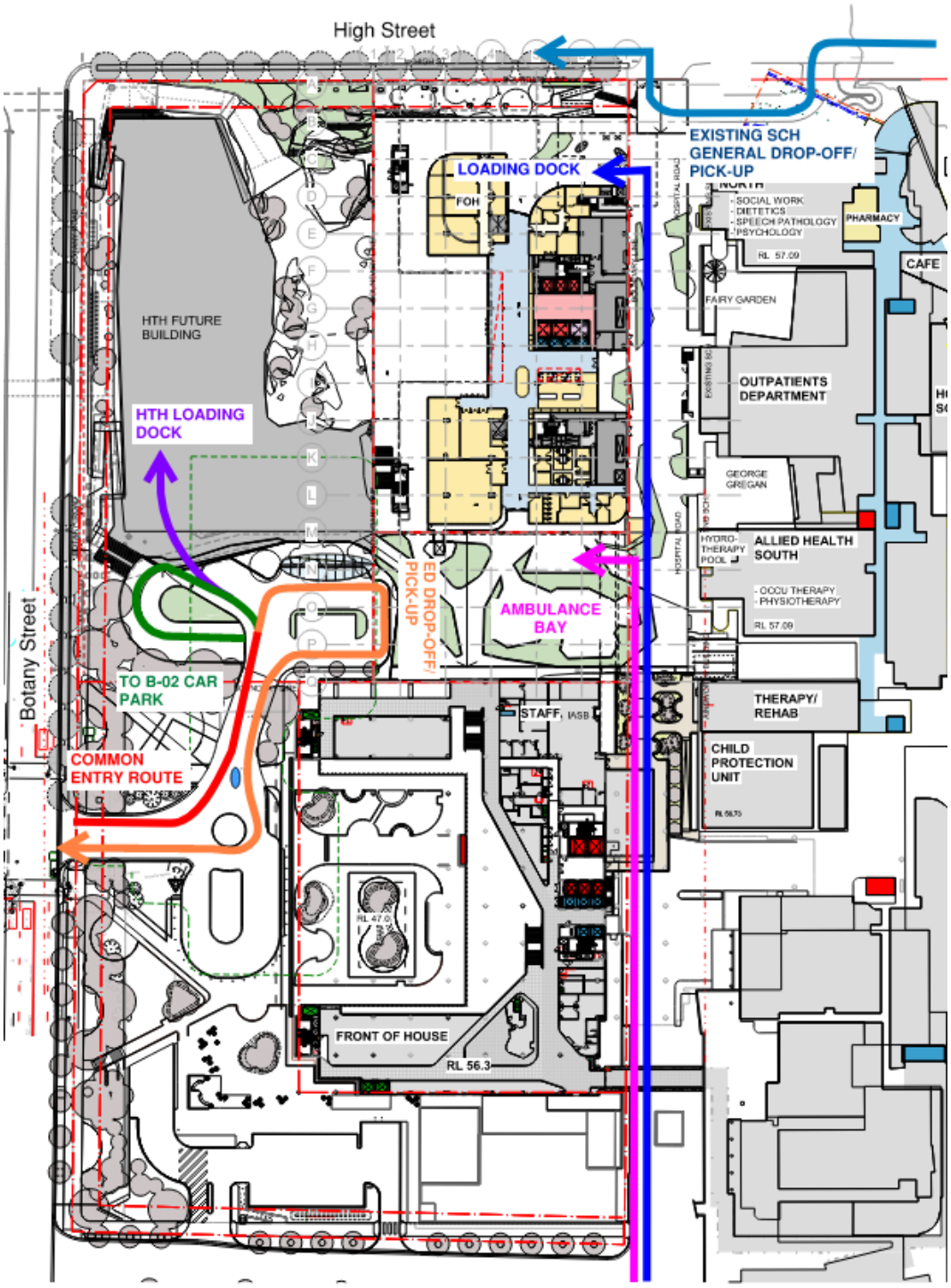

Figure 21: Proposed vehicle access routes

Table 10: Project vehicle access design vehicle

SCH1/CCCC vehicle access	Design vehicle
Entry road adjacent to Botany Street and UNSW Gate 11 intersection	Heavy rigid vehicle (HRV). This has been based on the largest vehicle accessing the HTH loading dock.
Emergency drop-off/ pick-up	Newborn and Paediatric Emergency Transport Service (NETS) ambulance
Ambulance bay	NETS ambulance
Logistics area	HRV
Car park on basement level 2	NETS ambulance. This has been driven by the proposal of the car park as a secondary egress/access point for emergency vehicles in case of an incident on Hospital Road.
Level B01, B02	HRV for initial section between L-01 and the access ramp to the HTH loading dock. Beyond this point a NETS ambulance has been used.

4.2.1 Main entrance

The main vehicle access to the Project will be via a new signalised intersection at Botany Street and UNSW Gate 11 as part of the approved IASB development. The signalisation of the new entry road with Botany Street will increase the capacity of this intersection, facilitating movements to other facilities onsite.

The entry road connects into a new roundabout which controls access to the main entrance of the Project, located on the north-eastern extent of the site and other health facilities on the RHC such as the IASB and the proposed HTH building.

4.2.2 Drop-off/ pick-up areas

A drop-off and pick-up area is being provided at the south-western end of the building in the form of a loop road arrangement. This area will be designated for patrons accessing the new emergency department. This facility can be accessed via the signalised intersection at Botany Street and UNSW Gate 11. The loop road has been sized to accommodate the forecast demands to the emergency department.

Patrons accessing the general drop-off area will continue to use the existing porte-cochere. Access is via High Street with vehicles exiting via the signalised intersection at Hospital Road and High Street. As outlined in Section 3.5, with improved time management of the porte-cochere, the facility will have scope to triple the current throughput capacity, therefore meeting forecast demands.

4.2.3 Ambulance bay

Hospital Road will be the main access point for the ambulance bay which is situated on the southern end of the Project site. The portion of Hospital Road north of Magill Street will be closed to general traffic as part of the IASB works.

It should be noted that works on Hospital Road is subject to a separate planning approval pathway.

The ambulance bay will provide the following parking provisions:

- Four (4) reverse-in spaces for ambulances;
- Two (2) parking spaces for ambulances to reposition and restock after offload; and
- One (1) police parking bay.

A secondary access point will be provided via the new basement level visitor car park for emergency situations where Hospital Road may be blocked. Ambulances using this route will be required to travel via the Botany Street and UNSW Gate 11 intersection to access the ramp to the car park entrance.

4.2.4 Logistics area

The Project includes provisions for a new loading dock located on the north-eastern extent of the site. The entrance to the loading dock will be accessible via Hospital Road. The loading dock has been designed to accommodate the forecast demand.

The facility consists of the following parking bays:

- Two (2) Roll-on Roll-off (RORO) bays;
- Three (3) contractor/ FM bays;
- Three (3) medium rigid vehicle bays; and
- One (1) heavy rigid vehicle bay.
- **Total: 9 parking bays**.

The loading dock will be separated from public traffic and allow for Heavy Rigid Vehicles (HRVs) to enter the facility.

There is no allowance for queuing of delivery vehicles on the road network external to the facility. To mitigate queueing, a pre-booking system will be implemented to manage the movement of traffic entering and exiting the loading dock and loading bays i.e. a managed dock.

Permission for after-hours access to the loading dock will be the responsibility of the dock operations personnel prior to their arrival. Security personnel will allow entry to approved vehicles. A roller shutter door will be used to control dock access outside of typical operating hours.

It should be noted that a RHC logistics strategy is currently under consideration. The intention of the strategy will be to recommend measures and the approach to managing logistics flows across the RHC. The current allocation of logistics parking bays is a conservative forecast assuming a business as usual approach.

4.2.5 Visitor car park

To support an improved visitor experience, a new car park has been proposed at basement level 2 of the building. The car park will service visitors, with provisions for up to 50 parking bays and include additional provisions for non-visitor uses including:

- One (1) funeral/ coroner bay;
- One (1) doctor's bay; and
- Two (2) ambulance patient transfer bays.

Visitors travelling to the car park will be required to turn left near the emergency drop-off loop (via the Botany Street entrance) to access a ramp to the entrance of the car park.

It should be noted that the initial section of the ramp will be shared with the proposed HTH logistics vehicles as it provides a connection to the loading dock access ramp. Beyond this connection point, the ramp is dedicated for car park users.

4.3 Pedestrian infrastructure

The GRUM has outlined key transport and traffic principles as part of the aspirational masterplan which include:

- **A quality urban environment (green and healthy)**. This promotes walkability through the provision of strong pedestrian connections such as a main pedestrian deck and permeable lower ground levels to allow for connectivity and visibility.
- **Ease of navigation and access within the Precinct and for medical priorities (connected)**. This considers separation of key access points to the Campus. This includes pedestrian access to public transport amenities to the north and east and vehicle access to the west and south. Physical separation of vehicles and pedestrian has been proposed via the main pedestrian deck allowing for unimpeded vehicle access below.

In order to align with the key aims of the GRUM and to service the primary pedestrian access points off High Street, Avoca Street and Botany Street, the concept design of the Project has proposed the following pedestrian infrastructure:

- Provision of a pedestrian crossing on Hospital Road just south of Magill Street. The crossing will provide a formal opportunity for pedestrians to cross Hospital Road and minimises interaction with vehicles;
- The new signalised intersection at Botany Street and UNSW Gate 11 will improve accessibility between UNSW and the RHC through the provision of a signalised pedestrian crossing. This signalised intersection has been approved as part of the IASB development;
- The creation of a main pedestrian deck on level 00 which connects the diagonal movement between the corner of High Street and Botany Street with

Avoca Street at St Paul's Street. The deck will separate vehicles and pedestrians, allowing for uninterrupted vehicle traffic beneath the deck;

- Provision of pedestrian walkways connecting Botany Street to the IASB, SCH1/CCCC and the proposed HTH building. It should be noted that the east-west pedestrian walkway will be retained; and
- Provision of a pedestrian colonnade running in a north-south alignment will act as a primary access point for pedestrians travelling between the High Street light rail terminus and the Project's emergency drop off area.

The pedestrian infrastructure proposed for the Project is illustrated in Figure 22.

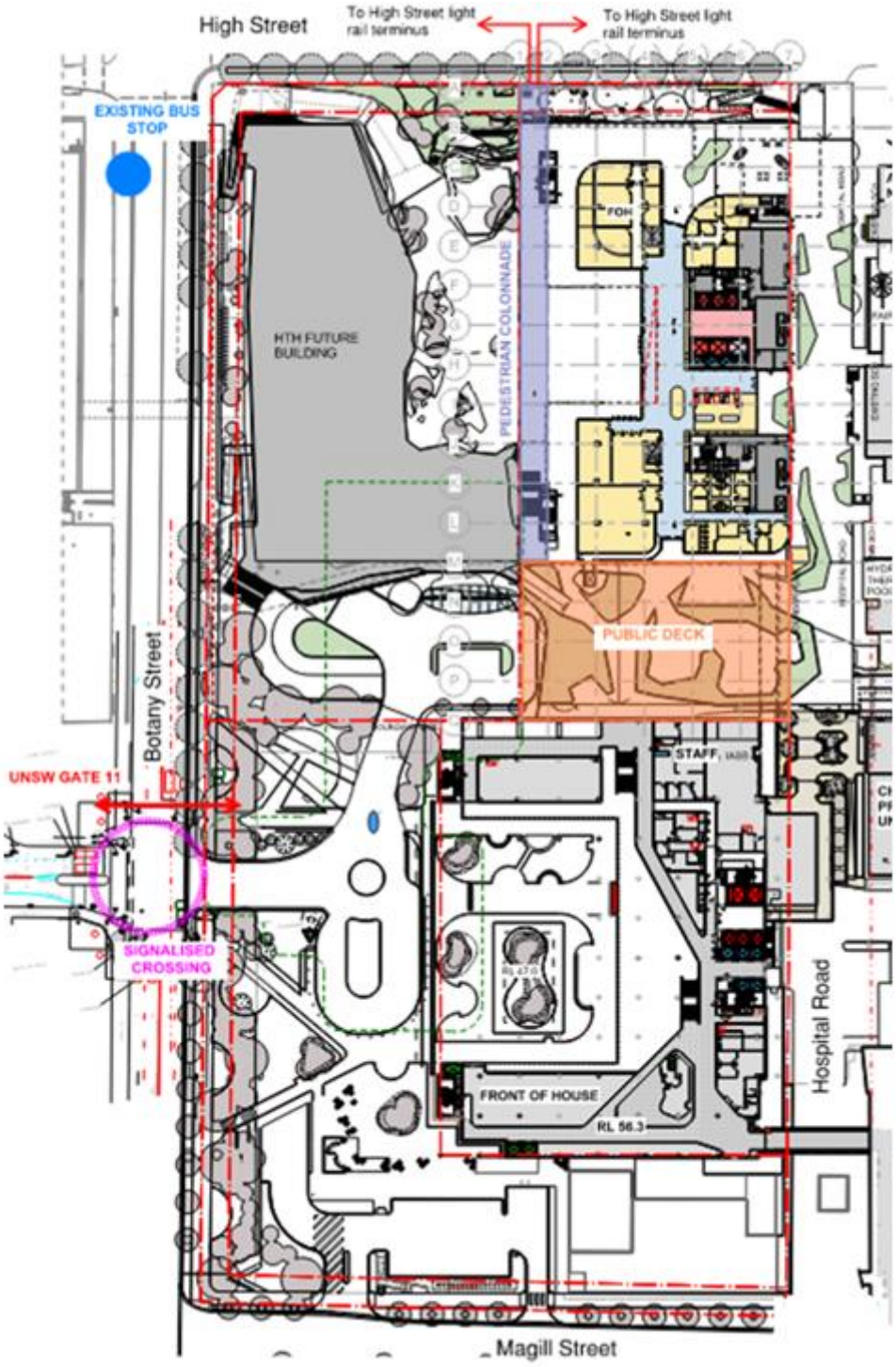

Figure 22: Location of proposed pedestrian infrastructure

4.4 End-of-trip facilities (EoT)

The Project is currently investigating options with regard to cycle parking and shared access to the proposed Campus wide EoT facilities. While the Campus EoT facilities being delivered as part of the IASB Project have latent capacity, any potential EoT provisions delivered as part of the Project will be informed by the recommendations set out in this assessment and in line with agreements made between the Campus partners regarding the overarching Green Travel Plan initiatives to support more sustainable modes of travel to the Randwick Health & Innovation Precinct (RHIP). Currently access to the facility has been proposed via Hospital Road.

Furthermore, to improve cyclist and pedestrian infrastructure at the RHC, a zebra crossing has been proposed on Hospital Road to provide a formal opportunity for cyclists to cross the road to access the facility via Magill Street.

The shared access to the proposed Campus wide EoT facilities includes secure bicycle parking, lockers and showers as detailed below:

- 200 bicycle parking;
- 350 lockers;
- 20 showers; and
- 4 water closets (wc).

4.5 Increase in levels of activity (beds and staff)

The projected increase in bed numbers and staff associated with the project is outlined in Table 11. The key sources and assumptions used to determine the forecasts were as follows:

- The increase in beds for the opening year (2025) and future year (2031) has been provided to Arup; and
- The increase in staff for 2025 and 2031 has been based on staff headcount projections for the SCH1/CCCC and Children's Cancer Institute (CCI) provided to Arup. To account for the overall increase in the RHC staff numbers, the headcount numbers have been factored by 0.86 to obtain Full Time Equivalent (FTE) staff projections to be consistent with the FTE staff projections for the IASB. This factor has been based on actual SCH headcount/ FTE ratio for 2020.

- Table 11: Forecast increase in beds and staff for the Project

Relative increase to existing supply	Forecast 2025	Forecast 2031
Beds	+40	+70
Staff FTE (SCH and KCC)	+224	+320
Staff FTE (CCI)	+19	+124
Total staff FTE	**+243**	**+444**

4.6 Interaction with public transport

The project interacts with key public transport infrastructure within the vicinity of the site, including the CSELR and the bus network.

Key points of interaction include:

- The approved traffic signal intersection on Botany Street and UNSW Gate 11 will provide a safe pedestrian crossing point. This will provide an improved link between the education and health facilities as well as facilitating access to the light rail stops;
- Vehicles accessing the emergency drop-off for the Project will use Botany Street via a new signalised intersection approved as part of the IASB development. Buses currently operate along Botany Street. The provision of a signalised intersection will minimise the potential for high levels of bus delays;
- Vehicles accessing the existing public drop off at the SCH porte-cochere will travel via High Street. High Street is a key CSELR route, however interaction with the light rail is minimal with access to the porte-cochere being provided by a one-way traffic lane running south of the light rail tracks. Vehicles exiting will be controlled by a signalised intersection at High Street and Hospital Road; and
- There will be minimal use of High Street for vehicle access to Project site. Vehicles will not be permitted to turn right into High Street from Botany Street as to minimise impacts to the light rail tracks.

5 Demand Summary

In order to accommodate the projected increase in levels of activity in the future, the Project has developed the key outcomes outlined below. This has been developed to align with the broader strategic context of the Precinct and considers the current strategy of the IASB.

- Improved visitor experience through maintaining existing visitor travel behaviours and provision of additional visitor parking products; and
- Encourage shift towards more sustainable modes of transport where possible. This will mean a focus towards optimising existing parking infrastructure as opposed to providing additional staff parking.

These key outcomes formed the basis for the development of the Project demand. Three (3) scenarios were investigated in order to obtain a wholistic understanding of the varying impacts on staff and associated traffic generation with the provision of additional parking in the main car park. These scenarios are outlined below:

- **Scenario 1** – No additional mode shift (from 43.6%) as proposed by the IASB in the 2027 project scenario. This scenario considers the potential for staff parking demand to be accommodated within the main car park;
- **Scenario 2** – Improved efficiency in the main car park. This scenario only provides an additional 65 parking bays for visitor/outpatient and staff based on improvements in efficiency in the existing main car park; and
- **Scenario 3** – No additional staff parking. Only visitor/ outpatient demand is accommodated.

It should be noted that Scenario 2 and 3 makes use of the existing main car park provisions (i.e. no additional parking spaces) with Scenario 1 requiring additional efficiency gains to increase parking capacity.

5.1 Visitor/ outpatient parking demand

The projected increase in bed numbers for the year 2025 and 2031 is outlined in Table 12 based on forecasted activity provided to Arup.

Currently, visitors and outpatients account for one third of the available parking on the RHC with staff consisting of the remaining two-thirds. Applying a parking space to bed ratio of 2.6:1 the visitor/ outpatient parking demand for the Project was derived as follows:

- Additional 34 parking spaces by 2025; and
- Additional 60 parking spaces by 2031.

Table 12: Forecast increase in beds for the Project

Relative increase compared to existing supply	Forecast 2025	Forecast 2031
Beds	+40	+70

5.2 Proposed parking supply

As outlined in 4.2.5, the provision of a new visitor car park will result in up to 50 additional parking bays.

The Project seeks to optimise the operation of existing parking assets and as such, the existing RHC main car park will be investigated for potential optimisation in efficiency which includes implementation of dynamic wayfinding systems and car stackers. Currently parking behaviours indicate that the average occupancy of the car park during the peak period is 91% on a weekday. A review of literature indicates that a dynamic wayfinding system has the potential to increase operational capacity of a multi-storey car park to the vicinity of 95%.

A parking audit undertaken by Arup in 2017 has indicated that there are approximately 1,600 parking bays within the main car park. Therefore, an increase in efficiency of 4%, could potentially provide an additional capacity of 65 parking spaces during peak times.

Furthermore, the Project is currently investigating additional efficiency gains to increase parking capacity to offset the demand in staff parking (Scenario 1). For the Project, this means an additional 95 parking bays will be required in the main car park to offset staff parking demand and to account for additional visitor/outpatient parking demand.

5.3 Staff parking demand

Based on an existing staff FTE of 6,273 for the RHC as outlined in the IASB Transport Assessment report and staff forecasts for the Project provided to Arup for the year 2031, the forecasted staff on-site during the peak and associated parking demand was derived as shown in Table 13.

The key assumptions used to determine the staff parking demands were as follows:

- The mode shift required for 2031 will be compared against the IASB 2027 staff drive mode share of 43.6% which accounts for the approved 8% staff drive mode shift from the IASB project;
- Proportion of SCH and KCC staff onsite during the peak is 57%, this assumption was sourced from the IASB Transport Assessment to maintain consistency;
- Proportion of CCI staff onsite during the peak is 70% was provided to Arup;
- No change in visitor/ outpatient travel behaviour. Therefore, 60 bays would be required to accommodate visitor/ outpatient demand as outlined in Section 5.1;
- Scenario 1 would require 89 parking bays in the main car park to offset staff parking demands;
- Forecast 2031 FTE staff numbers provided to Arup indicates a likely relative increase of 444 staff relative to existing staff numbers (as previously shown in 4.5).

Therefore, this would imply a reduction in staff driver mode share across the campus of a range of 0-2.2% is required by 2031 to offset the increase in staff parking demand. The staff driver mode shift required will be driven by the three (3) scenarios outlined below.

For the purposes of this assessment, the most conservative case i.e. Scenario 1 will be adopted as it represents the scenario which generates the greatest amount of staff trips and therefore impact to the road network.

Table 13: Staff parking demand and drive mode shift calculation

	Existing	**2031**		
		Scenario 1 (No additional mode shift)	**Scenario 2 (Improvements in efficiency in main car park only)**	**Scenario 3 (No additional staff parking)**
Staff FTE on-site (weekday)	6,273	7,280	7,280	7,280
Proportion of staff (IASB, SCH and KCC) on Campus during peak period	57%	57%	57%	57%
Proportion of staff (CCI) on Campus during peak period	70%	70%	70%	70%
Staff onsite (peak)	3,576	4,166	4,166	4,166
SCH1 visitor car park	-	up to 50	up to 50	up to 50
Additional parking in main car park		99	65	1**0**
Staff parking demand	1,859	1,814*	1,780	1,725
Staff driver mode share	52%	43.6%	42.7%	41.4%
Difference in staff driver mode share	-	0%	0.9%	2.2%

* Baseline staff parking demand has been based on the IASB 2027 staff parking demand as both demands should remain the same considering no additional mode shift.

6 Transport Strategy

As discussed in Section 5, a staff travel mode shift of 0-2.2% is required to offset the forecast in parking demand. The following section will investigate the strategy to achieve this required mode shift.

6.1 Public transport

The CSELR will continue to deliver reliable travel improvements for South East Sydney patrons travelling between the CBD and the RHC through the provision of frequent services and the removal of previous challenges faced when interchanging at Central.

A review of the CSELR Environmental Impact Statement (EIS) and CSELR Preferred Infrastructure report has shown the line loading for the light rail in the year 2021. The CBD bound and Randwick bound line loading for the 2021 morning inbound and outbound peak scenario is shown in Figure 23 and Figure 24 respectively.

The report has outlined upon opening the operational light rail vehicle (LRV) has a capacity of up to 6,000 passengers per hour. This capacity combined with the fact that the EIS forecasts a capacity consumed of approximately 80% for Randwick bound services (majority alighting at the UNSW High Street stop), indicates that there is sufficient forecast capacity to accept any increased patronage from staff and visitors from the RHC.

This is further supported by the fact the CSELR proposal includes the capability to increase the frequency of LRVs to an operational capacity of up to 9,000 passengers per hour if it is identified that there is sufficient demand for this level of service.

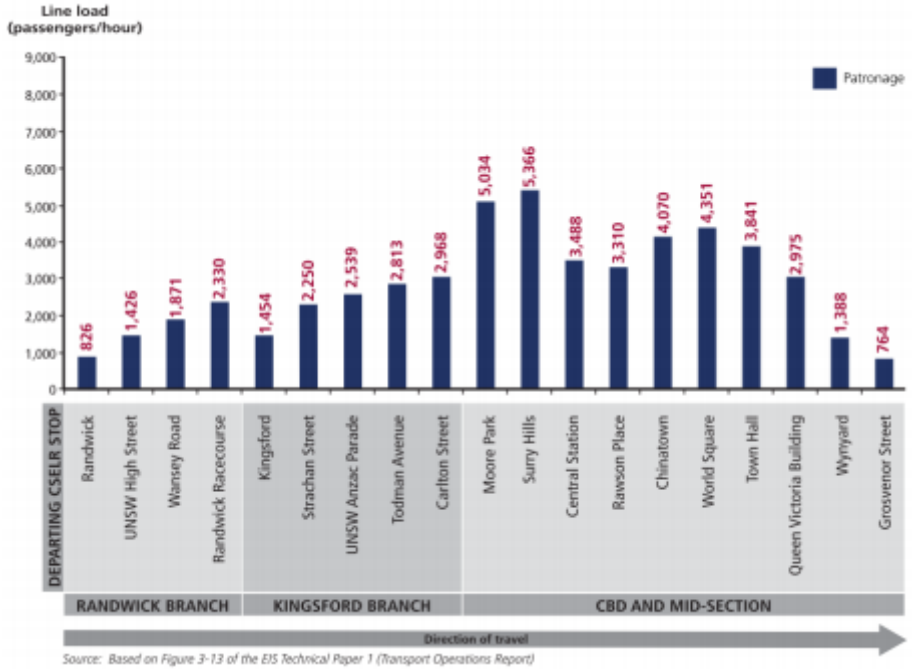

Figure 23: 2021 inbound morning peak CSELR line load (Source: CSELR Preferred Infrastructure report, March 2014)

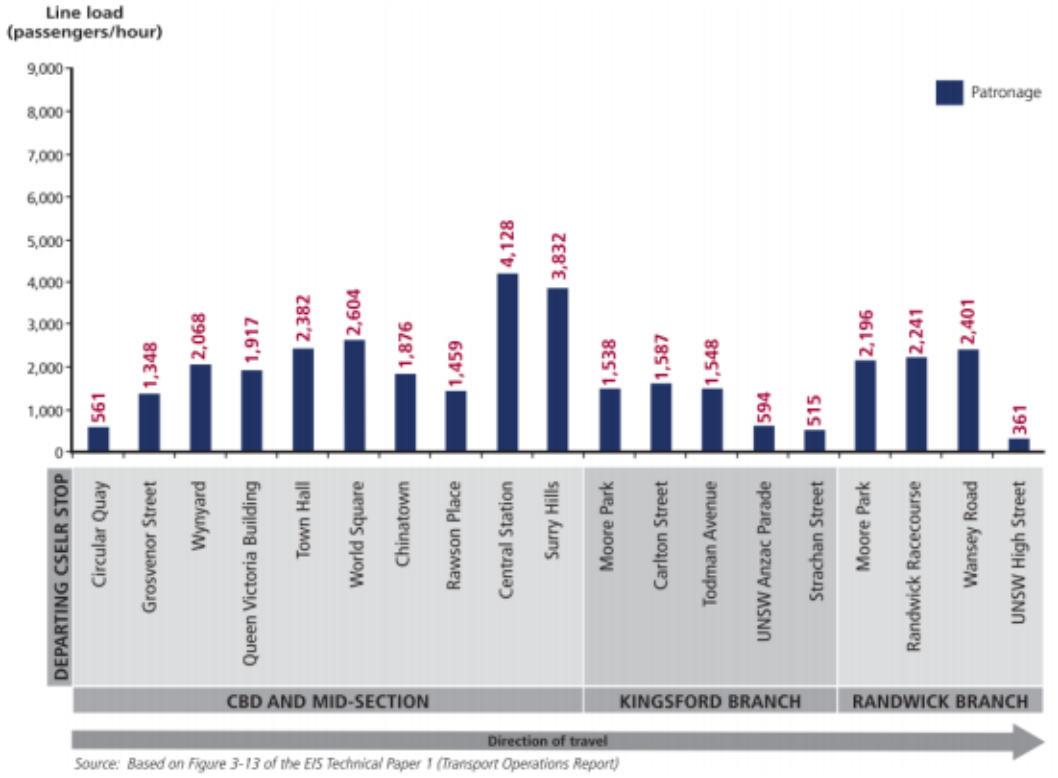

Figure 24: 2021 outbound morning peak CSELR line load (Source: CSELR Preferred Infrastructure report, March 2014)

The combined light rail and bus network deliver city bound morning peak capacity increases of more than 10 per cent from Kingsford and 30 per cent from Randwick, and a doubling of morning peak capacity from the CBD to UNSW and the Precinct.

The design of the Project leverages off the position of the High Street terminus. A ground level pedestrian colonnade offers a direct connection between the main entrance of the project to the pedestrian footpath on High Street which provides access to the terminus.

As discussed in Section 2, a number of key transport infrastructure is currently under investigation as part of the South East Sydney Transport Strategy. These initiatives are illustrated in Figure 25.

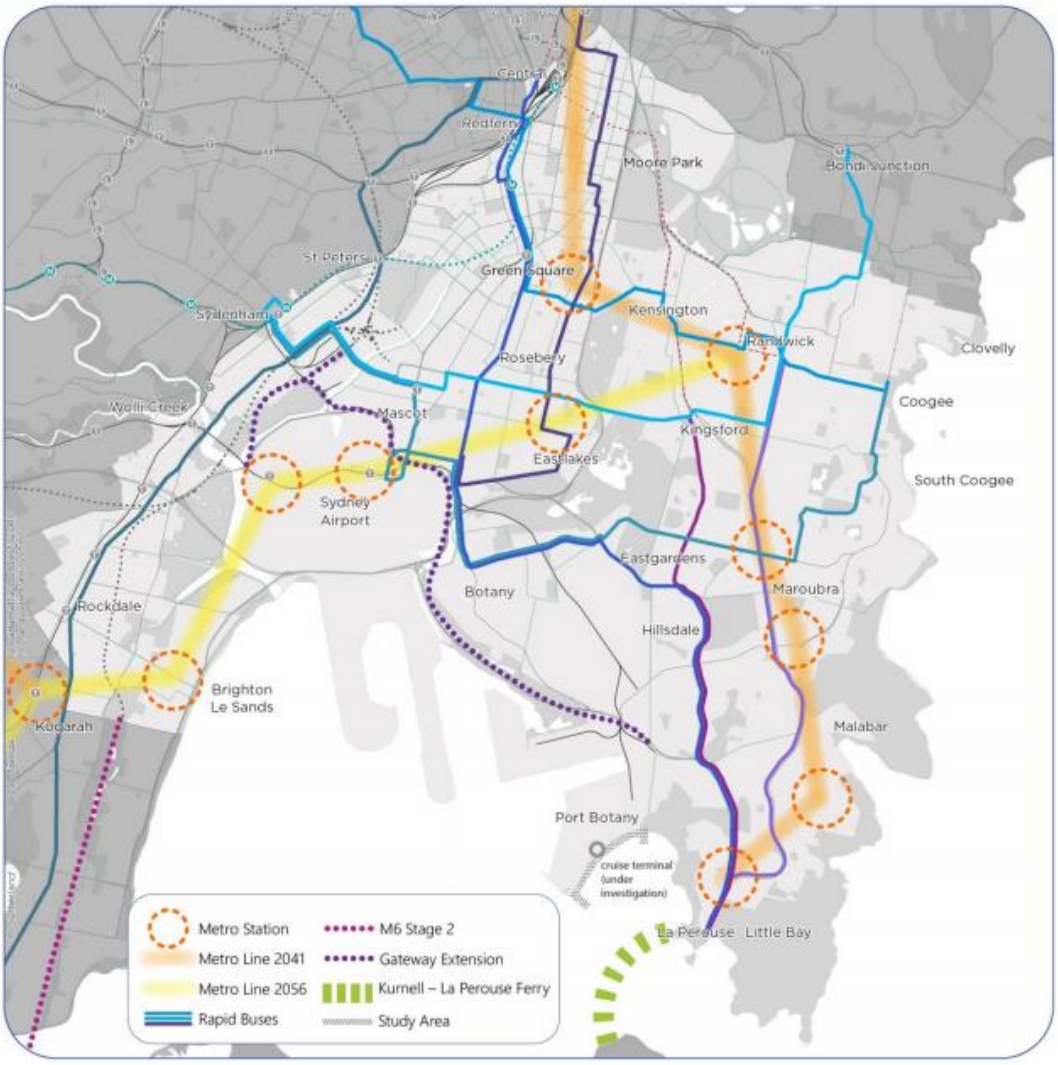

Figure 25: Preferred option for the South East Sydney Transport Strategy

The Strategy has outlined prioritisation of bus rapid routes between strategic locations such as Bondi Junction and Central to the north, Sydney to the west, Coogee to the west and La Perouse to the south. The provision of these routes will strengthen the network of centres across South East Sydney and contribute to the

increased accessibility across strategic centres and other activity nodes for both residents and workers.

The improvements in bus services will particularly have an impact on staff currently residing to the south of the RHC as current staff postcode data indicates that approximately 30% of staff live in this area. This includes suburbs such as Matraville, Pagewood and Botany. The RHC travel census indicated that only 15% of workers who reside in the eastern suburbs commute to work using public transport. This is notably lower when compared to the average RHC staff public transport use of 25%.

As a result, it is reasonable to assume that the provision of improved public transport services can reduce reliance on private vehicles and in turn improve the uptake of public transport usage.

6.2 Active transport

As outlined in Section 3.10 and 3.11, the current active transport mode share for staff is 14% (11% walking and 3% cycling). As walking has shown a drop of 3% when compared to travel behaviours exhibited in 2017, it is likely the walking mode share is already saturated and unlikely to increase significantly in the future and so, no mode share change has been proposed.

However, the cycling catchment analysis indicates that 20% of total staff reside in a 20 minute cycle of the RHC which highlights an opportunity to further increase the mode share.

This aligns with the investigation of shared access to the proposed Campus wide EoT facilities as part of the shift towards more sustainable modes of travel. This facility includes provisions for bicycle parking, showers and lockers which has been identified as an ongoing issue for cyclists to date.

Furthermore, Randwick City Council has developed a network of priority bike routes that are to be implemented as part of Randwick's 20-year City Plan. The eleven routes include seven east-west links that help to improve access towards the coast and west towards Green Square, and four north-routes that allow cyclists to safely travel towards the city. The connected cycle network being proposed by Randwick City Council will result in strong access improvements for casual cyclists.

Figure 26: Proposed cycle network (Source, Randwick City Council, 2017)

Figure 27 shows the active transport 20 minute isochrones overlayed on top of the staff post code density. The analysis also removed road links that was not deemed suitable for casual cyclists (i.e. roads with a steep gradient had time penalties imposed to limit its attractiveness and all arterial roads that did not have segregated cycle lane were removed). An average cycle speed of 15km/h was

assumed, and delays associated with traffic signals and crossings were considered. It should be noted that the emergence of micro mobility devices such as e-bikes and electric scooters can have the potential to increase cycling catchment for the RHC.

The light purple areas indicate the areas that sit within the 20 minute cycle catchment based on the current road and cycle network. The darker purple areas show the additional staff catchment that can be accessed with Randwick City Council's proposed cycle network. Analysis suggests that this will increase the staff living within the 20 minute active transport catchment to 26%. As walking mode shares are likely saturated at 11%, this analysis indicates that there is an additional 12% of staff living within a 20 minute cycle to the RHC that currently use other modes.

A mode shift from staff private vehicle use to cycling is feasible for the Project given the improvement in the surrounding cycle network and potential for a new shared access to the proposed Campus wide EoT facilities

Currently 200 bicycle parking spaces are being investigated as part of the proposed shared access Campus wide EoT facilities. Applying the cycling mode shift targets proposed for both the IASB and the Project, a total of approximately 170 cyclists accessing the RHC during the peak hour on a weekday is forecasted. Therefore, the proposed shared access Campus wide Eot facilities have adequate capacity to accommodate the additional mode shift.

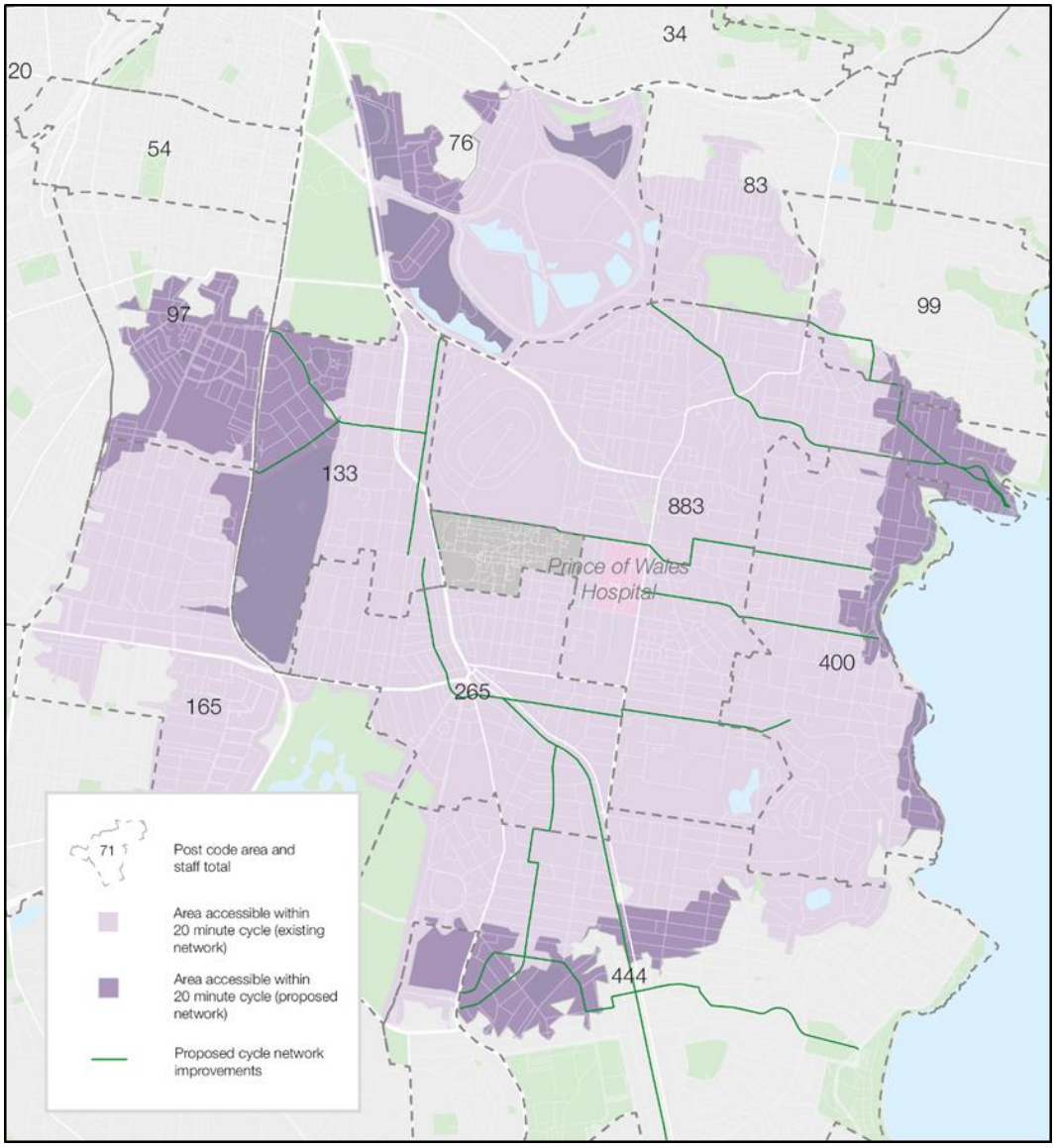

Figure 27: RHC staff catchment within a 20 minute cycle commute to work

6.3 Car-pooling

The staff travel census indicates that currently 4% of staff commute to work as a car passenger.

As stated in Section 3.1, out of the 82% of the workforce who have access to a car, 67% choose to drive with 7% carrying a passenger. This suggests significant potential for organised ride-sharing to decrease single occupancy car journeys. However, noting potential in the future to further investigate the car-pooling mode share if required.

6.4 Car park optimisation

As outlined in Section 3.7.2, the existing RHC car park has displayed an average peak occupancy rate of 91% for the weekday. Improving the efficiency of the car park through measures such as implementing a dynamic wayfinding system has the potential to further increase the occupancy rate of the car park to 95%, equating to an increased capacity of 65 parking bays based on approximately 1,600 parking bays available at the car park.

6.5 Summary of future mode shift

In consideration of the justification provided in the sections above, the future mode shift which could offset the demand for additional parking for the Project is outlined in Table 14.

Table 14: Potential future mode share shift

Mode	2027 Staff Mode Share	Potential Future Staff Mode Share
Driver	43.6%	41.4%
Car (Passenger)	8%	8%
Public Transport	29%	29.2%
Walking	14%	14%
Other (incl. cycling)	5.4%	7.4%

A summary of the justification for the future mode share is provided below:

- Car (driver) – a 2.2% reduction in driver mode share and improvements in the efficiency of the existing multi-storey car park has the potential to offset the additional parking required by the Project.
- Car (passenger) – No change to existing mode share behaviours for car-pooling.
- Public Transport – The opening of the CSELR in 2019 has continued to provide reliable and frequent services between the CBD, UNSW and the Precinct. Further investment opportunities have been identified as part of the South East Sydney Transport Strategy which has outlined potential new bus rapid transport routes and future Metro alignments and associated stops. These transport improvements will provide staff with increased accessibility to the RHC. In particular, those currently residing to the south of the RHC as survey results indicate currently only 15% use public transport which is considerably lower when compared to the RHC average of 25%. Therefore, there is a potential to provide up to a 2% mode shift to public transport.
- Walking – Given the saturation of staff who live proximate to the RHC and already walk, no mode shift for this mode has been assumed.
- Cycling – Existing staff locations in combination with a 20 minute cycling catchment highlight a potential opportunity to increase the mode share a further 2%. This can be supported by the provision of proposed shared access

Campus wide EoT facilities which are currently under investigation and improvements in the cycling network as part of Randwick City Council's 20-year City Plan.

6.6 Green Travel Plan (GTP)

A GTP is a package of measures put in place to encourage more sustainable travel for patrons and staff travelling to and from the RHC. The RHC GTP was developed by the Project team in July 2020 to support the development of the IASB. This document outlined a series of measures to be implemented prior to the opening of the IASB in order to drive a change in driver mode share across the RHC prior to the opening of the IASB in 2022. Some of the initiatives of the RHC GTP include:

- Undertaking a baseline travel survey and subsequent annual surveys to measure the change in travel behaviours;
- Improving wayfinding to key public transport locations;
- Hosting events such as 'Ride2Work' and 'Biketober' days;
- Undertaking audits of existing infrastructure including pedestrian access; and
- Stabling and maintaining a 'Go Randwick' website, which will act as the hub for all GTP material and initiatives.

Further details regarding the RHC GTP is provided in **Appendix B**.

7 Traffic Impact Assessment

7.1 Traffic generation

The key objectives of the Project include improving visitor experience and optimising existing parking infrastructure. Therefore, the project proposes the following:

- A new emergency drop-off facility accessed via the new road off Botany Street;
- A new car park which provides up to 50 visitor parking bays;
- Application of a mode shift campaign to encourage use of more sustainable transport modes; and
- No additional staff carparking, except for improvements to the efficiency of the existing multi-storey car park using dynamic wayfinding to achieve an average peak occupancy of 95%. This will equate to an additional capacity of 65 parking based on approximately 1,600 bays.

The following section details the trip generation associated with the Project. A summary of the key findings is as follows:

- Distribution of the 64 peak hour trips (two-way) on Botany Street has highlighted that the additional trips represent a 6 – 7% proportion of the existing northbound and southbound traffic on Botany Street as shown in Table 20 below, and so it is likely the project will have a minimal impact on the wider road network.
- This is further supported by the assessment undertaken for the IASB which outlined the Botany Street and UNSW Gate 11 intersection had the capacity to accommodate an additional 360 two-way trips during the peak hour for the Project and the proposed HTH. As the peak hour trips is below this threshold, the intersection is anticipated to operate within practical capacity and therefore no further analysis has been undertaken for this assessment.

7.1.1 Visitor/ outpatient

The visitor/ outpatient parking demand has been determined as 60 bays by 2031 (refer to Section 5.1). Based on a 4.3 turnover rate per day for visitor parking bays (approximate turnover rate derived from the RHC travel census), the visitor/outpatient trip generation per day was derived. The daily trip generation was factored at 7% to determine the peak hour two-way trips. This was based on benchmarking of other health campuses in Sydney to determine a typical visitor/ outpatient daily profile. As a result, a summary of visitor vehicle trips to the new car park is as follows:

- 516 daily trips (two-way); and

- 36 peak hour trips (two-way). From this, 30 peak hour trips (two-way) are attributed to the visitor car park with 6 peak hour trips (two-way) accessing the main car park.

Assuming a vehicle occupancy of 1.20 and that the visitor mode share presented in the RHC travel census is maintained, the trips generated by the vehicle modes (driver, passenger and taxi/uber) were calculated and are shown in Table 15.

Table 15: Forecasted visitor/ outpatient daily and peak hour trips

Mode	Mode share	Daily trips (people)	Daily trips (two-way)	Peak hour trips (two-way)
Car (Driver)	59%	310	516	36
Car (Passenger)	15%	79	131	9
Public Transport	17%	-	-	-
Walking	4%	-	-	-
Taxi/ Uber	4%	21	35	2
Community/ Health Transport	1%	-	-	-
Total	**100%**	**525**	**682**	**47**

7.1.2 Staff

The vehicle trip generation associated with staff will be limited by the availability of parking on the RHC. Scenario 1 considers the potential for staff parking demand is accommodated for the Project, equating to 149 bays. This encompasses the new visitor car park (up to 50 bays) and the additional capacity afforded by improvements in the existing car park (95 bays).

Assuming the current travel behaviour of visitors/ outpatients is maintained i.e. 60 parking bays will be allocated to visitors/ outpatient demand. An additional 89 parking bays will be required to offset staff parking demand.

Based on a 1.6 turnover rate per day for staff parking bays (approximate turnover rate derived from the RHC travel census), the daily trip generation was derived as shown in Table 16. The daily trip generation was then factored by 30.3%, which reflect the peak staff arrival and departures profile provided in the RHC travel census to determine the peak hour trips.

Table 16: Staff daily and peak hour trips

Daily trips (two-way)	Peak hour trips (two-way)
284	86

7.1.3 SCH1/ CCCC Emergency Department

The forecasted number of SCH ambulances accessing Hospital Road was developed based on existing and forecasted emergency department (ED) yearly

patient presentations. These presentations included mode of arrival and daily arrival profiles.

The proportion of ambulance vehicle types (state, retrieval including NETS and internal) were derived from existing data and was assumed to remain unchanged in the future years. To account for seasonal variability, an additional 20% increase has been applied. This is a conservative assumption as data from the Bureau of Health Information has indicated minimal fluctuation (0.96, with 1 being no fluctuation) between the quarterly volumes of emergency presentations as shown in Table 17.

Table 17: Quarterly emergency presentations for SCH Randwick (2018/19)

	Oct-Dec 2018	**Jan-Mar 2019**	**Apr-June 2019**	**Jul-Sept 2019**	**Peak seasonality (max/avg)**
Emergency presentations	8,873	8,874	9,521	9,440	1.04

Applying the hourly arrival profile from forecasted ED presentations for 2031, the daily and peak trip generation was determined as outlined in Table 18. The number of ED parking bays has been determined using the demand calculated in the section above.

Table 18: SCH1/ CCCC ED daily and peak hour trips

Daily trips (two-way)	**Peak hour trips (two-way)**
360	14

7.1.4 SCH1/ CCCC logistics

Arup undertook traffic counts of the existing RHC loading docks over a period of three days in January 2019 to determine estimated future vehicle movements for the Project. The analysis indicated that the development is anticipated to generate 178 daily trips (two-way) and 20 peak hour trips (two-way). This has been based on the assumption that the project will use a loading dock management system.

7.1.5 UNSW HTH

The forecasted traffic generation from the proposed HTH development is 130 daily trips (two-way) and 20 trips peak hour trips (two-way). This is based on the projections provided in the UNSW Health Translation Hub Traffic Impact Assessment (JMT Consulting, April 2021).

7.1.6 IASB drop-off

The forecasted traffic generation for the IASB development is 1,720 daily trips (two-way) and 160 peak hour trips (two-way). This information has been sourced from calculations done for the IASB transport assessment with extrapolation to 2031 to be consistent with the Project's design year.

7.1.7 Combined trip generation

The total trips generated by the project in the future year 2031 is summarised in Table 19. This considers Scenario 1 which accommodates staff and visitor/ outpatient parking demand in the main car park. The assessment also included the trips generated by the IASB and the proposed HTH development to determine the combined traffic impact.

Table 19: Combined daily and peak hour trip generation for the Project, IASB and HTH

Traffic Source	2031 Daily Trips (two-way)	2031 Peak Hour Trips (two-way)
Visitor/ outpatient (visitor car park)	464	30
Visitor/ outpatient (existing main car park)	52	6
Visitor/ outpatient (general drop-off at porte-cochere)	166	11
Staff	284	86
SCH1/CCCC ED	360	14
SCH1/CCCC logistics	178	20
Total SCH1/CCCC	**1,504**	**167**
UNSW HTH	130	20
IASB drop-off	1,720*	160
Total (SCH1/CCCC, IASB and HTH)	**3,354**	**347**

*The majority of the IASB volumes consist of a redistribution of trips from the Easy Street drop off.

By 2031, the project is expected to generate 1,504 daily trips and 167 peak hour trips (two-way). As the assessment accounted for the cumulative impact of the IASB and the proposed HTH developments, the combined trip generation was considered. This corresponds to 3,354 daily trips and 347 trips during the peak hour.

It should be noted that the IASB development outlined the removal of 92 dwellings as part of the works. This removal corresponded to an approximate decrease of 828 vehicle trips per day (i.e. 9 daily trips x 92 dwellings) from the surrounding road network.

Furthermore, the IASB assessment considered the impact of a mixed-use development south of the site referred as Newmarket Green, with the peak hour volumes factored into the SIDRA intersection analysis.

7.2 Network impacts

Given the new signalised intersection at Botany Street and UNSW Gate 11 will act as the main vehicle access for the Project, the IASB and the proposed HTH developments, an assessment of the intersection is required to understand potential localised access impacts. Assessment of the wider network impacts was

based on a comparison of the Project peak hour trip generation against the total peak hour throughput on Botany Street.

Trips generated by Project staff, the emergency department and the HTH loading dock were included in this assessment as vehicle access will be via the Botany Street and UNSW Gate 11 intersection. The IASB has been excluded from this assessment as the development has been approved as thus represents the baseline traffic conditions. As a result, the 2031 trip generation associated with the Project has been determined as 64 peak hour trips as outlined below:

- Visitor/ outpatient peak hour (two-way): 30 trips;
- Emergency department peak hour (two-way): 14 trips; and
- UNSW HTH peak hour (two-way): 20 trips.
- **Total: 64 peak hour trips (two-way)**

As outlined in Section 3.3, traffic surveys undertaken in 2019 has shown Botany Street with a midblock two-way volume of 1,013 vehicles (476 vehicles northbound and 537 vehicles southbound) during the morning peak. Distribution of the 64 peak hour trips (two-way) has highlighted that the additional trips represent a 6 – 7% proportion of the existing northbound and southbound traffic on Botany Street as shown in Table 20 and so it is likely the project will have a minimal impact on the wider road network.

Table 20: Traffic distribution of Project traffic

Road	Direction	Existing traffic (2019) – AM peak (veh/ hour)	Trip generation associated with the Project	Proportion of existing 2019 traffic
Botany Street	Northbound	476	+32	6.7%
	Southbound	537	+32	6.0%

The transport assessment undertaken for the IASB has made an allowance for approximately 360 two-way additional trips during the peak hour to account for future expansion north of the IASB (i.e. HTH Loading Dock and the Project). As this allowance is higher than the current forecasted peak hour movements (64 peak hour trips), the intersection is anticipated to operate within practical capacity with minimal impact to local access and therefore no further intersection analysis has been undertaken for this assessment.

8 Preliminary Construction Traffic and Pedestrian Management Plan

Prior to construction, a Construction Traffic Pedestrian Management Plan (CTPMP) will be prepared. The purpose of the CTPMP is to assess the proposed access and operation of construction traffic associated with the proposed development with respect to safety and capacity.

The Contractor will be responsible for preparing the CTPMP, ensuring the following are addressed:

- Proposed construction vehicle routes;
- Indicative construction programme;
- Expected construction vehicle types and volumes;
- On-site parking arrangement and site access during construction;
- Safety measures to minimise impacts to pedestrians and cyclists.

The Contractor will also be responsible for monitoring and coordinating all vehicles entering and exiting the Project.

A preliminary CTMP has been prepared alongside the Preliminary Construction Management Plan developed by PwC and follows the following framework:

- Description of proposed works
- Impact of proposed measures
- Effects on existing and future developments
- Measures to ameliorate impacts
- Public transport services affected
- Public consultation

9 Conclusion

Arup has undertaken a transport assessment which addresses the SEARs associated with the SSDA No. 10831778 issued on the 2 December 2020. The key findings of the assessment include:

- Review of existing transport behaviours highlighted that at least 38% of staff live within the Eastern Suburbs which is the region immediately surrounding the site. The majority of those accessing the RHC use private vehicles followed by public transport, which when benchmarked against other health campuses is comparatively higher.
- There are approximately 2,300 on-campus car parking bays available to staff and the public. From this, approximately 1,600 parking bays are available within the main car park. Parking demand peaks during the middle of the day (11am to 2pm), with occupancy at the RHC main car park reaching a peak average of 91% on a weekday. This demonstrates the car park is effectively at capacity, however sufficient parking is available outside of this peak period.
- It is expected that the number of beds for the Project will increase by 40 beds to 2025 and 70 beds to 2031. Assuming no changes to visitor travel behaviours, this would equate to 34 parking spaces needed by 2025 and 60 parking spaces by 2031.
- A mode share shift of up to 2.2% from car (driver) will be required to account for the demand in additional parking bays. The Transport Strategy seeks to achieve this through various improvements such as bus services (i.e. rapid bus routes as part of the South East Sydney Strategy), the promotion of existing transport infrastructure including the CSELR, Campus GTP initiatives and shared access to the proposed Campus wide EoT facilities.
- The main entry can be accessed via a new signalised intersection at Botany Street and UNSW Gate 11 as part of the approved IASB development.
- A designated emergency drop-off and pick-up area will be provided at the entrance to the emergency department in the form of a loop road arrangement. Patrons accessing the general drop-off area will continue to use the existing porte-cochere. Access is via High Street with vehicles exiting via the signalised intersection at Hospital Road and High Street.
- Hospital Road will be the main access point for the ambulance bay. A secondary access point will be provided via the new basement level visitor car park. Noting this will only be used for emergency situations where Hospital Road is closed.
- A new loading dock will be located on the north-eastern extent of the site. The entrance to the loading dock will be accessible via Hospital Road.
- A new car park has been proposed at basement level 2 of the building. Visitors travelling to the car park will be required to turn left near the emergency drop-off loop (via the Botany Street entrance) to access a ramp to the entrance of the car park.

- The Project includes provisions for pedestrians which include a pedestrian deck on level 00, pedestrian walkways from Botany Street connecting into a the IASB, SCH1/CCCC Project and proposed HTH building. Provision of a pedestrian colonnade enables north-south connectivity through the RCR site. A pedestrian crossing on Hospital Road being delivered as part of the IASB Project will also provide a connection between Magill Street, the RCR site and existing RHC.
- The Project is currently investigating options with regard to cycle parking and shared access to the proposed Campus wide EoT facilities. While the Campus EoT facilities being delivered as part of the IASB Project have latent capacity, any potential EoT provisions delivered as part of the SCH1/CCCC Project will be informed by the recommendations set out in this assessment and in line with agreements made between the Campus partners regarding the overarching Green Travel Plan initiatives to support more sustainable modes of travel to the RHIP.
- Assessment of the Botany Street and UNSW Gate 11 intersection indicated that it is likely the project will have a minimal impact on the road network as peak hour trips generated by the project represent 6 – 7% proportion of the existing northbound and southbound traffic on Botany Street.
- The Project trip generation is also below the traffic generation allowed for in the IASB transport assessment which allowed for an additional 360 two-way at the intersection for future expansion. As a result, the intersection is anticipated to operate within practical capacity and therefore no further analysis has been undertaken for this assessment.

Appendix A – Construction Traffic Pedestrian Management Plan (CTPMP)

Health Infrastructure

Sydney Children's Hospital Stage 1/ Children's Comprehensive Cancer Centre

Preliminary Construction Traffic and Pedestrian Management Plan

Issue | 7 May 2021

Job number 257913-00

Arup Pty Ltd ABN 18 000 966 165

Arup
Level 5
151 Clarence Street
Sydney NSW 2000
Australia
www.arup.com

ARUP

Contents

Construction Traffic Management

This section provides a preliminary Construction Traffic and Pedestrian Management Plan (CTPMP) for the construction of Sydney Children's Hospital Stage 1 and Children's Comprehensive Cancer Centre (the Project). The purpose of the CTPMP is to assess the proposed access and operation of construction traffic associated with the proposed development with respect to safety and capacity. The CTPMP is to be submitted in support of the state significant development application in conjunction with the Preliminary Construction Management Plan (PCMP).

The Contractor (once appointed) will prepare a detailed CTPMP with Traffic Control Plans prior to the commencement of works, detailing specific methods of safely managing construction vehicle traffic within the surrounding area and any required road closures for mobile crane days, if required. The Contractor will also be responsible for monitoring and coordinating all vehicles entering and existing the Project site.

1 Overview of construction planning

1.1 Construction and delivery programme

Construction activities are estimated to occur over a three year period, commencing in early 2022. As the project is in its preliminary stages, the following timeframes are approximate and may vary once a contractor is appointed.

1.2 Hours of work

As outlined in the PCMP provided to Arup, the hours of work will be as follows:

- Monday to Friday: 7:00am – 6:00pm;
- Saturday: 8:00am – 5:00pm; and
- Sunday and Public Holiday: No works.

Works outside of standards hours may be required during construction, pending design finalisation and approval of the final construction staging plan from the relevant authorities. The construction activities proposed for out of hours work include but are not limited to:

- Service reticulation works;
- Service switch overs (including private services);
- Large deliveries;
- Road restoration works; and
- Any other works deemed necessary for safety reasons or as directed by the relevant authorities.

1.3 Construction vehicles

The vehicles expected to access the site during construction are outlined below. All heavy goods are likely to be delivered outside of peak traffic hours.

- Articulated/ rigid vehicles for delivery of plant and equipment;
- Heavy and medium rigid trucks for construction material delivery;
- Heavy rigid tankers for fuel delivery;
- Compacting and excavation machinery;
- Rigid trucks for removal of excavated material;
- Mobile/ fixed crane/s;
- Piling rig/s;
- Concrete delivery truck/s; and
- Light vehicles.

1.4 Construction routes

To keep construction related traffic to a minimum on the surrounding roads, it is necessary to define routes for construction traffic to and from the work site. These access routes are to predominantly utilise arterial roads and minimise the use of local roads including Magill Street, Arthur Street and Clara Street where possible. Construction traffic through the Randwick Junction Town Centre (i.e. Belmore Road) is to also be avoided. The key arterial roads surrounding the site are Avoca Street, Anzac Parade and Alison Road.

Access to the site will primarily be via Botany Street. The RHC currently has provisions for two construction access gates along Botany Street as part of the ongoing constructions works onsite. Access via Hospital Road is to be coordinated to minimise impact on Hospital operations.

Proposed vehicle entry and exit routes to the site are displayed in Figure 1 and Figure 2 respectively. Access routes shown via a dotted line require access via High Street as well as the local roads of Arthur Street and Clara Street. These routes are not to be relied upon as a primary access route. These access routes will be confirmed during ongoing development of the CTPMP and are subject to confirmation with the relevant authorities.

The Contractor will need to seek approval from the relevant authorities to ensure access to the site is coordinated with other construction occurring onsite and within the neighbouring area, as well as limiting impacts to residential properties.

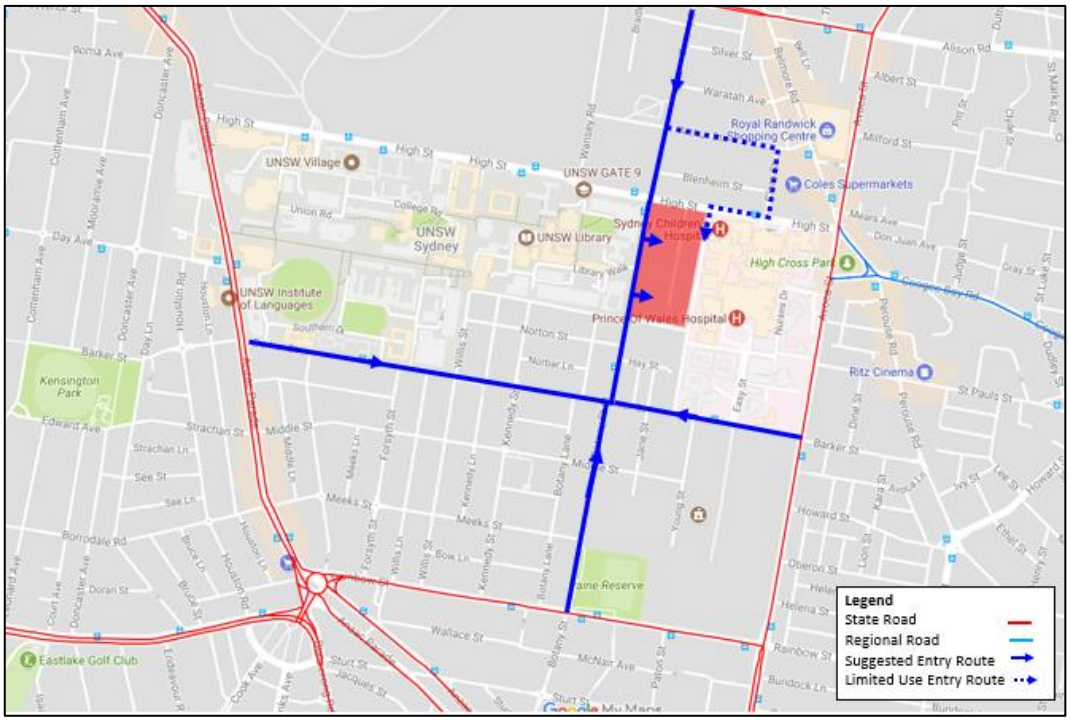

Figure 1: Proposed construction vehicle arrival route

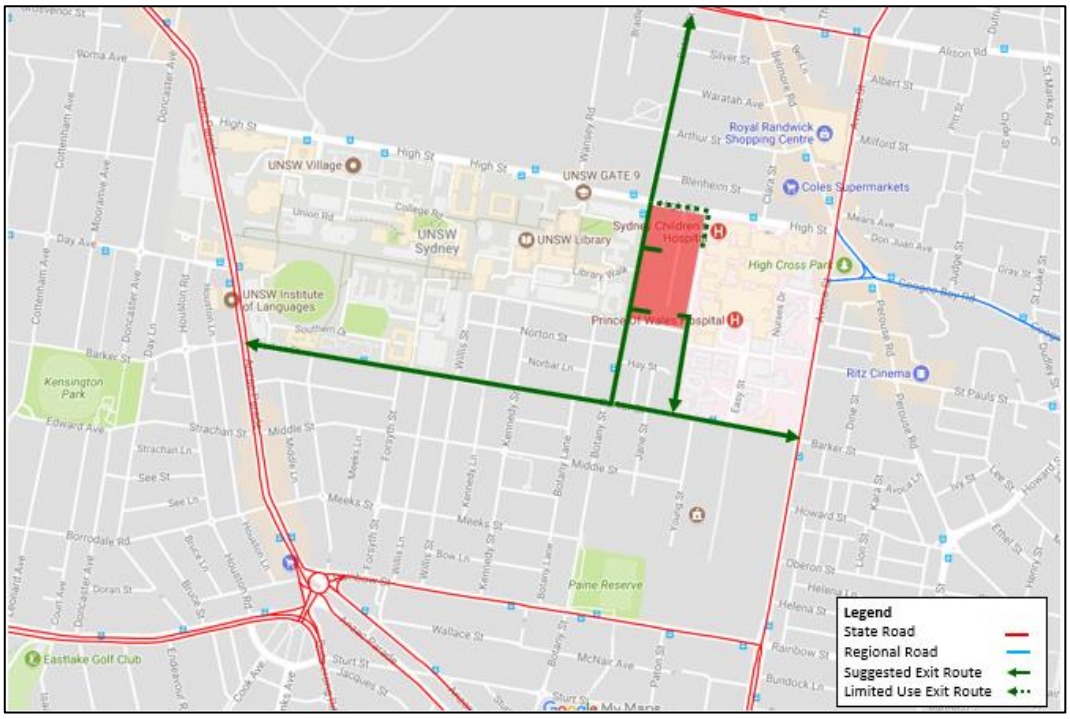

Figure 2: Proposed construction vehicle departure route

1.5 Construction traffic volumes

Workers will generate additional traffic to the site, although with minimal parking opportunities the numbers are expected to be low. It should be noted that construction workers generally start earlier and finish earlier than the commuter peak periods and would likely not coincide with the site's peak periods, therefore minimising impacts to the road network.

Furthermore, construction workers driving to sites in constrained parking environments, such as the RHC, typically carpool – further reducing the impact on the road network. The site is well connected to the bus and light rail network, leveraging off the accessibility of the site will encourage workers to minimise private vehicle use which will further reduce the impacts on the local road network. Furthermore, in aligning with the objectives of the RHC, the Project should consider adopting initiatives outlined the RHC Green Travel Plan (GTP) where practical in order to encourage construction workers to minimise private car trips, promoting carpooling and an increased uptake in the use of public transport and active modes of transport (walking and cycling).

The main stage of construction is likely to have a workforce of approximately 100 vehicles per day based on observed construction traffic volumes from neighbouring developments. Construction traffic movements will need to be coordinated to occur outside of the road network peak periods. The Project should consider the implementation of an online booking system for delivery of materials to the site. This will allow management of the delivery traffic to spread peak movements throughout the work day, avoid peak background traffic periods and implement "just in time" delivery to avoid trucks queuing on the wider road network.

Any lane closures that may impact two-way traffic flow and throughput along these roads is to be conducted outside of peak hours. The Contractor will need to consult with the relevant authorities during the development of the CTPMP to ensure impacts to the surrounding road network are minimised.

1.6 Cumulative impacts

There will be a number of other developments in the vicinity of the site which may coincide with the construction of the Project. This includes changes to the use of New Market House on Young Street from a dwelling to a centre-based child care centre and constriction of a two-story building. The development is currently on exhibition. The IASB will also be nearing completion by 2022 and therefore traffic associated with the development will consequently decrease leading up to the opening day.

2 Parking

2.1 On-street parking

Existing kerbside space adjacent to work sites may be temporarily required during construction due to potential constraints on parking or unloading / pick up locations onsite. The Contractor will be required to apply for works zone from the relevant authority, with Randwick City Council (RCC) having jurisdiction over local and regional roads and Transport for NSW (TfNSW) for State roads.

In order to minimise impacts to the road network, the use of works zones is to be kept to a minimum and not impact existing public transport locations where possible. In the case a public transport operator is impacted, an alternative stop location must be agreed with the operator and TfNSW.

2.2 Staff parking

Construction parking will not be provided on site or in the immediate streets to the site and it is the responsibility of the Contractor to enforce this on a day-to-day basis. Access to any of the RHC car parks is strictly prohibited. The Contractor may consider provisions for a temporary car park for safe use by construction contractors / staff to deliver tools and equipment to secure onsite storage areas.

An offsite location away from the precinct could be considered with a traffic assessment required to be undertaken on the potential traffic generations impact. The requirement for this parking facility is to be reviewed during the development of this plan. Furthermore, given the site is highly accessible by public transport, construction staff will be encouraged to either car-pool or arrive to the site via public transport or active modes of transport (walking or cycling).

3 Measures to ameliorate impacts

3.1 Driver code of conduct

To manage driver conduct the following measures are to be implemented:

- All deliveries are to be pre booked;
- All deliveries are to check in at the site office;
- Drivers are to give way to pedestrians.

Traffic Controllers will be used to stop traffic on the public street(s) to allow trucks to enter or leave the site. Where possible, vehicles must enter and exit the site in a forward direction. They must wait until a suitable gap in traffic allows them to assist trucks to enter or exit the site. The Roads Act does not give any special treatment to trucks leaving a construction site - the vehicles already on the road have right-of-way. Vehicles entering, exiting and driving around the site will be required to give way to pedestrians.

3.2 Pedestrians

Pedestrians on High Street and Botany Street may be impacted from walking past the site during construction. Accredited traffic controllers will manage the interactions between construction vehicles and pedestrians. In the case a construction vehicle is not able to safely pass pedestrians, the vehicle will be held by the traffic controller to allow pedestrians to cross through these work areas.

3.3 Public transport services affected

The proposed works will interface with a number of existing bus routes on Botany Street and High Street. The Contractor is to ensure that trucks do not queue along these roads and instead, directly enter and be wholly accommodated within the site. Any changes to bus stop locations to facilitate loading/works zones will require consultation with TfNSW and RCC.

3.4 Construction traffic management principles

The Contractor will be required to prepare a CTPMP for approval RCC and Health Infrastructure (HI) prior to the commencement of works.

As a general principle, construction of the proposed works will be staged to minimise impacts to traffic and other modes of transport. The overall principles for traffic management during construction of the proposed works will include:

- Maintain access to properties located in the vicinity of the site at all times;
- Manage and control construction traffic movements on the adjacent road networks and vehicles movements to and from the construction site;
- Limit the interaction of construction traffic with hospital traffic, especially heavy vehicle and light vehicle conflicts;
- Trucks to enter and exit the site in a forward direction;
- Maintain traffic capacity at intersections and mid-block in the vicinity of the site;
- Restrict construction vehicle activity to designated truck routes in the area;
- Construction access driveways and on-street work zones to be managed and controlled by site personnel;
- Provide an appropriate environment for pedestrians at all times;
- Maintain convenient access and circulation for public transport;
- Pedestrian movements adjacent to construction activity, across construction access driveways and to/from public transport facilities, will be managed and controlled by an authorised and qualified traffic controller;
- Pedestrian warning signs and construction safety signs/devices to be utilised in the vicinity of the site and to be provided in accordance with WorkCover and any applicable legislative requirements;

- Construction activity is to be carried out in accordance with RCC's approved hours of work; and
- Minimise vehicle usage of Magill Street.

3.5 Mitigation measures

Mitigation measures would be adopted during the construction phase to ensure traffic movements have minimal impact on surrounding land uses and the community in general, and would include the following:

- Truck loads would be covered during transportation off-site for sensitive loads;
- Establishment and enforcement of appropriate on-site vehicle speed limits (20km/h), which would be reviewed depending on weather conditions or safety requirements;
- All activities, including the delivery of materials would not impede traffic flow along local roads;
- Neighbouring properties would be notified of construction works and timing;
- Materials would be delivered and spoil removed during standard construction hours;
- Avoid idling trucks alongside sensitive receivers; and
- Deliveries would be planned to ensure a consistent and minimal number of trucks arriving at site at any one time

3.6 Construction summary

Any associated works along the surrounding road network is to maintain the availability of on-street parking supply where possible and maintain two way traffic flow. The use of works zones is to be kept to a minimum as to not impact the road network and existing public transport locations where possible. Any road closures are to be conducted outside of peak periods and construction traffic should be separated from hospital operations where possible.

Further assessment of construction traffic impacts will be conducted as part of the ongoing development of the CTPMP in consultation with relevant authorities which include Customer Journey Planning (formerly known as the Sydney Coordination Office).

Appendix B – Randwick Hospitals Campus Green Travel Plan

Health
South Eastern Sydney
Local Health District

Randwick Hospitals Campus

Green Travel Plan

Update
August
2019

TRIM: T19/19022

District Executive Unit
Locked Mail Bag 21
TAREN POINT NSW 2229

P. (02) 9540 7756 F. (02) 9540 8757
E. SESLHD-Mail@health.nsw.gov.au

Document Verification

ARUP

Job title		Randwick Campus Redevelopment			**Job number** 257913-00
Document title		Green Travel Plan			**File reference**
Document ref					
Revision	**Date**	**Filename**	20181003_Green Travel Plan_Final.docx		
Final	3 Oct 2018	**Description**	Issued for ABS Project approval		
			Prepared by	Checked by	Approved by
		Name	SZ	SG	AH
		Signature			
Update	09 July 2019	**Filename**	20190709 Green Travel Plan_Update.docx		
		Description	Issued for Integrated Acute Service Building (ASB) addition		
			Prepared by	Checked by	Approved by
		Name	SZ	SG	AH
		Signature			

The Green Travel Plan is a partnership between

The partners are also working with

1. Staff consultative committees
2. Consumer and Community reference groups
3. Local schools and surrounding community organisations

and

Table of contents

Executive Summary

South East Sydney Local Health District (SESLHD) is working across the Randwick Hospitals ' Campus and with a wide range of stakeholders to lead the development and implementation of a Green Travel Plan.

The Green Travel Plan sets out the:

a) Future staff travel mode share targets, specifically a reduction in car driver mode share,

b) Travel demand management strategies, for visitors, patients, staff and supplier/service personnel to encourage sustainable travel to and from the Randwick Hospitals Precinct, and

c) Initiatives to implement and monitor such travel measures.

A review of existing travel behaviour of staff, visitors and patients indicates that 40% of staff live in the Eastern Suburbs and 11% live within the suburb of Randwick itself. Just over half of those accessing the Campus use private vehicles as a primary mode of transport, and staff public transport use is high relative to other hospitals.

A number of specific measures have been outlined in this Green Travel Plan to promote the use of public transport, walking and cycling by staff and visitors travelling to and from the Campus. These measures include:

- All new staff members are to be made aware of this Green Travel Plan as part of their induction process. This would involve informing staff of available sustainable transport options to and from the Campus;
- The Campus, as well as future expansion areas, are to provide new bicycle parking and end of trip facilities for staff to further support cycling as a sustainable travel choice. This will include secure bicycle parking, lockers, change rooms and showers; and
- Carpooling is to be encouraged through the implementation of a staff car sharing database. This could involve establishing a staff intranet/internet page where staff can register their interest in carpooling by indicating where they live and their shift times. The Campus may also wish to consider participating in the Hospital Carshare scheme.
- Public transport information will be provided to staff and wayfinding through the hospital will be integrated with surrounding public transport nodes.
- Public transport information should be provided on visitor information stands and included in patient admission documents.

SESLHD will continue to proactively engage and consult with patients, families, community, staff and relevant government agencies to refine and implement the Green Travel Plan initiatives.

1. Introduction

1.1 Background

The Randwick Hospitals Campus is being strengthened with new investment. A new Acute Services Building for the Prince of Wales Hospital will open in 2022 and the South East Sydney Light Rail will commence operation in late 2019.

The South Eastern Sydney Local Health District has agreed to coordinate the development of a Green Travel Plan with patients, families, staff, community and government agencies. This Green Travel Plan will apply to the operation of the Integrated Acute Services Building (IASB) Addition.

Key to any successful workplace travel plan is ensuring that the development process is broadly encompassing in order to capture the views of a range of stakeholders within the hospital and across the Campus. This helps ensure that the best information is incorporated into the plan to make it more effective and viewed as an important part of the Campus operations.

This version of the Green Travel Plan must be submitted as part of the statutory requirements for planning approval for the Integrated Acute Services Building (IASB) Addition. Extensive consultation will continue over the coming years to ensure that all stakeholders can be involved with finalising and implementing the actions.

1.2 Site Location

The Randwick Hospitals Campus (Campus) is located approximately 7.2km south-east of the Sydney CBD and forms part of the Randwick Health and Education Precinct. The University of New South Wales (UNSW) is located to the west of the Campus, while Randwick Junction Town Centre is located immediately to the north.

The current Campus is bound by High Street to the north, Avoca Street to the east, Barker Street to the south and Hospital Road to the west. The Campus consists of four hospitals; Prince of Wales Hospital, Sydney Children's Hospital, Randwick, the Royal Hospital for Women and the Prince of Wales Private Hospital as well as associated research institutes; Black Dog Institute, Neuroscience Research Australia and the Bright Alliance.

As part of Stage 1 of the Randwick Campus Redevelopment, a new Acute Services Building (ASB) will bridge the physical gap between the Campus and UNSW. The ASB will include a new intensive care unit, operating theatres, extra beds and a new emergency department. The approved ASB (SSD 9113) will enable education, training and research to be more closely integrated into the health care services provided across the precinct.

The location of the new ASB as part of the Campus is shown in Figure 1. The IASB Addition to the east of the ASB utilises the airspace over Hospital Road. Ought there be a short description of the purpose of the IASB Addition?

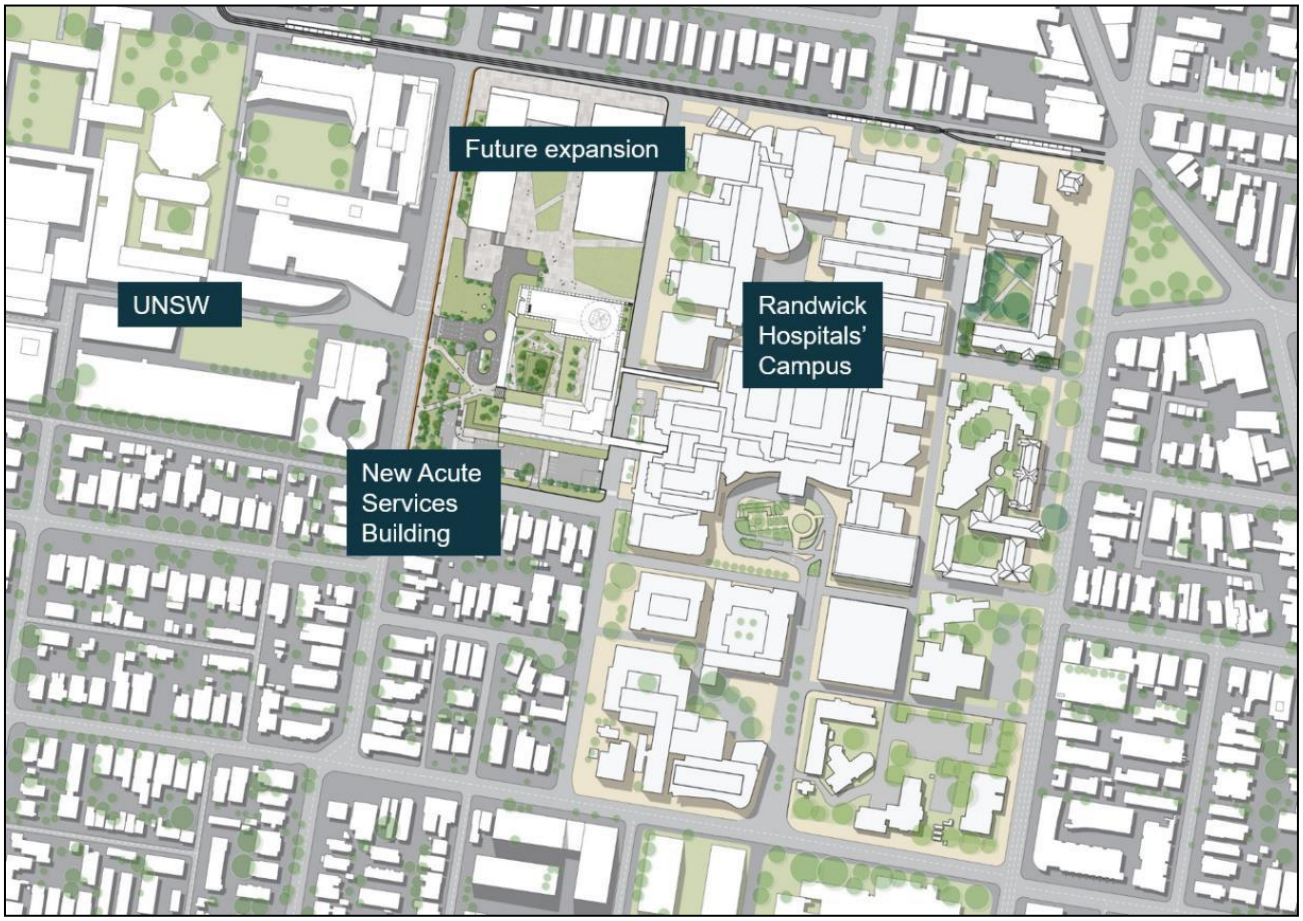

Figure 1: Randwick Hospitals Campus and approved ASB and future expansion area

1.3 What is a Green Travel Plan?

A Green Travel Plan is a package of measures implemented by an employer to encourage more sustainable travel for the journey to and from work and also during the course of work. It is a means for an organisation to reduce the use of cars by staff, particularly driving to and from work and for work related travel. Through a Green Travel Plan, workplaces can also demonstrate commitment to a more proactive approach in improving people's health and wellbeing and the environmental sustainability of its activities.

The principles of a Green Travel Plan are applied to all people travelling to and from a site. Government authorities are placing increasing emphasis on the need to reduce the number and lengths of motorised journeys and in doing so encourage greater use of alternative means of travel with more environmentally positive outcomes.

The intention of this Green Travel Plan is to:

a) Set future staff travel mode share targets, specifically a reduction in car driver mode share,

b) Detail the travel demand management strategies, for visitors, patients, staff and supplier/service personnel to encourage sustainable travel to and from the Randwick Hospitals Campus,

c) Describe initiatives to implement and monitor such travel measures,

d) Promote healthy living to staff by encouraging the integration of walking/cycling into their everyday routine.

1.4 Policy Support

NSW Health policy is well aligned to the intent of the Green Travel Plan and increasing the use of healthy and sustainable modes, including walking and cycling. The NSW State Health Plan Towards 2012, NSW Healthy Eating and Active Living Strategy 2013 – 2018 and the NSW Health Hospitals Car Parking Fees Policy (2013) all provide strong support for the Green Travel Plan approach.

The SESLHD is aligned to the purpose and intent of the Green Travel Plan. It has adopted the Journey to Excellence Strategy 2018 – 2021 (Strategy), following the Roadmap to Excellence 2014 -2017. It sets out the strategic priorities for the LHD in the short term, continuing a process of transformation.

The Strategy looks to a broad future vision, including:

"Much better links between health services and other agencies, such as education, community services, justice, transport, primary care and local councils so together, we can improve the health and wellbeing of our communities and whole population across our region."

While also identifying key strategic themes that include:

- *"Community wellbeing and health equity: we will work together with our partners to achieve health, wellbeing and equality for our shared communities."*

- *“Workforce wellbeing: we will create an environment where our people can be accountable, happy and well, and supported to reach their potential."*

In 2019, SESLHD released its Environmental Sustainability Plan 2019 – 2021 in which its People and Places theme has a specific module dedicated to Travel and Logistics. This module has specific objectives and targets that support and/or overlay with the Green Travel Plan including the ongoing assessment of transport and travel, provision of facilities for active travel, innovation and, importantly, communications about sustainable travel options to staff.

The Randwick Hospitals Campus has committed to broader planning of the Randwick Health and Education Precinct which includes improving the urban environment through four key principles:

1. Supporting a green environment,
2. Connecting open spaces, buildings and key centres of activity,
3. Integrating quality and diverse spaces that encourage people to gather to meet, relax and foster collaboration, and
4. Being responsive to the natural environment and respectful of the area’s heritage and long history.

The Randwick Campus Redevelopment, which will deliver the new Acute Services Building, identifies the need for putting patients first, which includes addressing access issues in and outside of the hospital.

The six design principles are:

- Patients first
- People collocated and collaborative
- Services integrated and not duplicated
- Evidence-based and/or evidence generating
- Flexible and future ready
- Support patient care beyond the boundaries of the hospital

1.5 Engagement

Health Infrastructure’s guiding principles for capital projects in relation to communications and engagement are being used across the Campus. These are:

- Proactive stakeholder engagement
- Proactive and transparent communications
- Coordinated information
- Collaboration

The first public material focused on transport, access and car parking and was developed and presented to staff and community in April 2018. A Staff Travel Census was undertaken in June 2019 and data has been used to update base line travel data in this update of the GTP.

A GTP operational user and advisory group consisting of diverse stakeholders across the Hospitals Campus was established in May 2019. The group meets monthly to guide the implementation of the plan.

A separate project user group consisting of relevant Hospital Campus stakeholders is also meeting monthly with experts and architects to drive forward the development of the new end-of-facility due for opening 2020.

Briefings to staff and stakeholders in regard to the baseline staff travel census and Green Travel Plan have been received well and provide a strong platform for ongoing engagement and implementation of the GTP.

Regular engagement and consultation will continue as certain actions are further developed and implemented which will include:

- Engaging with all of the community and consumer reference groups across the Campus
- Establishing an online forum to collect staff and visitor feedback which will be used to update the GTP initiatives
- Establishing user groups on cycling and other issues from time to time as needed
- Undertaking regular staff updates

SESLHD will also work collaboratively with other key stakeholders such as UNSW, Randwick City Council, Transport for New South Wales and community groups.

This Green Travel Plan will be updated and amended as the implementation progresses.

2. Existing Travel Patterns and Infrastructure

2.1 Mode Split

The most notable features of the existing hospital campus staff travel patterns are:

- 39% of staff live within the Eastern Suburbs (within 5 km of the Campus); and
- of the total staff population, 11% live in Randwick.

The high proportion of staff living in close proximity to the Campus provides great opportunities for travel via non-car modes of transport – such as public transport, walking and cycling.

2.2 Travel patterns

A Travel Census was undertaken in late June 2019. The data from this survey has been used to inform and update the travel behavior and mode share within this updated GTP, Key insights from these were:

- Just over half of staff drive to work (55%) and 4% travel as a car passenger. Public transport accounts for 25% of the mode share, while 11% access the Campus via walking (see Figure 2); and
- The majority of visitors and outpatients access the Campus via private vehicle, and approximately 17% utilised public transport (see Figure 3).

The 2019 Travel Census provides a baseline for the GTP.

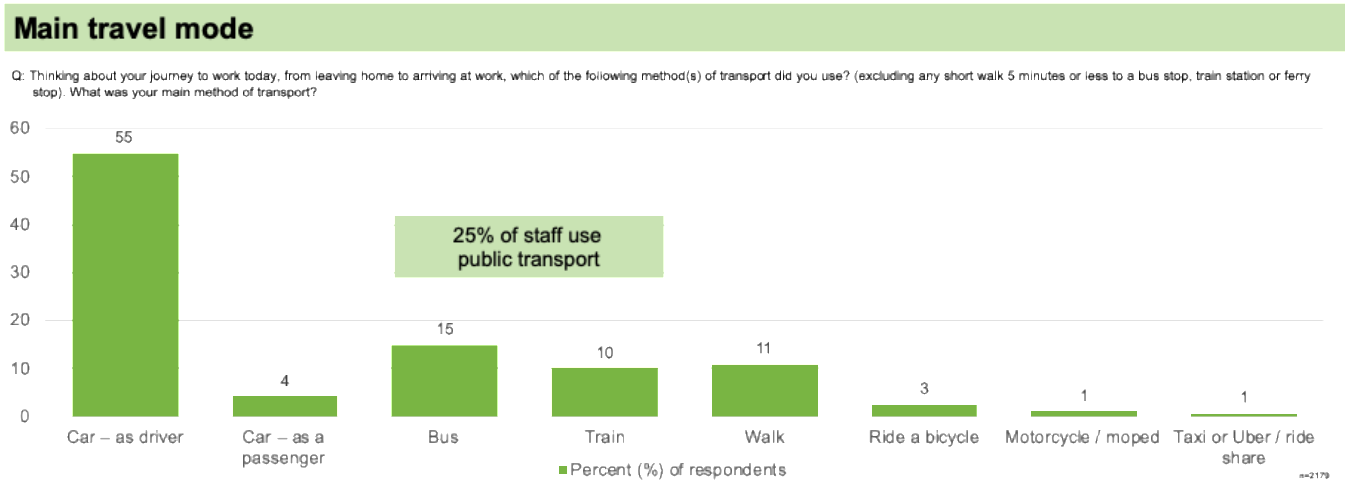

Figure 2: Staff mode share (RHC Staff Travel Census, 2019)

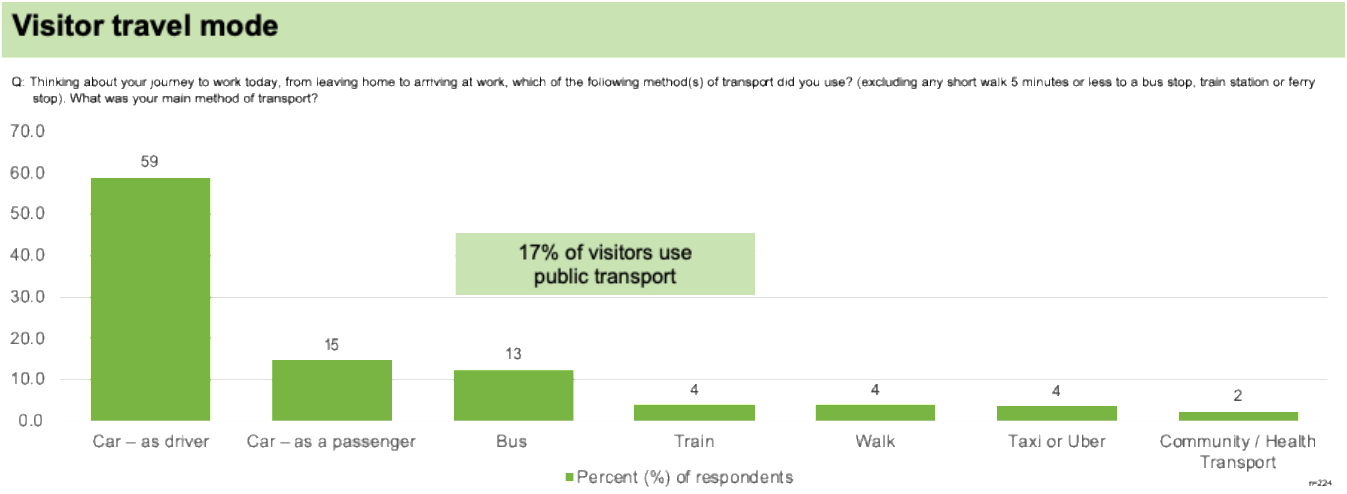

Figure 3: Visitor mode shares (RHC Staff Travel Census, 2019)

To have a clear understanding of the current travel behaviours, it is important to compare the results of the 2012 staff survey with the latest (2016) Census data. This comparison is shown in Table 1.

Table 1: Mode share comparison between the 2019 Travel Census and 2016 Census data

Mode of Travel	Proportion of Total Trips	
	2019 RHC Travel Census	2016 Census JTW
Car Driver	55%	56%
Car Passenger	4%	5%
Public Transport	25%	21%
Walk	11%	14%
Other (including Cycling)	3%	4%
Total	100%	100%

The Travel Census data is highly consistent with the 2016 Census Journey to Work data.

2.3 Pedestrian and Bicycle Networks

The existing bicycle network surrounding the Campus is shown in Figure 4. The road shoulder on Doncaster Avenue and Houston Road provides a north-south bicycle route that connects Kingsford and Kensington to the Anzac Parade bicycle route at Centennial Park, continuing on to the Sydney CBD. A shared path (shared by pedestrians and cyclists) on Alison Road and Wansey Road provides a connection between the Campus, Randwick Racecourse and Centennial Park. A shared path is being provided along Botany Street adjacent to the ASB as a condition of the ASB planning consent.

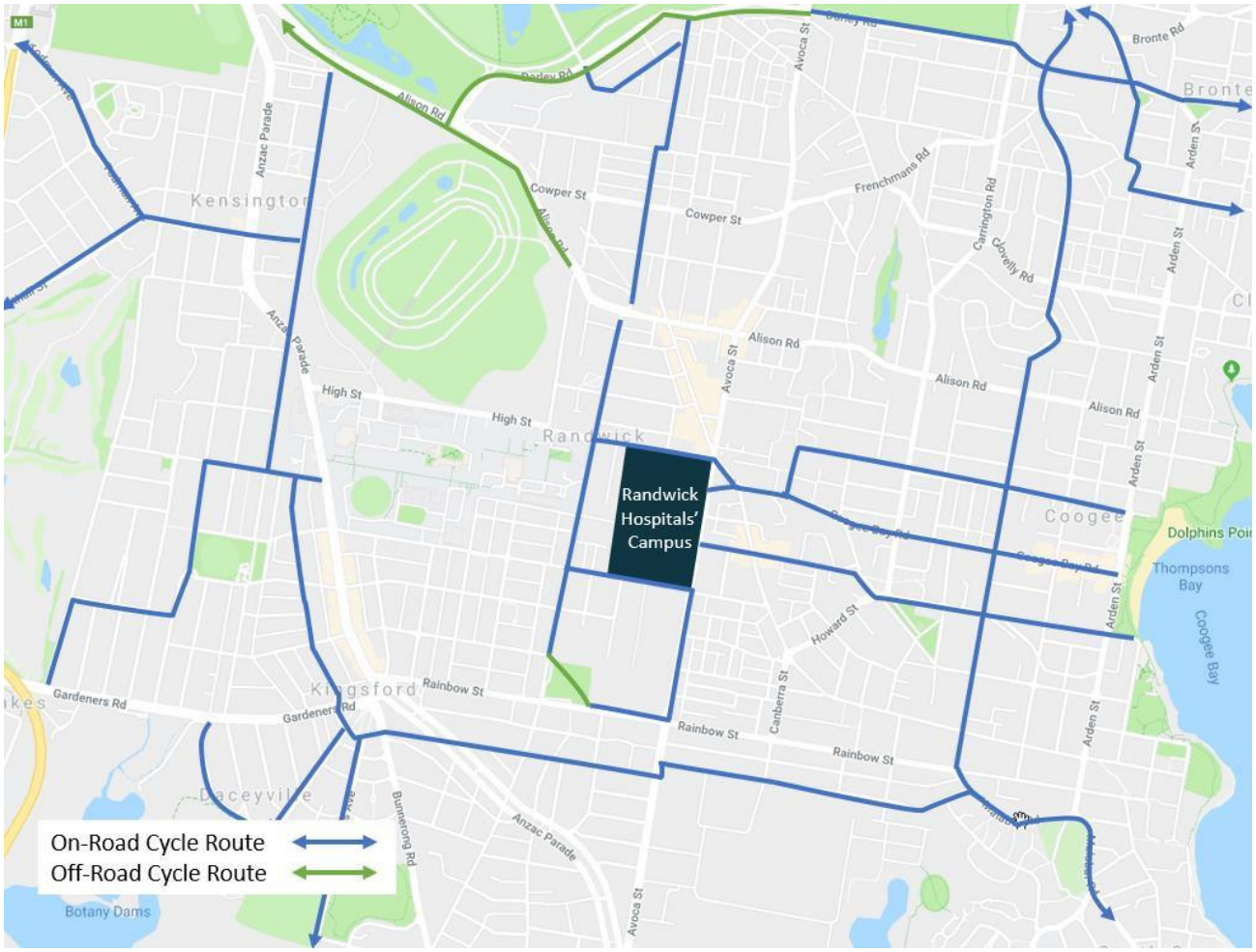

Figure 4: Existing bicycle network serving the Campus (Randwick City Council, 2018)

5, 10, 15 and 20 minute walking and cycling isochrones for the Randwick Campus are shown in Figure 5 and Figure 6, respectively. Key desire lines around the Campus for walking and cycling are accentuated by Strava (a popular website/mobile application used to track walking, running and cycling activity) outputs shown in Figure 7.

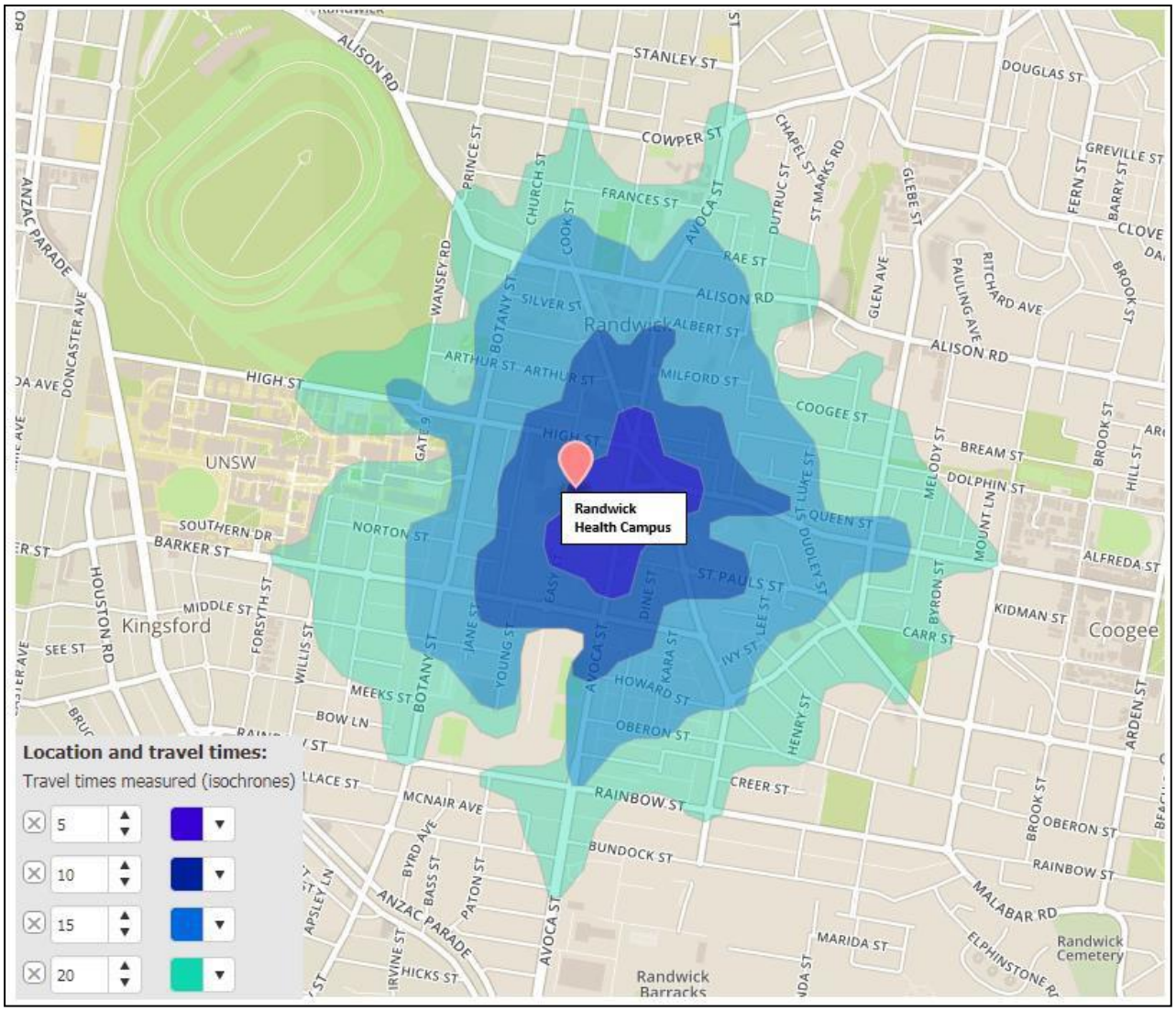

Figure 5: Walking isochrones to/from Randwick Campus

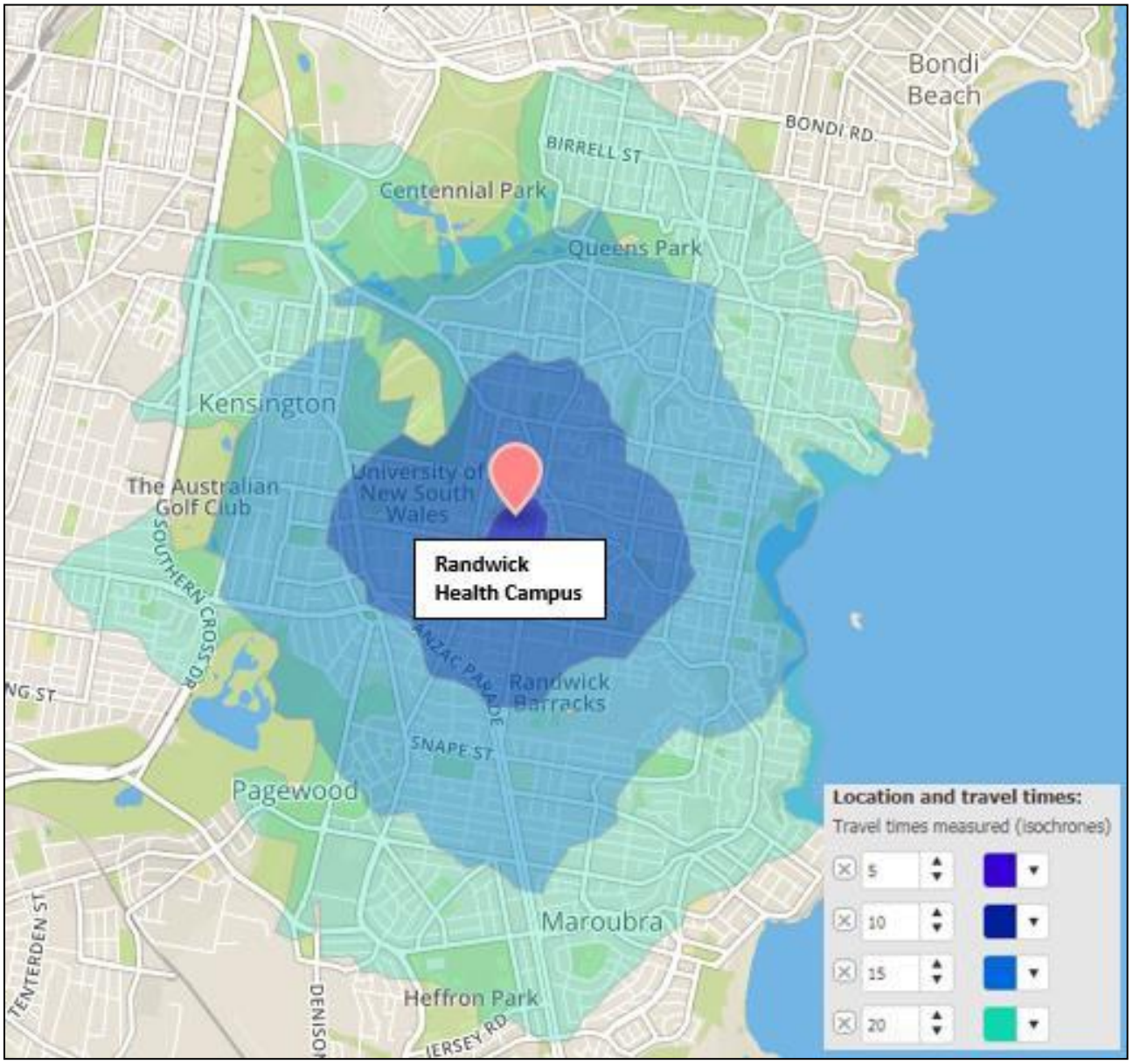

Figure 6: Cycling isochrones to/from Randwick Campus

Figure 7: Heat map showing key pedestrian and cyclist routes and intensity of use (Strava, 2018)

Randwick City Council has developed a network of priority bike routes that will be implemented as part of Randwick's 20-year City Plan. The eleven routes include seven east-west links that help to improve access towards the coast and west towards Green Square, and four north-south routes that allow cyclists to travel safely towards the city.

Figure 8 shows the new separated cycleway connections proposed as part of the City Plan.

Figure 8: Proposed cycle network (Randwick City Council, 2017)

2.4 Public Transport Accessibility

Bus accessibility

The southern end of Belmore Road, which is located at the north-eastern boundary of the Randwick Campus, is a district hub for buses in Sydney's Eastern Suburbs. Figure 9 below shows the bus stops in the vicinity of the Campus.

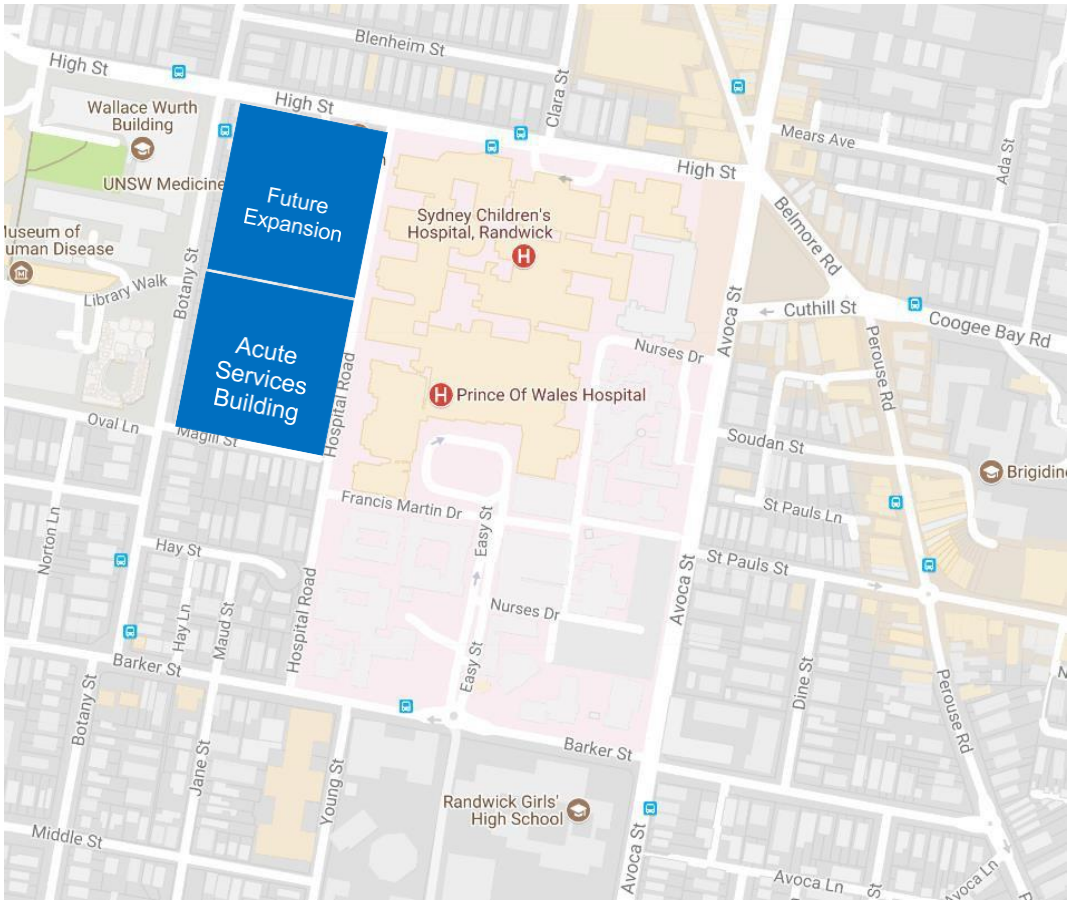

Figure 9: Bus stops in the vicinity of the Campus (Basemap source: Google, accessed July 2018)

A number of bus routes, shown in Figure 10, frequent these stops, including:

- All-day services connecting the south-eastern suburbs with Central Station and the Sydney CBD via Moore Park – routes 372, 373, 374, 376, 377 and M50;
- A range of express service variants of these routes that operate during peak hours;
- North-south services that connect centres in the Eastern Suburbs, including Bondi Junction and Maroubra Junction – routes 314, 316, 317;
- East-west services that connect Randwick with Bondi Junction, Green Square, Mascot and various locations in the inner western and southern suburbs – routes 348, 400, 410 and 418;
- Leichhardt to Coogee – route 370; and
- Central Station - UNSW express bus services – routes 891, 893 and 898.

Most bus services travel along Belmore Road, with some using High Street, Alison Road and Avoca Street. Recent changes associated with the construction and operation of the CSELR have resulted in buses using Arthur Street instead of High Street.

Transport for NSW (TfNSW) are currently designing a new bus network for Sydney's south-east to support the introduction of the CSELR. The new bus network will continue to support local links to Randwick's Health and Education precinct.

Figure 10: Existing bus services and future light rail servicing the Randwick Campus

A summary of the frequency of services of the bus routes mentioned above is included in Table 2.

Table 2: Bus service frequencies (weekday)

Bus route	Bus services (per day)
372 – Coogee to Central Railway Square	79
372 – Central Railway Square to Coogee	67
373 – Coogee to City Circular Quay	104
373 – City Circular Quay to Coogee	120
374 – Coogee to City Circular Quay	45
374 – City Circular Quay to Coogee	46
376 – Maroubra Beach to Central Railway Square	35
376 – Central Railway Square to Maroubra Beach	31
377 – Maroubra Beach to City Circular Quay	46
377 – City Circular Quay to Maroubra Beach	50
M50 – Coogee to Drummoyne	66
M50 – Drummoyne to Coogee	66
314 – Coogee to Bondi Junction	36
314 – Bondi Junction to Coogee	37
316 – Eastgardens to Bondi Junction	22
316 – Bondi Junction to Eastgardens	24
317 – Eastgardens to Bondi Junction	24
317 – Bondi Junction to Eastgardens	26
348 – Wolli Creek to Bondi Junction	37
348 – Bondi Junction to Wolli Creek	37
400 – Sydney Airport to Bondi Junction via Eastgardens	140
400 – Bondi Junction to Sydney Airport via Eastgardens	139
410 – Bondi Junction to Rockdale	15
410 – Rockdale to Bondi Junction	16
418 – Bondi Junction to Burwood	46
418 – Burwood to Bondi Junction	48
420 - Eastgardens to Burwood via Sydney Airport & Rockdale	54
420 - Burwood to Eastgardens via Rockdale & Sydney Airport	54
370 – Leichhardt Marketplace to Coogee	71
370 – Coogee to Leichhardt Marketplace	68
X73 – City to Coogee	15
X73 – Coogee to City	24
X74 – City to Coogee	7
X74 – Coogee to City	14
891 – Central Station to UNSW	139
893 – UNSW to Central Station	107
898 – UNSW to Central Station	49

CBD and South East Light Rail

The CBD and South East Light Rail (CSELR) is a new light rail network for Sydney. It is currently under construction and the first services are anticipated to begin in late 2019. The 12km route will feature 19 stops, extending from Circular Quay along George Street to Central Station, through Surry Hills to Moore Park, then to Kensington and Kingsford via Anzac Parade and Randwick via Alison Road and High Street. The proposed light rail alignment and stops are shown in Figure 11.

The eastern end of High Street, which forms the northern boundary of the Randwick Campus, will feature a terminus for the CSELR. Light rail services will terminate at a stop on High Street immediately west of the Belmore Road and Avoca Street intersection.

Light rail services will travel from High Street towards the Sydney CBD every eight minutes between 7am and 7pm on weekdays, when the CSELR commences operation. There will be a number of bus operational changes associated with the introduction of light rail including amendments city-bound bus services, potentially changing the number of bus services using Belmore Road, particularly at peak times.

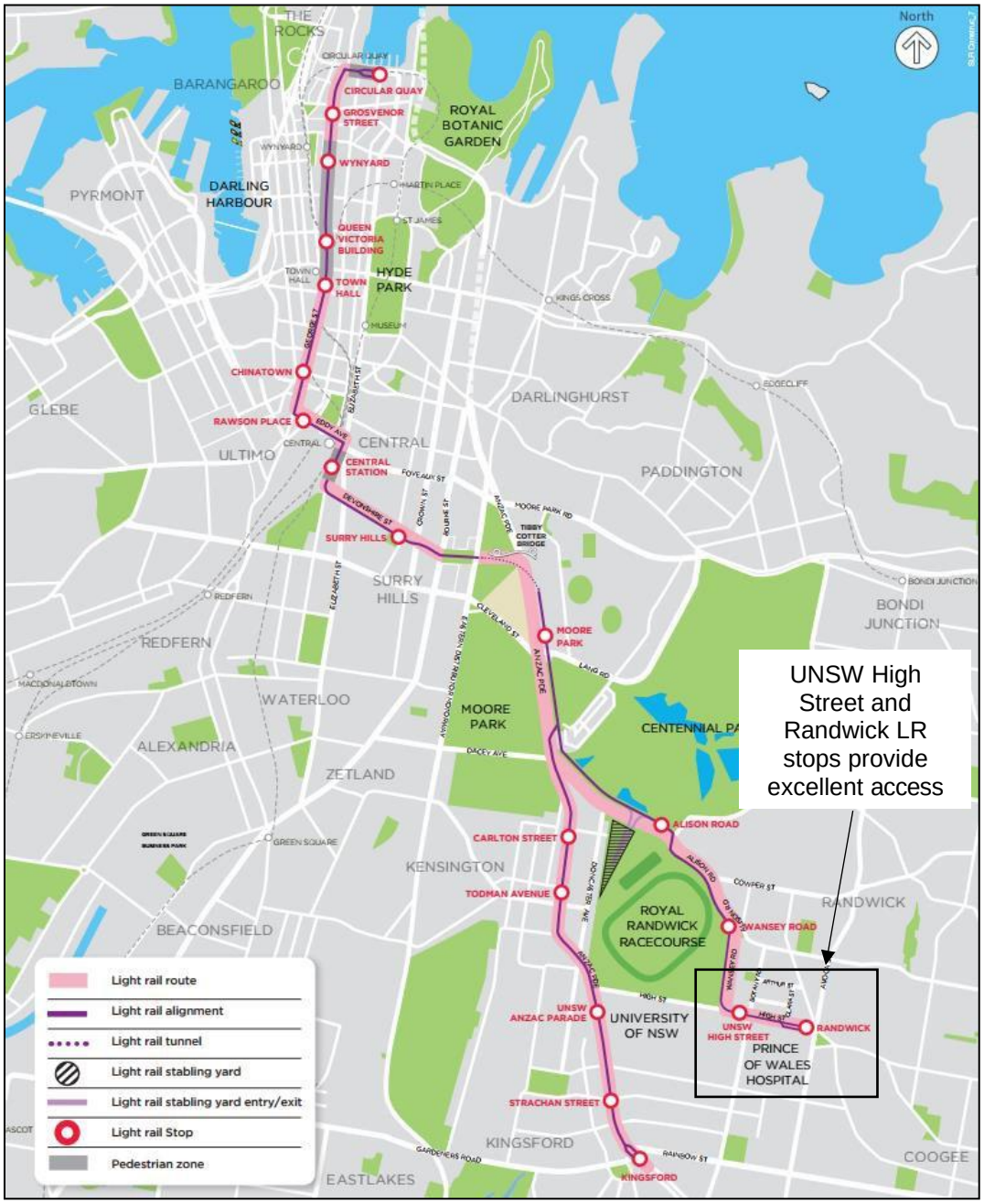

Figure 11: Proposed CSELR rail route alignment (TfNSW, 2017)

A review of the CSELR Environmental Impact Statement (EIS – TfNSW, 2013) shows the forecast line loading for the light rail at 2021. The CBD bound and Randwick bound line loading for the 2021 AM peak scenario is shown in Figure 12 and Figure 13, respectively.

While the majority of light rail passenger trips will be CBD bound in the AM peak, a balance of contraflow movements is anticipated given the demand generated by UNSW and the Randwick Hospitals Campus. AM peak line loading of approximately 80% is forecast for Randwick bound services, with the majority of passengers alighting at the UNSW High Street stop. This indicates that there is sufficient forecast capacity to meet additional demand resulting from increased patronage by hospital staff and visitors.

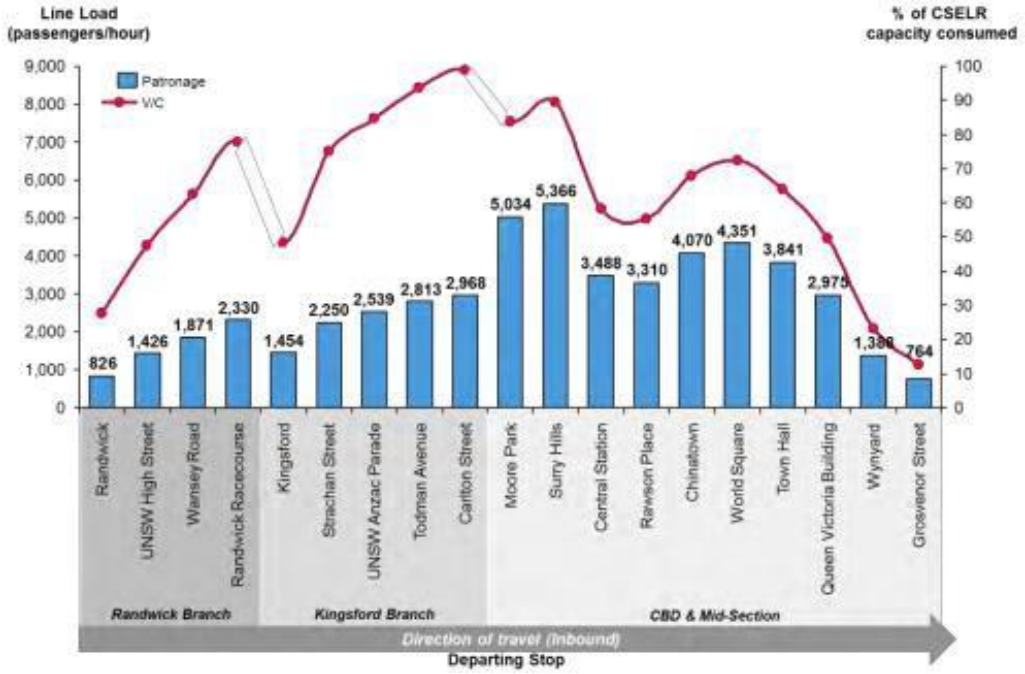

Figure 12: CSELR line load and capacity consumed - 2021 CBD bound AM peak (TfNSW, 2013)

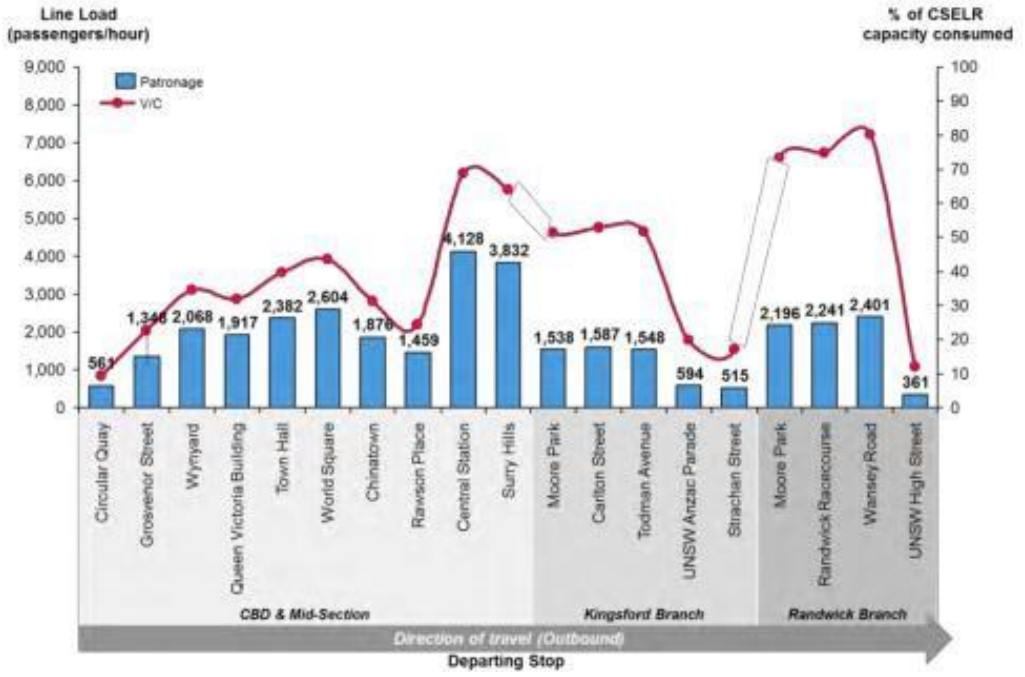

Figure 13: CSELR line load and capacity consumed - 2021 Randwick bound AM peak (TfNSW, 2013)

3. Green Travel Plan Framework

3.1 Objectives

The main objectives of the Green Travel Plan are to reduce car driver mode share and encourage the use of more sustainable means of transport.

The more specific objectives include:

- Meet the targets to increase mode share for public transport, cycling and walking to/from work journeys;
- Provide adequate facilities at the Campus to support staff and visitors to commute by sustainable transport modes;
- Reduce substantially the number of car journeys to and from the Campus;
- Promote the health benefits of active (i.e. Walking/Cycling) transport;
- Encourage new employees to use sustainable transport; and
- Raise awareness of sustainable transport amongst staff and visitors.

3.2 Proposed Green Travel Plan Measures

3.2.1 Green Travel Plan

Description of measure

The green travel plan will be implemented to promote the uptake of public transport, walking and cycling by staff and visitors for travel to and from the Campus and discourage the use of private vehicles where possible.

Monitoring mechanisms

- Annual travel survey of staff and visitors to be conducted to understand travel patterns and trends of people travelling to and from the Campus. The baseline Travel Census in June 2019 is the first of the annual program.
- Car parking data and observations of cycle parking use around the campus.

3.2.2 Staff induction

Description of measure

To ensure new members of staff are aware of the Green Travel Plan, all new staff members will be made aware of the Plan as part of their induction process, which will include:

- A brief introduction to the plan and its purpose;
- Map of the Campus showing public transport stops, bicycle parking areas, lockers, and shower and changing facilities;

- Staff access to a designated end of trip facility (based on the specific working location); and
- Provision of transport information packs or personalised journey planning services to new staff explaining the various ways (other than motor vehicle) of travelling to and from the Campus.

Monitoring mechanisms

- Annual travel survey of staff and visitors to be conducted to understand travel patterns and trends of people travelling to and from the Campus, and
- South Eastern Sydney Local Health District (SESLHD) to maintain a record of the number of staff inducted through the updated process.

3.2.3 Cycling

Description of measure

Based on the 2019 RHC Staff Travel Census, the top 5 barriers to the use of bicycles as a mode of transport to work include:

- Lack of bike racks / secure parking
- Lack of showers and change rooms
- Lack of local infrastructure: lanes / paths / routes
- Weather difficulties
- Navigating traffic and busy roads (rider confidence)

To support cycling as an option for staff traveling to and from work, bicycle parking and end of trip facilities (showers, change facilities and lockers) for staff will be identified and augmented as necessary.

The project is currently exploring opportunities during detailed design for the construction of appropriately sized and specified end of trip facilities in close proximity to the Acute Services Building, within the existing hospital car park. The end of trip facilities will be sized and specified to meet needs and encourage a greater take up of cycling. All staff will be made aware of the bicycle parking and end of trip facilities available.

Events such as National Bike Week and Ride2Work Day, which encourage the usage of bikes as a mode of transport, should also be promoted. Events can also be timed to promote the use of the local cycleway network as Council opens new connections.

A bicycle user group was established by SESLHD in June 2018. This group will be an important stakeholder in defining future cycle user provision across the Campus. It is recommended that this user group will be a partner in implementation of initiatives through the GTP governance structure. The group has already facilitated the undertaking of a detailed user survey of bicycle end-of-trip facilities in April/May 2019.

- Investigate potential additional barriers to those identified above that may be deterring staff from cycling to work through a survey;
- Initiate and promote a Buddy Cycling initiative (the pairing of an experienced rider with a new/less-confident rider to help familiarise them with cycle routes); and

- Provide staff with access to custom and local area bike maps.

The Campus may initiate a trial with a private bike company to provide rental bicycles to staff. This would provide staff with an opportunity to trial cycling as a mode of travel to work, before committing financially by purchasing a bike. This external company may also organise training for staff who are beginner cyclists.

Monitoring mechanisms

- SESLHD to monitor the demand for bicycle parking at the Campus through an occupancy survey undertaken annually; and
- Annual travel survey of staff and visitors to be conducted to understand travel patterns and trends of people travelling to and from the Campus.

3.2.4 Walking

Description of measure

Given the large proportion of staff living nearby to the Campus, there is opportunity to increase the proportion of people walking to work. The identification and provision of end of trip facilities is anticipated to encourage more staff to walk to the Campus. There is also opportunity to improve existing connections between the Campus and the wider pedestrian network, including:

- Improved signage and wayfinding
- The provision of custom and local area walking maps; and
- Improved lighting along pedestrian routes.

Monitoring mechanisms

- SESLHD to monitor the percentage of staff walking to the Campus through travel survey
- Obtain feedback from staff regarding issues they may have walking certain routes and liaise with local authorities regarding improvements (e.g. lighting and security issues)

3.2.5 Carpooling

Description of measure

Currently only a small number of staff who drive to the Campus have a passenger. The Travel Census in June 2019 indicates just 4% of staff travel to work as a car passenger. Of these, the majority (83%) travel with a domestic partner, with little-to-no organized trip sharing. This presents an excellent opportunity to promote car-pooling as method of commuting to work.

This would involve the implementation a staff car sharing database or matching system. This could involve a staff intranet page where staff would register their interest in carpooling by indicating where they live and their shift times.

A website has recently been established (www.hospitalcarshare.com.au) which allows staff members at participant hospitals (Hornsby Ku-ring-gai Hospital participates) to connect with each other to encourage sharing a lift to and/or from work. Randwick Campus could participate in this scheme and promote the website to their staff members.

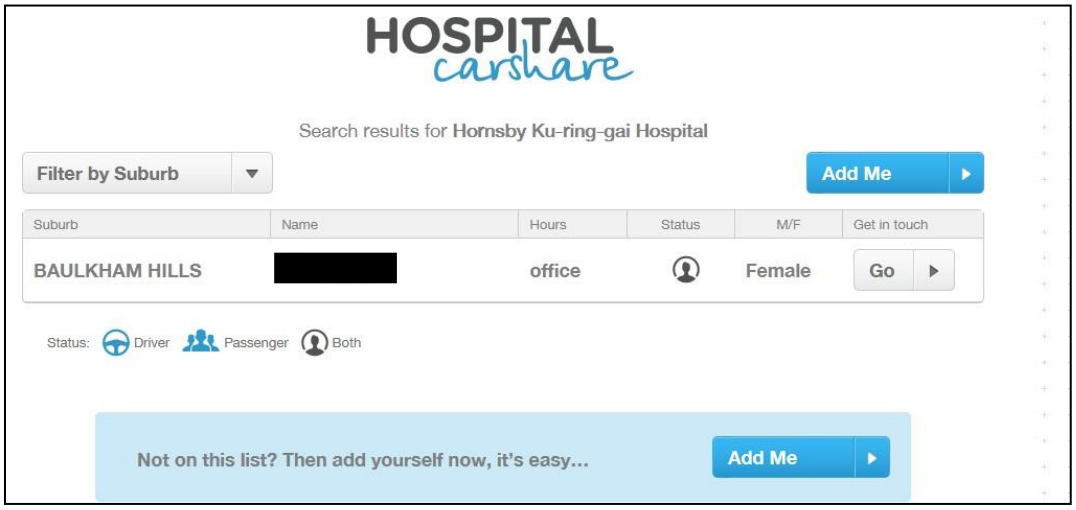

Figure 14: Example hospital car share website

The Campus may also consider offering a subsidised parking rate or preferential parking locations to people with two or more staff members in the car.

Monitoring mechanisms

- Annual travel survey of staff and visitors to be conducted to understand travel patterns and trends of people travelling to and from the Campus.

3.2.6 Other measures

SESLHD will work with all stakeholders to explore other measures that could be implemented. These could include:

- Conduct a review of fleet management operations against the objectives outlined in this Green Travel Plan
- Establish a working group with Transport for NSW to consider how the surrounding bus network can better support the Campus
- Conduct a review of the current car parking operations contract and policies against the objectives outlined in this Green Travel Plan and explore opportunities to improve parking and management efficiency
- Work with the SESLHD public health promotion team to support active transport and highlight the 'Make Healthy Normal' and NSW 'Get Healthy at Work' campaigns
- Provision of existing or white-labelled trip planning apps to staff
- Co-location of car-share pods with preferable access plans to facilitate trips for sustainable transport users
- Expand Opal top-up facilities across or near the Campus

The measures and initiatives outlined above are not a prescriptive or exhaustive list. These measures should be considered relative to the outcomes associated with monitoring of this Green Travel Plan and implemented on agreement and consensus of the SESLHD.

3.3 Summary of key monitoring mechanisms

- Feedback from staff as to the effectiveness and usefulness of GTP initiatives;
- Annual travel survey of staff and visitors to be conducted to highlight key transport issues and outline travel patterns and trends of people travelling to and from the Campus, enabling the SESLHD to monitor the effectiveness of measures in increasing use of non-car driver travel options;
- SESLHD to monitor the demand for bicycle parking at the Campus through an occupancy survey undertaken annually.

4. Forecast Levels of Activity

4.1 Acute Services Building

Based on data provided by HI and SESLHD, it is expected that the development of the ASB will increase the number of beds at the Randwick Campus by 156 by 2027, and increase the number of full-time equivalent (FTE) staff by 563 in 2027. These anticipated increases are outlined in Table 3 below.

Table 3: Forecast increase in beds and staff for the Prince of Wales Hospital (Source: South Eastern Sydney Local Health District, 2017)

Increases compared to existing supply	Forecast 2022	Forecast 2027
Beds	+ 58	+ 156
Staff (FTE)	+ 386	+ 563

Significant change in visitor and outpatient travel behaviour is unlikely for the increased number of beds. Mode share targets for staff are outlined in Section 5.

4.2 IASB Addition

As part of the collaboration agreement and the proposed integration of UNSW use into the IASB Addition, the staff to be accommodated in the IASB are currently working out of the UNSW Campus. There will be no additional patients. The same mode share targets will be applied to these staff as outlined in Section 5. Parking for the users of the spaces will continue to be accommodated on the UNSW Kensington Campus

4.3 Construction worker parking

Construction workers should primarily be encouraged to use modes other than private vehicle to access the site, and carpooling initiatives should be promoted.

Lendlease will work with the Royal Randwick Racecourse to establish a “park and ride” and associated shuttle bus service that would run between the Racecourse and site between 6:00am - 9:00am and 3:00pm - 6:00pm. This shuttle service is to be in place during the demolition and construction phases. Monitoring should also be included to ensure utilisation by workers and that workers are not parking on-street or in hospital/public car parks near the development site.

Lendlease propose that the area to the north of site for future development could be primarily utilised for materials handling, lay down area and site storage, however this 130m x 100m section of the site could provide on-site parking for up to around 100 workers should this be needed. This proposal is to be worked through with TfNSW, SESLHD and HI through the detailed design phases.

Access to all of the Campus car parks will be strictly prohibited. The contractor will allow for maintaining a temporary car park for safe use by construction contractors / staff to deliver tools and equipment to secure onsite storage areas.

5. Mode Share Targets

The implementation of the measures identified in this Green Travel Plan will encourage staff currently driving to and from the Campus to use more sustainable travel modes. This plan sets a minimum target mode share shift away from single occupancy private vehicle use of 8% by 2022. This equates to a car driver mode share for staff of approximately 47%, in comparison to 55% in 2019. It is anticipated that this shift will offset the increased parking demand generated from Stage 1 of the Randwick Campus Redevelopment.

The mode share targets for each mode and the respective shift from current behaviours is shown in Table 4.

Table 4: Target mode share

Mode	Existing Staff Mode Share	Target Staff Mode Share	Difference
Driver	55%	47%	-8%
Car (Passenger)	4%	6%	+3%
Public Transport	25%	29%	+3%
Walking	11%	11%	-
Other (incl. cycling)	3%	5%	+2%

- Car (Passenger) – With introduction of car pool programmes, increased staff awareness and potential incentives to registered car pool vehicles, a 3% increase in mode share is likely reasonable.
- Public Transport – Given NSW government's significant investment in public transport (CSELR, Sydney Metro, etc.), this is a mode that has the greatest propensity for change. The introduction of CSELR will improve the legibility of transport services to the Campus from the CBD. The potential subsequent improvements to north-south bus services towards the south of the Campus will likely increase the current public mode share in this area. As result, a 3% increase in mode share is likely reasonable.
- Walking – Analysis of staff postcodes relative to reasonable walking distances indicate that this mode is highly utilised. New staff on campus choosing to live nearby are likely to walk to work further supporting this sustainable mode of travel.
- Cycling – Analysis of staff postcodes relative to reasonable cycling distances, proposed major upgrades to the surrounding cycle network by Randwick City Council and improvements in bicycle parking and end of trip facilities indicate that there is an excellent opportunity to promote cycling as a mode of transport for staff. As result, a 2% increase in mode share is likely reasonable.

An annual travel survey is recommended as the mechanism to monitor progress in reaching the target. A Staff Travel Survey has recently been undertaken and data will be used to update base line travel data. Survey data will be used to further tailor the Green Travel Plan measures to ensure the target is achieved.

6. Next Steps

The SESLHD will work with the Randwick Hospitals Campus partners (Prince of Wales Hospital, Prince of Wales Private, Sydney Children's Hospital, Randwick and the Royal Hospital for Women) as well as UNSW, the research institutes and other providers across the Campus to develop and implement the Green Travel Plan.

SESLHD will continue to proactively engage and consult with patients, families, community, staff and relevant government agencies to refine and implement the Green Travel Plan initiatives.