aurecon

Project: Prince of Wales Hospital Randwick NSW
Nelune Comprehensive Cancer Centre & Australian Advanced Treatment Centre

Traffic and Transport Assessment - Stage 2 100% Design Development

Reference: 223921

Prepared for: NSW Health Infrastructure

Revision: 6

22 May 2013

Document Control Record

Document prepared by:

Aurecon Australia Pty Ltd
ABN 54 005 139 873
Level 2, 116 Military Road
Neutral Bay NSW 2089
PO Box 538
Neutral Bay NSW 2089
Australia

T +61 2 9465 5599
F +61 2 9465 5598
E sydney@aurecongroup.com
W aurecongroup.com

Document control						
Report Title		Traffic and Transport Assessment - Stage 2 100% Design Development				
Document ID			**Project Number**		223921	
File Path		P:\CIV\223921\3.Project Delivery\Traffic\Reporting\Stage 2\NCCC+AATC\223921 POWH Traffic and Transport Assessment - Stage 2 100% Design Development - Final.docx				
Client		NSW Health Infrastructure	**Client Contact**		Thinc Health	
Rev	**Date**	**Revision Details/Status**	**Prepared by**	**Author**	**Verifier**	**Approver**
0	17 August 2012	Draft Report	PS	PS	KH	KH
1	31 August 2012	Revised Draft Report	PS	PS	KH	KH
2	11 September 2012	Final Report	PS	PS	KH	KH
3	12 September 2012	Final Report	PS	PS	KH	KH
4	1 February 2013	Revised Final Report	PS	PS	KH	KH
5	28 March 2013	Revised Final Report	PS	PS	KH	KH
6	22 May 2013	Revised Final Report	PS	PS	KH	KH
Current Revision		**6**				

Approval			
Author Signature		Approver Signature	
Name	Para Sangarapillai	Name	Ken Hind
Title	Senior Traffic and Transport Engineer	Title	Associate Transport Services

Contents

Appendices

1. Introduction

Aurecon has been engaged by NSW Health Infrastructure to prepare a traffic report for the proposed Nelune Comprehensive Cancer Centre & Australian Advanced Treatment Centre (NCCC+AATC) at Prince of Wales Hospital, Randwick. The proposed NCCC+AATC will be constructed in two stages as follows:

- Stage 1 – Bulk excavation and construction of a lower ground treatment area, 4 underground radiotherapy bunkers, and a new underground tunnel connecting staff to the Building 3 and the hospital
- Stage 2 – Development of the remainder of the Nelune Comprehensive Cancer Centre & Australian Advanced Treatment Centre.

This traffic study has been undertaken as part of the development application for the Stage 2 of the proposed NCCC+AATC to assess the traffic impacts of the proposed development on the roads located immediately adjacent to the proposed development and to provide traffic advice during design and construction stages of the project. This report specifically addresses the requirements for the construction and operation aspects of the Stage 2 development of the NCCC+AATC.

1.1 Study area

The proposed NCCC+AATC site is located in the north east corner of the Prince of Wales Hospital Campus. Figure 1.1 shows the location of the proposed NCCC+AATC site.

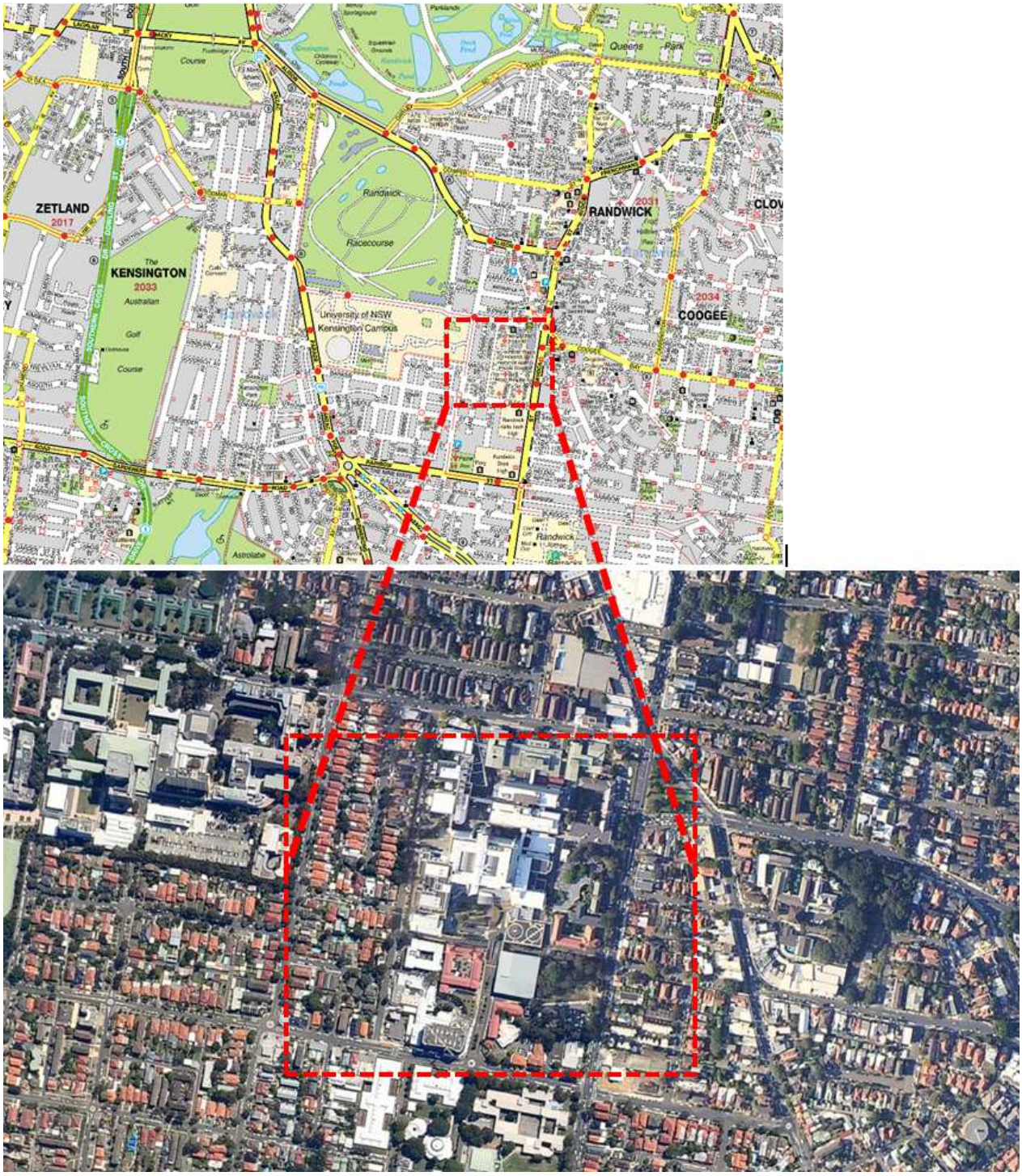


Figure 1.1 Site location

1.2 Project background

The Prince of Wales Hospital (POWH) is a tertiary referral teaching hospital and is located within the Randwick Health Campus. The POWH treats patients requiring specialised services for cancer through a referral pattern endorsed by NSW Health. The cancer services are currently provided for patients from the Northern Hospitals Network (NHN) of the South Eastern Sydney Illawarra Area Health Services (SESIAHS) which represent the primary catchment. Some services of the POWH are provided on a state wide level including Cancer Genetic Services.

The POWH needs to reconfigure and reorganise its services into a Nelune Comprehensive Cancer Centre (NCCC) for the following reasons:

- Consolidate its services that are currently located in more than eight (8) separate locations across the Randwick Campus in buildings ranging in age from 1950 to 1970.
- Existing bunkers (which house the linear accelerators that provide radiotherapy services) need to be replaced due to severe cracking and problems with leakage.

In September 2009 it was decided to construct a new cancer facility by consolidating its facilities at one location within the Prince of Wales Hospital campus.

During the development of the NCCC in 2012, it was decided to add Australian Advanced Treatment Centre (AATC) to the facility.

Director-General's Environment Assessment Requirements (DGEARs)

The following items in relation to traffic and transport assessment need to be addressed in the DGEARs for the Stage 2 development of the proposed NCCC+AATC.

Item 6 of the DGEARs – Transport and Accessibility (Construction and Operation)

- Address the implications of the development on non-car travel modes; the potential for implementing a location-specific sustainable travel plan, and the provision of facilities to increase the non-car mode share for travel to and from the site.
- Provide accurate details of daily vehicle movements including emergency vehicles (if applicable) and assess the impacts of this traffic on the local road network, including any impact on nearby intersections and the need for upgrading or road improvements.
- Detail access arrangements during construction and operation and address any impacts on the operation of Avoca Street, other local roads in the vicinity of the access point and vehicle movements within the hospital.
- Analyse the car parking requirements for the proposal, including consideration of any loss of existing on-site parking and the need for compensatory parking.
- Details of all service vehicle movements.
- Provide a draft Construction Traffic Management Plan.

<u>Relevant Policies and Guidelines</u>

- Guide to Traffic Generating Developments (RTA)
- Planning Guidelines for Walking and Cycling
- NSW 2021: A Plan to make NSW number one

2. Existing traffic and parking situation at Prince of Wales Hospital

2.1 Existing road network

Avoca Street

The section of Avoca Street between Cowper Street and Anzac Parade is a State Road and is under the care and control of Roads and Maritime services (RMS). Avoca Street carries approximately 23,000 vehicles per day south of High Street. Avoca Street is signposted for a 60km/h speed limit in the vicinity of the site.

High Street

High Street is classified as a Regional Road and carries approximately 6,700 vehicles per day west of Avoca Street. High Street is a two way, two lane road. High Street provides access to the Prince of Wales Hospital, University of New South Wales and Randwick Racecourse. High Street connects Anzac Parade and Avoca Street. High Street is signposted for a 50km/h speed limit. Parking is currently allowed on both sides of High Street.

Cuthill Street

Cuthill Street is classified as a Regional Road and carries approximately 7,300 vehicles per day east of Avoca Street. Cuthill Street is a one-way street and allows westbound movements only from Coogee Bay Road to Avoca Street and Belmore Road and is signposted for a 50km/h speed limit. Parking is allowed on both sides of Cuthill St.

Belmore Road

Belmore Road west of Avoca Street is classified as a collector road and carries approximately 6,800 vehicles per day west of Avoca Street on a two-way road. Belmore Road is signposted for a 50km/h speed limit. The Randwick shopping centre is located on either side of Belmore Road between the High Street/Avoca Street intersection and Allison Road. Belmore Road, east of Avoca Street, is classified as a Regional Road and carries approximately 5,300 vehicles east of Avoca Street on a one-way road (eastbound movements are allowed).

Avoca Street/ High Street/Belmore Road intersection

Avoca Street/High Street/Belmore Road intersection is a signalised intersection and all movements are allowed at this intersection except the following movements.

- Avoca Street (north) to Belmore Street (north)
- Avoca Street (south) to Belmore Street (south)
- Avoca Street (north) to High Street (7am-9am & 4pm-6pm)

Avoca Street/Cuthill Street intersection

Avoca Street/Cuthill Street intersection is a signalised intersection. Cuthill Street provides two right turn lanes and a left turn lane at the intersection with Avoca Street. There is a ‘No Right Turn’ restriction in Avoca Street at the intersection with Cuthill Street with the one way westbound operation of Cuthill Street.

2.2 Existing traffic volumes

Daily traffic volumes and growth rates

Based on the RTA Traffic Volume Data – 2005, the Annual Average Daily Traffic (AADT) volumes recorded on the roads located within the road network adjacent to the study area are provided in Table 2.1.

Table 2.1 Annual average daily traffic volumes and growth rates

Station number	Location	Annual Average Daily Traffic Volume (AADT)				
		1996	1999	2002	2005	Growth rate per annum (1996-2005)*
13.174	Avoca Street, MR660-Kingsford-North of MR661, Anzac Parade	18,309	19,178	17,804	17,450	-0.5%
12.012	Anzac Parade, MR171-Kingsford-North of Day Avenue	40,954	41,947	40,395	38,793	-0.6%
13.099	Rainbow Street,MR183-Kingsford-West of Willis Street	14,693	17,176	14,561	13,799	-0.7%

* Note – Linear growth rate

Based on Table 2.1, it is evident that no growth in traffic occurred for the roads in the road network located immediately adjacent to the study area.

2.3 Peak hour traffic volumes

The peak hour traffic volumes along Avoca Street, High Street, Belmore Road and Cuthill Street are provided in Table 2.2. The peak hour traffic volumes are based on the results of the morning and afternoon peak hour traffic surveys undertaken on Wednesday 12 October 2011 at the Avoca Street/High Street/Belmore Road and Avoca Street/Cuthill Street intersections. The summary results of the traffic surveys are attached in Appendix A.

Table 2.2 Existing peak hour traffic volumes (2011)

Location	Direction	Peak hour traffic volumes (veh/h)	
		AM peak	PM peak
Avoca Street – North of High Street	NB	881	857
	SB	733	716
Avoca Street – South of High Street	NB	1627	1331
	SB	660	708
High Street – West of Avoca Street	EB	275	481
	WB	398	258
Belmore Road – West of Avoca Street	NB	433	355
	SB	250	337
Belmore Road – East of Avoca Street	SB	513	687
Cuthill Street – East of Avoca Street	WB	734	529

2.4 Existing performance of intersections

The level of service analysis of the intersections was undertaken based on the Level of Service (LOS) criteria for intersections specified in the RMS Guide to Traffic Generating Developments. Table 2.3 provides the descriptions of the level of service.

Table 2.3 Level of Service Criteria for Intersections

Level of service	Average delay per vehicle (secs/veh)	Traffic signals, Roundabout	Give way & Stop signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study is required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays	At capacity, requires other control mode

The existing performance of the key intersections in the study area for the morning and afternoon peak hour traffic volumes has been assessed using the SIDRA intersection analysis software. The traffic volumes that were used for the intersection analysis are provided in Appendix A. The results of the analysis are summarised in Table 2.4.

Table 2.4 Existing intersection performance – 2011

Intersection with Avoca Street	Type of Control	Peak Hour	Degree of Saturation (DS)	Average Delay (secs/veh)	Level of Service (LOS)
High Street/Belmore Road	Signal	AM	0.589	24.6	B
		PM	0.628	33.1	C
Cuthill Street	Signal	AM	0.568	24.0	B
		PM	0.498	19.9	B

From Table 2.4, it can be seen that the existing performance of the intersections that are situated within the study area is generally assessed as being acceptable (LOS C or better) during the morning and afternoon peak hour periods.

2.5 Pedestrian and cyclists

Pedestrians

The POWH is located in a high pedestrian activity area due to the adjacent land uses such as UNSW and Randwick Shopping area. A traffic survey was undertaken at the intersections and pedestrian access locations from 6.00am to 10.00am and from 3.00pm to 7.00pm on Wednesday 12 October 2011 immediately adjacent to the POWH. The summary results of the pedestrian surveys are provided in Table 2.5. The gates surveyed included Gate 6, the entrance located on Avoca Street just south of the Cuthill Street intersection, the Heritage Gate located in front of the Edmund Blackett Building on Avoca Street and the pedestrian entry to Building 3 on High Street.

Table 2.5 Number of pedestrian movements at the POWH accesses

Location	Number of pedestrian movements	
	AM Peak Period (6.00am-10.00am)	PM Peak Period (3.00pm-7.00pm)
Gate No 6 of the POWH located on Avoca Street	265	228
Heritage Gate located north of Cuthill St on Avoca St	132	187
Gate west of Avoca Street on High Street	3	2

From Table 2.5, a high number of pedestrian movements are currently occurring at Gate No 6 and Heritage Gate. Pedestrian movement at the gate located west of Avoca Street on High Street are low since this access has not been designated as a pedestrian access point by POWH.

Cyclists

A high number of cyclist movements are currently occurring along Avoca Street and High Street. The summary results of the cyclist surveys undertaken on Wednesday 12 October 2011 are provided in Table 2.6.

Table 2.6 Number of cyclist movements

Location	Number of cyclist movements	
	AM peak period (6.00am-10.00am)	PM peak period (3.00pm-7.00pm)
Avoca Street – South of High Street	220	78
High Street – West of Avoca Street	56	61
Gate No 6 of the POWH located on Avoca Street	9	17

From Table 2.6, it is evident that a high number of cyclist movements are currently occurring on the road network located immediately adjacent to the POWH. A few cyclists are currently using Gate No 6.

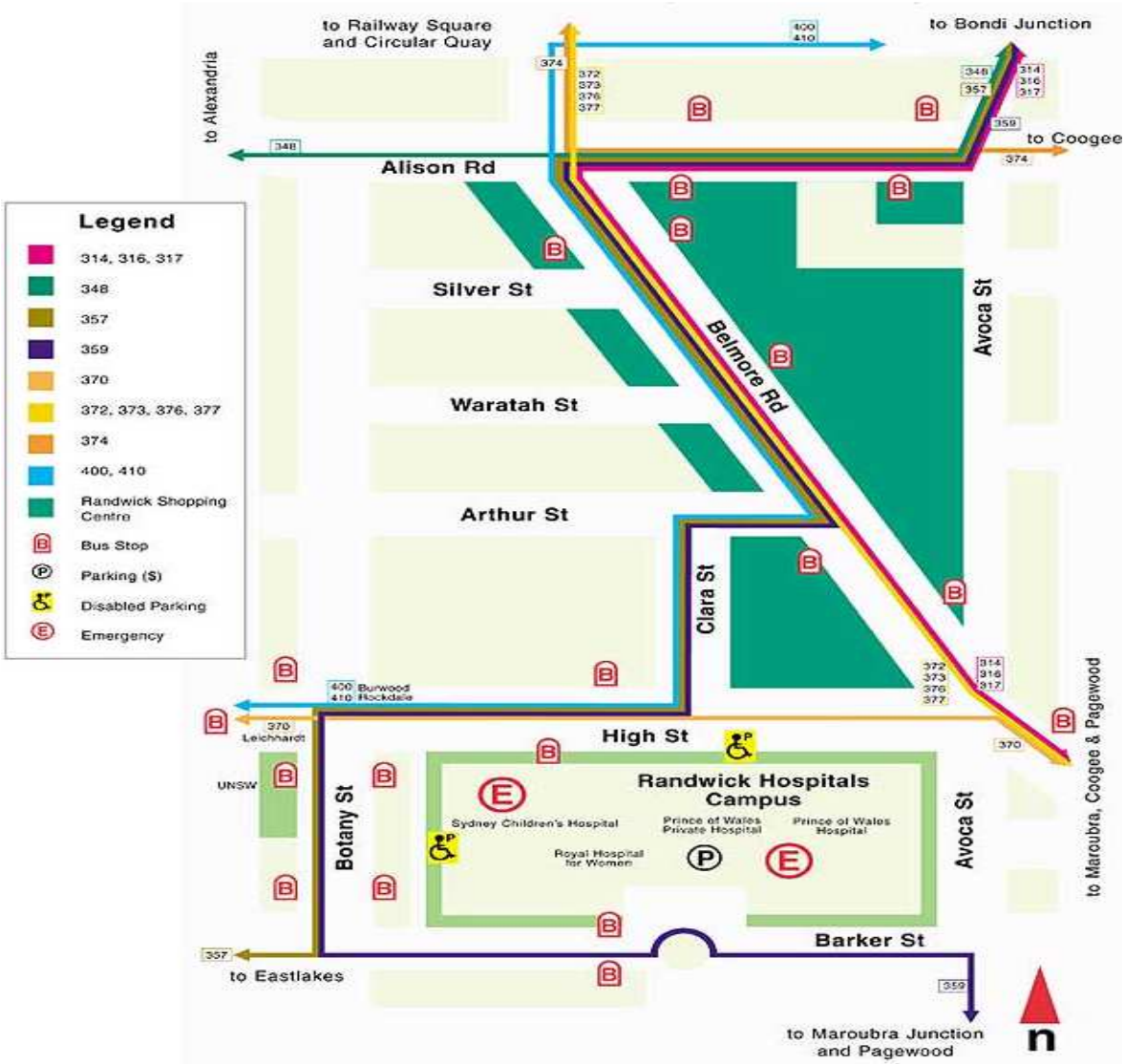
2.6 Bus services

The POWH is currently well served by bus services to the City and other parts of the eastern suburbs of the Sydney Region. The details of the bus services are provided below:

- Route No 314 – Coogee-Randwick-Bondi Junction
- Route No 316/317 – Eastgardens-Randwick-Bondi Junction
- Route No 357 – Sydenham-Eastlakes-Bondi Junction
- Route No 370 – Leichhardt-Glebe-Newtown-UNSW-Coogee
- Route No 372 – Coogee-Randwick Junction-Railway Square
- Route No 373 - Coogee-Randwick Junction-Circular Quay
- Route No 376 – Maroubra Beach-Randwick Junction-Central-City
- Route No 377 – Maroubra Beach-Randwick Junction-City
- Route No 400 – Burwood-Mascot-Airport-Eastgardens-UNSW-Bondi Junction
- Route No 410 - Rockdale-Mascot-Eastgardens-UNSW-Bondi Junction

Bus stops

Bus stops are located on High Street, Belmore Road, Barker Street and Botany Road, as shown in Figure 2.1. Bus stops are located in High Street just west of Clara Street, Belmore Road north of Avoca Street and Barker Street west of Easy Street.



Source: SESIAHS

Figure 2.1 Bus stop locations

2.7 Existing access arrangement for the POWH

The existing vehicle access arrangements for the POWH Randwick Health Campus are via High Street, Avoca Street, Barker Street and Hospital Road as shown in Figure 2.2.

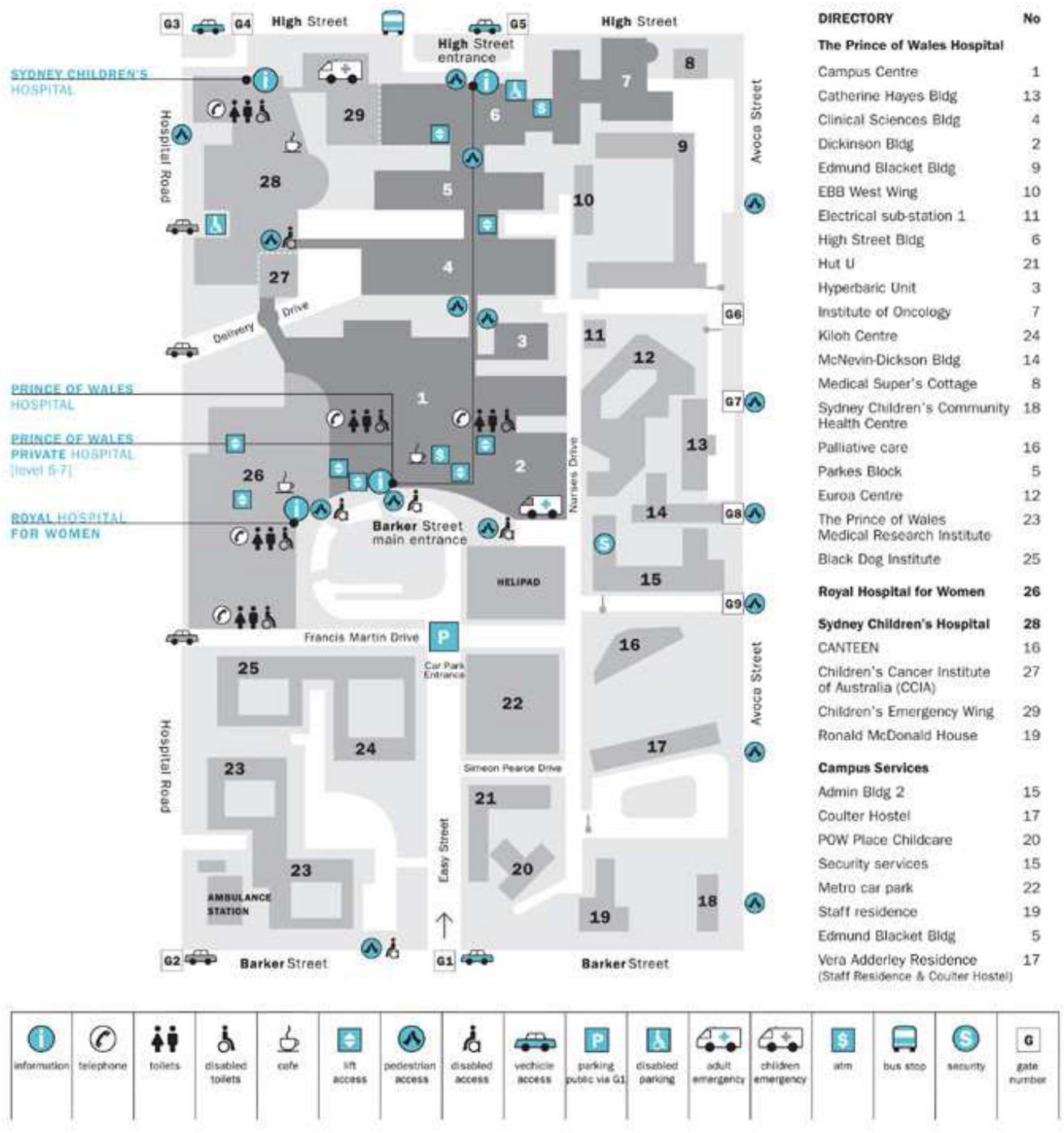


Figure 2.2 Existing Access Arrangement

The following access arrangements are provided via Avoca Street

- Vehicular and pedestrian access at Gate No 6 – This gate provides access for staff and the vehicles operated by the POWH. A concrete central median is provided on Avoca Street to restrict left in/left out movements to/from Avoca Street at this gate.
- Pedestrian access – a total of 7 pedestrian accesses are provided along Avoca Street including a pedestrian access (Heritage Gate access) which is located north of Cuthill Road.

The following access arrangements are provided via High Street

- Vehicular and pedestrian access at Gate No 5 – This gate provides access to emergency vehicles and other vehicles.
- Vehicular access at Gate No 4

2.8 Existing parking situation

POWH car parking

The following information in relation to the existing car parking was provided by Health Infrastructure.

- Number of car parking spaces provided on-site is approximately 2,240.
- Only staff exit the main car park onto Hospital Road
- Patient/visitor traffic enters and leaves the site via Easy Street Only
- Hospital Road at the intersection with Barker Street is restricted to left in/left out
- Entry at Gate 6 (off Avoca) is restricted to left in/left out only.
- Car parking facilities within the POWH campus are operated under Licence to a third party (International Parking Group) managed by Metro Parking Management.
- Edmund Blackett Building parking is not included in Metro's managed spaces but is part of the total number of Car Spaces on site

There is an existing car park located immediately adjacent to Edmund Blackett Building with access off Avoca Street. This parking area is designated as staff car park and most of the cars parked at this location are owned by the hospital. It appears that vehicles are parked overnight and staff use the vehicles to undertake their work. Most of the staff arrive at the car park and leave the car park for outside works after a short period of time.

A car park utilisation survey was carried out at the Edmund Blackett Building car park at 1 hour intervals from 7.00am to 6.00pm on Wednesday 12 October 2011. Table 2.7 shows the available parking spaces during the parking survey period.

Table 2.7 Available Parking Spaces

Time	Capacity of the Car Park	Demand	Available parking spaces
7.00am	59	47	12
8.00am	59	53	6
9.00am	59	50	9
10.00am	59	48	11
11.00am	59	51	8
12.00am	59	51	8
1.00pm	59	55	4
2.00pm	59	53	6
3.00pm	59	58	1
4.00pm	59	58	1
5.00pm	59	56	3
6.00pm	59	51	8

From Table 2.7, the car park utilisation is high during most of the survey period and the peak car parking demand occurs between 3.00pm and 4.00pm. Maximum car parking demand is 58 spaces with the existing car park having a capacity of 59 spaces.

On-street car parking

Parking demand is also high on the roads located immediately adjacent to the POWH. A car parking utilisation survey has been undertaken from 7.00am to 6.00pm on High Street, between Avoca Street and Hospital Road. The results of the survey indicated that the utilisation of on-street car parking spaces is high during the entire survey period.

2.9 Adjacent landuses

University of New South Wales

The University of New South Wales (UNSW) is located west of POWH on High Street. Bus services are exclusively provided for university students only from Central Station and Green Square Station during morning and afternoon peak hour periods. Therefore, the bus services that are currently servicing the POWH are not impacted by the operation of the UNSW.

Randwick Racecourse

The Randwick Racecourse is located opposite to UNSW and the car park access to the racecourse is provided via High Street. A total of 10 race meetings are scheduled for first half of 2013 with only one of the meetings occurring mid-week. The remainder of the meetings occur on weekends or public holidays.

3. Proposed Development

3.1 Proposed Nelune Comprehensive Cancer Centre & Australian Advanced Treatment Centre

Nelune Comprehensive Cancer Centre (NCCC)

The range of services proposed for the new NCCC will include all of the following:

- Adolescent and Young Adult (AYA) Services for radiotherapy for patients of the Sydney Children's Hospital (SCH)
- Allied Health Services
- Breast Cancer Care Services
- Breast Screen Services
- Cancer Genetic Services – Statewide service
- Cancer Outreach Team
- Cancer Registry
- Clinical Trials
- Community and Outreach Services
- Diagnostic and interventional imaging provided by medical imaging and nuclear medicine services on site (including PET-CT)
- Gynaecological Oncology Services (from Rural Health Workforce)
- Haematology – malignant and non-malignant blood disorders.
- Inpatient services
- Integrated ambulatory services including chemotherapy, apheresis, infusions, biopsies, minor procedures and other treatments that may emerge over time.
- Medical Oncology and Radiation Oncology Services
- Palliative Care Services
- Pathology Services provided by South Eastern Area Laboratory Services
- Patient and Carer Support Services
- Pharmaceutical Services provided by the POWH Pharmacy Department
- Surgical Cancer Services
- Thalassaemia Services

Australian Advanced Treatment Centre (AATC)

The AATC will be an early phase clinical trial facility in NSW, which will provide the opportunity for medical treatment and cures-of-tomorrow to be tested. Clinical trials will be conducted onsite and AATC will provide an opportunity for medical treatments to be tested, patients will access the site for medications for all diseases, including cancer. A total of 50 staff will work on the site and 20 visitors are expected to access the facility daily.

3.2 Proposed traffic and parking arrangements

The proposed NCCC+AATC include the following traffic and parking arrangements during construction and operation of the Stage 2 development of the facility.

Construction

- No construction vehicle access will be provided via Gate No 6. All construction vehicles need to park on High Street at the proposed works zone which will located between Avoca Street and the disabled parking space on the southern side of High Street. All construction materials will be lifted from construction vehicles using a crane.
- All parking between Avoca Street and the disabled parking space on the southern side of High Street will need to be removed to accommodate the proposed 'Works Zone".
- Pedestrians walking on the southern side of High Street will be diverted to use northern side of the footpath between Avoca Street and marked pedestrian crossing (see Figure 8.1).
- Parking within the POWH provided south of the Heritage Gate will be reinstated. All parking provided north of the Heritage Gate will be relocated to a nearby site and the car park area will be used for construction purposes. A total of 35 parking spaces including two (2) disabled parking spaces will be relocated. Additional parking is in the process of being constructed at the Mental Health Intensive Care Unit in the south east corner of the site. The 62 spaces will be used by the SESLHD vehicles until the car parking at the front of the EBB is re-instated, approximate timing around May 2014.
- Pedestrian access via Heritage Gate will be allowed to the Edmund Blackett Building. However, Pedestrian access to the Stage 1 development of the NCCC+AATC will be provided via the existing Building 3 entry off High Street. This access will be provided by means of a tunnel between Building 3 and the proposed Stage 1 development of the NCCC+AATC.
- Existing emergency vehicles access arrangement for Cancer Patients will be maintained for the proposed NCCC+AATC via High Street.
- All service vehicles will access the current loading dock off Hospital Road for deliveries.

Operation

- Pedestrian access to the proposed NCCC+AATC will be provided via Gate No 6 and Heritage Gate accesses.
- All parking provided south of the Heritage Gate will be reinstated. A total of 20 parking spaces including two disabled parking spaces will be reinstated north of the Heritage Gate and the remainder (15 parking spaces) will be relocated to a nearby site. These 20 parking spaces will provide short term parking for the dropping off/picking up of patients. Longer term parking will

occur in the centralised parking area for POWH. Additional parking has been identified at the Mental Health Intensive Care Unit in the south east corner of the site.

- Vehicle access for Cancer Patients will be via Gate 6 (Avoca Street) or High Street.
- All service vehicles will access the current loading dock off Hospital Road for delivery

The proposed car parking arrangement north of the Heritage Gate is provided in Figure 3.1.

Figure 3.1 Proposed car parking arrangement during operation north of the Heritage Gate.

The following comments are provided in relation to the proposed vehicle access and parking design.

- Short term hospital parking areas need to be adopted to comply with the Australian Standards: *AS/NZS 2890.1:2004: Parking facilities, Part 1:Off-street car parking*.
- The Void has been protected with barriers to prevent errant and/or reversing vehicles/motor cycles entering the Void when leaving the parking spaces proposed on the eastern side or circulating the Void.
- Concrete block seating is proposed at several locations including on the footpath. These concrete blocks might provide a hazard to visually impaired pedestrians. Therefore, the concrete block seating proposed on foot path should be located clear of the pedestrian pathway.

3.3 Swept path analysis

A swept path analysis has been undertaken to check vehicle movements at the critical locations during the construction and operation. Some basic features of the swept paths for each of the figures in Appendix B are as follows:

- The path of the blue line for each vehicle indicates the swept path of the vehicle body.
- The path of the purple line for each vehicle indicates the swept path for the low speed manoeuvring clearance of 300 mm on both sides.
- The swept path analyses were assessed at a design speed of 5 km/h, which is the standard recommended low speed manoeuvring turn speed.

The swept path analyses were performed in accordance with the Australian Standards AS 2890.2–2002 Parking facilities Part 2: Off-street commercial vehicle facilities.

Construction

The swept path analysis has been undertaken for the following movements/manoeuvres. Appendix B provides drawings (Figures B1 to B2) illustrating the swept path analyses for 8.8m Medium Rigid Vehicle (MRV) and 12.5m Heavy Rigid Vehicle (HRV)/bus and incorporates the following:

- Bus movements when construction vehicles parked 30m west of Avoca Street on the southern side of High Street
- Construction vehicle movements to parking on the proposed High Street works zone

Based on the results of the analysis, heavy vehicles would only pass a parked heavy vehicle on the proposed works zone, if the heavy vehicle is parked beyond 30m from Avoca Street on the southern side of High Street.

Operation

The swept path analysis has been undertaken for turnaround movements around the Void area during operation of the NCCC+AATC. Appendix B provides drawings (Figures B3 & B4) illustrating the swept path analyses for an ambulance and 6.4m Small Rigid Vehicle (SRV). The turnaround area located at the Void would not be able to accommodate vehicles longer than SRV.

Based on the results of the swept path analysis, the turnaround area around the void would not be able to accommodate the vehicles larger than 6.4m.

4. Future traffic and transport situation

This section provides the details on relation to the traffic and transport operation during the operation and construction of the Stage 2 development of the NCCC+AATC.

4.1 Traffic generation

Construction

It is estimated that less than five construction vehicle movements are expected to occur during peak periods. These traffic movements do not include site staff who will be encouraged use public transport due to the non-availability of parking on the site and immediately adjacent to the site. Site staff traffic movements would be minimal during the peak hour as most will arrive prior to 7.00am and depart after 5.00pm. It is expected that any movements would be less than five trips during the peaks.

Operation

Since the proposed NCCC is aimed to consolidate existing Cancer services and with only a small growth in patient numbers identified, no expansion of staffing is anticipated. The additional patients using the POWH would arrive and depart throughout the day (not necessarily during peak hour periods).

However, AATC is expected generate additional 42 staff vehicle movements (for 50 staff) and 20 visitor movements (one-way) daily. These staff and visitors are expected to park in the main car park and on-street since no designated parking area will be provided for them.

4.2 Future intersection performance

Construction

The existing performance of the intersections is acceptable and is expected to continue with an acceptable level during the construction since only a small number of construction vehicles are anticipated to access the work zone on High Street during the peak periods.

Operation

The existing performance of the intersections is acceptable and is expected to continue with an acceptable level since the traffic growth is not anticipated in the roads located immediately adjacent to the POWH based on the historical traffic growth and a small growth in patient numbers identified and no expansion of staffing is anticipated.

4.3 Pedestrian and cyclists

Construction and operation

No changes to the pedestrian and cyclist movements are expected during the construction and the operation of the Stage 2 development of the NCCC+AATC. The pedestrian access at the Heritage Gate on Avoca Street will be allowed. Cycle access will also be redirected to Gate 7.

Pedestrian and cycle access along Avoca Street will be maintained during construction and operation of Stage 2.

4.4 Bus services

Construction and operation

No changes to the bus services are required or anticipated during the construction and the operation of the Stage 2 development of the NCCC+AATC. None of the bus stops that are located immediately adjacent to the POWH will be affected during the construction and operation of the NCCC+AATC.

4.5 Emergency vehicle access

Construction

No changes to the emergency vehicle access during the construction of the Stage 2 development of the NCCC+AATC. Existing emergency vehicle access via High Street will be used and patients will be transported via the proposed tunnel connecting Building 3 and the Stage 1 development.

Operation

Emergency vehicle access will be provided via Gate 6 as well as High Street. In most cases emergency vehicles would use the existing entry to the hospital off High Street. The height of the canopy from finished paved area to the underside should be 3.5 metres (3.2 metres to the underside of any beam). It is understood that the design of the entry area to the NCCC+AATC has been designed to accommodate ambulances

4.6 Service vehicle access

Construction and operation

No loading dock will be provided in the proposed NCCC+AATC and existing service vehicle movements/arrangements via Hospital Road will be maintained during the construction and operation of the NCCC+AATC. No deliveries are proposed to occur at the front entrance to the new NCCC+AATC off Avoca Street. The existing loading docks within the hospital grounds will be used for the new facility and POWH needs to manage the duration of delivery vehicle occupancy at the loading dock to avoid queuing of delivery vehicles.

5. Proposed traffic management measures

The following traffic management measures are recommended for the safety of staff, road users and visitors to the PWOH for the Construction and operation of Stage 2.

Construction

The following traffic management measures are proposed during the construction:

- A minimum of one RMS certified Traffic Controller be present to manage traffic when trucks are reversing within the proposed works zone and when entering or exiting the works zone on High Street.
- A sign posting plan needs to be developed to ensure pedestrians, construction vehicles, hospital traffic and other traffic are kept away from the works zone and to avoid unnecessary reversing manoeuvres into traffic and pedestrian areas.

Operation

- A sign posting plan needs to be developed to guide pedestrian, hospital traffic and other traffic. Signposting should include maximum size (SRV) of the vehicle that could be allowed to access the Void area.
- A barrier needs to be provided around the Void to prevent vehicles falling into the Void.

6. Car parking assessment

EBB car park

Parking assessment has been undertaken to determine the parking loss during the construction and operation of the Stage 2 development of the proposed NCCC+AATC. Table 6.1 shows the estimated parking loss during the construction and operation of the Stage 2 development.

Table 6.1 Estimated parking loss

Stage	Available staff parking at the EBB car park	Available cancer patients parking at the EBB car park	Staff Parking demand at the EBB car park	Staff parking loss
Construction	24	0	59	35
Operation	24	20	59	35

Based on Table 6.1 it is evident that the proposed construction and operation activities of the proposed NCCC+AATC will remove some of the parking spaces at the front of the Edmund Blackett Building during the construction of Stage 2 development and the operation of the NCCC+AATC. A total of 60 staff parking spaces are proposed to be provided, during the construction, at the Mental Health Intensive Care Unit to compensate the staff parking loss. These 60 parking spaces will also be available during the operation of the NCCC+AATC, in addition to 20 short term parking spaces for patients attending the centre near the entrance of the NCCC+AATC.

AATC staff and visitor parking

AATC staff and visitors are expected to park at the main car park at POWH and on-street parking areas located adjacent to the POWH. POWH needs to develop and implement a Sustainable Travel Plan, as provided in Section 7 of this report, to encourage staff to use public transport and to minimise parking impacts within immediately adjacent to the POWH.

High Street parking

It is proposed to establish a ‘Works Zone’ on the southern side of High Street west of Avoca Street. This will require the removal of approximately 10 short term parking spaces along this section of road. These parking spaces are currently used by people either visiting the hospital or Randwick Town Centre users.

No on-street parking loss is expected during the operation of the NCCC+AATC. A total of 20 short term parking spaces including two disabled parking spaces will be provided for cancer patients north of the Heritage Gate during the operation of the NCCC+AATC. Some of the cancer patients currently parking on-street would be able to park on-site. This would have the potential to increase the capacity of on-street parking.

7. Sustainable travel plan

Based on the information provided by the POWH, no sustainable travel plans are currently available for the hospital campus. The proposed NCCC+AATC development is expected to increase the number of staff at the Hospital Campus. The patients visiting the proposed NCCC+AATC are unlikely to use sustainable transport options (walk, cycling and bus) due to the nature of treatment and would use private cars. Therefore, the development of a sustainable travel plan would help some of the existing NCCC+AATC staff to change travel mode from private cars to public transport. This will reduce the need for staff parking opposite the Edmund Blackett Building and to provide parking immediately adjacent to the proposed NCCC+AATC for cancer patents.

It should be noted that the POWH is located where a high level of public transport services are available. All staff and patients accessing the hospital campus are already provided with sustainable travel options. Since all necessary sustainable transport infrastructures are already in place, POWH needs to develop a sustainable travel plan following consultation with staff and public to identify ways and means to encourage them to use sustainable transport options. Based on the survey results the following actions could be considered:

- Provision of financial incentives by providing MyMulti, MyBus, and MyTrain annual passes through salary sacrifice scheme
- Provision of better public transport timetabling arrangement to suit the staff travel pattern by consulting with Sydney Buses and TfNSW
- Provision of bicycle parking facilities and associated infrastructures on site
- Provision of additional bicycle routes and footpath by consulting with Randwick City Council
- Encourage carpooling by providing reserved parking on-site for the staff participating in the carpooling scheme.

8. Traffic impact assessment

8.1 Road network

Construction

The increase in construction traffic movements (5 veh/h) during the peak periods compared to northbound traffic movements on Avoca Street (more than 800 veh/h during the morning and afternoon peak periods) is minimal. Therefore the impact on nearby intersections is marginal. As a result of this upgrading or road improvements are not required during construction.

Operation

The proposed NCCC is expected to slightly increase traffic movements to/from the Prince of Wales Hospital and the road network located immediately adjacent to the hospital. This increase will occur due to the patient drop and pick up activities which are anticipated to occur during off-peak periods at the proposed pick up and drop off area at the entrance area and the public car park located within the Hospital. This volume is not quantified at this time. However, it is estimated that it would be less than 10 movements per hour. Therefore, the impact on nearby intersections is minimal. As a result of this upgrading or road improvements are not required during operation. There would also be a corresponding reduction in staff vehicle movements with the reduced capacity of the car park in front of the Edmund Blackett Building for hospital/staff vehicles.

The proposed AATC is expected increase approximately 50-60 vehicle movements per hour to/from the Prince of Wales Hospital and the road network located immediately adjacent to the hospital during the morning and afternoon peak periods. This increase would have some impacts on the road network. POWH needs to develop and implement a Sustainable Travel Plan, as provided in Section 7 of this report, to encourage staff to use public transport and to minimise impacts on road network.

8.2 Pedestrian and cyclists

Construction and operation

The pedestrian access via the Heritage Gate at the Edmund Blackett Building will be open the duration of the construction works. The proposed construction and operation activities would not cause extensive delays and would not affect pedestrian and cyclist movements along Avoca Street and High Street. Construction vehicle movements will not be allowed via Gate No 6. Therefore the proposed construction and operation would have minimal impacts on pedestrian and cyclists.

8.3 Bus services

Construction

The proposed works zone on High Street will be provided so as not to block bus movements along High Street.

Construction and operation

Since the increase in traffic movements is predicted to be marginal during the construction and operation of the NCCC+AATC and no changes to the existing access arrangements to POWH, the proposed construction and operation activities would not cause extensive delays and would not affect bus services in the vicinity of the POWH. Therefore the proposed construction and operation would have minimal impacts on public transport operations.

The proposed works zone on High Street will be set without blocking the bus movements along High Street.

8.4 Light Rail

In December 2012 the NSW state government released “Sydney’s Light Rail Future”, which provided an outline for the implementation and expansion of the light rail network in Sydney. This plan outlined the provision of new light rail lines through the Sydney CBD, from Circular Quay to Central and extending to the south east to the University of NSW and Randwick. The outline of the route to Randwick indicates that it will travel along Allison Road, Wansey Road and High Street to a terminus and bus interchange located in Belmore Road near Coogee Bay Road. Subject to planning approvals, at this time the work is expected to commence in 2014.

The impact of the construction of the light rail during the construction phase of the NCCC+AATC cannot be assessed at this stage as the construction program for the light rail has not been finalised at the time of preparation of this report. Liaison and co-ordination with Transport for NSW will need to be carried out as the project develops to ensure that any disruptions to the project and the surrounding road network are minimised.

8.5 Adjacent landuses

Construction and operation

Since the increase in traffic movements is predicted to be marginal during the construction and operation of the NCCC+AATC, the impact on adjacent landuses is marginal.

8.6 Car parking on High Street

Construction

The proposed ‘Works Zone’ will remove approximately 10 short term on-street parking spaces on High Street during the construction.

8.7 Car parking at POWH

Construction

A total of 60 staff parking spaces are proposed to be provided during the construction at the Mental Health Intensive Care Unit to compensate the staff parking loss within the POWH. Therefore, off-street parking impact during the construction phase is minimal.

Operation

The proposed operation of the Stage 2 development of the NCCC+AATC would have an impact on the Edmund Blackett Building parking. The estimated staff parking loss is 35 spaces during the operation of the NCCC+AATC at this location. However, as indicated above, a total of 60 car parking spaces have been provided at the Mental Health Intensive Care Unit, within the POWH campus. The following measures are recommended to reduce the impact on car parking.

- POWH could provide parking at other locations for these vehicles. Alternative parking has been identified within POWH near Mental Health Intensive Care Unit in the south east corner of the site.
- Allow staff to park these cars at their home overnight

- Undertake a detailed car parking study to assess the car park utilisation and to identify the locations where the removed parking spaces due to the operation of the facility could be replaced

9. Draft construction traffic management plan

9.1 Legislative requirements, guidelines and standards

In order to identify and assess the requirements for the traffic management associated with the construction of the NCCC+AATC, there are a number of guidelines and standards that are applicable. These documents identify a number of requirements for managing the traffic generated by the works.

Table 9.1 below outlines the relevantly applicable acts, guidelines and standards that have been considered for the preparation of this traffic management plan.

Table 9.1 Legislative and guideline requirements

Relevant guidelines (author)	Summary of guidelines	Approvals/Permits or licences required
Roads Act 1993	Obtaining a Road Occupancy Licence (ROL) for the specified activities is a legal requirement under Section 138 of the Roads Act.	For all occupancies that are on or may impact upon a classified road (State Road/Regional Road), applications for a ROL are to be made to the RMS's Planned Incident Unit. For occupancies that impact solely on unclassified (Council) roads, applications for a ROL are to be made to the relevant Council.
Occupational Health and Safety Act 2000	Preparation of a Traffic Control Plan (TCP) is an OHS requirement of a work site, and a TCP must comply with AS 1742.3 to comply with the OHS Act.	Preparation of a Traffic Control Plan by appropriately qualified personnel.
Australian Standard 1742-2009: Manual of uniform traffic control devices – Part 3, Traffic control for works on roads, Standards Australia.	Refer to Part 3: Traffic Control Devices for Works on Roads to ensure the safety of the construction work site staff undertaking construction works in/near roads, and the safety of road users while road construction work is being undertaken.	Any new or temporary traffic control device must be installed in accordance with AS 1742.3-2009.

Relevant guidelines (author)	Summary of guidelines	Approvals/Permits or licences required
Traffic Control at Work Sites manual - Version 4, Issue 1, June 2010, RMS	Must be used on all RMS road work sites. Its use is also encouraged on non-RMS sites where practitioners are responsible for the control of traffic at work sites. Contains standard TCPs which can be used at work sites for which the plan meets all requirements. Where a standard plan does not meet the traffic control needs of a particular site, the manual provides procedures for the design of a new or site specific plan. If the manual does not contain advice on a particular aspect of traffic control, then AS 1742.3-2009 must be consulted and its advice adopted, if such advice exists.	Works approval required from RMS for RMS controlled roads. Approval required from the relevant Local Council's Traffic Committee for local (non-RMS) roads. Traffic control and the selection or designing of TCP's must only be undertaken by persons who are qualified, authorised, and have passed RMS-approved training courses.

9.2 Traffic management plan

Proposed construction activities

It is proposed that the construction activities will occur within the north eastern corner of the POWH campus. The TMP seeks to manage construction vehicles movements accessing and exiting the site throughout the day.

The following details of construction activities have been provided by Health Infrastructure:

- Construction activities will take approximately 14 months from May 2014.
- Car park area located north of Heritage gate will be used for construction activities. During the construction period, this car park will be closed to hospital vehicle parking.
- The proposed working hours during the construction period are Monday to Friday 6.30 am to 6.00 pm and Saturday 7.00 am to 4.00 pm. Generally, no work will be undertaken on Sundays and public holidays however, there may be the need for works out of these hours for specific construction activities.
- Approximately five deliveries of plant or materials will occur during the morning peak period and five deliveries are expected to occur during the afternoon peak period.
- It is advised that some of the plant and/or material deliveries to the site will take approximately 30 minutes whereas others may require longer periods. Delivery vehicles will predominantly consist of medium rigid and concrete trucks.

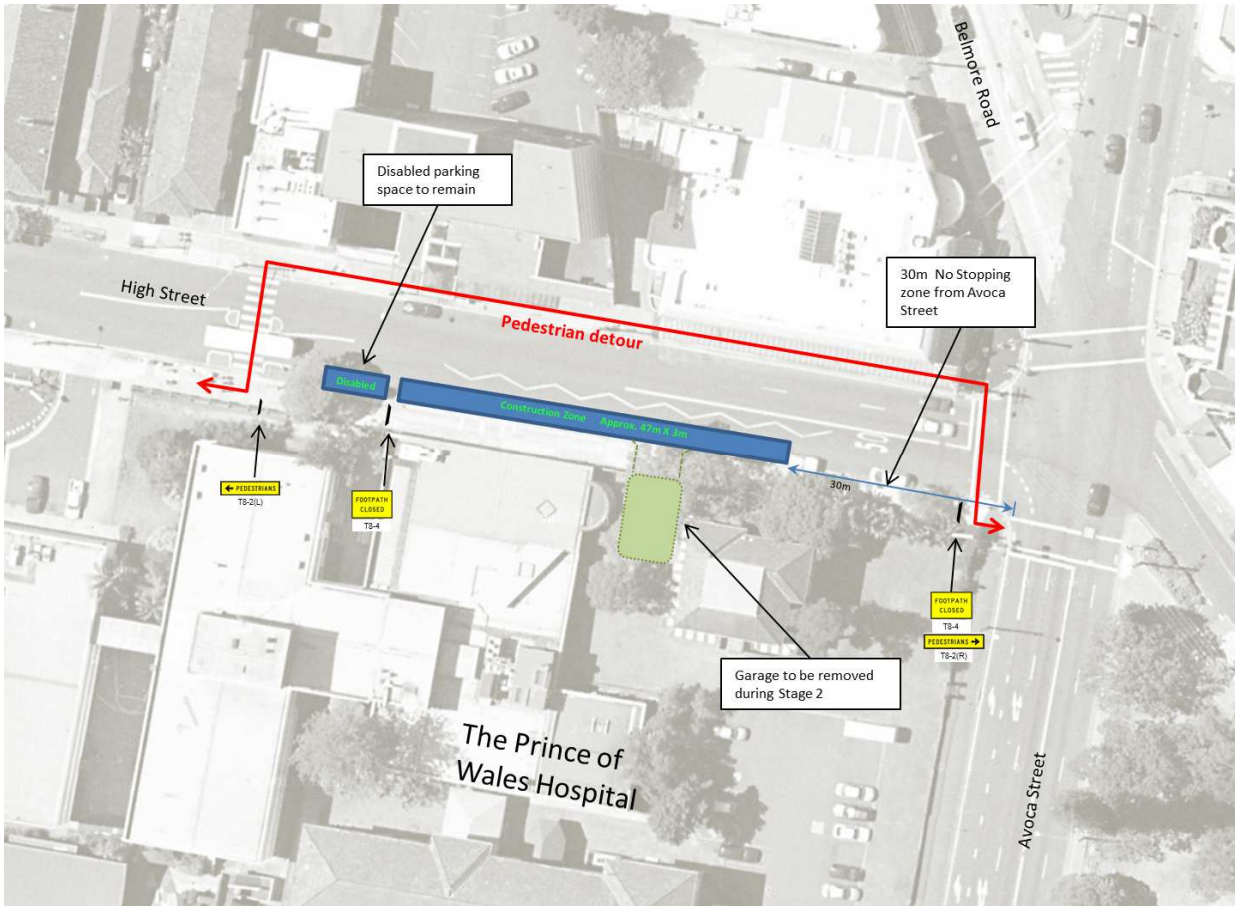
- It is recommended that construction staff use public transport to access the site since parking availability is limited within and immediately adjacent to the POWH. There will be no construction staff parking provided on-site.

The above activities will occur on a demand basis over the construction period. The number of movements per day will vary, however it is estimated that generally, it will not exceed 20 vehicle trips per day. It is expected there will be minimal impact on the operation of the traffic network.

A traffic management plan prepared for the proposed works zone on High Street and the details are provided below and in Figure 8.1.

- A 'Works Zone' restriction will be required to be implemented on the southern side of High Street, immediately west of Avoca Street. The works zone needs to be setup from 30m west of Avoca Street to the existing disabled parking space. A 'NO STOPPING' area will be provided for a 30m distance from Avoca Street on the southern side of High Street. This will be subject to Randwick City Council approval.
- The access to the garage located within the proposed works zone is not required as this garage will be removed during the Stage 2 construction period.
- Pedestrians walking on the southern side of High Street will be diverted to use northern side of the footpath between Avoca Street and marked pedestrian crossing.

Figure 8.1 Proposed works zone on High Street



Proposed construction haulage routes

It is recommended that all the delivery vehicles travel to and from the construction site by state and regional roads where possible. The following roads, as shown in Figure 8.2, are recommended for haulage activities based on the current road network restrictions:

- Inbound: via Anzac Parade –Rainbow Street – Avoca Street – High Street
- Outbound: via High Street – Anzac Parade

The proposed haulage routes are classified as either State Road or Regional Road. A number of schools are located along the proposed haulage route. Therefore, construction vehicle movements need to be limited during the school opening and closing periods.

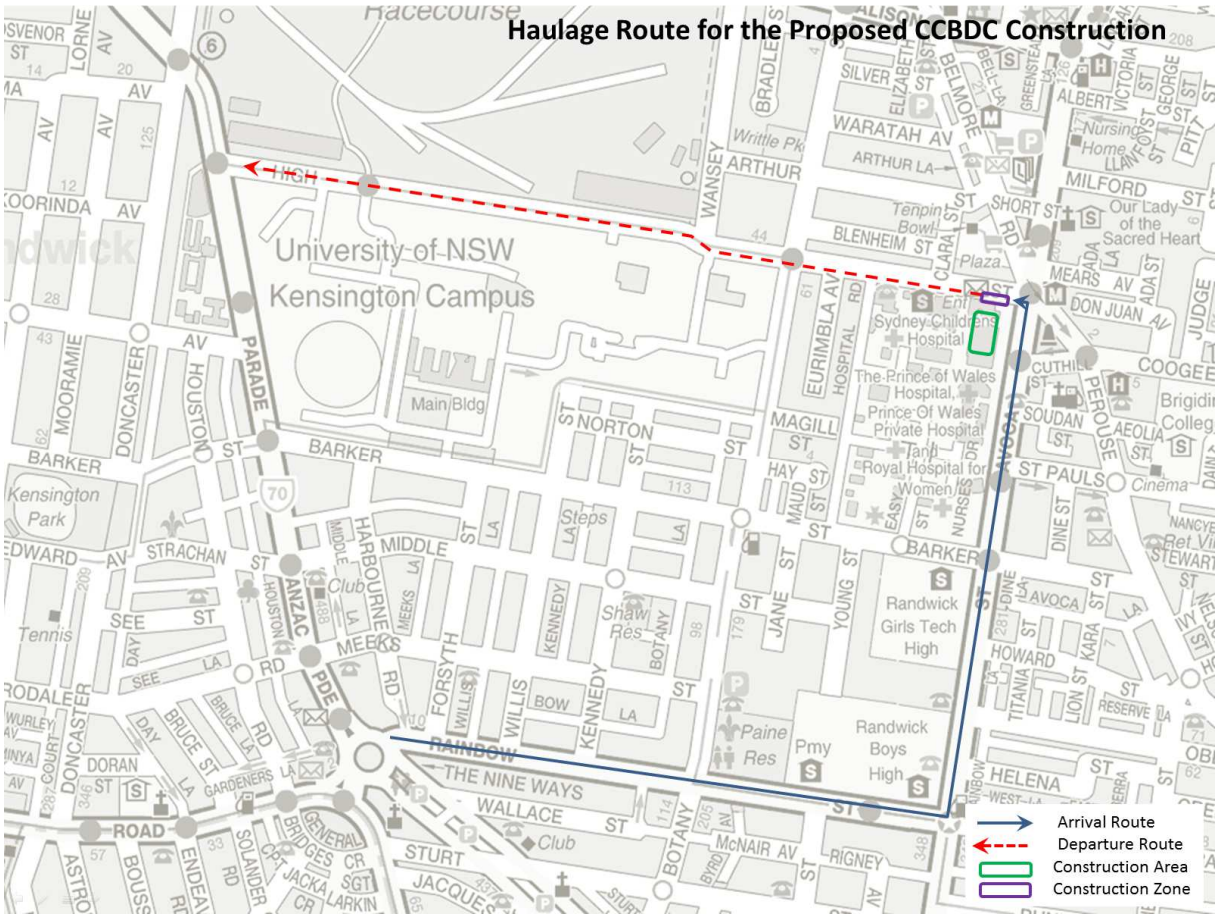


Figure 8.2 - Construction vehicle haulage routes

Marshalling of trucks shall be done to control construction vehicles entering and departing the work zone. This will be the responsibility of a RMS certified Traffic Controller.

If there is to be any low loader activities (delivery of large/heavy equipment and/or material), they are recommended to occur outside of morning and afternoon peak periods. The time of operation for low loaders is based on the RMS permission to use state roads, which would require a Road Occupancy Licence (ROL). The application for a ROL will be lodged to RMS prior to the commencement of works. All low loader activities such as loading and unloading of plant are to occur within the site where possible.

Construction guidelines

The base information for the preparation of this CTMP may be summarised as follows:

A detailed construction traffic management plan and traffic control plan needs to be prepared prior to commencing the construction works and submitted for RMS' approval.

Following the completion of the Detailed Construction Traffic Management Plan, Traffic Control Plan and the pedestrian management plan audits by RMS approved personnel shall be carried out.

Access and egress from the proposed works zone on High Street as shown in Figure 8.1. It is important that no construction vehicles use streets that have not been approved for use by RMS and/or Council. Construction vehicles are to enter and leave the site in a forward direction.

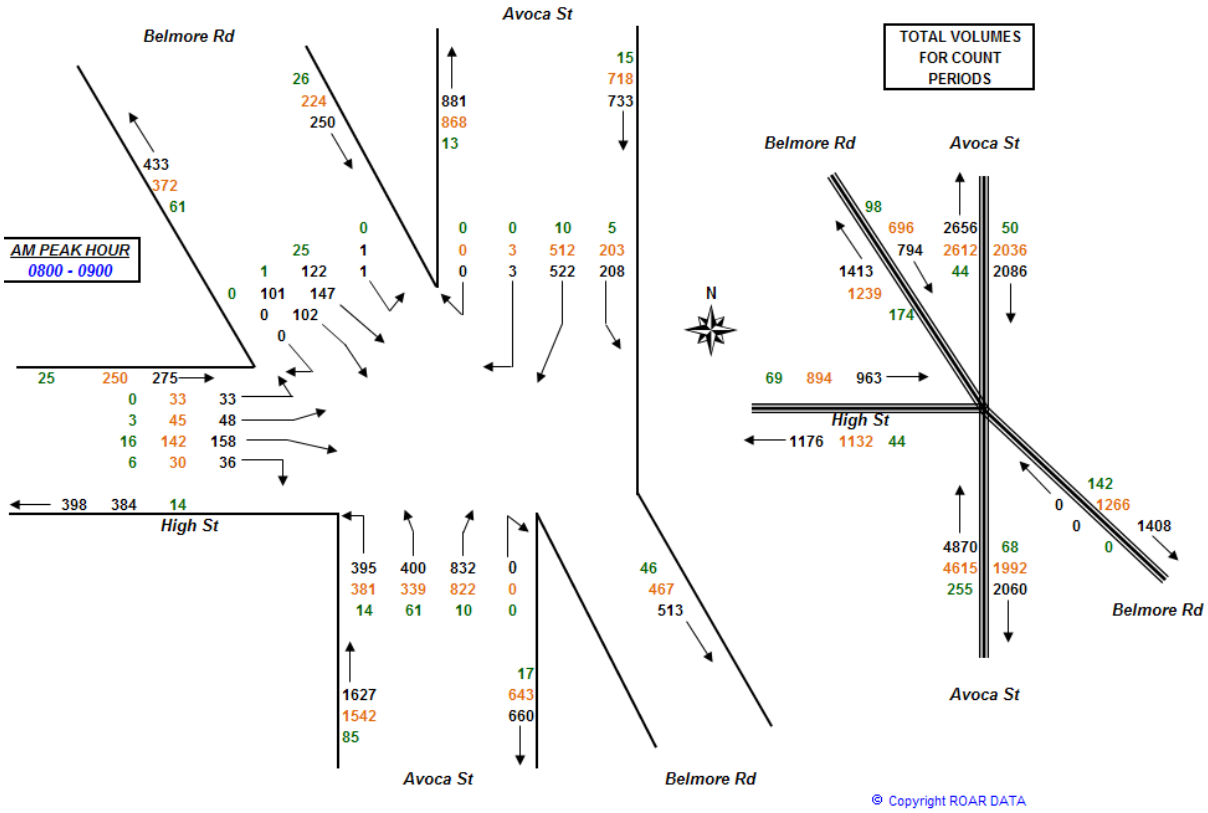
During the construction period where vehicles are required to cross over into the oncoming lane whilst manoeuvring into or out of the designated works zone transporting plant/material, it is required that a RMS certified Traffic Controller be present to manage traffic. The Traffic Controller must manage approaching vehicles adequately so queuing does not extend and block general traffic in the area.

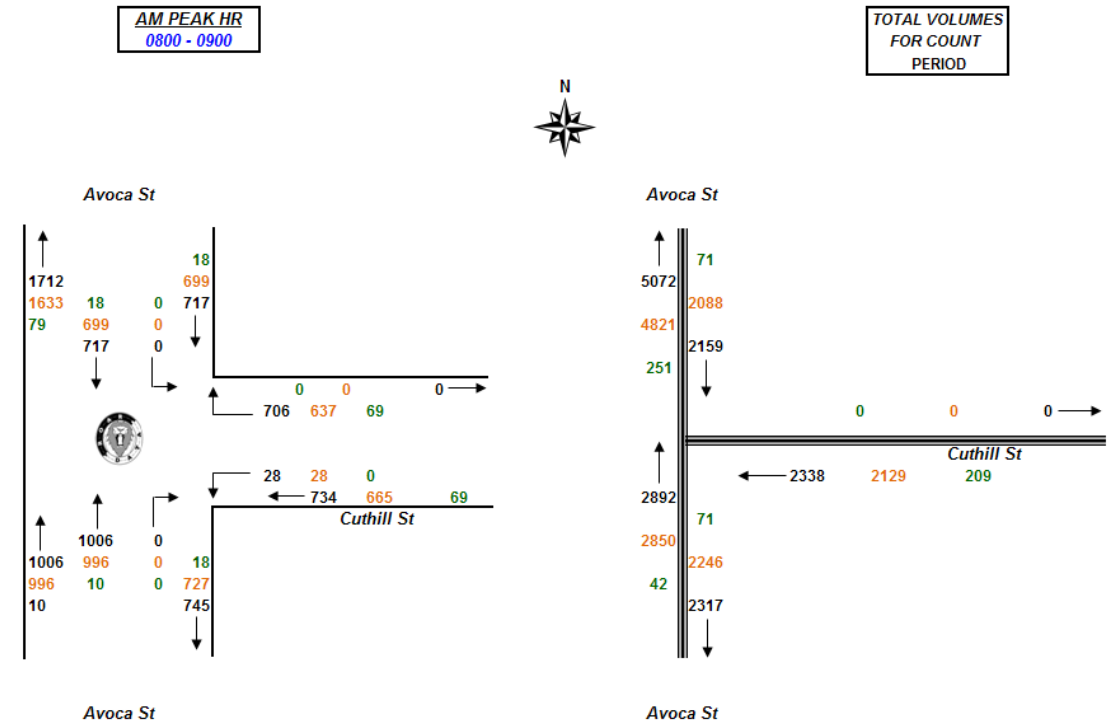
During construction, it is a requirement that all neighbouring properties are to remain accessible for both vehicle and pedestrian activities. It is unlikely that construction vehicles will block neighbouring properties however, should this occur, the construction vehicles are to be relocated immediately to allow temporary access/egress for local residents.

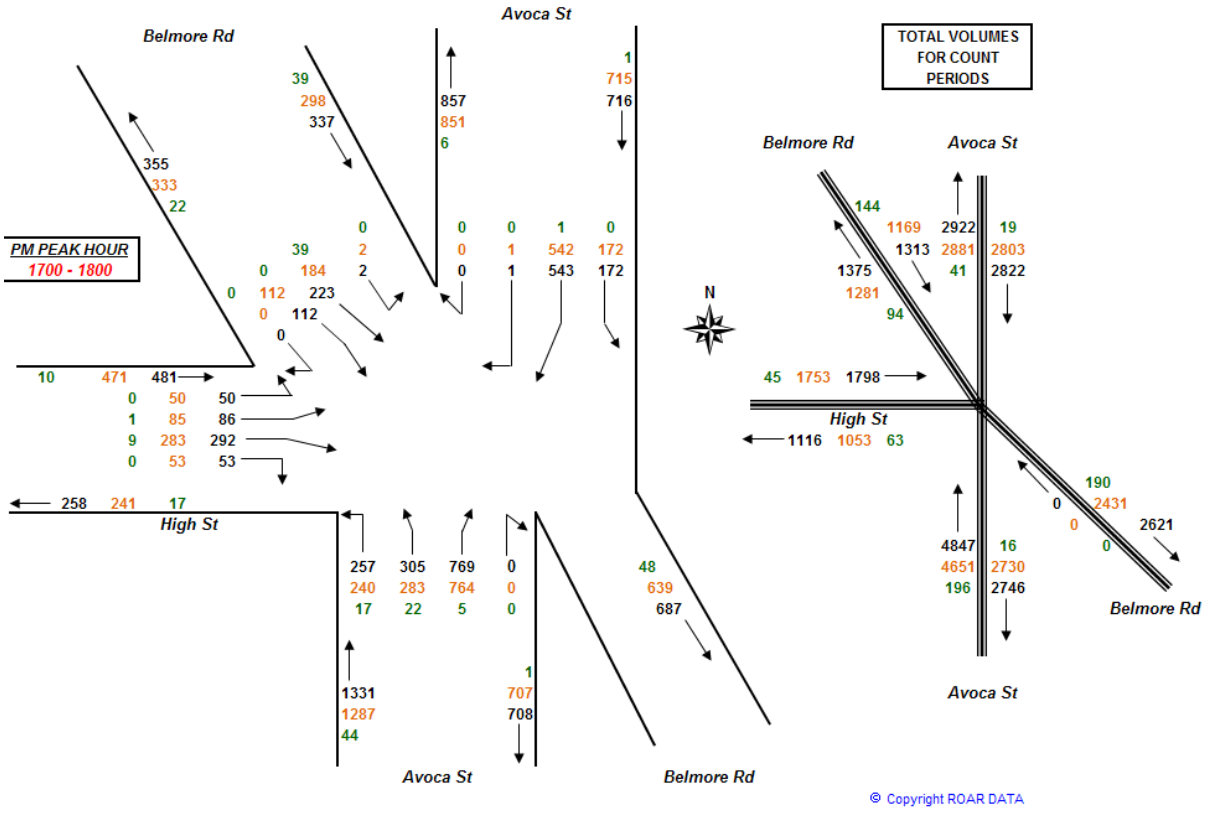
Any sections of the road, including kerb and footpath, which are damaged by construction vehicles, are required to be rectified at the cost of the contractor/developer following the completion of the construction period. It is recommended that a survey of the existing conditions be undertaken prior to commencement of works.

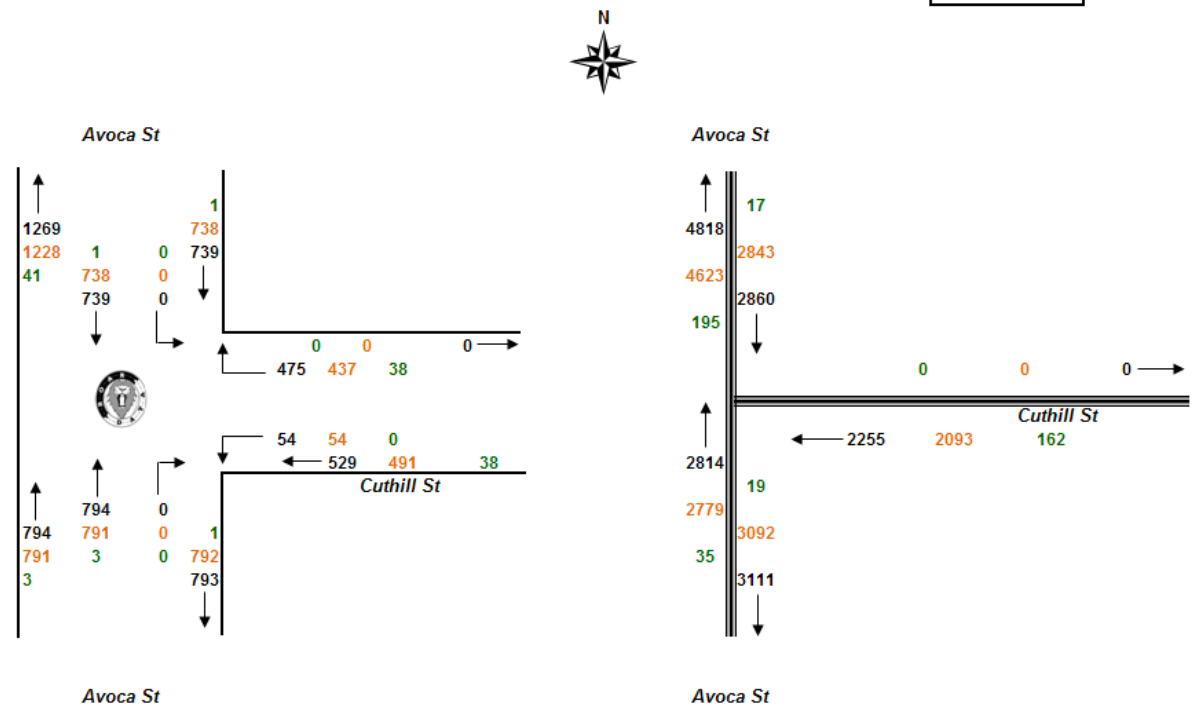
Construction vehicles movements should be minimised during the morning and afternoon peak periods, where possible, to reduce the impacts on road network located immediately adjacent to the POWH.

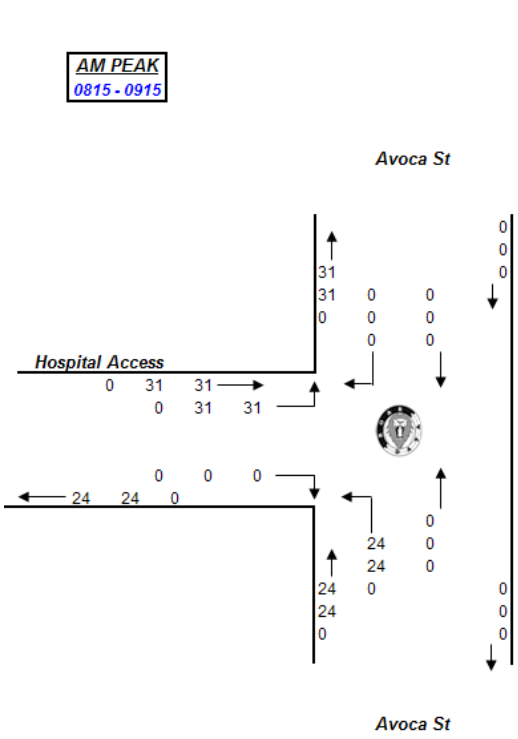
Appendix A
Results of traffic surveys

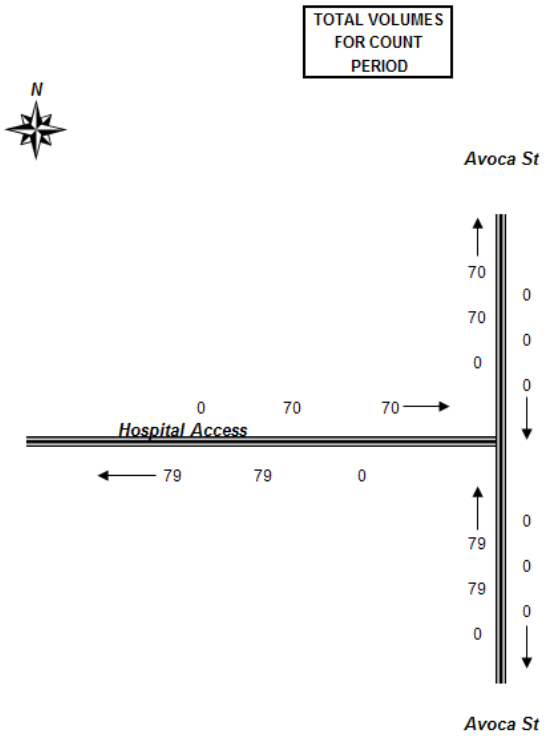

Avoca St
Belmore Rd
AM PEAK HOUR
0800 - 0900
TOTAL VOLUMES FOR COUNT PERIODS
Belmore Rd
Avoca St
High St
Avoca St
Belmore Rd
High St
Avoca St
Belmore Rd
N
© Copyright ROAR DATA

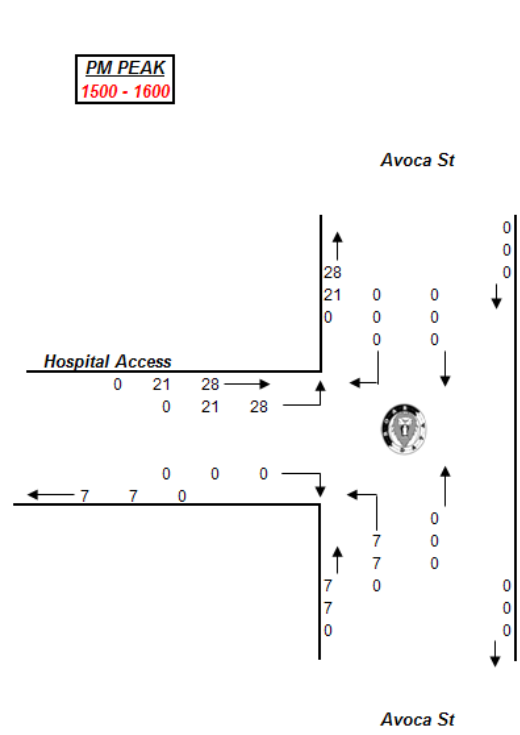

AM PEAK HR
0800 - 0900
TOTAL VOLUMES FOR COUNT PERIOD
N
Avoca St
Cuthill St
Avoca St
Avoca St
Cuthill St
Avoca St

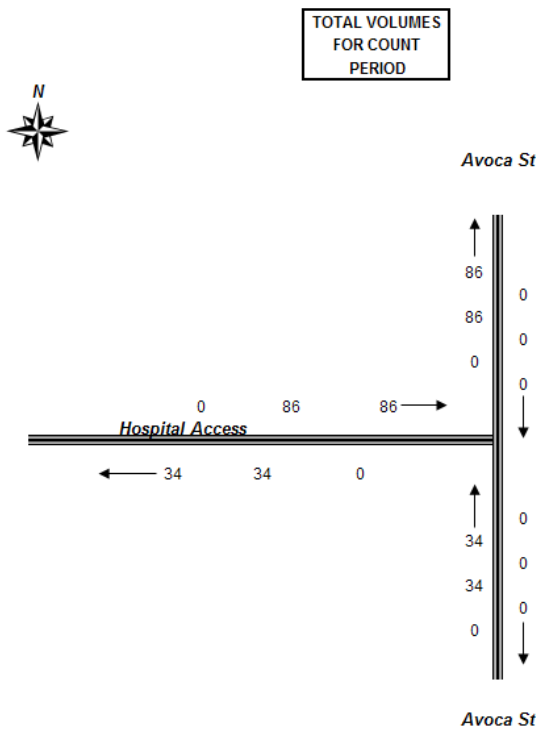

Avoca St
Belmore Rd
PM PEAK HOUR
1700 - 1800
TOTAL VOLUMES FOR COUNT PERIODS
Belmore Rd
Avoca St
High St
Avoca St
Belmore Rd
Avoca St
Belmore Rd
High St
N
© Copyright ROAR DATA


PM PEAK HR
1700 - 1800
TOTAL VOLUMES FOR COUNT PERIOD
N
Avoca St
Cuthill St
Avoca St
Avoca St
Cuthill St
Avoca St


AM PEAK
0815 - 0915
Avoca St
Hospital Access
Avoca St


TOTAL VOLUMES FOR COUNT PERIOD
N
Avoca St
Hospital Access
Avoca St


PM PEAK
1500 - 1600
Avoca St
Hospital Access
Avoca St


TOTAL VOLUMES FOR COUNT PERIOD
N
Avoca St
Hospital Access
Avoca St

Appendix B
Results of swept path analysis

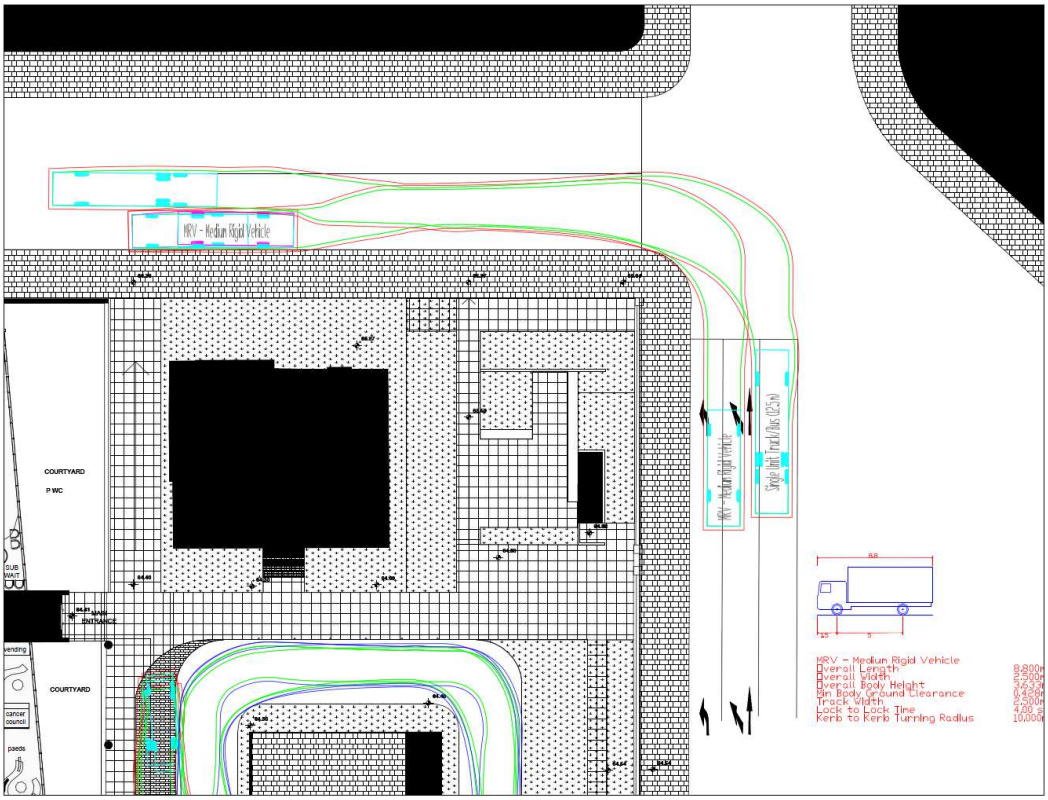


Figure B1 – MRV movements at the Avoca St/High St/Belmore St intersection during construction

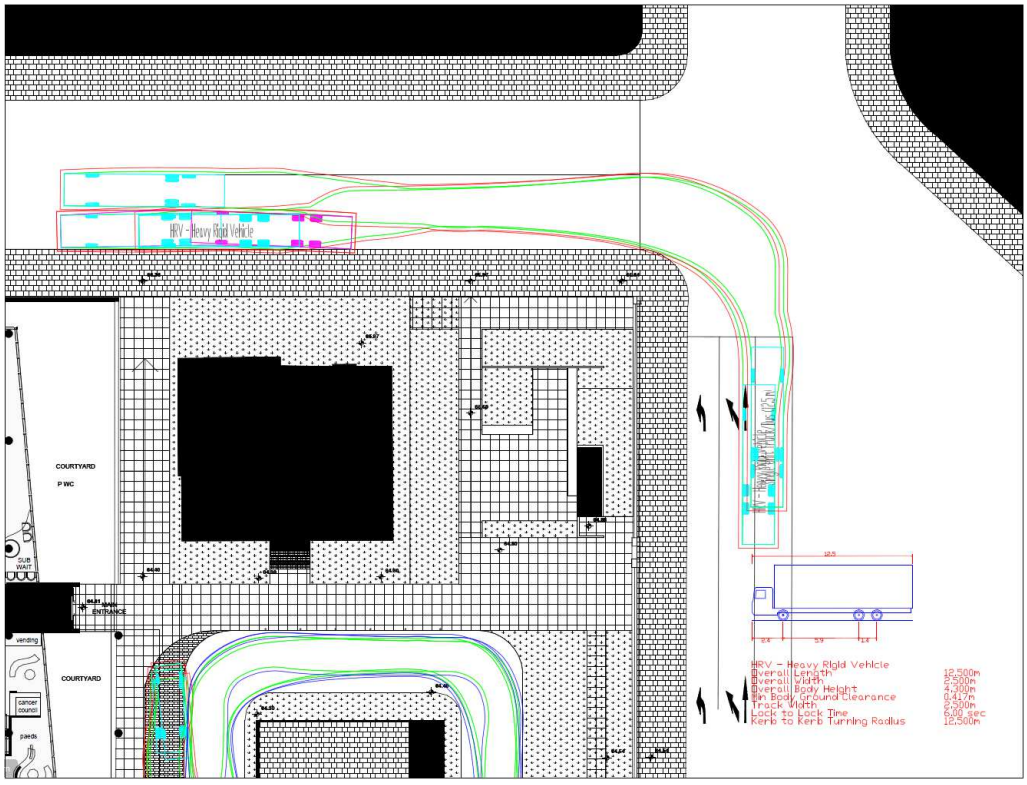


Figure B2 – HRV movements at the Avoca St/High St/Belmore St intersection during construction

Figure B3 – Ambulance movements around the Void

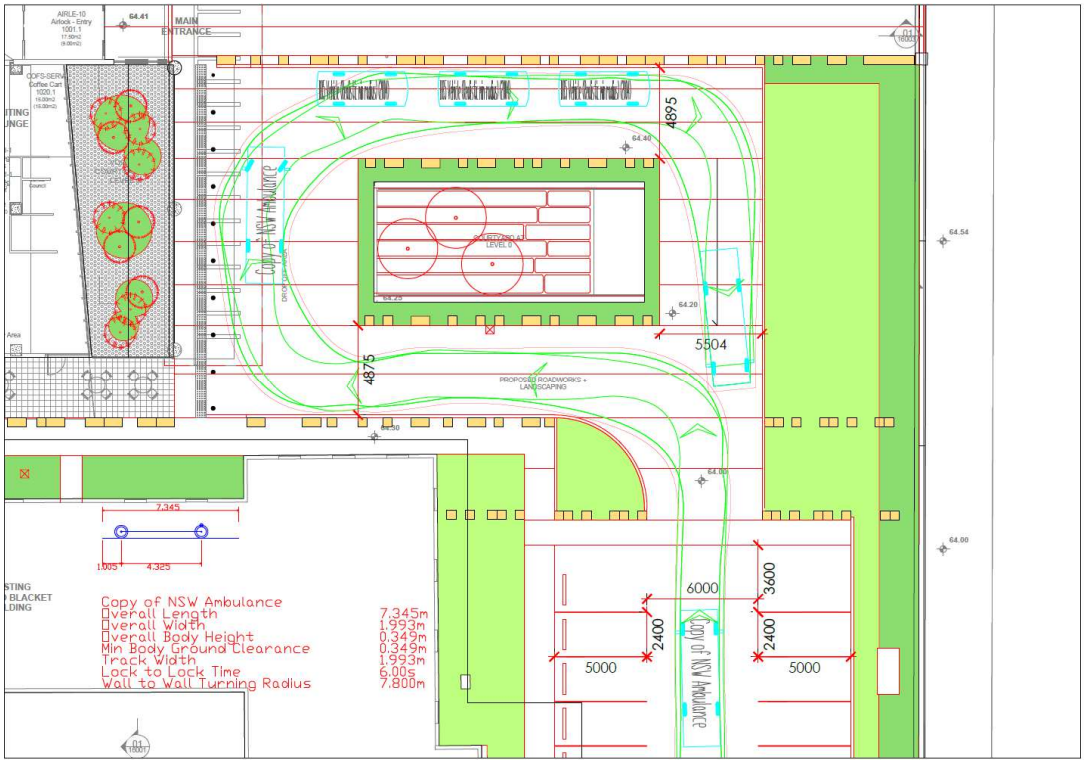
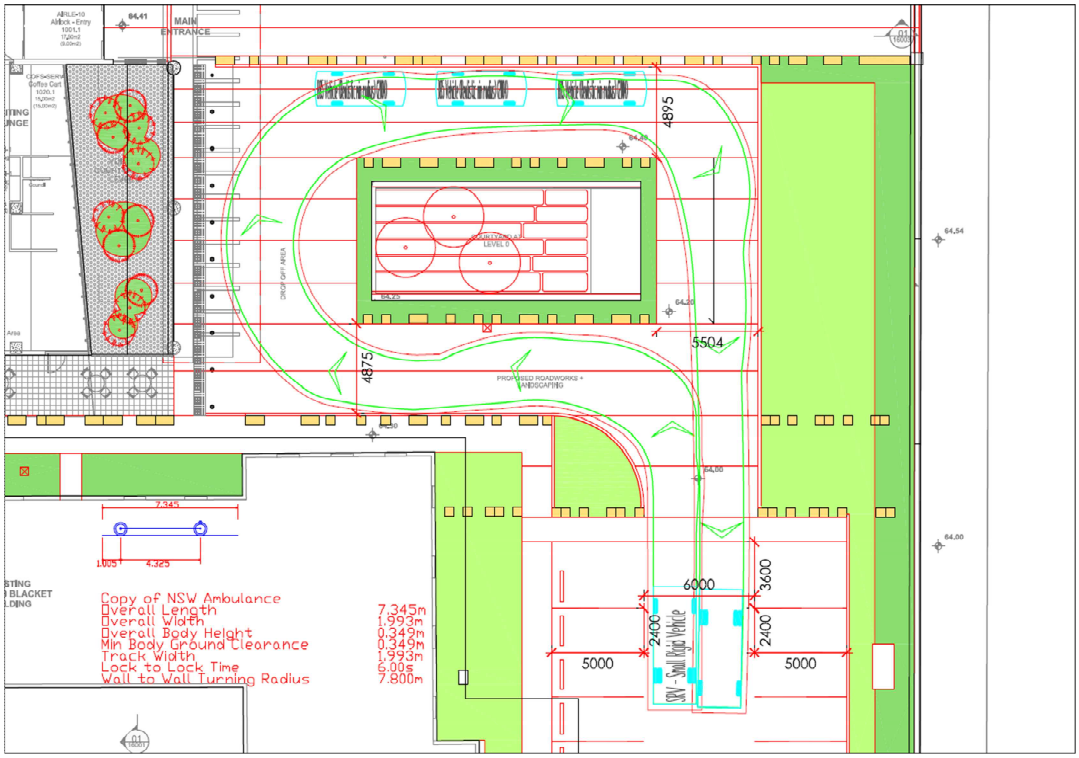


Figure B4 – SRV movements around the Void



Aurecon Australia Pty Ltd
ABN 54 005 139 873
Level 2, 116 Military Road
Neutral Bay NSW 2089
PO Box 538
Neutral Bay NSW 2089
Australia
T +61 2 9465 5599
F +61 2 9465 5598
E sydney@aurecongroup.com
W aurecongroup.com