

University of Sydney, Health Precinct Stage 1 Construction Management Plan

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CMP

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Abbreviations

Abbreviation	Meaning
CMP	Construction Management Plan
CTMP	Construction Traffic Management Plan
D&C	Design and Construct
ECI	Early Contractor Involvement
ESCP	Erosion and Sediment Control Plan
FDP	Final Distribution Points
HPS1	Health Precinct Stage 1
Laing O'Rourke	Laing O'Rourke Australia Construction Pty Ltd
MDF	Main Distribution Frame
NOHSC	National Occupational Health and Safety Commission
PCA	Principal Certifying Authority
RPA	Royal Prince Alfred
SSDA	State Significant Development Application
TCP	Traffic Control Plan
USYD	University of Sydney
WMP	Waste Management Plan

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1. Introduction

The development of the Health Precinct on the Camperdown campus is a key initiative of the University of Sydney (USYD) to support the needs of the Health disciplines through the creation of an attractive and world class multi-disciplinary research and education precinct. Due to its function and location, the Health Precinct will have a strong physical connection to the Camperdown.

The USYD's Health Precinct Stage 1 (HPS1) has been identified as a major transformational project for the precinct since 2013. The project scope includes the development of a site master plan that enables the stage 1 construction of an 8-storey health education facility and that will create a contemporary, collaborative and flexible teaching and learning environment for students and staff alike.

The local government with jurisdiction in this area is Sydney City Council (SCC). This document serves as the Construction Management Plan (CMP) for Stage 1 of the overall Health Precinct. The objectives of this CMP are to:

1. Carefully plan all activities involved in the construction of HPS1 to minimise the impact on the campus, nearby colleges, the Royal Prince Alfred (RPA) hospital, precinct neighbours, Newtown North Public School, pedestrians, road users, the environment and USYD property;
2. Be a vehicle for communicating the intent and focus of the procedures developed for site works throughout the life of the project; and
3. Be an instrument through which the project will meet a number of its State Significant Development Application (SSDA) requirements.

In keeping with these objectives, this CMP will be a live document that will grow in detail throughout the life of the project as the design progresses, methodologies are refined, subcontractors and consultants engaged and legislative requirements are met. It will be a reference point for project stakeholders and participants, the latest version of which will always be available for viewing on site.

The CMP progresses by first describing the project, then the development site. Site establishment, site management issues and the construction methodology are discussed as well as the strategy for material handling on site.

2. Design Objectives

HPS1 will provide accommodation for a number of USYD disciplines and organisations including:

- Faculty of Health Sciences, currently located at Cumberland campus;
- Faculty of Nursing and Midwifery, currently located at Mallett Street campus;
- Medical Library, currently located on Level 3 of the Bosch 1B building; and
- Sydney Medical School Central Clinical School (CCS) teaching and learning components, currently partially located within buildings belonging to the Royal Prince Alfred Hospital and the Blackburn building.

The key Design objectives for HPS1 are:

- Create a vibrant and attractive workplace that:
 - supports the creation of multi-disciplinary academic and professional staff teams, while at the same time maintaining strength and identity at the faculty and discipline levels;
 - creates an open, interconnected and functional working environment;
 - provides welcoming places for part-time and off-campus staff, with easy access to support services when they visit;
 - supports increased interaction between Higher Degree Research candidates and academic staff;
 - increases access to core equipment and clinical research facilities;
 - provides a variety of flexible working environments for different working functions and make them accessible to all;
 - enhances business sustainability through efficient use of facilities and infrastructure;
 - supports the USYD in its efforts to attract and retain outstanding researchers, clinicians and administrative leaders;
 - creates space that can accommodate both current requirements as well as potential, technology driven, changes to workplace practices;
- Create teaching and learning spaces that creates a 'home for students of the health disciplines, provides centralised information, support and access to student services, and provides inter-professional learning opportunities;
- Enhances the campus experience:
 - prioritises pedestrians and cyclists over vehicles;
 - maximises views of and access to campus green spaces and heritage architecture;
 - Respect and enhance the amenity of adjoining residential colleges;
 - make provision for a diverse student and staff population, including those with disabilities, those from different cultural backgrounds and those combining work or study with caring for children;
 - create places that allow the USYD to engage with the community;
 - consolidate back of house and support services, with a view to future expansion around redevelopment zones; and
 - Establishes strong connections with neighbouring facilities, within the USYD campus as well as RPA hospital campus.
- Flexible spaces that:
 - Enable flexibility through design using modularity, generic, vertically repeated layouts;
 - Structural grid and performance that enables repurposing; and
 - Services infrastructure that enables maximises ease of repurposing systems that cater for future stages of the Health Precinct development and enable the integration of systems that will facilitate energy efficiency improvements.

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3. The Site

3.1 Site Location

The Health Precinct site is located on the western end of the University's Camperdown campus and is directly adjacent to the RPA Hospital. Currently, the 13,000m² site is home to the Bosch 1A and 1B Buildings, the Bosch Glasshouse, the Blackburn Building and the associated Dangerous Goods Store.

Boarded to the East by Western Avenue, to the West by RPA Hospital and John Hopkins Drive, and to the South by Cadigal Lane, the site slopes steeply down to the North where it is bordered by the University Oval Number 01.

The site is almost the lowest point on the campus and is significantly affected by the requirement to manage overland flow of stormwater. Figure 1 below illustrates the greater Health Precinct Site.

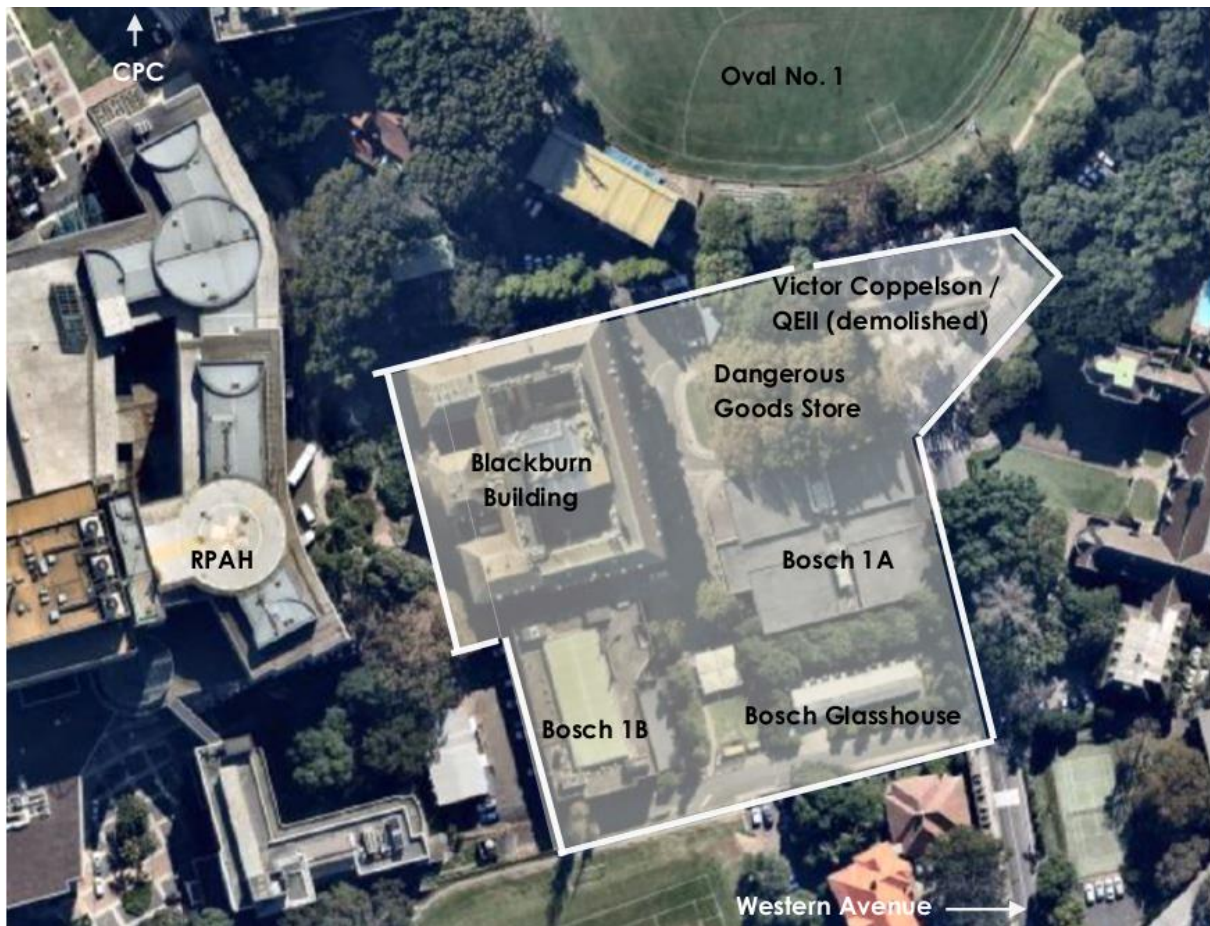


Figure 1: USYD Health Precinct Location

The USYD's project team is currently undertaking a program of Enabling Works to facilitate the vacation and demolition of the HPS1 site. USYD have indicated that decanting and relocation of the Blackburn Building will be targeted to be complete by the end of August, 2017 to allow demolition activities to commence in September 2017. Bosch Buildings 1A and 1B will remain operational during the construction of the project. Maintaining access to and from the HPS1 site will be critical, as well as maintaining access to the following key locations:

- Bulk gas storage

- Bosch Building 1B loading dock
- Grandstand bar
- Bosch Building 1A fire escapes
- Ausgrid substation within Bosch Building 1A
- Cadigal Lane car park

It is essential to maintain pedestrian and vehicle routes to Bosch 1A and 1B buildings to ensure the USYD can operate as usual within the two buildings remaining within the new Stage 1 precinct site.

Figure 2 below, illustrates USYD's proposed construction area for the HPS1 scope of works.

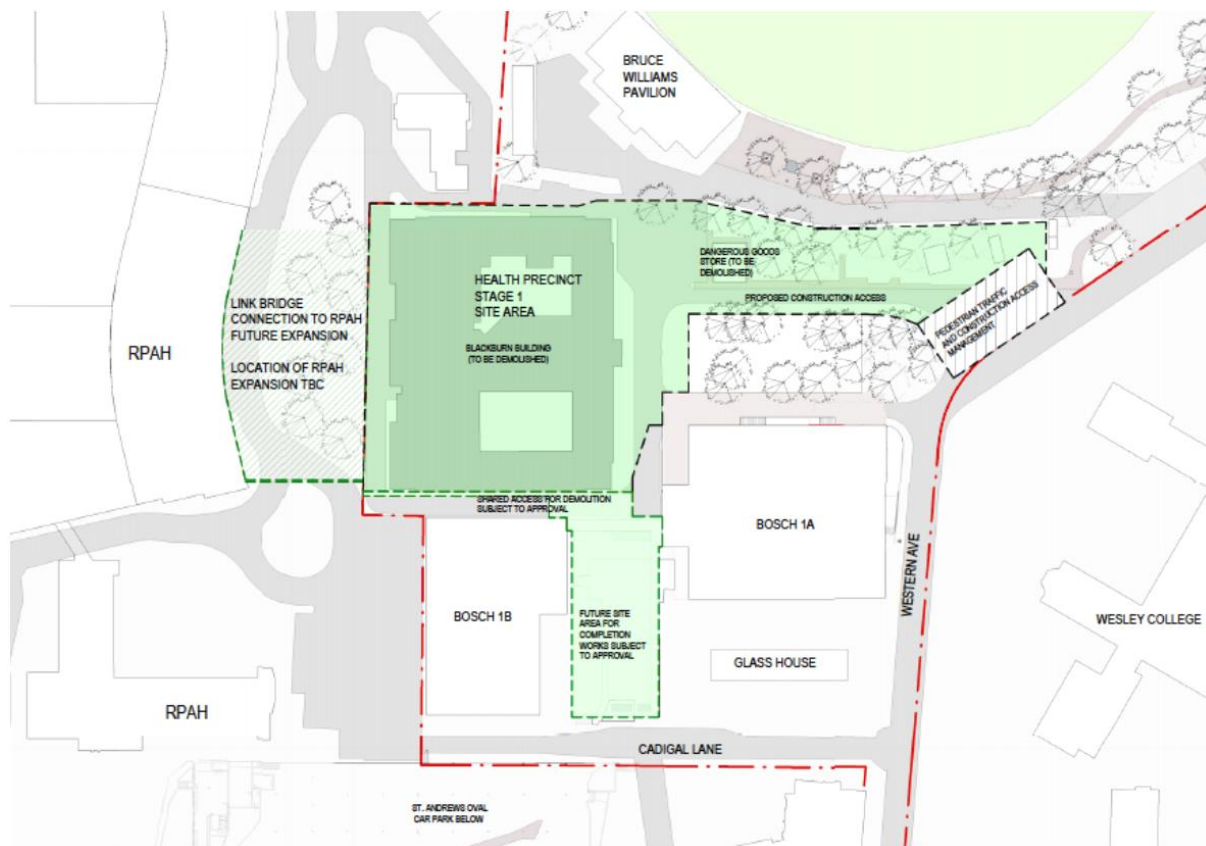


Figure 2: Proposed Health Precinct Stage 1 Construction Area (USYD)

3.2 Existing Buildings

Currently on site, there are three existing low-rise educational buildings built from the 1930s to 1950s. The Blackburn, Bosch 1A and Bosch 1B buildings are planned to be demolished, with the Blackburn Building and Dangerous Goods Store to be demolished as part of the HPS1 enabling works. The demolition and enabling works will be completed under a separate Contract to the main ECI and D&C Contracts.

The Blackburn Building is a five-level reinforced concrete structure with face brickwork infill walls and slate and metal roofing in Art Deco / Georgian Revival style. It was built in circa 1931-1933, and currently functions as laboratories for pathology and bacteriology within the Faculty of Medicine. It also accommodates a number of offices and teaching space.

The Dangerous Goods Store is a single level, rendered brick building with a steep metal deck roof. It was built circa 1980 as a storage space.

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3.3 Neighbours

As shown above in Figure 4, the site is neighboured by the following:

- 1A Bosch and Bosch 1B Education Buildings – Access will be maintained to Bosch 1B throughout construction for pedestrians and deliveries to the loading dock adjacent to the Southern boundary of the site. There are two fire exists for Bosch 1A that will be maintained throughout the construction of HPS1. Access will be maintained to the existing Ausgrid substation that services the Blackburn and Bosch 1B buildings located in Bosch 1A.
- Sydney Uni Cricket Ground and Grandstand – The sporting ground located to the North of the site. Access will be maintained during the early stages of the project for the catering business located in the Grandstand prior to the Shared Path being completed to the North-East of the site.
- RPA Hospital – The RPA Hospital is located to the west of the site and has been identified as a sensitive receiver for the project.
- St Andrew's College and Wesley College – The colleges located to the east and south of the site have been identified as a sensitive receiver for the project.

3.4 Existing Utilities

3.4.1 Ausgrid

An existing Ausgrid substation asset (S2497) is located at ground level in the North-West corner of the Bosch 1A building (D04). At present, the substation supplies the following:

- Blackburn Building (D06)
- Bosch 1A Building (D04)

In addition, there is a neighbouring kiosk sub to the south up the hill which serves the Bosch 1B building (D05), and the St Andrew's oval car park. Both substations likely serve the various local street lighting in the greater Health Precinct area and are relatively lightly loaded.

3.4.2 Sydney Water

Cold Water

Domestic cold water is available from the 250 mm Sydney Water main at the Oval, north of the site. There are no Sydney Water water mains assets within the footprint of the proposed development. There is a Sydney Water water mains asset that runs along Western Avenue to the East of the development.

Sewer

There are two existing sewers that run north and south of the proposed Stage 1 building and must remain. Care will be taken to protect these during construction as they are live.

The following stormwater assets are in the vicinity of the development's building footprint:

1. An existing 1200mm reinforced concrete (RC) stormwater main owned by SSC is located to the West, adjacent to the proposed building developing, running north to south outside the existing Blackburn building footprint.
2. A disused 300mm diameter RC stormwater drain running through the North-West corner of the site
3. An existing 900mm diameter RC stormwater drain running north to south through the middle of the existing Blackburn building at approximately IL18.34m.

3.4.3 Sydney City Council

An existing 1200mm reinforced concrete (RC) stormwater main owned by SSC is located to the West, adjacent to the proposed building developing, running north to south outside the existing Blackburn building footprint.

There is a disused 300mm diameter RC stormwater drain running through the North-West corner of the site and a 900mm diameter RC stormwater drain running north to south through the middle of the existing Blackburn building at approximately IL18.34m.

Further investigation of this asset will be undertaken to determine its functionality and if it will be diverted or protected through construction and maintained as part of the development. This will be subject to the design development and Council's input and approval.

3.4.4 Jemena

An existing secondary main natural gas supply runs around the USYD Camperdown Campus with a 1050kPa pressure supply. There are a series of gas mains that run around the perimeter of the existing site within the campus that form part of the 100kPa pressure USYD gas main supply.

The natural gas supply to the proposed building development is available within the north elevation of the Blackburn Building where the gas meter is situated.

The existing mains are to be cut back and re-aligned to avoid the new building footprint as part of the Early Works being performed by the USYD who will ensure the supply to other buildings will be maintained and provide a branch to supply the new HPS1 facility.

3.4.5 Communications

Consistent with the results of a Dial Before You Dig (DBYD) inquiry, there are a number of existing telecommunication cables installed adjacent to the proposed work site. The USYD host a comprehensive ICT network across the campus.

The location of the communications pits has been indicated within the USYD's 'Apricot Danish' drawings. During project delivery, Laing O'Rourke will locate and protect all of these telecommunications services.

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4. Description of Works & Staging

The work stages and materials handling strategy are described in the following sections

4.1 Enabling Works

The Enabling Works will be completed by the USYD prior to the commencement of the main development works. The enabling works will include service diversions, capping of services, removal and certification of all Hazardous Materials (HazMat) and the demolition of the Blackburn Building and Dangerous Goods Store, including all subterranean structure and foundations.

4.2 Pre-Construction Phase

Prior to the works being undertaken on site, investigations will be undertaken to mitigate and control impacts arising from the works.

- A detailed dilapidation survey will be performed on surrounding areas and adjacent buildings.
- Undertake infrastructure to locate and mark all in-ground services.
- Seek authority approvals from the University, Council and utility providers as necessary.

4.3 Site Establishment and Security

4.3.1 Removal and Protection of Trees

The removal and protection of existing trees are to be in strict accordance with the Arcadia Vegetation Management Strategy document. As part of the USYD's Enabling and Demolition Works, the six non-significant trees will be removed along the Eastern façade of the Blackburn Building.

Tree protection and removal for the main works will occur at the commencement of the project and be completed prior to hoarding establishment.

4.3.2 Site Establishment

The site's establishment will include the Contractor's offices, lunch and toilet facilities, vehicle access, vehicle loading and unloading zones and establishment of site work areas. The Contractor will ensure the security of all active work areas for the safety of the public and protection for the works.

The HPS1 site establishment plan is shown in Figure 3.

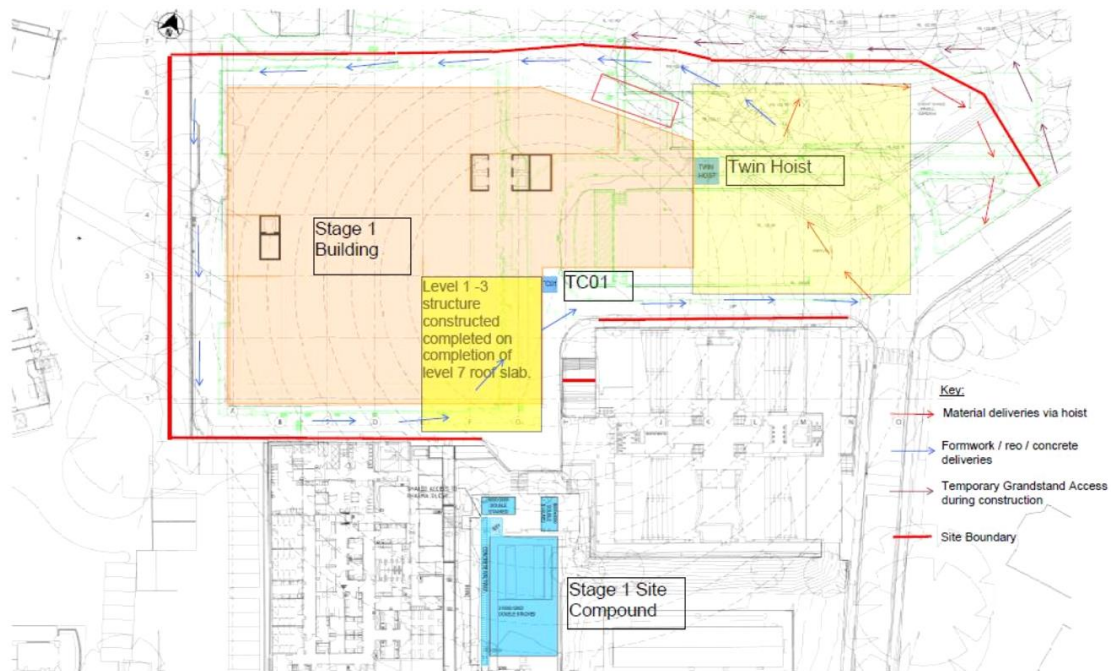


Figure 3: Site Setup and Logistics Plan Phase Superstructure

As shown in Figure 3 and Figure 4, Laing O'Rourke will use perimeter A-Class hoarding for the majority of the site's external perimeter, including the site compound to ensure the site remains secure during non-working hours and prevent unauthorised entry. Emergency Access and Egress gates will be provided. Security and public access lighting will be installed.

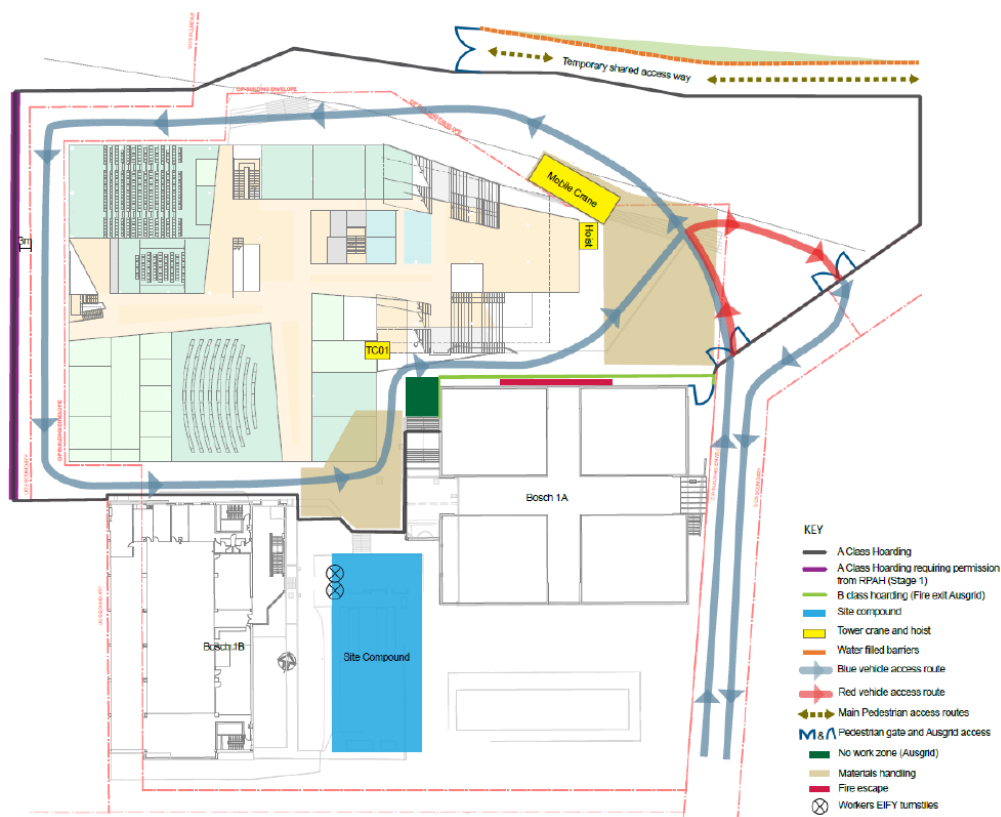


Figure 4: Site Hoarding and Vehicle Access Routes

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B-Class hoardings (overhead protection) will be erected immediately north of the Bosch Building 1A on Blackburn Circuit to ensure the fire exit doors to Lecture Theatre 1 remain operational in the event of an evacuation.



Figure 5: Fire exit doors in Bosch Building 1A to remain operational



Figure 6: Proposed Location for Hoarding on the Western Boundary

The project site will be clearly signposted, and all personnel, including visitors, will be required to enter via Cadigal Lane, south of Bosch Buildings 1A and 1B, shown in Figure 7, through a turnstile and gate system. The access control system will provide unmanned access into and out of the site and will include video monitoring, vocalised messages on entry and exit and the ability to show important messages via a video display. A shared path access way will be created for people accessing Pharmacology via Cadigal Lane, which is shown in Figure 7. Laing O'Rourke will also ensure access to the hospital bulk gas tank is maintained via Cadigal Lane.

Signage will be placed at all site entrances clearly stating that access is for authorized personnel only. Only those workers who have completed site specific inductions will be allowed to enter the site. Visitors will be required to first attend the Site Office to site in.

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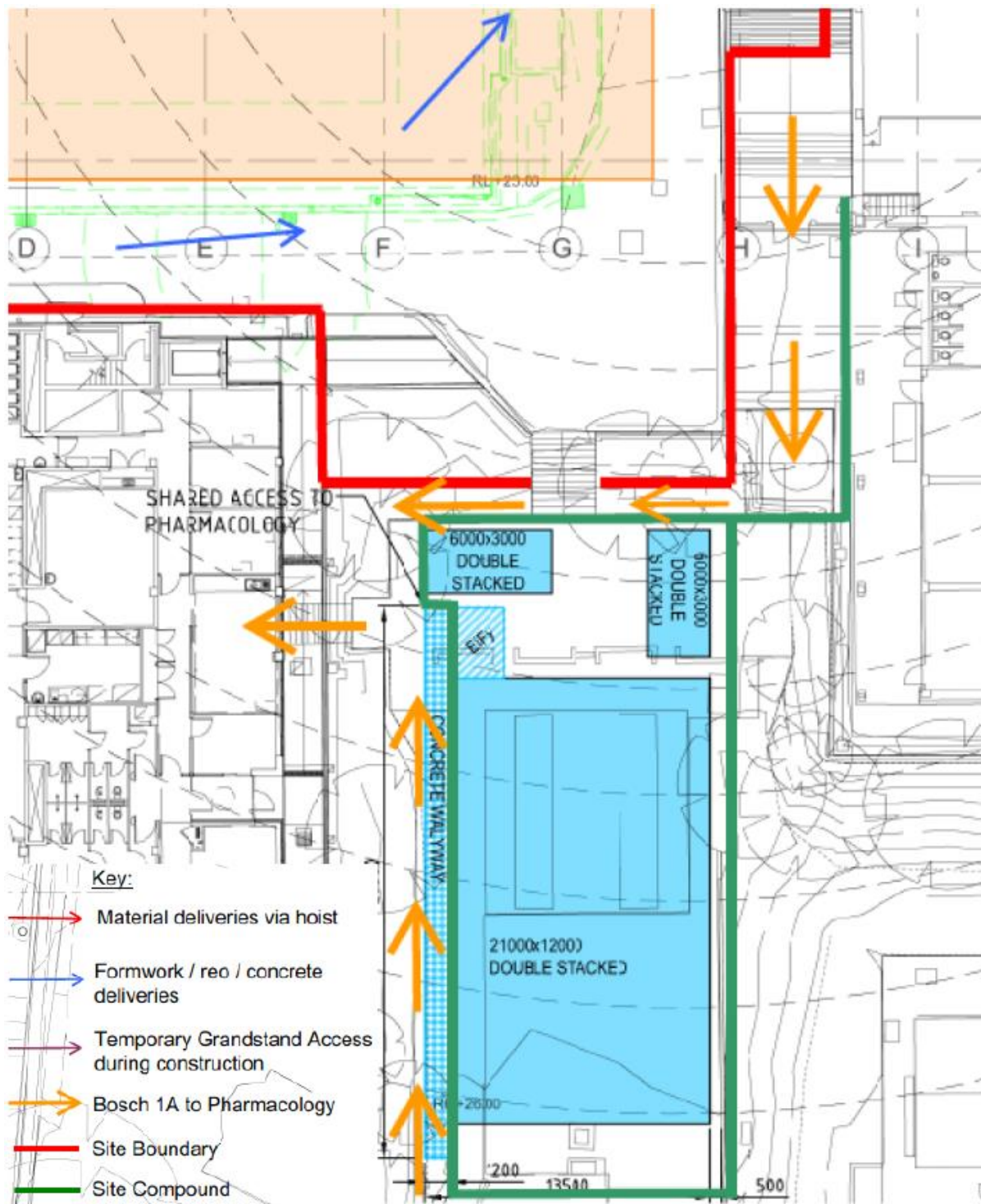


Figure 7: Shared Access by Pharmacology Users and Construction Staff to the Site Compound on Cadigal Lane

4.4 Site Services, Civil and Ground Works

After consultation with the appropriate utility companies, services will be disconnected/ made safe and protected as necessary around the building footprint. Initial site services work comprises:

- Removing the high voltage supply to the Bosch Building 1A and re-feeding this substation from Bosch Building 1B kiosk.
- Protecting the two live existing sewers that run north and south of the proposed Stage 1 building footprint.
- Protecting the 1200mm diameter RC stormwater that is situated to the west of the Stage 1 building footprint
- Protecting the 900mm diameter RC stormwater that is situated through the centre of the project site.

4.5 Construction

Once the enabling works have been complete, Laing O'Rourke will set up the tower crane and commence construction of the substructure, superstructure and the façade. It is envisaged that there will be one tower crane serving the project.

Once the construction of the floor slabs is past the ground level, temporary scaffold will be installed around the perimeter for safety as construction continues.

4.6 Materials Handling

Laing O'Rourke will use one tower crane and a twin hoist to ensure efficient delivery and location of materials.

A twin builder's hoist will be installed on the eastern elevation to provide access to each upper level floor as the structure commences. Ties will be installed to support the hoist mast from the new building structure. The hoist will be powered from the temporary electrical builder's supply.

Different materials handling strategies will be applied to different levels of the new building:

- Level 0 will be serviced by the hoist, which will be situated on the Level 0 slab.
- Level 1 is the same floor as the main staging/delivery area so materials do not require the hoist
- Level 2 will be serviced with a Manitou telehandler through the front entrance of the building using the overhanging slabs
- Level 3 will be the first level serviced by the hoist.
- Levels 4–6 will be serviced by a twin hoist Levels 4, 5 and 6 only. The twin hoist will be installed once the Level 4 structure is complete. Take the hoist to service Level 4. Then second mast installation is to service Levels 5 and 6.

The twin hoist will be dedicated to moving the workers during the shift start and finish times. Level 1 structure on the eastern side of the building has been designed to support 15KPa loading for construction traffic to support the staging/delivery area.

4.6.1 Twin Hoist

The twin hoist will be a 2240-2260 twin car, which can be used for materials and site personnel.

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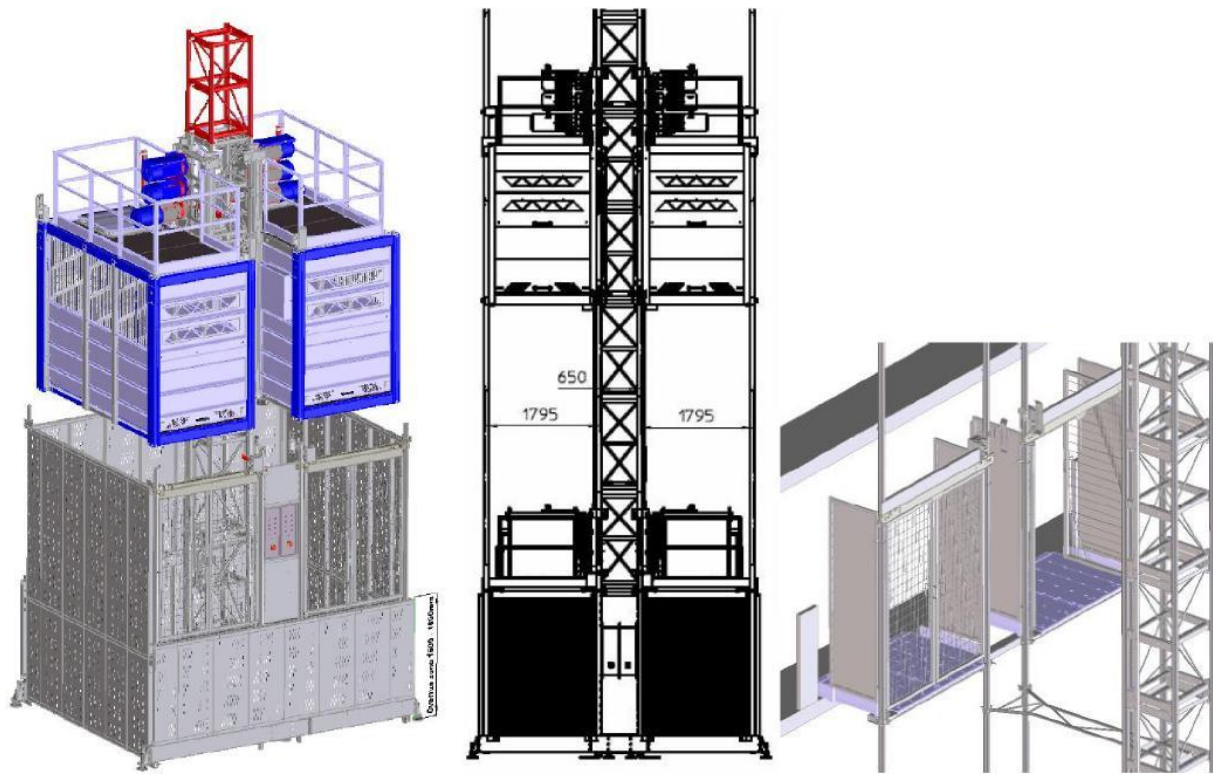


Figure 8: Bocker Giant Lift Twin Goods Hoist

4.6.2 Tower Crane

Laing O'Rourke will use a Comedil CTT 561-20 hammerhead tower crane for the HPS1works. This type of crane has been selected to ensure the hook can be used across the site. Another factor influencing our choice of crane was the adjacent helipad; a luffing jib crane would penetrate the RPA helipad airspace. Tower Crane 01 (TC01) will be supplemented with a 130t mobile crane for the larger floor plates on Levels 1, 2 and 3. Figure 9 shows the coverage of the tower crane.

Figure 10 depicts a cross section of the Health Precinct Stage 1 site, showing the height of the tower crane in relationship to RPA and the helipad located on the adjacent building.

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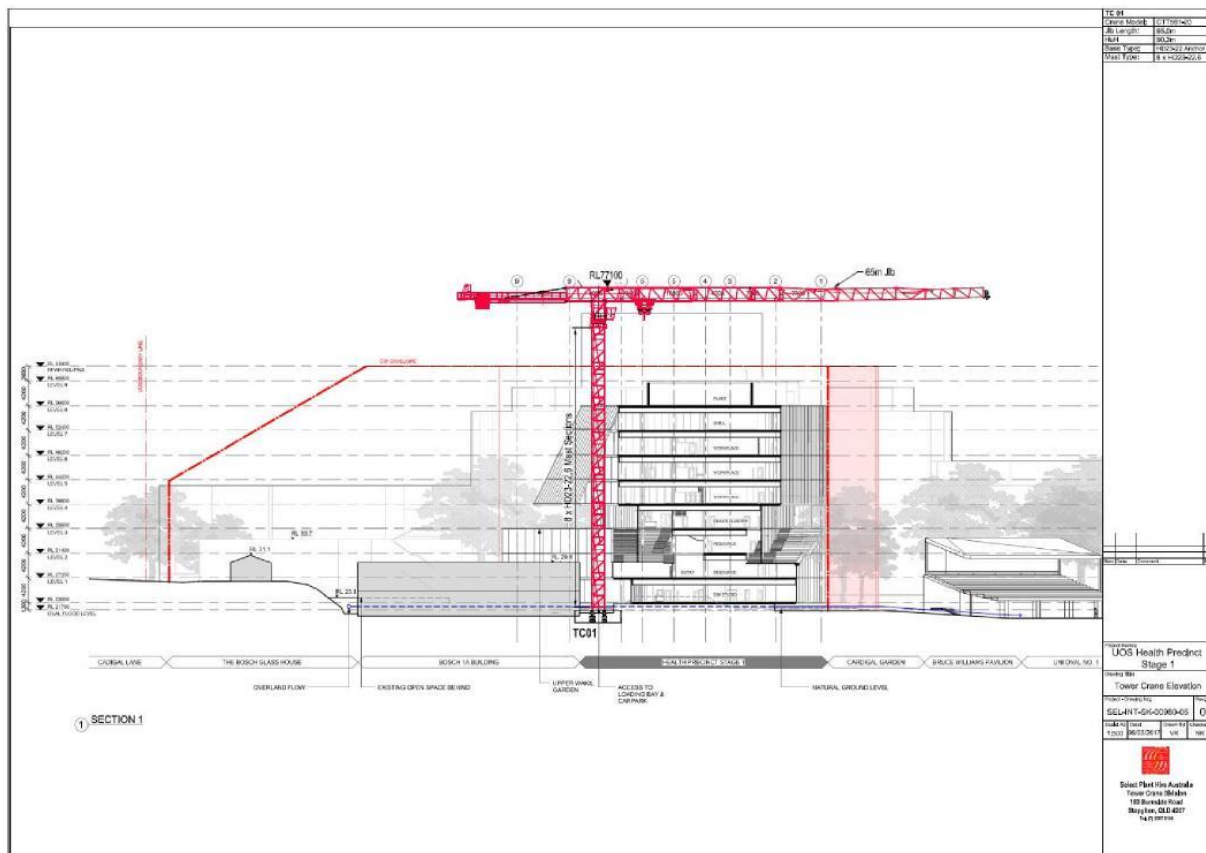


Figure 10: Cross-Section of Crane Layout in Relation to the RPA

RPA Medical Helipad

Laing O'Rourke is conscious of the proximity of the Health Precinct Stage 1 site to the medical helipad at RPA, and we have reviewed our crange strategy in relation to transitional surface penetration in accordance with the requirements of 14.4 of the NSW Ministry of Health Hospital Helicopter Landing Sites - HLS) Policy guidelines - Rev07d (The Guidelines).

To minimise interference of the crane with flights to and from the helipad, we have placed the crane as far to the east as possible. Laing O'Rourke have also consulted with AviPro, aviation management and safety advisors. Initial advice suggests that the HPS1 works will impact the Category A approach and departure flightpaths for the RPA helipad. However, this is not uncommon and, during the ECI Phase, mitigation strategies such as red, low-intensity obstruction lighting on our tower crane will be developed to ensure approaching and departing helicopters have visibility of the tower crane, Figure 11 shows the impact from TC01 and the 130t mobile crane. During the ECI phase we will engage AviPro to undertake further analysis and recommendations in consultation with RPA.

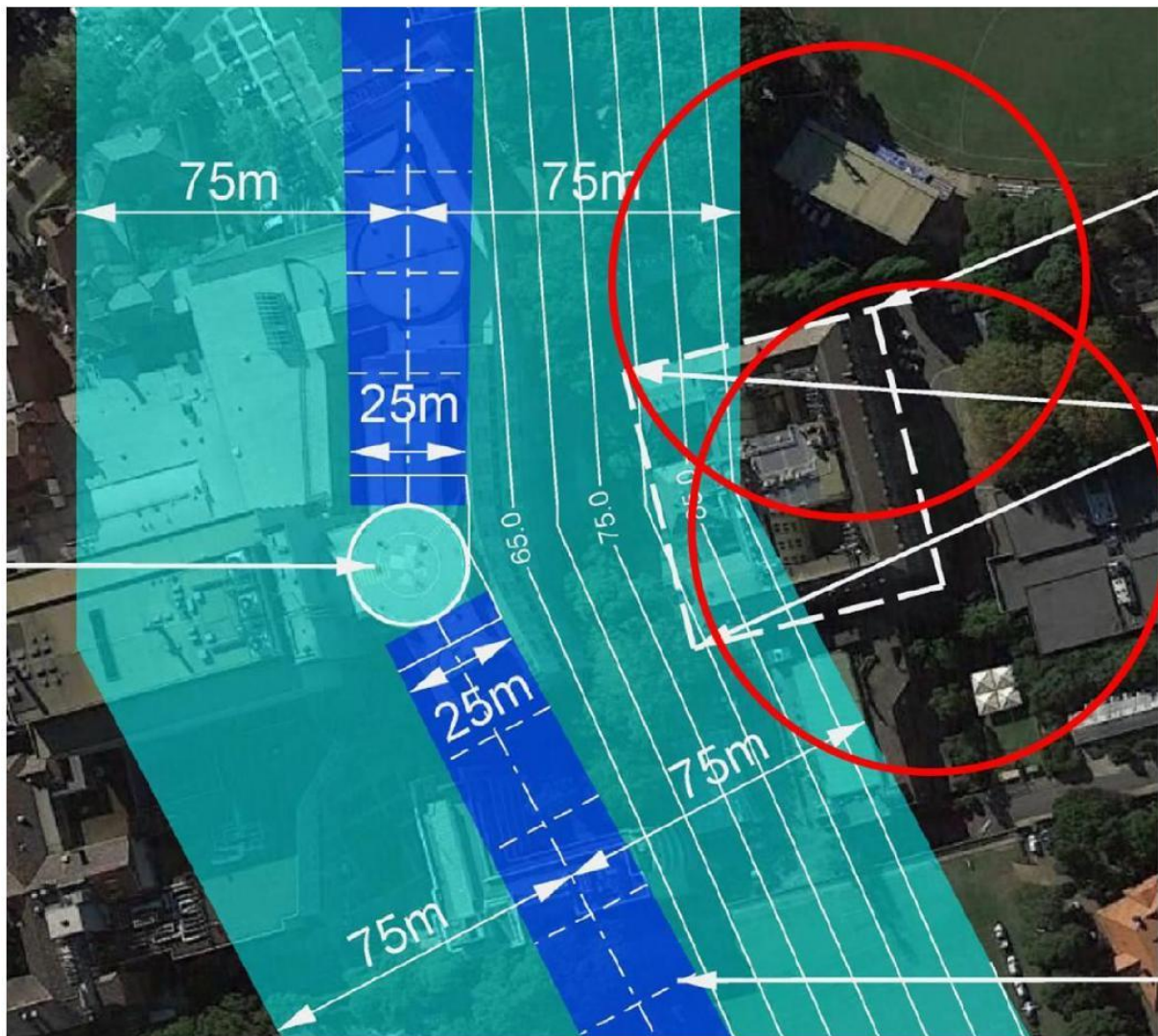


Figure 11: Minimisation of TC01's Impact on the RPA Helipad

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5. Work Program and Working Hours

The on-site work hours for the HPS1 project are to be confirmed with the consent conditions that follow the approval of the State Significant Development Application (SSDA). It is anticipated that the building, demolition and excavation working hours will be 07:00am to 6:00pm, Monday to Friday, 07:00am to 3:30pm Saturday with no work or deliveries on Sunday and/or Public Holidays. Building, demolition and excavation works are defined as follows:

- “Demolition works” means any physical activity to tear down or break up a structure (or part thereof) or surface, or the like, and includes the loading of demolition waste and the unloading of plant or machinery.
- “Excavation work” means the use of any excavation machinery and the use of jackhammers, rock breakers, excavators, loaders or the like, regardless of whether the activities disturb or alter the natural state of the existing ground stratum or are breaking up or removing materials from the site and includes the unloading of plant or machinery associated with excavation work.
- “Building construction” means any physical activity on the site involved in the erection of a structure, cladding, external finish, formwork, fixture, fitting of service installation and the unloading of plant, machinery, materials or the like.

If it is necessary for works to occur outside the hours allowed by the SSDA conditions, an out-of-hours application will be made and approval obtained from the relevant authority in advance of the dates requested.

6. Site Specific Management Plans

6.1 WHS Management Plan

A detailed site specific Work Health and Safety Plan, which will include a health and safety risk assessment for the planned construction works shall be prepared by the Laing O’Rourke prior to the CC being issued.

The Plan shall include, but not be limited to:

- Name of key personnel responsible for site safety;
- Emergency contact details and procedures;
- Identification and description of the risks associated with each operation conducted;
- Description of actions to be taken to mitigate risks and hazards;
- Confirmation that on-site personnel are adequately trained to perform their joint responsibilities; and
- Description of personal protective clothing (PPE) that will be worn by site personnel.

6.2 Environmental Management Plan

Prior to the commencement of works, a detailed site specific Environmental Management Plan will be prepared by the Contractor. The EMP will include a Waste Management Plan, Sediment and Erosion Plan as well as a Noise and Vibration Management Plan.

Noise and Vibration Management Plan

Laing O’Rourke has had a preliminary SEARs Noise and Vibration Assessment report (NVAR) compiled for the ECI phase to set out the noise and vibration goals and limits for the HPS1 project. The NVAR forms part of the SSDA submission.

The report is based on relevant standards and environmental guidelines, including the “*Interim Construction Noise Guideline*” and, “*Assessing Vibration – a technical guideline*”.

Key Recommendations

To manage the potential impact of noise and vibration during construction, reasonable and feasible management measures and work practices should be implemented as detailed below:

- Construction Noise and Vibration Management Plan – a Construction Noise and Vibration Management Plan (CNVMP) will be developed by Laing O'Rourke and trade specific CNVMP will be developed by key trades that generate large amounts of noise and vibration emissions.
- Stakeholder Consultation – Nearby stakeholders should be consulted prior to the works and kept regularly informed of potential noise and vibration impacts from the works.
- Work Programming – Work should be programmed such that works, and particularly noisy works, occur during standard working hours wherever feasible
- Out-of-Hours Work – If high noise works are to occur outside of normal working hours then the CNVMP should define an approval process for undertaking out-of-hours works, notifying sensitive receivers and stakeholders, and identifying reasonable and feasible mitigation measures to be implemented.
- Truck Management and Site Access – Site access and delivery points shall be located as far away from residences as possible, truck movements shall use arterial roads and be diverted away from residential streets where feasible and, deliveries to/and from site shall not occur during the night time period where possible.
- Site Management – Locate site accommodation facilities away from residents as far as practical, use shielding where appropriate, noise associated with demobilisation of equipment should be kept to a minimum.
- Equipment Management – selection of low-noise plant where possible, maintain equipment and install muffling and silences where relevant, equipment and plant not in use should be shut down.

Waste Management Plan

Laing O'Rourke shall prepare the Waste Management Plan (WMP) prior to the commencement of the works.

Erosion and Sediment Control Plan

Laing O'Rourke shall prepare the Erosion and Sediment Control Plan (ESCP) prior to the commencement of the works.

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7. Appendices

7.1 Preliminary Construction Traffic Management Plan

University of Sydney, Health Precinct Stage 1

Construction Traffic Management Plan

Document and revision history

Document details	
Title	Construction Traffic Management Plan
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Client reference no.	
Laing O'Rourke contract no.	TBC

Revisions

Revision	Date	Description	Prepared by	Approved by
1	10/07/17	DRAFT: Construction Traffic Management Plan	Jody Hogg	
2	13/07/17	SSDA Issue	Jody Hogg	

Management reviews

Reviewers	Role
Nick Dillon	Design Manager
Elliot Howse	Project Director

Controlled:	YES	Copy no.:	Uncontrolled:	NO
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Note: This plan is a draft plan for SSDA for the Health Precinct State 1 only.

Terms and definitions

The following terms, abbreviations and definitions are used in this plan.

Term	Definition
CBD	Central business district
CIP	Campus Improvement Programme
CIS	Campus Infrastructure Services
CMP	Construction Management Plan
HML	Higher mass limits
MRV	Medium rigid vehicle
NTC	National Transport Commission
RAV	Restricted access vehicles
RMS	Roads and Maritime Services
ROL	Road Occupancy Licence
SMS	Safety Management System
SRV	Small rigid vehicle
SWMS	Safe Work Method Statement
TC	Traffic controller
TCP	Traffic Control Plan
TPMP	Traffic and Pedestrian Management Plan
TMC	Transport Management Centre

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1. Introduction

This Construction Traffic Management Plan (CTMP) forms part of the Construction Management Plan developed for the University of Sydney's Health Precinct State Significant Development Application (SSDA). This Plan will outline the key management systems, procedures and controls that Laing O'Rourke will use to:

- Assess the traffic and transport impacts during construction
- Identify potential construction traffic implication on the operation of the surrounding road, transport and pedestrian networks
- Recommend proposed management and measures to be implemented to mitigate these impacts

Laing O'Rourke will provide certainty of delivering the project on schedule by maintaining direct communication with key stakeholders on traffic and pedestrian management.

Included in the Construction Management Plan (CMP), is a detailed outline of the proposed staging of construction, operational conditions such as working hours and required construction traffic management and measures to be implemented during construction.

This CTMP has been prepared to address the potential for any pedestrian and traffic impacts arising from the Stage 1 works and to recommend appropriate mitigation measures. The plan outlines the existing traffic conditions and management measures Laing O'Rourke will implement during construction. It also discusses the delivery of materials to and from the proposed site access and egress points and maintains the segregation of students, staff and visitors from construction plant and vehicles.

The CTMP has been prepared in accordance with the Transport Management Centre's Road Occupancy Manual as well as legislative requirements, guidelines and standards (as outlined Section 3). It is a dynamic document and will be updated throughout delivery of the project, as required to reflect changes and agreed workflows with the University's Campus Infrastructure Services (CIS).

1.1 Proposed works

The University of Sydney is developing its Health Precinct to create a contemporary, collaborative and flexible teaching and learning environment for students and staff alike. The existing 13,000m² Health Precinct is situated in the University's Camperdown campus, in an area currently home to the Bosch Buildings 1A and 1B, the Bosch Glasshouse, the Blackburn Building and a dangerous goods store. The precinct is bordered by Royal Prince Alfred Hospital (RPAH), St Andrew's Oval, University Oval No. 1 and grandstand, and Western Avenue.

The University has proposed three stages for the redevelopment of the precinct:

- Stage 1 – 22,120m² of new facilities to be built in the area currently occupied by the Blackburn Building, adjacent to RPA. The Bosch Glasshouse and Bosch Buildings 1A and 1B will remain operational during construction and operation of the Stage 1 works.
- Stage 2 – 16,000m² of new facilities situated adjacent to Western Avenue, in the area occupied by Bosch Building 1A and the Bosch Glasshouse
- Stage 3 – 14,950m² of new facilities to be built in the area currently occupied by Bosch Building 1B, adjacent to St Andrew's Oval.

This CTMP is for stage 1, the timing of Stages 2 and 3 are not finalised or known at this stage. The scope of works also includes the associated demolition works and selected infrastructure upgrades.

1.2 Site location

The site is located to the east of the RPAH and accessed off Western Avenue.

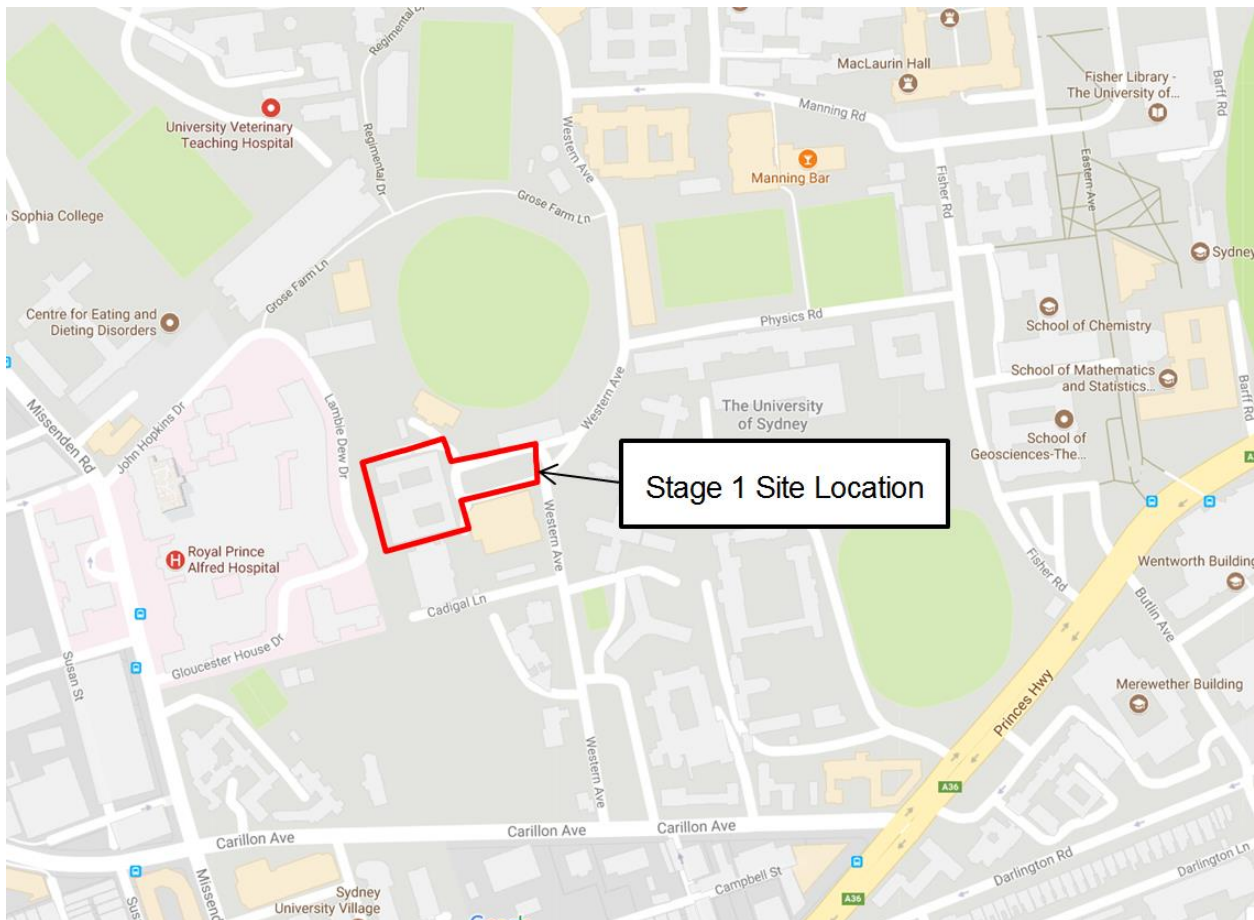


Figure 1: Stage 1 site location

2. Traffic Management

Daily construction activity is detailed to occur as detailed in the SSDA. No work is planned to be conducted on the site during Sunday or Public Holidays. Vehicular movements associated with construction will only operate within these hours, which will be defined by the condition of the consent. All works will be undertaken within the site in the materials handling zone zones. Key principles of the traffic management are:

- No construction vehicles or materials will obstruct walkways on Western Avenue.
- Western Avenue (which links Carillon to Parramatta Road) will be kept open throughout the construction phase.
- There will be no access to site via RPAH.
- Access will be maintained along Cadigal Lane for bulk gas storage tanks and entrance to the car park.
- Construction vehicles will enter the site from the south (via Carillon Avenue) and exit the campus via the same route, minimising the impact of construction to the campus north of Health Precinct. The access route to the north via Parramatta road will be minimised to reduce any potential impact on the Women's and Wesley College's.

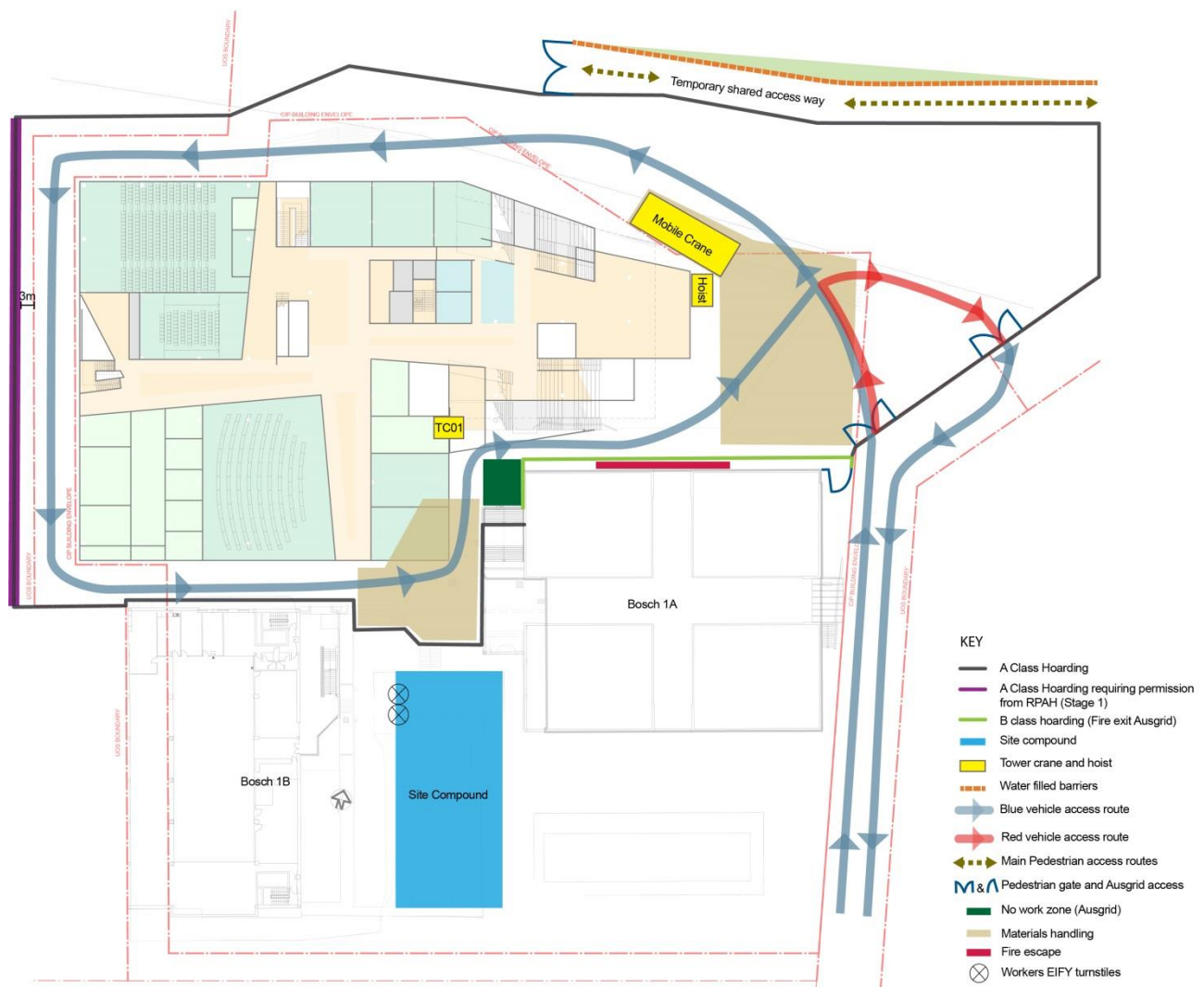


Figure 2: Logistics and Materials Handling

2.1 Overview of Truck Movement Types

The proposed construction operations affecting traffic are outlined below:

- Use of Medium Rigid Vehicles (including truck and trailer) for demolition and excavation removal
- Delivery trucks associated with site establishment works
- Use of trucks longer than heavy rigid vehicles such as semi-trailers for delivery of materials and machinery.
- Concrete deliveries by medium rigid concrete trucks
- Delivery vans, utilities and cars as required

2.2 Truck movements

The envisaged truck arrivals to site will be:

Activity	Anticipated number of trucks per day
Demolition	5-10 per day

Activity	Anticipated number of trucks per day
Excavation	25-40 per day
Structure	3-5 per day
Concrete pour	5-40 per day (pour days only)
Facade	7-8 per week
Fit out	5-15 per day

3. Legislative requirements, guidelines and standards

As outlined in Table 2, a number of legislative requirements, guidelines and standards will apply to managing traffic and pedestrians on the Health Precinct Stage 1 project.

Relevant guidelines (author)	Summary of guidelines	Requirements
<i>Work Health and Safety Act 2011</i>	Preparation of a Traffic Control Plan (TCP), in accordance with AS 1742.3 is a requirement of the WHS Act.	Preparation of a TCP.
Transport Management Centre Road Occupancy Manual	The manual provides the information and forms required for the proponent to submit a Road Occupancy Licence (ROL) application. A proponent is the applicant and can be any public authority, company, individual or RMS proposing to change the operational conditions of the road network.	ROL issued by the Transport Management Centre (TMC) on behalf of Roads and Maritime Services (RMS).
<i>Roads Act 1993</i>	For all occupancies that are on or may impact on a classified road (state or regional), applications for a ROL must be made to the RMS Planned Incident Unit. For all occupancies that are on or may impact on unclassified (council) roads, applications for a ROL are to be made to the council (City of Sydney) for approval.	Obtaining a ROL for the specified activities is a legal requirement under Section 138 of the Roads Act. However, Laing O'Rourke does not believe that any ROLs will be required for the Health Precinct Stage 1 project.
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 or 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.
CIS Contractor Handbook Ver 3	Sections 2.5: Contractors and their personnel must observe all parking, road markings, directional and control signage within the University grounds. Section 3.13: Traffic Management	Road closures require notification to the Campus Security Unit at security@sydney.edu.au.
Traffic Control at Work Sites Manual – Version 4, Issue 1, June 2010, RMS	This manual 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. This document contains standard TCPs that can be used at work sites. 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, AS 1742.3-2009 must be consulted and its advice adopted.	Works approval is required from RMS for roads it controls. Approval is required from the relevant council's Traffic Committee for local roads. Traffic control and the selection or design of TCPs must only be undertaken by qualified and authorised people who have passed RMS-approved training courses.

Table 2: Legislative and guideline requirements

3.1 Approvals and procedures

Western Avenue falls under the University's control and will not require ROLs from either RMS or the City of Sydney during the construction phase. Laing O'Rourke will use Western Avenue via Carillon Avenue for deliveries.

Our construction methodology is based on creating a work zone in the Blackburn Circuit, from the demolition phase through to completion (As shown in Appendix 2 **Error! Reference source not found.**). There are several car parking spaces surrounding the Blackburn building which will be permanently lost due to the new development in Stage 1. These will be replaced by basement car parking as part of the new development.

Following demolition and excavation, all loading and unloading will take place within the confines of the site.

4. Traffic Impact Assessment

- All construction vehicles entering the campus will park in accordance with restricted site conditions and posted directions. Parking or driving across the footpath will be avoided outside of the site boundary.
- To minimise the impact of construction traffic on the University, Laing O'Rourke will implement a one-way-in, one-way-out traffic flow. Following contract award, we will work with our supply chain to minimise the number of partially full deliveries travelling onto Western Avenue.
- During excavation works, empty vehicles will enter the site via Western Avenue. There is an option during this phase to use the northern exit onto Parramatta Road. As this zone is more pedestrianized, it will not be used for the bulk of trucks. This approach, however, would minimise the number of heavily laden vehicles south bound using Western Avenue.
- Works zones will be established within the Health Precinct Stage 1 site to minimise congestion on Western Avenue.
- A dedicated access–egress gate will be created on Western Avenue, allowing construction vehicles to offload materials in the dedicated staging area and then exit in a one-way direction either south on Western Avenue or north towards Parramatta Road (shown in Appendix 2). This will prevent the need for vehicles to reverse. If vehicles such as concrete trucks require access to the western side of the site, they will continue around the building footprint in an anticlockwise direction and exit the site onto Western Avenue.
- Traffic controllers will be in place to direct construction traffic to and from the site and direct pedestrians within the project vicinity, as shown in Appendix 2.
- All signage fencing, safety barriers and line marking details will be agreed with Campus Infrastructure and Services (CIS).
- Due to the close proximity of various public transport modes, as well as the constrained nature of the site, no parking will be provided on site for construction staff or workers at any time. Space will be provided for the storage of tools and materials required by trades, and construction workers will be encouraged to deliver their tools to site initially and then travel to site via bus and train. In addition, site staff and subcontractors will not be permitted to park in the immediate vicinity of the site, to reduce impacts on the local community.

4.1 Traffic routes

The car parking spaces in the current Blackburn building vicinity will be removed. This will allow the removal of trees and installation of site accommodation for the main works. Pedestrian access to the Bosch buildings will be maintained, with hoarding installed to allow access, as shown in Appendix 2.

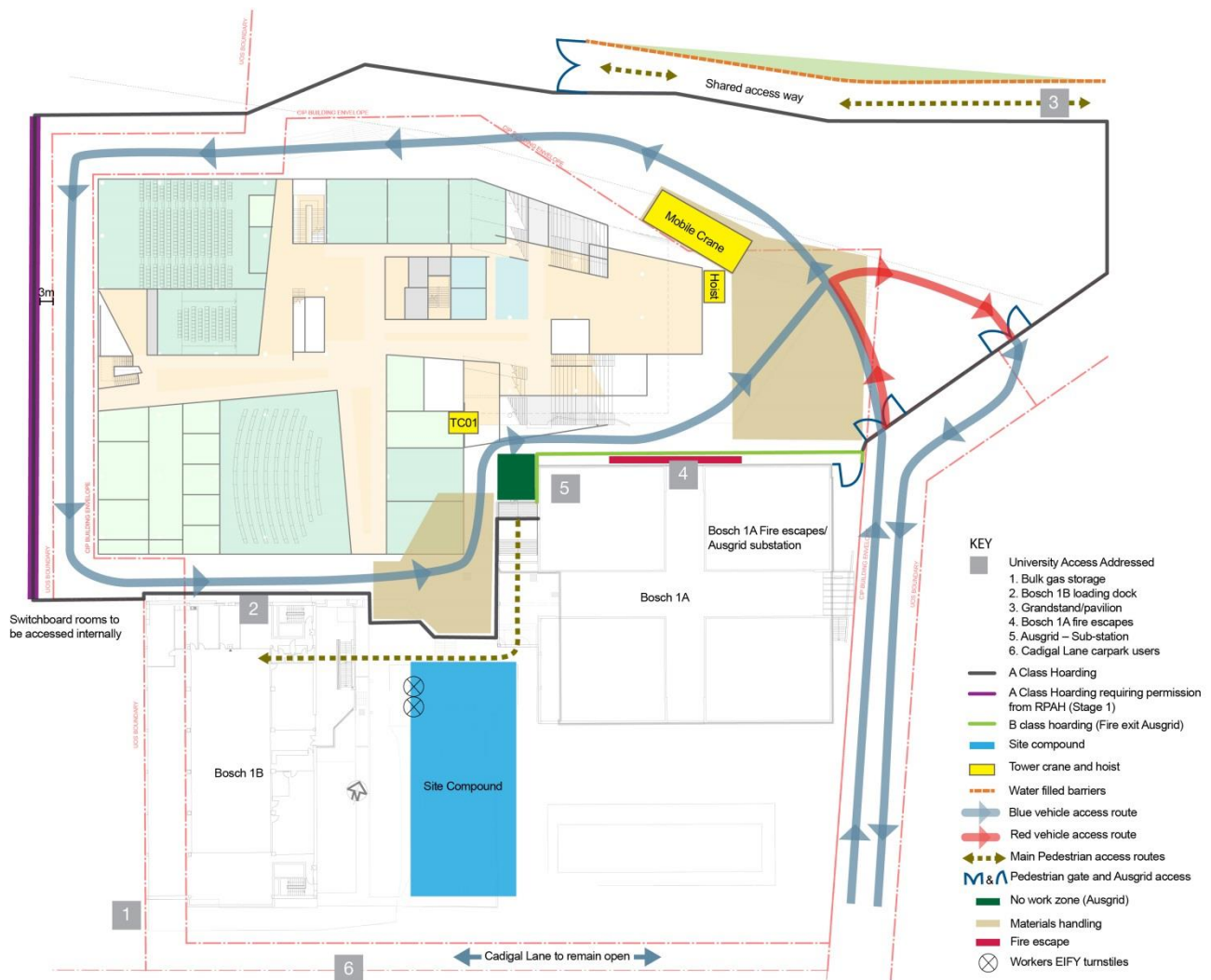


Figure 3: traffic routes on site

5. Impact Assessment

In preparing this CTMP, traffic and pedestrians impacts were assessed to:

- Provide a safe environment for road users, students, staff and workers
- Keep to a minimum the overall impact on road users
- Maintain access for the local community, transport operators and commercial developments
- Keep road users and local communities informed of changed traffic conditions.

The objectives of the TPMP are to:

- Ensure only those parking spaces currently existing on the site will be unavailable.

- Minimise major road closures during peak periods or university holidays, where reasonably practical. We will require temporary road closures for Cadigal Lane while installing the site amenities.
- Minimise delays to all road users when half road closures are required, prioritising weekends and after hours for temporary closures.
- Ensure that heavy vehicles are not detoured onto restricted and local roads, but redirected onto alternative regional roads, where reasonably practical.
- Ensure TCPs are prepared by personnel with appropriate and current certification from RMS in accordance with the Traffic Control at Work Sites Manual and AS1742-2009 Part 3.

5.1 Main works guidelines

The following general principles will be followed for delivery of the main works with roles and responsibilities shown in appendix 2 and:

- Construction vehicles must not use streets that have not been approved for use by RMS, the council or University. Appropriate permission and approval from the governing authority will be required for any construction vehicles exceeding the restrictions of any streets.
- No road closures are proposed; therefore, route diversions for general traffic are not required. No changes to speed zones are required.
- For the delivery and removal of materials at the proposed access points, due consideration and caution must be exercised for the safety of other road users that may be in the vicinity.
- A spotter will be used when moving materials and plant in proximity to pedestrians, commuters and other road users.
- Traffic control signs will be erected in accordance with the standard distances as specified in the RMS Traffic Control at Work Sites Manual. Due diligence will be exercised when erecting traffic control signs within the vicinity of potential obstructions, such as adjacent roadside objects or parked vehicles on the street. It will be at the discretion of the traffic controllers to position signs that are clearly visible for road users providing adequate information.

5.2 Emergency and service vehicles

No road closures are proposed that will influence the operation of emergency and service vehicles. The delivery of materials and plant is expected to occur during designated loading zone hours and locations; therefore, the impacts to emergency and service vehicles are expected to be little to none.

5.3 Existing roads

The road network serving the site comprises:

- Princes Highway (A36)
- Carillon Avenue leading onto Western Avenue
- Great Western Highway / Parramatta Road (A22)

There will be some heavy vehicles arriving and departing the site each day during the demolition and construction stages of the work. All vehicles transporting loose materials will ensure the entire load is covered by means of tarpaulin or similar impervious material. The vehicle driver will take all precautions to prevent any excess dust or dirt particles depositing onto the roadway during travel to and from the site. Most of the construction traffic will enter the site Carillon Avenue.

Road	Characteristics	Restrictions
Carillon Avenue	- Approximately 7.3m wide. - Two lanes, two-way with kerbside parking bays and bus stops - Significant pedestrian and traffic volumes	Site traffic will primarily enter/exit from this route. Vehicles will be encouraged not to utilise Parramatta Road Entrance.
Western Avenue	- Approximately 6m wide - Two lanes, two-way	
Princess Highway	- Approximately 11m wide - Two lanes, two-way - Significant pedestrian and traffic volumes - Numerous bus routes travelling along	Main access route around the University.

Table 3: Road network features and restrictions

5.4 Restricted access vehicle

RMS generally separates vehicles into general access vehicles and restricted access vehicles (RAVs). Roads and zones throughout Sydney have been approved for RAV as well as higher mass limits (HML) for certain heavy vehicles. The heavy vehicle types for the approved operation routes include:

- Short combination vehicles (standard six-axle semi-trailers)
- B-doubles (19m B-doubles operating greater than 50t, 23m B-doubles and 25/26m B-doubles)
- 4.6m high vehicles.

5.5 Parking

There will be no on-site parking for construction workers. The site is well serviced by public transport. Parking within Camperdown streets is generally restricted and has limited capacity. The streets in vicinity of the University offer either little or no on-street parking capacity or are subject to parking restrictions. There are car parks adjacent to the Royal Prince Alfred Hospital, primarily for staff and patient use.

5.6 Public transport

During construction, construction workers will be encouraged to use public transport to prevent additional traffic on the campus.

6. Load management

The safe loading of vehicles is important in preventing injury to people and damage to property. All people working within the Chain of Responsibility must ensure they follow the National Transport Commission (NTC) Load Restraint Guide 2004 and Loading, Unloading Exclusion Zone (LUEZ) guidelines to ensure the safe carriage of loads on road vehicles. Load management guidelines are outlined below.

6.1 Mass and dimension

- Use consignment notes that require the consignor to complete full mass and dimension details
- Implement vehicle, vehicle load and over-mass registers
- Implement load plans or other load placement guidance
- Provide training on calculating appropriate legal load mass and dimension (register of common lifts)
- Implement regular inspections and weighing of loaded vehicles to ensure compliance with legal mass and dimension requirements.

6.2 Load restraint

- Ensure sufficient and appropriate load restraint equipment is provided in line with the NTC Load Restraint Guide
- Provide training on safe load restraint methods and equipment
- Implement load inspection checklists for drivers to use before departing
- Perform regular inspections of the condition of load restraint equipment.

6.3 Loading and unloading behaviours

- Implement vehicle and equipment inspection checklists to be completed at the start of each shift
- Provide training on the safe and appropriate use of loading equipment
- Ensure loading and unloading procedures include the concepts contained in the LUEZ guidelines
- Provide training on the loading requirements for dangerous goods
- Monitor loading and unloading behaviour
- Streamline parking, queuing and loading and unloading practices to minimise delays.

6.4 Load mass

The NTC Load Restraint Guide includes a list of the common plant and equipment that will be used on the Health Precinct Stage 1 project. This list references the appropriate transport mode for those items. For items of greater mass that fall outside of the common list, the following process will be followed:

- Details of truck weight restrictions to be forwarded to Project Engineer
- Consigner provides a diagram and weights of the plant or materials to be moved
- The Project Engineer or the person coordinating the transport booking considers the mass of the load and selects an appropriate transport mode
- E-T-8-0542m Load Plan Template is completed for the load
- Load information is issued to the driver.

The following documents must be used as required.

Document	When to use	Accountability/ responsibility	Record storage location
E-T-8-0504a Container Weight Declaration	Each time a container is transported	A – Project Manager or Project Engineer R – Project Engineer, Supervisor	Server
E-T-8-0504b Dispatch Manifest	Each time a heavy vehicle is dispatched	A –Project Manager or Project Engineer R – Project Engineer, Supervisor, driver	Server
E-T-8-0542j Heavy Vehicle Register	Established and maintained at each depot or project where heavy vehicles are based	A –Construction Manager R – Project Engineer	Server
Equipment Pre-Start Checklists	Prior to operation of equipment	A – Foreman R - Driver	Defects logged in MEX
E-T-8-0542m Load Plan Template	For each load that is not included in the Load Restraint Guide	A – Project Engineer R – Foreman, driver	Server

Document	When to use	Accountability/ responsibility	Record storage location
E-G-8-0542e Loading and Restraint Guide	As guidance for all load restraint activities	A – Project Engineer R – Foreman, Driver	Guidance
NTC Load Restraint Guide	As guidance for all load restraint activities	A – Project Engineer R – Foreman, driver	Guidance
E-G-8-0542d Heavy Vehicle Dangerous Goods Transport Guidance	As guidance when transporting dangerous goods	A – Project Engineer R – Foreman, driver	Guidance
E-C-8-0542d Load Safety Inspection Checklist	Prior to journey, following loading activities	A – Project Engineer R – Foreman, driver	Server

Table 4: Load management documents

6.5 Construction hours

Work hours will be determined by DA condition approval. Building construction is likely to be restricted to between 7am to 6pm Monday to Friday and 7am to 3.30pm on Saturdays. No work is planned to be carried out on Sundays and public holidays.

6.6 Logistics planning

Laing O'Rourke will implement its bespoke web-based logistics management programme, Juggler, to reduce congestion. Through this system, drivers are allocated specific times and dates to make deliveries. Subcontractors and suppliers will submit an online form to book the delivery. A schedule will be maintained and adjusted to plan and prioritise deliveries as required.

7. Traffic control plans

A TCP for the Health Precinct Stage 1 project is provided in Appendix 2.

8. Pedestrian management

Managing pedestrians through the construction works zone is a critical project component. Laing O'Rourke will implement a strategy throughout all stages of construction, to minimise impacts on pedestrians, bicycles, public transport and vehicular traffic (including emergency vehicles). Particular attention will be paid to maintaining pedestrian access as described in the Construction Management Plan (CMP). Key elements of our pedestrian management are:

- Hoardings will be installed, as described in Section 2.5, to ensure pedestrians cannot enter the construction site.
- Pedestrians using the university will be directed by temporary contraction signage and briefed on changes to pedestrian routes through regular construction updates. All temporary signage will be agreed with CIS and a unique app will be used to help students identify their new surroundings with the use of the 3D model.
- A temporary shared access way will be created north of the site adjacent and in between the Stage 1 site and University Oval No. 1. The shared access way will also be used by light vehicular traffic accessing the grandstand.
- No construction vehicles or materials will obstruct designated pedestrian walkways adjacent to the site.
- Pedestrian activity on the corner of Western Avenue will managed by traffic controllers; however, we note there is currently no designated crossing for pedestrians from Blackburn Circuit to cross Western Avenue.
- Two new temporary pedestrian crossings will be created for the efficient and safe flow of students.

- Students will be protected by hoardings installed in accordance with the Construction Management Plan (to be developed during the ECI Phase).
- Pedestrian barriers and gates, controlled by qualified traffic controllers, will be installed to the north and west of the site to prevent pedestrians walking into the construction zone.

9. Conclusion

This CTMP has been prepared to address the potential for any pedestrian and traffic impacts arising from the new Health Precinct Stage 1 works. The Plan has recommended appropriate mitigation measures. The plan outlines the existing traffic conditions and management measures Laing O'Rourke will implement during construction. It also discusses the delivery of materials to and from the proposed site access and egress points and maintains the segregation of students, staff and visitors from construction plant and vehicles.

The Plan forms part of the overall Construction Management plan submitted in support of the State Significant Development Application.

10. Appendices

Appendix 1: Roles and responsibilities

The key traffic and pedestrian management roles and responsibilities are outlined in the following table.

Role	Responsibility
Construction Manager	• Lead the logistics strategy and ensure deliveries are offloaded in accordance with the agreed TPMP • Act as the point of contact with the University for any queries with general site issues • Develop the TPMP and ensure it is kept up to date • Implement temporary wayfinding so students are aware of walking routes • Support the delivery team with safe systems of work including subcontractors.
WHSEQ Manager	• Lead investigations and close out safety issues regarding traffic or pedestrian management • Support the Construction Manager to complete the traffic management risk assessments and implement adequate procedures and control measures on-site • Oversee the implementation of signage and emergency response plans • Support the delivery team by reporting work health and safety (WHS) issues internally and to relevant regulatory bodies, advising any corrective actions necessary, and assisting in their implementation.
General Foreman	• Lead the task of safe delivery and offloading of materials in accordance with safe work method statements (SWMS) and Laing O'Rourke's Safety Management System (SMS) • Act as the main point of contact for the senior project engineer for incoming deliveries • Develop a process for filing and retaining delivery dockets as required by the project administration team • Support subcontractors by ensuring they are fully briefed and understand the offloading requirements.

Table 5: Roles and responsibilities

Appendix 2: Traffic control plan

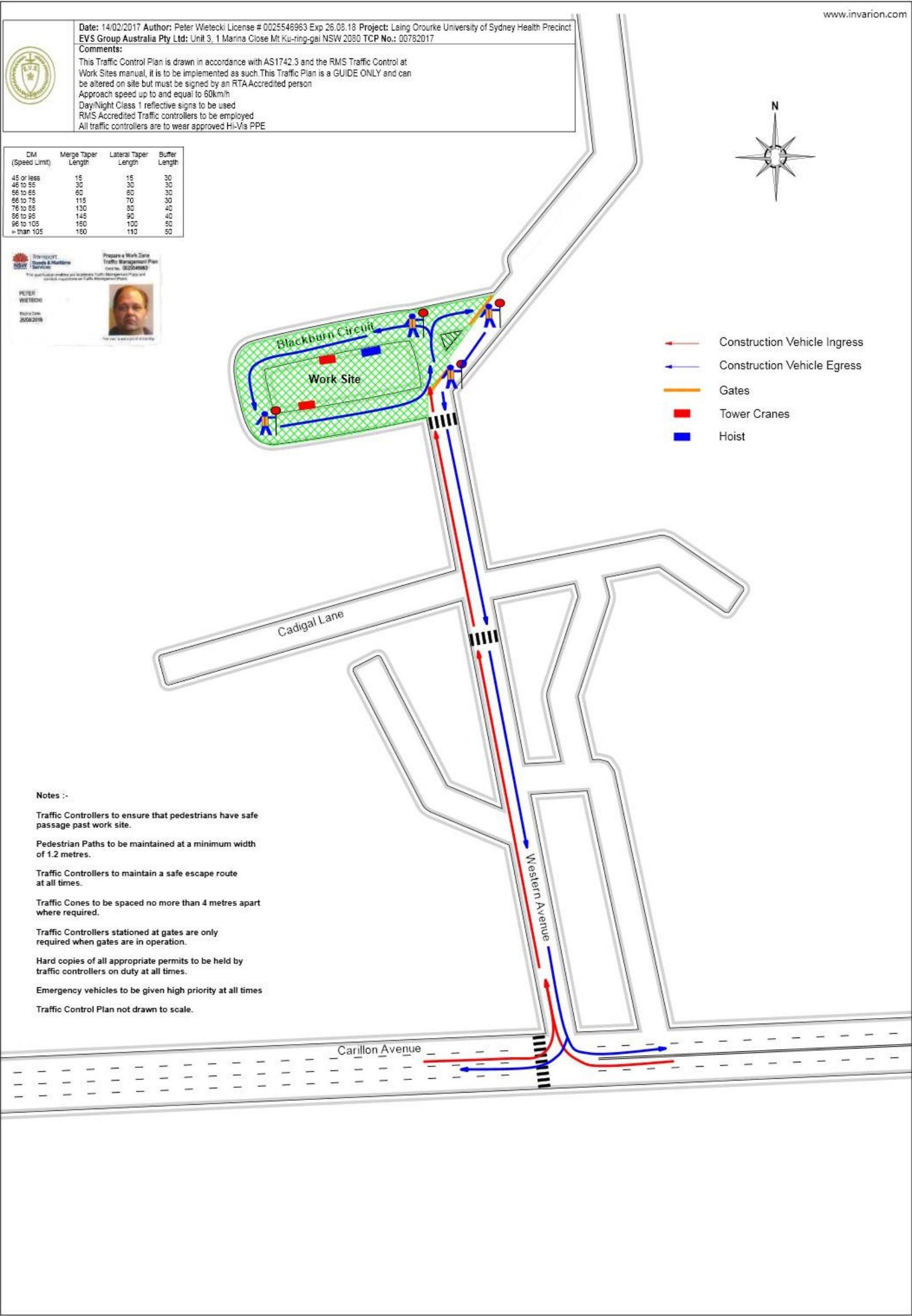


Figure 4: TCP for the Health Precinct Stage 1 project