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OSD Detailed SSD DA - TRAFFIC AND TRANSPORT IMPACT ASSESSMENT

Victoria Cross Over Station Development

Document No: SMCSWSVO-LLC-SVC-TI-REP-000001

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Prepared For – Lendlease Building Pty Limited | ABN 97 000 098 162

OSD Detailed SSD DA - TRAFFIC AND TRANSPORT IMPACT ASSESSMENT

Victoria Cross Over Station Development

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23/08/2019	C	Sydney Metro comments incorporated	Nicole Vukic

Contents

Acronyms

Abbreviation	Description
ABS	Australian Bureau of Statistics
BTS	Bureau of Transport Statistics
CBD	Central Business District
Council	North Sydney Council
CSSI	Critical State Significant Infrastructure
CPTMP	Construction Pedestrian and Traffic Management Plan
CTMP	Construction Traffic Management Plan
DA	Development Application
DCP	Development Control Plan
DPE	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
GFA	Gross floor area
GSC	Greater Sydney Commission
LEP	Local Environment Plan
LoS	Level of Service
MRV	Medium Rigid Vehicle
OD	Origin-destination
OSD	Over station development
Roads and Maritime	NSW Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environment Planning Policy
SRV	Small Rigid Vehicle
SSD	State Significant Development
SWTC	Scope of Works and Technical Criteria
TfNSW	Transport for NSW
TZ	Travel zone

1. Introduction

This report has been prepared to accompany a detailed State Significant Development (SSD) development application (DA) for a commercial mixed-use Over Station Development (OSD) above the new Sydney Metro Victoria Cross Station. The detailed SSDA is consistent with the Concept Approval (SSD 17_8874) granted for the maximum building envelope on the site, as proposed to be modified.

The Minister for Planning, or their delegate, is the consent authority for the SSDA and this application is lodged with the NSW Department of Planning, Industry and Environment (NSW DPIE) for assessment.

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 6 May 2019. Specifically, this report has been prepared to respond to the SEARs requirements summarised in Table 1.

Table 1 – SEARs requirements, Traffic and Transport Impact Assessment

Item	Description of requirement	Section reference (this report)
8	*describe consultation undertaken with the owners of the MLC Building regarding basement vehicle access via shared connection or future breakthrough panel*	Separate Report - Pre Consultation Report
	Include a Transport and Traffic Impact Assessment that provides, but is not limited to, the following:	This report
	accurate details of the current daily and peak hour vehicle, public transport, point to point transport services, pedestrian and bicycle movements from existing buildings/uses on the site using the adjacent and surrounding road network	Section 3
	forecast total daily and peak hour trips likely to be generated by the proposed development including vehicle, public transport, point to point transport services, pedestrian and bicycle trips, including an indication of whether related to the station or OSD, together with cumulative impacts of existing, proposed and approved developments in the area and any transport/traffic upgrade	Section 4
	an assessment of impacts of the development on the operation of existing and future transport networks, in particular bus corridors, including the public transport capacity and its ability to accommodate the forecast number of trips to and from the development	Section 5
	detailed assessment of the existing and future performance of key intersections providing access to the site, supported by appropriate modelling and analysis to the satisfaction of RMS and TfNSW	Sections 3.3 and 5.1

Item	Description of requirement	Section reference (this report)
	measures to mitigate impacts of the proposed development on the operation of existing and future traffic, public transport, pedestrian and bicycle networks	Section 5
	measures to be implemented, including a Green Travel Plan, to encourage users of the development to make sustainable travel choices, including walking, cycling, public transport and car sharing, such as the integration with rail and bus infrastructure and provision of adequate bicycle parking and end of trip facilities	Appendix B
	proposed car and bicycle parking provision for workers as well as car parking provision for visitors, including consideration of the availability of public transport and the requirements of the relevant parking codes and Australian Standards	Sections 4.5 and 4.7
	modelling and analysis of pedestrian and cyclist access to the development in consultation with TfNSW, together with an assessment of pedestrian and cyclist safety and consideration of the relationship with design and operation of the station	Sections 5.3 and 5.4
	proposed vehicle access arrangements, including for service and loading activities, including an assessment of any potential impacts such as potential pedestrian, cyclist and transport conflicts, and measures to mitigate impacts	Section 4.7
	adequacy of the loading dock servicing and management arrangements.	Section 4.7
	provide a draft Construction Pedestrian and Traffic Management Plan to demonstrate the proposed management of impacts during construction. The Plan shall include: • *vehicle routes, peak hour and daily truck movements, hours of operation, access arrangements (including swept path analysis) and traffic control measures for all demolition/construction activities including management of light commercial vehicles attending the site* • *an assessment of road safety at key intersections and locations subject to pedestrian/ vehicle/ bicycle conflicts* • *details of temporary cycling and pedestrian access and end of trip facilities during construction* • *an assessment of the impacts associated with any required road / lane closures and diversions, on bus and 'point to point' transport, pedestrian and cycle movement, and taking into account other construction activities within the precinct,*	Appendix C

Item	Description of requirement	Section reference (this report)
	and other stations along the Sydney Metro City and Southwest.	

This report has also been prepared in response to the following condition of consent for the State Significant Development Concept (SSD 8874) for the OSD summarised in Table 2.

Table 2 – Concept approval Conditions of Consent, Traffic and Transport Impact Assessment

Item	Description of requirement	Section reference (this report)
B10	*Future detailed development application(s) shall be accompanied by a Traffic and Transport Impact Assessment.*	This report
B11	*Future detailed development application(s) shall incorporate the following:*	
	a) include a strategy, including possible technological solutions, that will manage conflict between loading dock, parking area access and bike parking access	Section 6
	b) demonstration of manoeuvring of larger/ longer vehicles via Denison Street including swept path analysis, if larger or longer vehicles are required to service the OSD compared to station infrastructure	Appendix A
	c) demonstration of wayfinding infrastructure and public exposure to bicycle parking within the basement	It should be noted that no public/ visitor bicycle parking provision is provided within the basement. All parking to be provided in the basement will be private parking.
	d) consideration of responsibilities, timing and commitments to the development of pedestrian facilities and bicycle infrastructure proposed to be undertaken by others	This will be considered in consultation with North Sydney Council, Transport for NSW and other relevant road authorities
	e) a Construction Traffic Management Plan (CTMP) prepared in consultation with the Sydney Coordination Office and North Sydney Council, and to the satisfaction of relevant roads authorities. The CTMP shall include, but not be limited to: *i. construction car parking strategy* *ii. haulage movement numbers/ routes including contingency routing*	Section 7 and Appendix C

Item	Description of requirement	Section reference (this report)
	iii. detailed travel management strategy for construction vehicles including staff movements *iv. maintaining property accesses* *v. maintaining bus operations including routes and bus stops* *vi. maintaining pedestrian and cyclist links/ routes* *vii. independent road safety audits on construction-related traffic measures* *viii. measures to account for any cumulative activities/ work zones operating simultaneously.*	
B12	*Independent road safety audits are to be undertaken for all stages of detailed design development involving road operations and traffic issues relevant to the OSD. Any issues identified by the audits shall be closed out in consultation with the Sydney Coordination Office and North Sydney Council to the satisfaction of the relevant road authorities.*	This will be undertaken as part of the design process, separate to this report.

The detailed SSDA seeks development consent for:

- Construction of a new commercial office tower with a maximum building height of RL 230 or 168 metres (approximately 42 storeys)
- The commercial tower includes a maximum GFA of approximately 61,500 square metres, excluding floor space approved in the CSSI
- Integration with the approved CSSI proposal including though not limited to:
- Structures, mechanical and electronic systems, and services
- Vertical transfers
- Use of spaces within the CSSI 'metro box' building envelope for the purposes of:
    - Retail tenancies
    - Commercial office lobbies and space
    - 161 car parking spaces within the basement for the purposes of the commercial office and retail use
    - End of trip facilities
    - Loading and services access
- Utilities and services provision
- Signage locations (building identification signs)
- Stratum subdivision (staged).

1.1 The site

The site is generally described as 155-167 Miller Street, 181 Miller Street, 187-189 Miller Street, and part of 65 Berry Street, North Sydney (the site). The site occupies various addresses/ allotments and is legally described as follows:

- 155-167 Miller Street (SP 35644) (which incorporates lots 40 and 41 of Strata Plan 81092 and lots 37, 38 and 39 of Strata Plan 79612)
- 181 Miller Street (Lot 15/DP 69345, Lot 1 & 2/DP 123056, Lot 10/DP 70667)
- 187 Miller Street (Lot A/DP 160018)
- 189 Miller Street (Lot 1/DP 633088)
- Formerly part 65 Berry Street (Lot 1/DP 1230458).

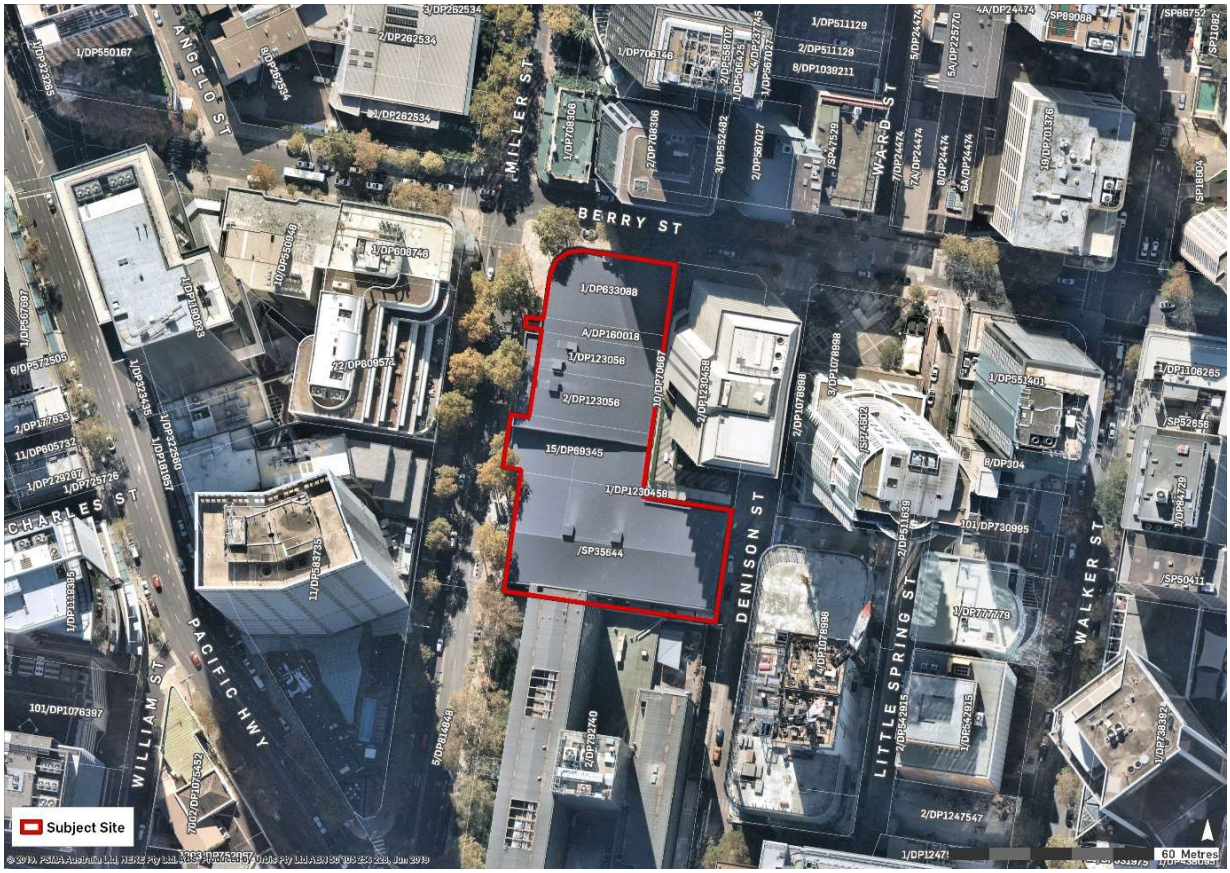


Figure 1 – Site aerial

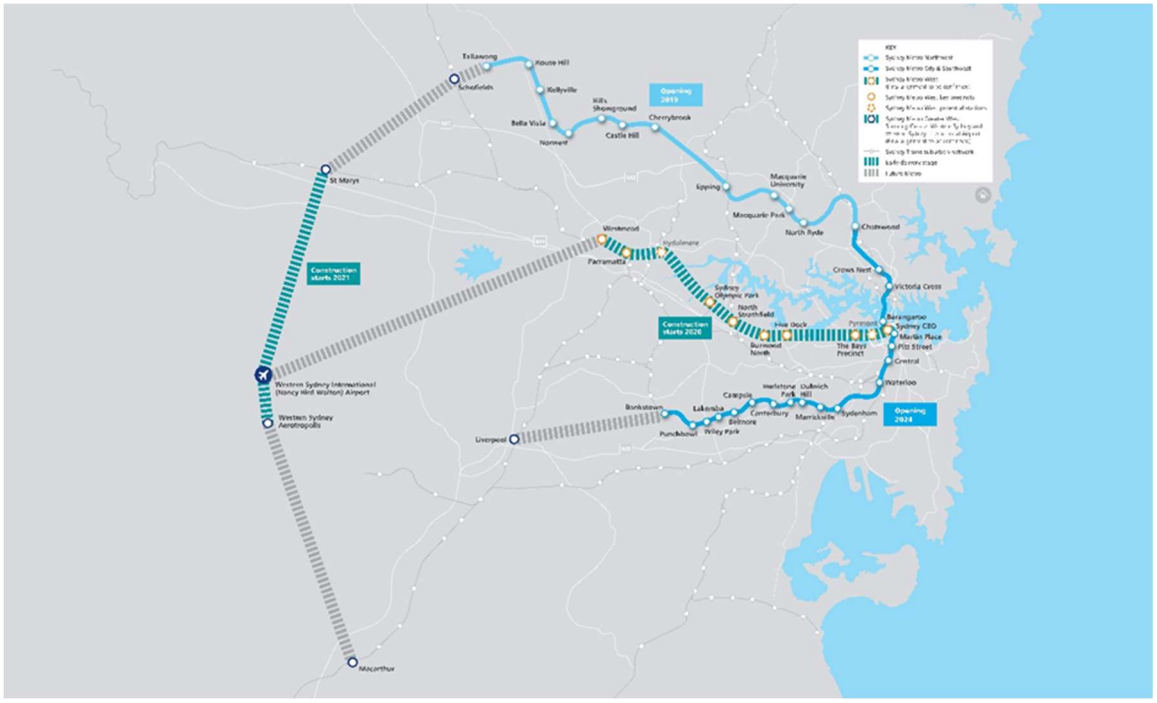
1.2 Sydney Metro description

Sydney Metro is Australia's biggest public transport project. Services started in May 2019 in the city's North West with a train every four minutes in the peak. Metro rail will be extended into the CBD and beyond to Bankstown in 2024. There will be new metro railway stations underground at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street, Waterloo and new metro platforms under Central.

In 2024, Sydney will have 31 metro railway stations and a 66 km standalone metro railway system – the biggest urban rail project in Australian history. There will be ultimate capacity for a metro train every two minutes in each direction under the Sydney city centre. The Sydney Metro project is illustrated in the Figure below.

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham project as a Critical State Significant Infrastructure project (reference SSI 15_7400) (CSSI Approval). The terms of the CSSI Approval includes all works required to construct the Sydney Metro Victoria Cross Station, including the demolition of existing buildings and structures on both sites. The CSSI Approval also includes construction of below and above ground improvements with the metro station structure for appropriate integration with the OSD.

With regards to CSSI related works, any changes to the "metro box envelope" and public domain will be pursued in satisfaction of the CSSI conditions of approval and do not form part of the scope of the detailed SSD DA for the OSD



Source: Sydney Metro

Figure 2 – Sydney Metro network, in delivery and under development, 2019

1.3 Report structure

The remainder of this report is structured as follows:

- **Section 2 Regulatory context** provides a summary of the planning and statutory context for the proposal
- **Section 3 Existing transport conditions** summarises the existing transport network surrounding the site and its operation
- **Section 4 Development proposal** details the proposed development at the site
- **Section 5 Transport assessment** provides an assessment of the surrounding transport network following the introduction of the proposed development
- **Section 6 Loading dock operation** provides a preliminary plan for managing service vehicles within the loading dock, to minimise conflict with other vehicles expected to access the site
- **Section 7 Construction pedestrian traffic management plan** summarises the framework for the management of pedestrians and traffic during the construction of the proposed development
- **Section 8 Conclusions** summarises the findings of this study
- **Appendix A Swept path analysis** provides the analysis of swept paths for vehicles proposed to access the site
- **Appendix B Green travel plan** provides a preliminary plan for encouraging sustainable transport modes to be used to access the site
- **Appendix C Framework CPTMP** includes an outline for managing traffic and pedestrians during construction of the proposed development.

2. Regulatory context

Transport for NSW is currently working with the Greater Sydney Commission, NSW Government Architect and North Sydney Council (Council) to develop the preferred place making vision for the environs surrounding Sydney Metro at Victoria Cross. The vision will guide transport planning and investment in the North Sydney CBD – and interconnected areas – over the next 20 years and beyond. The vision will support and facilitate the outcomes envisaged by the *Greater Sydney Region Plan* and *Future Transport 2056*. The delivery of the vision is cognisant of two major projects within the locality including Sydney Metro City and South West and Western Harbour Tunnel Beaches Link (WHTBL) timeframes. Realising opportunities presented by land use development and transport infrastructure requires balanced and integrated solutions to service customer needs and manage the potential impacts of increasing travel demand to, from and within North Sydney. The vision will address the strategic multi-modal changes required to enable the precinct to grow and support its role as part of the Eastern Harbour City. It is framed by the desired growth and physical constraints of the North Sydney CBD, which underlines that future success of the precinct is dependent on improved transport infrastructure and efficient operations for all transport modes. Transport for NSW will also further investigate improved pedestrian amenity and safety, improved access for cyclists to and through the CBD, convenient interchanges between bus and rail services, and management of kerbside access to support business activity across the day, including night-time activation. In delivering this Proposal, Lendlease will continue to work with Transport for NSW, Council and other stakeholders in a collaborative manner to ensure there is an integrated transport solution for North Sydney.

2.1 North Sydney Local Environment Plan and North Sydney Development Control Plan

The North Sydney Local Environment Plan (LEP) 2013 is the principal legal document for controlling development and guiding planning decisions within the North Sydney Council area. The North Sydney Development Control Plan 2013 (DCP) provides guidance which supports the implementation of the LEP. Although the DCP is not applicable to the SSD, it provides a guide to the maximum number of on-site car parking spaces that can be provided for new developments based on their location and level of transport accessibility. It also recommends the minimum number of bicycle parking spaces to be provided by new developments.

2.2 State Environmental Planning Policy (Infrastructure) 2007

The aim of the State Environment Planning Policy (SEPP) (Infrastructure) is to facilitate the provision of infrastructure across NSW. Clauses relevant to the development include:

Clause 88B: Development near proposed metro stations

A consent authority must not grant consent to development on land to which this clause applies unless it has taken into consideration:

- Whether the proposed development will adversely affect the development and operation of a proposed metro station, including by impeding access to, or egress from, the proposed metro station

- Whether the proposed development will encourage the increased use of public transport.

The proposed development is above the entrance to the Victoria Cross Station and will not adversely affect access/ egress to the proposed Sydney Metro Station. Furthermore, the station is likely to encourage and facilitate the use of public transport to and from the development, which has the potential to increase the public transport mode share on existing conditions for the area.

Clause 104: Traffic-generating development

This clause sets out thresholds for scale of new or extended development, above which the consenting authority must:

(a) Give written notice of the application to Roads and Maritime Services (Roads and Maritime) within seven days after the application is made, and

(b) Take into consideration:

  (i) Any submission that Roads and Maritime provides in response to that notice within 21 days after the notice was given (unless, before the 21 days have passed, Roads and Maritime advises that it will not be making a submission), and

  (ii) The accessibility of the site concerned, including:

    A. The efficiency of movement of people and freight to and from the site and the extent of multi-purpose trips, and

    B. The potential to minimise the need for travel by car and to maximise movement of freight in containers or bulk freight by rail, and

  (iii) Any potential traffic safety, road congestion or parking implications of the development.

The consent authority must follow these steps when assessing the development application submitted for this development.

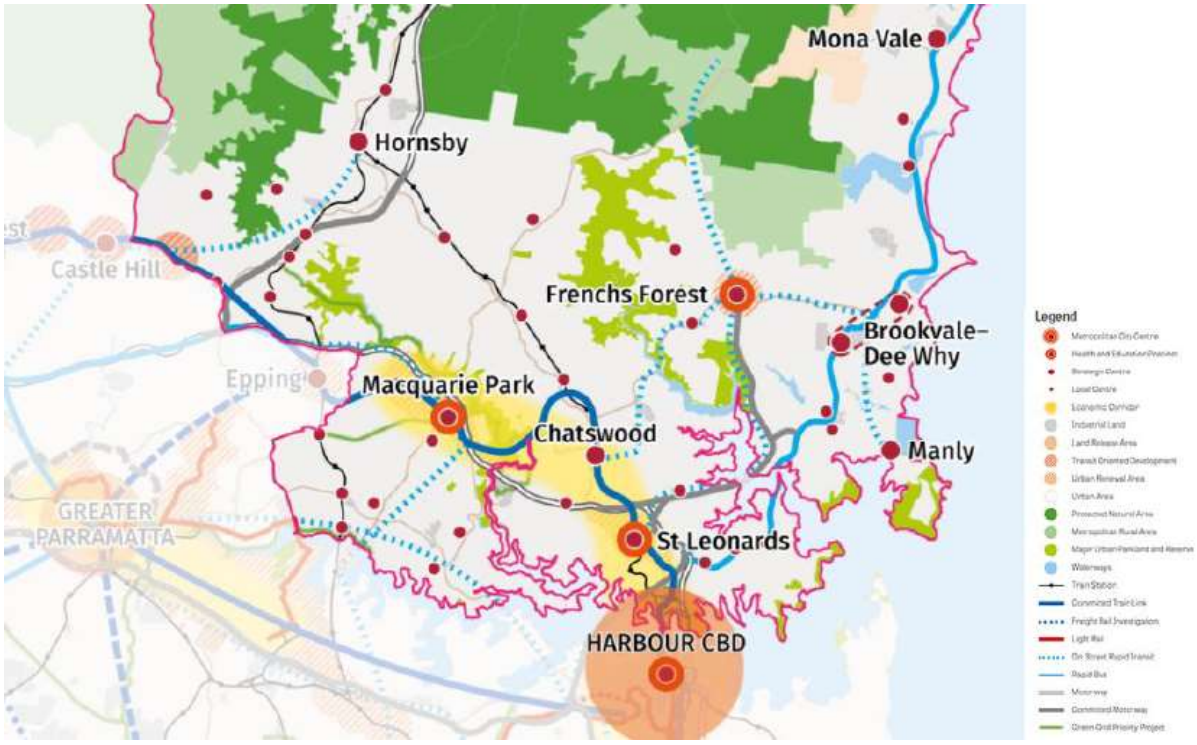
This traffic impact assessment has been prepared to assess how the proposed OSD impacts these criteria, and where necessary describe possible mitigation measures to ensure the efficiency of movement, reduce the need for private car travel and address any traffic safety, congestion and parking impacts.

2.3 Greater Sydney Region Plan

In March 2018 *A Metropolis of Three Cities – the Greater Sydney Region Plan* was released. The plan, along with Transport for NSW's Future Transport *2056* and Infrastructure NSW's *State Infrastructure Strategy 2018-36* will bring to life the vision of Greater Sydney as a vibrant and sustainable metropolis of the Eastern Harbour City, Central River City and Western Parkland City. It provides strategic direction for Sydney's productivity, environmental management, and liveability; and for the location of housing, employment, infrastructure and open space. The plan's vision is to maintain Sydney's position as a strong global city and a great place to live. The proposed development is part of the Victoria Cross Station that will contribute to the implementation of a world class transport system that is connected, accessible and can accommodate the future demands of a growing population. The OSD will contribute to continued growth and opportunities in support of the plan's vision.

2.4 North District Plan

The *Greater Sydney Regional Plan* nominates six districts of Sydney, the district plans have been released by the Greater Sydney Commission (GSC). The *North District Plan* (GSC, 2018) sets out priorities and actions for the North District, where the proposal is located. The vision includes strengthening the transport connections from the North Sydney CBD to the Eastern Economic Corridor and the Harbour CBD and is illustrated in Figure 3.



Source: Greater Sydney Commission, 2018

Figure 3 – North District Plan

The introduction of the new Victoria Cross Station will help strengthen the transport connection from the North Sydney CBD to the Eastern Economic Corridor and the Harbour CBD through more frequent and better connected rail services. The proposed OSD will provide a significant level of employment. Located above the Victoria Cross Station, it will help expand the catchment of accessibility through non-car modes of travel by taking advantage of this important transport connection.

2.5 Future Transport Strategy 2056

The *Future Transport Strategy 2056* is NSW Government's framework for planning and improving NSW transport system and was developed as part of the five-year update to the 2012 *Long Term Transport Master Plan* for NSW. The plan enables Sydney to prepare for a period of population

growth with a vision for setting a pathway up to 2056. This vision is based on Greater Sydney being a metropolis of three cities (Eastern Harbour City, Central River City and Western Parkland City).

The strategy to accommodate population growth seeks to take advantage of technological enabled mobility that offers opportunities to maximise travel by car free alternatives within Sydney. This includes the transformation of the mass transit network to align with a 30-minute trip to services and employment. It also recognises the role of automation and how it can help to improve safety, travel choices and mode concepts, service frequency, reliability and travel times for customers when travelling within and around Sydney's transport network.

Sydney Metro City and Southwest and the proposed Victoria Cross Station form a key part of this future vision. It offers a modern technologically advanced public transport system solution, which, through the provision of a strategic public transport hub, supports both placemaking and efficient connections to and from the North Sydney CBD. Future activity generated by the proposed OSD will directly benefit from Sydney Metro, which will help to appropriately manage its impacts through its proximity within the North Sydney CBD and its alignment with the objectives of this strategy.

2.6 Sustainable Sydney 2030

The plan for Sydney moving forward is to become a green city, whilst delivering world class services and competing economically on a global scale. Sustainable transport networks are key for Sydney to achieve this, and the Sydney Metro and proposed OSD will contribute to creating a more sustainable transport system and employment opportunities within the CBD and inner-city suburbs.

2.7 Sydney Metro Planning Study – Crows Nest and North Sydney

In response to the introduction of the Sydney Metro, Council has prepared a planning study, which aims to inform and guide the future planning and development of the Sydney Metro, including OSDs on Sydney Metro station sites and their immediate surroundings.

The study concludes that OSD on Sydney Metro station sites will contribute to the overall amenity of the North Sydney Centre, particularly with regard to provision of new commercial floor space in the North Sydney Centre commercial core and the creation of new public spaces facilitating a sense of place and identity. The proposed OSD allows the incorporation of design excellence to create an exceptional built form and improve the performance and capacity of the public domain in the vicinity of the site.

2.8 Transport Strategy, North Sydney Council

The *North Sydney Transport Strategy* (NSTS) is Council's guiding document for the delivery of its transport planning and management responsibilities. This includes strategic transport planning, transport advocacy and the delivery of local transport projects. The NSTS builds on the directions, outcomes and strategies detailed in *North Sydney's Community Strategic Plan 2013-23* and *Ecologically Sustainable Development Best Practice Project 2014* to create an over-arching transport planning and management framework for the whole of Council.

The NSTS is based on community engagement undertaken in 2016, which was used to identify the North Sydney community's transport priorities and aspirations for the future of North Sydney's

transport networks that informed the development of the NSTS. The vision for transport developed from the community priorities is: *In 2030, transport will play a positive role in supporting a happy, healthy and prosperous North Sydney community.*

Council's NSTS generally aims to deliver inclusive streetscape design and slow speed (40km/h) traffic environments in commercial, mixed use, neighbourhood centres and residential zones, which will encourage the sharing of local streets by all travel modes. On classified state and regional roads outside of local centres, Council aims to advocate for the delivery of high quality, separated walking, cycling and public transport facilities to improve walking, cycling and public transport safety and amenity on these strategic traffic routes, even where this comes at the expense of general traffic capacity and travel times.

The following five principles that influence travel demand and mode choice are:

- Land use density
- Land use diversity
- Walking and cycling infrastructure design
- Distance to transit
- Destination and accessibility.

Sydney Metro City and Southwest and the proposed Victoria Cross Station will contribute to the vision of the NSTS by providing a strategic public transport hub, combined with increased land use density around the new public transport hub and appropriate pedestrian and cyclist infrastructure to support active transport mode share.

2.9 North Sydney CBD Public Domain Strategy

The *North Sydney CBD Public Domain Strategy, Stage 1 – Public Spaces Vision* (North Sydney Council, October 2018) provide guidance on the development of the public domain in the North Sydney CBD. This document establishes the vision for the centre's public spaces, identifies short, medium and long-term projects and provides an implementation plan to improve the North Sydney CBD. The purpose of the strategy is to activate the CBD through developing activity-based infrastructure that is appealing to residents and workers, providing places for people to gather while facilitating the movement of large numbers of people. Stage 2 of the strategy is currently being undertaken, which will develop a strategy for the delivery of the proposals identified in Stage 1.

The four approaches to improve the public domain in North Sydney CBD are:

- Increasing the quantity of public domain and green space
- Increasing the quality and variety of public domain
- Slowing vehicle speeds and actively encourage walking and cycling
- Creating new city-shaping spaces that connect with cultural, social and transport hubs.

The strategy includes creating a "civic spine" along Miller Street, which involves creating a high-quality, authentic main street that connects people with places, history, landmarks, green space, activity attractors and transport on a paved boulevard. The creation of "Miller Place" includes the implementation of a shared zone along Miller Street, between its intersections with the Pacific Highway and Berry Street. The primary features of Miller Place identified in the strategy are:

- Upgrading the intersection of Miller Street and Pacific Highway to improve pedestrian safety and amenity, with the potential implementation of a scramble crossing
- Upgrading the lawns and gardens in front of the existing MLC building to provide additional seating, activation of the building edges and creation of an event space
- Installation of overhead lighting and public art near the main entrance to the Metro Station
- New raised garden and seating areas that connect the MLC lawns to Civic Park, Stanton Library, North Sydney Oval and St Leonards Park
- Installing a potential scramble crossing at the intersection of Miller Street and Berry Street to improve pedestrian priority.

The proposed Victoria Cross Station will contribute to the vision of the Public Domain Strategy by creating high-quality public domain and green space. This proposal also includes the pedestrian and cyclist infrastructure to support and encourage the use of active transport modes, ensuring that the new transport hub is connected to the city-shaping spaces identified in the strategy.

2.10 Relevant Policies and Guidelines

The following documents have also been considered in the development of this report:

- *Guide to Traffic Generating Developments* (Roads and Maritime Services [Roads and Maritime], 2002) and *Technical Direction 2013/04a: Guide to Traffic Generating Developments – Updated traffic surveys* (Roads and Maritime, 2013) which were used to inform the traffic assessment undertaken for this project
- *Guide to Traffic Management – Part 12: Traffic impacts of developments* (Austroads, 2019), which was used to develop the methodology for assessing the traffic impact of the development
- Australian Standards AS2890 Parking Facilities Parts 1 to 6
- *NSW Planning Guidelines for Walking and Cycling*
- *Draft North of Centre/ Ward Street Precinct Masterplan* (North Sydney Council).

3. Existing transport conditions

This section of the report provides the transport context within which the proposed development sits, summarising the existing travel patterns of employees near the site, the accessibility of the site by various transport modes, the on- and off-street parking provision and the current kerbside uses surrounding the proposed development site.

The site is located on the south eastern corner of the Berry Street/ Miller Street intersection extending through to Denison Street towards the southern end of the site.

3.1 Existing travel patterns/ mode share

Census 2011 Journey to Work data collected by the Australian Bureau of Statistics (ABS) has been used to assess the current commuter travel behaviour in the proposed development area and characterise the public transport conditions near the site.

The Bureau of Transport Statistics (BTS) uses ABS data to determine the mode used to travel to work by 'travel zones' (TZs[1]). The TZs that apply to this proposed development site are located within the North Sydney CBD, bounded by Ridge Street in the north, the Warringah Freeway in the east, Union Street in the south and the boundary of the suburb of Waverton in the east and are considered appropriate for determining the travel patterns for the site. The location of the relevant TZs are illustrated in Figure 4.

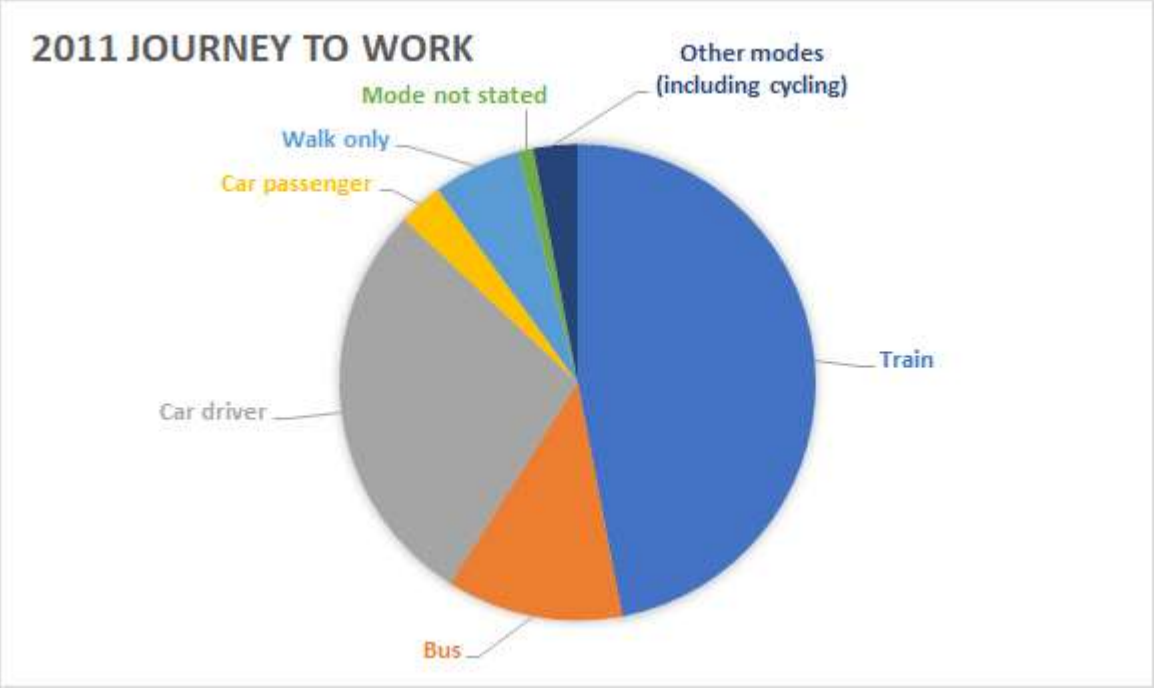
Source: BTS TZs 1951, 1952, 1953, 1954, 1955, 1956 and 1957

[1] TZs 1951, 1952, 1953, 1954, 1955, 1956 and 1957 used for the purpose of this analysis

Figure 4 – Census 2011, Journey to Work relevant TZs

At the time of the Census and prior to demolition work for the Sydney Metro, this zone included about 39,511 employees. Their main mode of travel is summarised in Figure 5 and includes the following mode share:

- 47 per cent travelled by train
- 12 per cent travelled by bus
- 28 per cent travelled by car as a driver
- Three per cent travelled by car as a passenger
- Six per cent walked only
- One per cent did not state their mode of travel
- Three per cent travelled by other modes (including by bicycle).



Source: Census 2011

Figure 5 – Census 2011, Journey to Work mode share

In additional to the Journey to Work mode share data for North Sydney the results were compared to other highly accessible locations situated in the Eastern Harbour City and along the Sydney Metro line, including Pitt Street and Martin Place. These locations are influenced by parking controls, congestion along the road network, high density mixed used environments, high public transport accessibility and service levels. The mode share for Greater Sydney is also provided. This comparison is presented in Table 3. The Journey to Work mode share indicates that Pitt Street and Martin Place have seven to nine per cent higher trips by public transport and approximately 17 per cent lower car trips compared to North Sydney.

Table 3 – Comparison of 2011 Journey to Work mode share for other Sydney Metro stations and Greater Sydney

Mode	Eastern Harbour City			Greater Sydney
	North Sydney	Pitt Street	Martin Place	
Train	47%	47%	42%	14%
Bus	12%	21%	22%	6%
Car driver	28%	14%	15%	67%
Car passenger	3%			5%
Walk only	6%	6%	6%	4%
Mode not stated	1%	11%	11%	2%
Other modes (including cycling)	3%			2%

Source: Census, 2011

3.2 Existing vehicular access and kerbside uses

The key roads in the vicinity of the study area include Miller Street, Berry Street, Walker Street and the Pacific Highway.

Miller Street provides a north-south connection from North Sydney to Northbridge. It continues as Blues Point Road to the south and Strathallen Avenue to the north. The section located near the proposed Victoria Cross Station is classified as a Regional Road. Through the North Sydney CBD, the road is predominantly two lanes in each direction, with time restricted parking and ancillary turning lanes at some key intersections within the kerbside lanes. The area adjacent to the site is currently designated and signposted as a high pedestrian activity area, with a speed limit of 40 kilometres per hour. Miller Street also includes a 40-kilometre per hour school zone that operates north of Berry Street during school pick-up and drop-off periods.

Berry Street is classified as a State Road east of the intersection with the Pacific Highway and follows an east-west alignment. It has a three to four traffic lane configuration that operates in the eastbound direction only. East of Walker Street, Berry Street joins Arthur Street and offers connections to the M1 Motorway and Sydney Harbour Bridge. For most of its length Berry Street is designated as a 40-kilometre per hour speed zone. The kerbside lanes of Berry Street are subject to time restricted parking.

Walker Street is a local road which has a north-south alignment, parallel with Miller Street. It is located between the Pacific Highway to the south and Ridge Street to the north. The road is two-way, with predominantly one traffic lane in each direction. Time restricted parking is provided within the kerbside lanes. The designated speed limit through the North Sydney CBD is 40 kilometres per hour. Between

McLaren Street and Ridge Street it is generally 50 kilometres per hour with a 40-kilometre per hour school zone that operates during school pick-up and drop-off periods.

The Pacific Highway is a State Road, which provides a key north-south connection from the Pacific Motorway to North Sydney. Near Victoria Cross Station, the road generally comprises three lanes in each direction and facilitates access to the North Sydney CBD, Blues Point and Milson Point as well as key roads such as Falcon Street, River Road, Sydney Harbour Bridge and the Warringah Freeway. The kerbside lanes have time restricted parking and is subject to clearway restrictions. The Pacific Highway has a sign-posted speed limit of 60 kilometres per hour within North Sydney.

The existing kerbside near the site includes a mixture of parking restrictions and uses, including:

- Bus zones
- Loading zones
- Short stay ticketed parking (quarter and half-hour restrictions)
- Medium stay ticketed parking (one to two-hour restrictions)
- Taxi zones
- Clearways
- No stopping areas (both full-time and period dependent).

There are also works zones located along Denison Street, next to the 1 Denison construction site. The kerbside uses and parking restrictions are summarised in Table 4, based on a site investigation carried out on 25 April 2019.

Table 4 – Summary of kerbside uses

Parking type/ use	Period effective	Locations
Bus zones	Full time	• Miller Street, northbound, south of Berry Street • Miller Street, southbound north of the Pacific Highway
Loading zones	• 8.30am to 3pm, Monday to Friday • 8.30am to 12.30pm, Saturday	Miller Street, northbound south of Northpoint driveway
	10am to 6pm, Monday to Friday	Miller Street, southbound in front of 105 Miller Street
	6am to 10am, Monday to Friday	Berry Street, east of Miller Street in front of site
	10am to 3pm, Monday to Friday	Berry Street, east of Miller Street opposite site
Short stay	• 8.30am to 3pm, Monday to Friday • 8.30am to 12.30pm, Saturday	Miller Street, northbound in front of Northpoint
	8.30am to 12.30pm, Saturday	Miller Street, southbound in front of 105 Miller Street
	10am to 6pm, Monday to Friday	Miller Street, southbound in front of the site
	• 10am to 3pm, Monday to Friday • 8.30am to 12.30pm, Saturday	Miller Street, southbound, north of Berry Street

Parking type/ use	Period effective	Locations
Medium stay	6pm to 12am, Monday to Friday	• Miller Street, southbound in front of the site • Berry Street, east of Miller Street in front of site • Denison Street, eastern kerb • Denison Street, western kerb, south of site
	• 8.30am to 3pm, Monday to Friday • 8.30am to 12.30pm, Saturday	Miller Street, northbound, north of Berry Street
	10am to 6pm, Monday to Friday	Berry Street, east of Miller Street in front of site
	• 8.30am to 6pm, Monday to Friday • 8.30am to 12.30pm, Saturday	• Denison Street, eastern kerb • Denison Street, western kerb, south of site
	7pm to 12am, Monday to Friday	• Miller Street, northbound, north of Berry Street • Miller Street, southbound, north of Berry Street • Berry Street, east of Miller Street, northern kerb
Taxi zones	Full time	Miller Street, southbound in front of the site, just south of Berry Street
Clearways	3pm to 7pm, Monday to Friday	Miller Street, northbound
	6am to 10am, Monday to Friday	Miller Street, southbound
	• 3pm to 7pm, Monday to Friday • 6am to 10am, Monday to Friday	Berry Street, northern kerb
No stopping	Full time	On all approaches to intersections (about 20 metres)
	• 5am to 5pm, Monday to Friday • 5am to 1pm, Saturday	Denison Street, western kerb, north of site access
	• 7am to 5pm, Monday to Friday • 8am to 1pm, Saturday	Denison Street, western kerb, in front of 105 Miller Street
	3pm to 7pm, Monday to Friday	Miller Street, southbound, north of Berry Street

Source: Site investigation, 25 April 2019

3.3 Traffic volumes

The existing traffic volumes on the key roads surrounding the site have been obtained from the Sydney Metro Chatswood to Sydenham CSSI Environmental Impact Statement (EIS), which are based on surveys undertaken in 2015. A summary of the existing traffic volumes is provided in Table 5.

Table 5 – Peak hour traffic volumes, 2015

Location	Direction	AM peak (vehicles/ hour)	PM peak (vehicles/ hour)
Pacific Highway, between McLaren and Berry streets	Southbound	1,390	1,060
	Northbound	1,000	790
Pacific Highway, between Berry and Miller streets	Southbound	520	620
	Northbound	1,210	1,160
Miller Street, between McLaren and Berry streets	Southbound	630	530
	Northbound	470	500
Miller Street, between Berry Street and Pacific Highway	Southbound	540	370
	Northbound	550	640
McLaren Street, between Pacific Highway and Miller Street	Eastbound	240	190
	Westbound	290	250
Berry Street, between Pacific Highway and Miller Street	Eastbound	1,220	940
Berry Street, between Miller and Walker streets	Eastbound	1,280	1,700
Walker Street, between Arthur and Mount streets	Southbound	160	100
	Northbound	1,170	940

Source: Sydney Metro Chatswood to Sydenham EIS, Chapter 8 (May 2016)

The following review was provided in the CSSI EIS on the traffic operation of the road network surrounding the site:

During the AM peak hour, the Pacific Highway carries a large number of vehicles southbound between McLaren Street and Berry Street. South of this intersection vehicle numbers drop significantly due to the large left turn movement into Berry Street for vehicles heading towards the Sydney Harbour Bridge and the Warringah Freeway. As a result, Berry Street also experiences high traffic volumes. Miller Street generally has lower traffic volumes with a relatively even split in each direction.

The commonly used measure of intersection performance, as defined by Roads and Maritime, is vehicle delay. The average delay that vehicles encounter at an intersection provides a measure of the level of service. Table 6 summarises the criteria in assessing the level of service.

Table 6 – Level of service criteria

Level of service	Average delay per vehicle (seconds)	Traffic signals, roundabout	Give way and stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

For intersections without traffic signals, the level of service is reported for the worst approach.

The following review was provided in the CSSI EIS on the traffic operation of the intersections surrounding the site:

All intersections currently operate at a level of service C or better. However, at some intersections, vehicles performing minor conflicting movements experience delays. These intersections are:

- *Berry Street/ Walker Street (AM peak)*
- *Falcon Street/ Miller Street (AM and PM peaks)*
- *Falcon Street/ Warringah Freeway ramps (AM and PM peaks).*

Table 7 – Existing intersection performance

Intersection	Degree of saturation (volume/ capacity)	Level of service	Average delay (seconds)	95% back of queue (metres)
AM peak				
Miller Street/ Pacific Highway	0.62	C	29.0	105
Berry Street/ Pacific Highway	0.82	B	14.7	135

Intersection	Degree of saturation (volume/ capacity)	Level of service	Average delay (seconds)	95% back of queue (metres)
Miller Street/ Berry Street	0.74	C	37.7	138
Berry Street/ Denison Street	0.11	A	6.7	3
Berry Street/ Walker Street	0.90	C	32.0	255
Miller Street/ McLaren Street	0.57	B	23.6	92
PM peak				
Miller Street/ Pacific Highway	0.52	C	30.2	85
Berry Street/ Pacific Highway	0.78	A	12.1	107
Miller Street/ Berry Street	0.72	C	29.9	141
Berry Street/ Denison Street	0.29	A	7.4	6
Berry Street/ Walker Street	0.87	C	32.2	185
Miller Street/ McLaren Street	0.69	B	21.8	82

Source: Sydney Metro Chatswood to Sydenham EIS (May 2016)

3.4 On-site parking

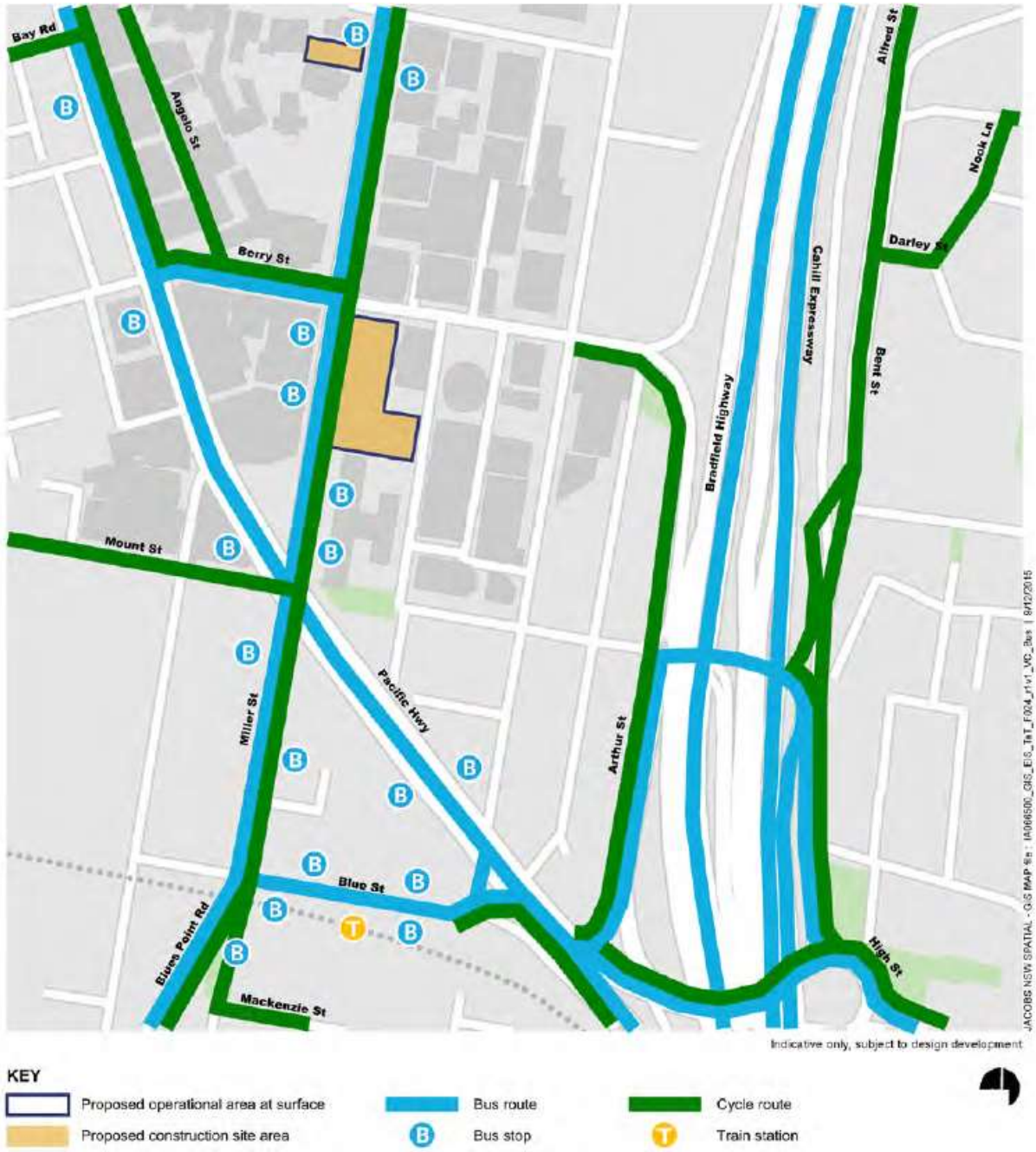
The site had a total of 208 off-street parking spaces, which were accessible from Denison Street, and have been removed in the demolition of the site, including:

- 65 spaces at 155 Miller Street,
- 128 spaces at 181 Miller Street (Wilson Car Park)
- 15 spaces at 189 Miller Street.

3.5 Public transport access

The site is accessible by public transport, which is reflected in the substantial public transport mode share (trains and buses) of 59 per cent. Bus stops are located near the site along Miller Street and North Sydney Station is located with a 500-metre radius of the site.

Figure 6 illustrates the existing public transport and cyclist routes surrounding the site. The following subsections summarise the public transport services (trains and buses) near the site.



Source: Sydney Metro Chatswood to Sydenham EIS (May 2016)

Figure 6 – Existing public transport and cyclist routes

3.5.1 Trains

North Sydney Station is located on Blue Street and is the fifth busiest station on the Sydney Trains network during the AM peak, behind Central, Town Hall, Wynyard and Parramatta (BTS, 2014). In

2014, North Sydney Station was recorded to have 17,541 station exits and 1,961 entries during the AM peak (3.5 hours) on a typical weekday.

North Sydney Station serves the following train lines:

- T1 Western Line – Emu Plains or Richmond to City
- T1 North Shore Line – Berowra to Parramatta
- T1 Northern Line – Hornsby to City, via Strathfield
- T9 Northern Line – Hornsby to North Shore, via City
- CCN Central Coast and Newcastle Line – Newcastle Interchange to Central, via Strathfield or Gordon.

Table 8 summarises the frequencies of all the train services on these train lines.

Table 8 – Train service frequencies, 2019

Route	Description	Frequency (minutes)		
		Peak	Off-peak	Weekends/ public holidays
T1	City to Berowra, via Gordon	3-5	4-10	
T1	Berowra to City, via Gordon	3	5-10	5-8
T9	Gordon to Hornsby, via Strathfield	15	15	15
T9	Hornsby to Gordon, via Strathfield	15	15	15
CCN	Central to Newcastle, via Strathfield or Gordon	15	No services at North Sydney	No services at North Sydney
CCN	Newcastle to Central, via Strathfield or Gordon	15	No services at North Sydney	No services at North Sydney

Source: https://transportnsw.info, accessed 26 April 2019, timetable effective 28 April 2019.

Pedestrian access between the project site and North Sydney Station is provided along the following routes, which are grade separated from Pacific Highway:

- Along Miller Street, entry into Greenwood Plaza from the corner of Pacific Highway and Mount Street (underground)
- Along Denison Street, via Mount Street and Elizabeth Plaza, pedestrian overpass of Pacific Highway, then entry into Greenwood Plaza.

Alternatively, pedestrian access is provided along Miller Street and along Blue Street for access into North Sydney Station from Blue Street.

3.5.2 Buses

North Sydney has over 80 bus routes stopping in the area surrounding the site, with major bus stops located on Miller Street, Pacific Highway and Blue Street. These bus routes are operated by Sydney Buses, as well as private operators Hillsbus and Forest Coach Lines. Immediately near the site, there are four bus stops located on Miller Street. Based on the current bus timetable information, the bus routes servicing these stops are summarised as follows:

- Northbound:
  - Bus stop number 206046: 26 bus routes, providing services to the Lower North Shore and Northern Beaches
  - Bus stop number 206045: 18 bus routes, providing services to the Lower North Shore, Northern Beaches and Ryde in the northern suburbs
- Southbound:
  - Bus stop number 206085: 30 bus routes, providing services from the Lower North Shore, Northern Beaches and Ryde in the northern suburbs
  - Bus stop number 206052: 20 bus routes, providing services from the Lower North Shore, Northern Beaches, The Hills District (Dural, Cherrybrook, West Pennant Hills and Kellyville), the northern suburbs (Epping, Denistone East, Macquarie and Gladesville) and services to the Sydney CBD and Botany.

3.6 Pedestrian access

Prior to demolition, the main pedestrian accesses to the site are summarised in Table 9.

Table 9 – Pedestrian access to the site, pre-demolition

Address	Main pedestrian access point
155 Miller Street	Miller Street and Denison Street
181 Miller Street	Miller Street
187 Miller Street	Miller Street
189 Miller Street	Miller Street and Berry Street

Source: AECOM, 17 May 2018

3.7 Pedestrian volumes

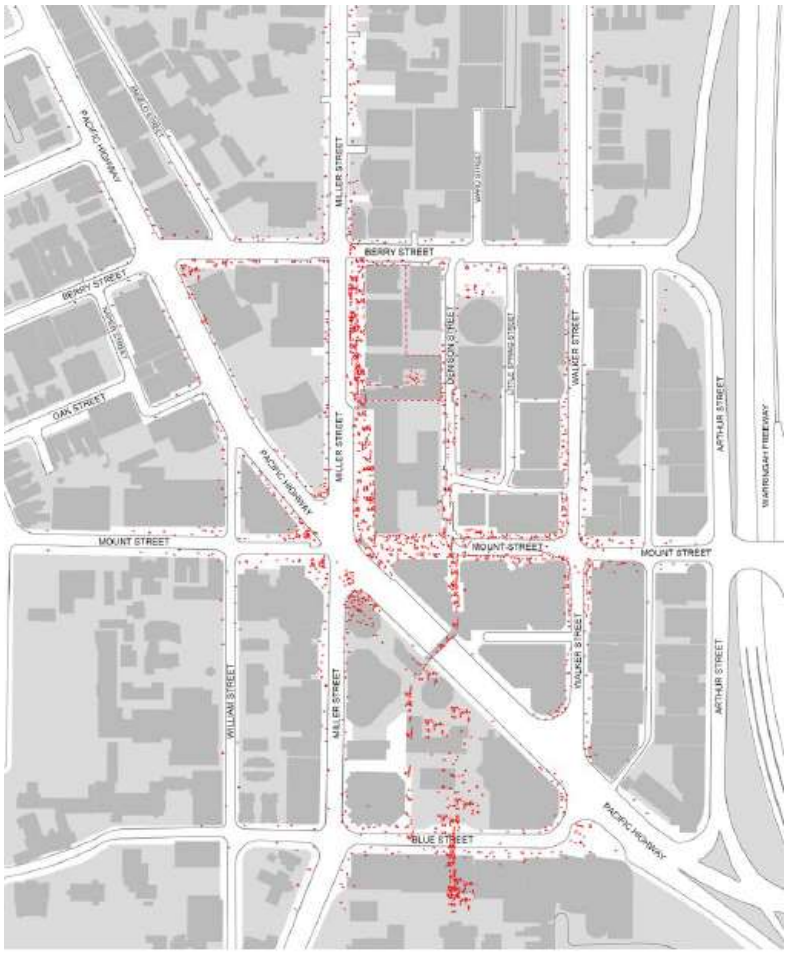
North Sydney comprises high density residential and commercial land uses, which results in a high proportion of trips made by foot. The North Sydney centre generates high pedestrian volumes, particularly in the peak commuter periods. The *North Sydney Centre Traffic and Pedestrian Study* (Arup, September 2014) identified insufficient footpath width in some locations and constrained crossing locations (including small splitter islands at signalised crossings) often result in congestion

for pedestrians during these peak periods. This includes narrow footpaths on Denison Street and Little Spring Street, with insufficient storage for pedestrians on splitter islands at crossings along the Pacific Highway within the North Sydney Centre.

Near the site, the key pedestrian desire lines are located along Pacific Highway, Miller Street, Denison Street, Mount Street and Walker Street, which are all used to access North Sydney Station and the main commercial land uses with North Sydney. Other key pedestrian generators within North Sydney include the educational precincts, west of the Pacific Highway and north of Berry Street and retail/ restaurants and cafes in Greenwood Plaza and along Mount and Walker streets.

The following locations near the site have pedestrian crossing facilities:

- Miller Street/ Berry Street intersection: Signalised crossing of all four approaches
- Miller Street/ Pacific Highway: Signalised crossing of all four approaches, with marked crossings of the left-turn slip lanes on the northbound and southbound approaches of the Pacific Highway
- Berry Street/ Denison Street: Continuous footpath across the Denison Street approach to the intersection.



Source: Bates Smart, April 2019

Figure 7 – Observed existing pedestrian movements at 9am on a typical weekday

3.8 Cycling network

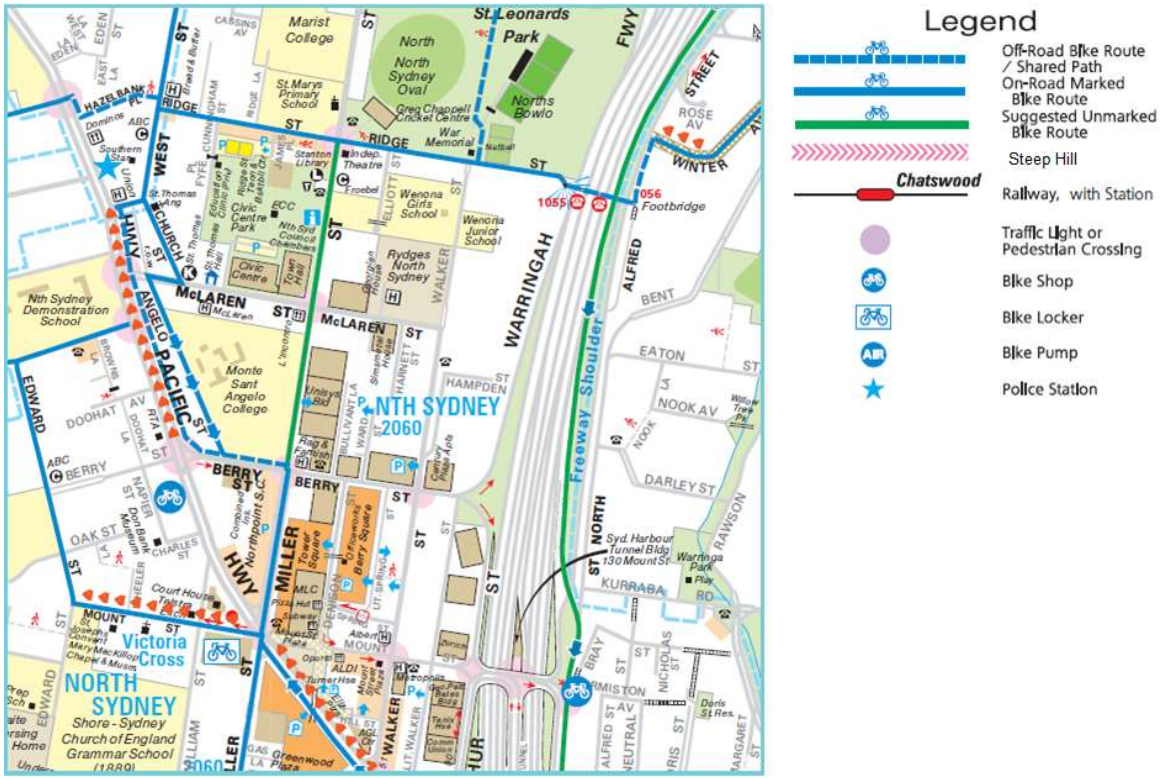
The following key cyclist routes are located in North Sydney:

- On-road cycleways:
  - Miller Street, between Blue Street and Berry Street
  - Berry Street, between the Pacific Highway and Miller Street
  - Mount Street, west of the Pacific Highway
  - The Pacific Highway, between Walker Street and Miller Street
  - Angelo Street, between Berry Street and West Street
- Off-road cycleways:
  - The Pacific Highway, between Berry Street and West Street
  - The Pacific Highway, between the Warringah Freeway off-ramp and Walker Street
- Suggested unmarked cyclist routes:
  - Miller Street, between Berry Street and Ridge Street.

Council and Roads and Maritime have also undertaken a number of studies with the aim to improve the quality of cycling connections to North Sydney. These studies highlight that West Street, Ridge Street, Miller Street and the Pacific Highway are key cycling routes and will be the focus for future enhancements to the cycling network.

Additionally, bicycle parking facilities such as O-rings, rails and enclosed lockers have been provided near the site for cyclists. Use of the secure enclosed lockers available on Mount Street is subject to Council approval. There is currently a waiting list of people seeking to use these lockers, indicating that the demand for secure bicycle parking is currently higher than the existing facilities. The North Sydney Council DCP requires new development to make provision for secure bicycle parking and end-of-trip facilities, which is expected to address this current deficiency over time.

Figure 8 illustrates the North Sydney cyclist network from the Council website, accessed in April 2019.



Source: North Sydney Council, 2012

Figure 8 – North Sydney Cycling Map, 2012

4. Development proposal

4.1 Description

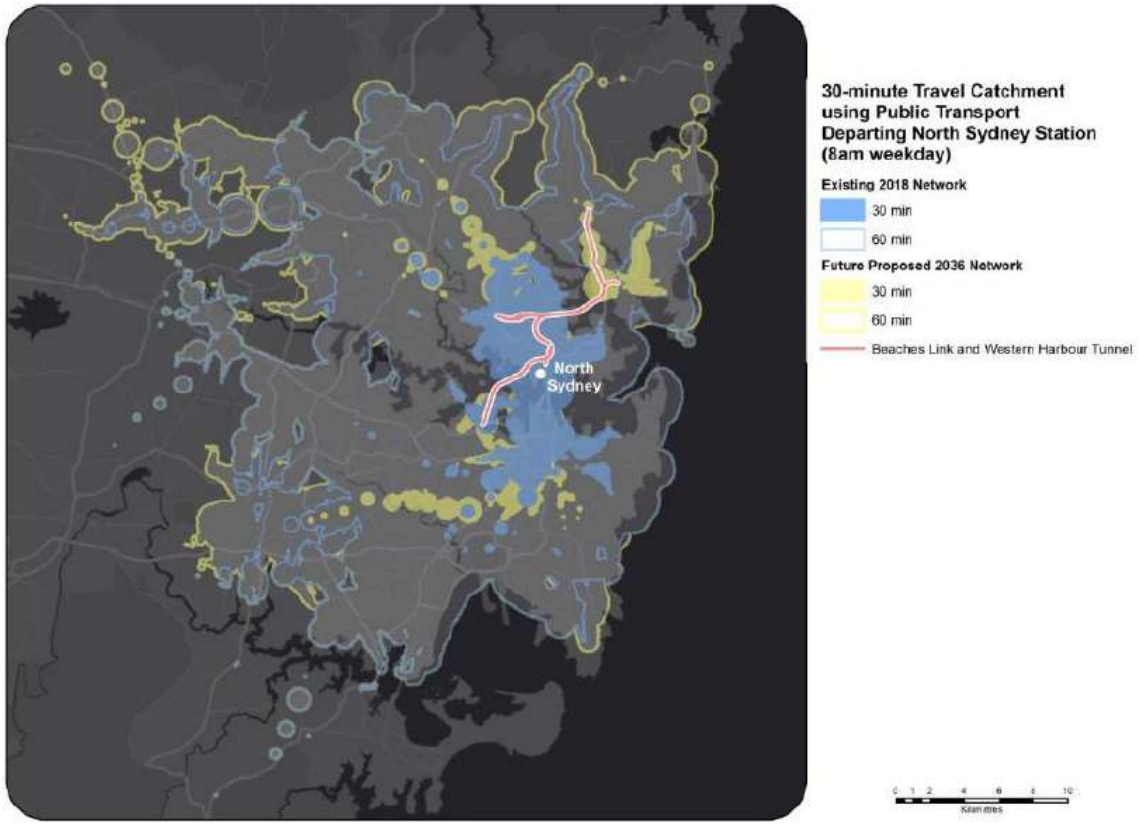
Section 1 of this report provides an overview of the proposed OSD above the new Victoria Cross Sydney Metro Station. The site is proposed to have 61,500 square metres GFA of commercial tower, excluding floor space approved in the CSSI. The CSSI Approval includes 4,500 square metres GFA for station retail. For the purpose of this assessment, the GFA approved in the CSSI has been included, to ensure the required infrastructure considers the cumulative impact of the site.

4.2 Future mode share

The future mode share for the site has been estimated based on existing and predicted future travel patterns. Section 3.1 summarises the existing journey to work mode share for the site, for employees travelling to the area surrounding the proposed OSD. To understand the likely trends from the progressive intensification of North Sydney, a review of other more established areas that form part of the Eastern Harbour City was undertaken with travel zones around Pitt Street and Martin Place used as benchmarks (refer to Table 3). The review highlighted that the mode share for access by private vehicle for journey to work purposes was substantially lower (up to 15 per cent) than the portion of trips by car for North Sydney (31 per cent). Parking provision and management together with a concentration of high density, mix of uses and accessibility to other key catchments are attributing factors to this outcome. In terms of planning benchmarks for centres and employment areas in CBD environments, it is noted that Barangaroo was planned around a private vehicle mode share target of five per cent and is still subject to completion and validation.

The introduction of Sydney Metro (Northwest and City and South West lines) as well as the Beaches Link and Western Harbour Tunnel is likely to increase the coverage and accessibility to the site by public transport. The resulting estimated increased coverage of a 30- and 60-minute travel catchment by public transport is illustrated in Figure 9.

Given its proximity to the proposed Victoria Cross Metro Station, the proposed OSD will directly benefit from the Sydney Metro. Combined with the existing public transport network surrounding the site, it is expected that the mode share to public transport for the site will increase on existing splits to be more comparable to Pitt Street and Martin Place.



Source: Transport for NSW, 2018
Note: The catchments illustrated in this figure assume completion of the Sydney Metro City and South West, Western Harbour Tunnel and Beaches Link.

Figure 9 – Future catchment of North Sydney by public transport

4.3 Future daily and peak hour movements

At the time of the assessment, the site had been demolished under the works of the CSSI Approval. Therefore, it was not possible to confirm the previous development trip generation rates using survey data. Accordingly, an alternative approach was adopted for the Concept SSDA to determine the site's baseline approved (or existing) development traffic generation level (AECOM, 2018). This was determined through reviewing information for the adjacent approved developments at 1 Denison Street and 177 Pacific Highway, North Sydney. Both these developments are located near the site and have similar commercial uses to the site prior to demolition, and this information along with the traffic surveys carried out at 65 Berry Street (refer to details below), provide an appropriate baseline for the study.

The 1 Denison Street development is located next to the proposed OSD site and was approved to accommodate a similar commercial GFA in 2017. The previous development comprised the Berry Square car park, which was surveyed and offers an understanding of traffic generation rates per space for a public car parking area. The rates adopted for existing levels were as follows (AECOM, 2018):

- AM Peak hour equated to 35 two-way movements for 117 spaces or 0.3 two-way movements per public parking space
- PM Peak hour equated to 29 two-way movements for 117 spaces or 0.25 two-way movements per public parking space.

The 177 Pacific Highway development is located on the opposite side of Miller Street, about 250 metres west of proposed OSD site and was approved to accommodate a similar commercial GFA in 2010. The approved development increased the number of on-site parking spaces from 60 to 112 spaces. The traffic impact assessment stated that 'based on surveys of the traffic generation of similar commercial buildings' the traffic generation rate to be adopted should be 0.25 to 0.4 vehicle trips per hour per parking space during commuter peak periods (AECOM, 2018).

The 65 Berry Street development is situated directly adjacent to the proposed OSD site and comprises mixed use development (mostly commercial uses) and 259 car parking spaces. The car parking spaces are available to both the building tenants and the public. Site observation were carried out by AECOM in 2017 to verify the trip rate per parking space against the rates previously defined under the approved 1 Denison Street and 177 Pacific Highway developments. The review confirmed the rates were consistent with observed trip generation rates per parking space of (AECOM, 2018):

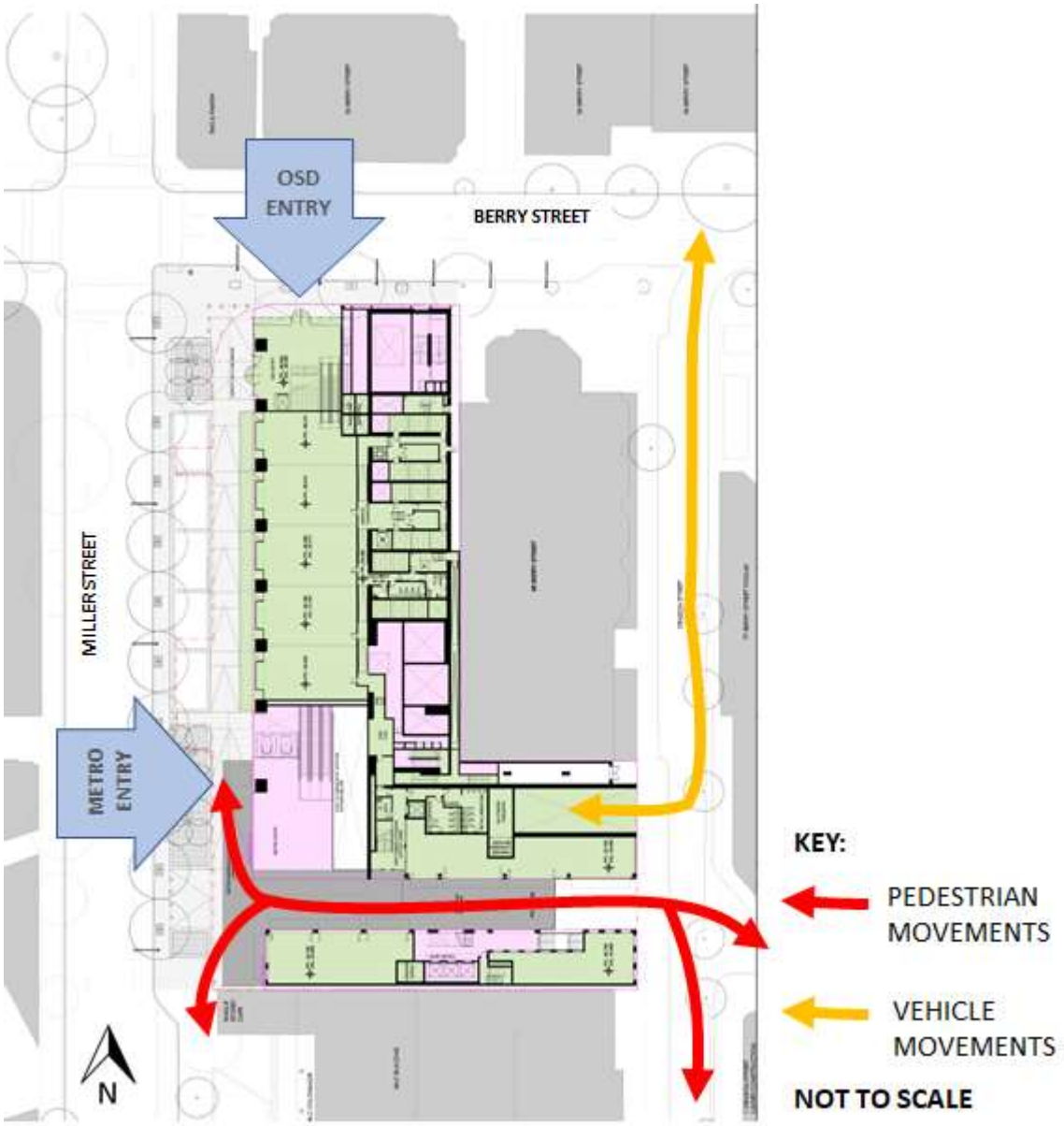
- 75 two-way movements for 259 parking spaces or 0.29 two-way movements per parking space in the AM peak hour
- 70 two-way movements for 259 parking spaces or 0.27 two-way movements per parking space in the PM peak hour.

Based on this assessment, a rate of 0.3 trips per parking space has been adopted to assess the previously approved developments trip generation. Application of this rate equates to an existing approved generation of 62 vehicles per hour in the AM peak hour (50 vehicles per hour entering and 12 vehicles per hour exiting), and 52 vehicles per hour in the PM peak hour (42 vehicles per hour entering, 10 vehicles per hour exiting) (AECOM, 2018).

4.4 Pedestrian access

There is one main pedestrian access point to the proposed OSD located on Berry Street, near its intersection with Miller Street. The main station access in located on Miller Street, with a pedestrian laneway connection towards the southern end of the site, linking Miller Street, Denison Street and the developments on the eastern side of Denison Street, including 1 Denison Street, which is currently under construction.

Figure 10 illustrates the proposed pedestrian access points for the site and the Sydney Metro station.



Source: Base plan Bates Smart, 31 May 2019

Figure 10 – Pedestrian access points

2036 peak hour origin-designation (OD) matrices are unchanged from the Concept Approval assessment and are shown in Figure 11 and Figure 12 for the AM and PM peak periods, respectively.

Description	Zone	01	02	03	04	05	06	07	08	09	10	22	23	24	11	12	13	14	15	17	19	20	21	Total
Miller St, North of Berry St, Western side	01	0	0	75	28	11	12	24	22	0	0	0	0	0	0	0	0	0	0	0	112	0	0	284
Miller St, North of Berry St, Eastern side	02	0	0	371	140	55	60	118	109	0	0	0	0	0	0	0	0	0	0	0	96	0	0	949
Miller St, South of Berry St, Eastern side	03	133	487	0	0	107	117	230	213	0	0	0	0	0	0	0	0	0	0	0	0	288	0	1575
Miller St, South of Berry St, Western side	04	52	192	0	0	40	46	91	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	505
Berry St, West of Miller St, Northern side	05	7	25	37	14	0	0	12	12	0	0	0	0	0	0	0	0	0	0	0	0	288	0	395
Berry St, West of Miller St, Southern side	06	9	31	49	18	0	0	15	14	0	0	0	0	0	0	0	0	0	0	0	0	272	0	408
Berry St, East of Miller St, Southern side	07	14	51	75	28	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	303
Berry St, East of Miller St, Northern side	08	13	49	73	27	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	185
McLaren Street	09	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	64	0	0	114
Denison St South	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	368	368
McLaren Street East Southern side	22	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	50
McLaren Street West Northern side	23	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	50
McLaren Street West Southern side	24	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	50
OSD 1#	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	153	0	153
Bus Stop, Miller St, Southbound, South	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	307	0	307
Bus Stop, Miller St, Southbound, North	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	307	0	307
Bus Stop, Miller St, Northbound	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	32
KnR-Walk	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	0	0	126
Taxi-Walk	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	32
Miller Street Entry (North)	19	880	264	0	0	0	0	0	0	176	0	0	0	0	0	0	0	0	0	0	0	0	0	1320
Miller Street Entry (South)	20	0	0	1321	0	880	439	0	0	0	0	0	0	0	1386	5	5	198	0	0	0	0	0	4234
Denison Street Entry (South)	21	0	0	0	0	0	0	1101	0	0	5943	0	0	0	0	0	0	0	0	0	0	0	0	7044
	Total	1108	1099	2001	255	1115	698	1591	454	226	5943	50	50	50	1386	5	5	198	0	0	430	1647	480	18791

Source: Stage 1 Precinct modelling report, 2018

Figure 11 – Peak hour AM OD matrix

Description	Zone	01	02	03	04	05	06	07	08	09	10	22	23	24	11	12	13	14	15	17	19	20	21	Total
Miller St, North of Berry St, Western side	01	0	0	114	26	4	5	10	8	0	0	0	0	0	0	0	0	0	0	0	801	0	0	968
Miller St, North of Berry St, Eastern side	02	0	0	498	114	18	20	43	37	0	0	0	0	0	0	0	0	0	0	0	240	0	0	970
Miller St, South of Berry St, Eastern side	03	74	109	0	0	23	26	56	48	0	0	0	0	0	0	0	0	0	0	0	0	1203	0	1539
Miller St, South of Berry St, Western side	04	94	138	0	0	29	33	70	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	425
Berry St, West of Miller St, Northern side	05	8	12	73	17	0	0	6	5	0	0	0	0	0	0	0	0	0	0	0	0	801	0	922
Berry St, West of Miller St, Southern side	06	14	22	123	28	0	0	11	9	0	0	0	0	0	0	0	0	0	0	0	0	401	0	608
Berry St, East of Miller St, Southern side	07	31	45	267	61	9	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1002	1426
Berry St, East of Miller St, Northern side	08	24	35	206	47	7	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	327
McLaren Street	09	0	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0	0	160	0	0	205
Denison St South	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5408	5408
McLaren Street East Southern side	22	0	0	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	45
McLaren Street West Northern side	23	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0	0	0	0	45
McLaren Street West Southern side	24	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0	0	45
OSD 1#	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1261	0	1261
Bus Stop, Miller St, Southbound, South	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5
Bus Stop, Miller St, Southbound, North	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180	0	180
Bus Stop, Miller St, Northbound	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5
KnR-Walk	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taxi-Walk	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miller Street Entry (North)	19	102	87	0	0	0	0	0	0	58	0	0	0	0	0	0	0	0	0	115	29	0	0	391
Miller Street Entry (South)	20	0	0	262	0	262	245	0	0	0	0	0	0	0	139	279	279	29	0	0	0	0	0	1495
Denison Street Entry (South)	21	0	0	0	0	0	0	103	0	0	335	0	0	0	0	0	0	0	0	0	0	0	0	438
	Total	347	448	1543	293	352	348	299	168	103	335	45	45	45	139	279	279	29	115	29	1201	3856	6410	16708

Source: Stage 1 Precinct modelling report, 2018

Figure 12 – Peak hour PM OD matrix

The peak minute OD matrices were calculated from the peak hour, using a surge factor of 1.2, as was applied throughout the Concept Approval assessments and referenced in the Victoria Cross Scope of Works and Technical Criteria (SWTC) *Appendix B6 – Fire and Life Safety and Fire Services Systems*, clause 2.4.r. The peak minute OD matrices are shown in Figure 13 and Figure 14 for the AM and PM peaks, respectively.

Description	Zone	1	2	3	4	5	6	7	8	9	10	22	23	24	11	12	13	14	15	17	19	20	21	Total
Miller St, North of Berry St, Western side	1	0	0	1.5	0.56	0.22	0.24	0.48	0.44	0	0	0	0	0	0	0	0	0	0	0	2.24	0	0	5.68
Miller St, North of Berry St, Eastern side	2	0	0	7.42	2.8	1.1	1.2	2.36	2.18	0	0	0	0	0	0	0	0	0	0	0	1.92	0	0	18.98
Miller St, South of Berry St, Eastern side	3	2.66	9.74	0	0	2.14	2.34	4.6	4.26	0	0	0	0	0	0	0	0	0	0	0	0	5.76	0	31.5
Miller St, South of Berry St, Western side	4	1.04	3.84	0	0	0.8	0.92	1.82	1.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.1
Berry St, West of Miller St, Northern side	5	0.14	0.5	0.74	0.28	0	0	0.24	0.24	0	0	0	0	0	0	0	0	0	0	0	0	5.76	0	7.9
Berry St, West of Miller St, Southern side	6	0.18	0.62	0.98	0.36	0	0	0.3	0.28	0	0	0	0	0	0	0	0	0	0	0	0	5.44	0	8.16
Berry St, East of Miller St, Southern side	7	0.28	1.02	1.5	0.56	0.22	0.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.24	6.06
Berry St, East of Miller St, Northern side	8	0.26	0.98	1.46	0.54	0.22	0.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.7
McLaren Street	9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1.28	0	0	2.28
Denison St South	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.36	7.36
McLaren Street East Southern side	22	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
McLaren Street West Northern side	23	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
McLaren Street West Southern side	24	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
OSD 1#	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.06	0	3.06
Bus Stop, Miller St, Southbound, South	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.14	0	6.14
Bus Stop, Miller St, Southbound, North	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.14	0	6.14
Bus Stop, Miller St, Northbound	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.64	0	0.64
KnR-Walk	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.52	0	0	2.52
Taxi-Walk	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.64	0	0	0.64
Miller Street Entry (North)	19	17.6	5.28	0	0	0	0	0	0	3.52	0	0	0	0	0	0	0	0	0	0	0	0	0	26.4
Miller Street Entry (South)	20	0	0	26.42	0	17.6	8.78	0	0	0	0	0	0	0	27.7	0.1	0.1	3.96	0	0	0	0	0	84.68
Denison Street Entry (South)	21	0	0	0	0	0	0	22.02	0	0	118.9	0	0	0	0	0	0	0	0	0	0	0	0	140.88
	Total	22.16	22	40.02	5.1	22.3	14	31.82	9.08	4.52	118.9	1	1	1	27.7	0.1	0.1	3.96	0	0	8.6	32.9	9.6	375.82

Figure 13 – Peak minute AM matrix

Description	Zone	1	2	3	4	5	6	7	8	9	10	22	23	24	11	12	13	14	15	17	19	20	21	Total
Miller St, North of Berry St, Western side	1	0	0	2.28	0.52	0.08	0.1	0.2	0.16	0	0	0	0	0	0	0	0	0	0	0	16.02	0	0	19.36
Miller St, North of Berry St, Eastern side	2	0	0	9.96	2.28	0.36	0.4	0.86	0.74	0	0	0	0	0	0	0	0	0	0	0	4.8	0	0	19.4
Miller St, South of Berry St, Eastern side	3	1.48	2.18	0	0	0.46	0.52	1.12	0.96	0	0	0	0	0	0	0	0	0	0	0	0	24.1	0	30.78
Miller St, South of Berry St, Western side	4	1.88	2.76	0	0	0.58	0.66	1.4	1.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.5
Berry St, West of Miller St, Northern side	5	0.16	0.24	1.46	0.34	0	0	0.12	0.1	0	0	0	0	0	0	0	0	0	0	0	0	16	0	18.44
Berry St, West of Miller St, Southern side	6	0.28	0.44	2.46	0.56	0	0	0.22	0.18	0	0	0	0	0	0	0	0	0	0	0	0	8.02	0	12.16
Berry St, East of Miller St, Southern side	7	0.62	0.9	5.34	1.22	0.18	0.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20.04	28.52
Berry St, East of Miller St, Northern side	8	0.48	0.7	4.12	0.94	0.14	0.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.54
McLaren Street	9	0	0	0	0	0	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0	3.2	0	0	4.1
Denison St South	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108.2	108.16
McLaren Street East Southern side	22	0	0	0	0	0	0	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0	0	0	0.9
McLaren Street West Northern side	23	0	0	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9
McLaren Street West Southern side	24	0	0	0	0	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0	0	0	0	0	0.9
OSD 1#	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25.2	0	25.22
Bus Stop, Miller St, Southbound, South	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1
Bus Stop, Miller St, Southbound, North	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.6	0	3.6
Bus Stop, Miller St, Northbound	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1
KnR-Walk	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taxi-Walk	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miller Street Entry (North)	19	2.04	1.74	0	0	0	0	0	0	1.16	0	0	0	0	0	0	0	0	2.3	0.58	0	0	0	7.82
Miller Street Entry (South)	20	0	0	5.24	0	5.24	4.9	0	0	0	0	0	0	0	2.78	5.58	5.58	0.58	0	0	0	0	0	29.9
Denison Street Entry (South)	21	0	0	0	0	0	0	2.06	0	0	6.7	0	0	0	0	0	0	0	0	0	0	0	0	8.76
	Total	6.94	8.96	30.86	5.86	7.04	6.96	5.98	3.36	2.06	6.7	0.9	0.9	0.9	2.78	5.58	5.58	0.58	2.3	0.58	24.02	77.1	128.2	334.16

Figure 14 – Peak minute PM matrix

Figure 15 illustrates the origin and destination points in the precinct area.

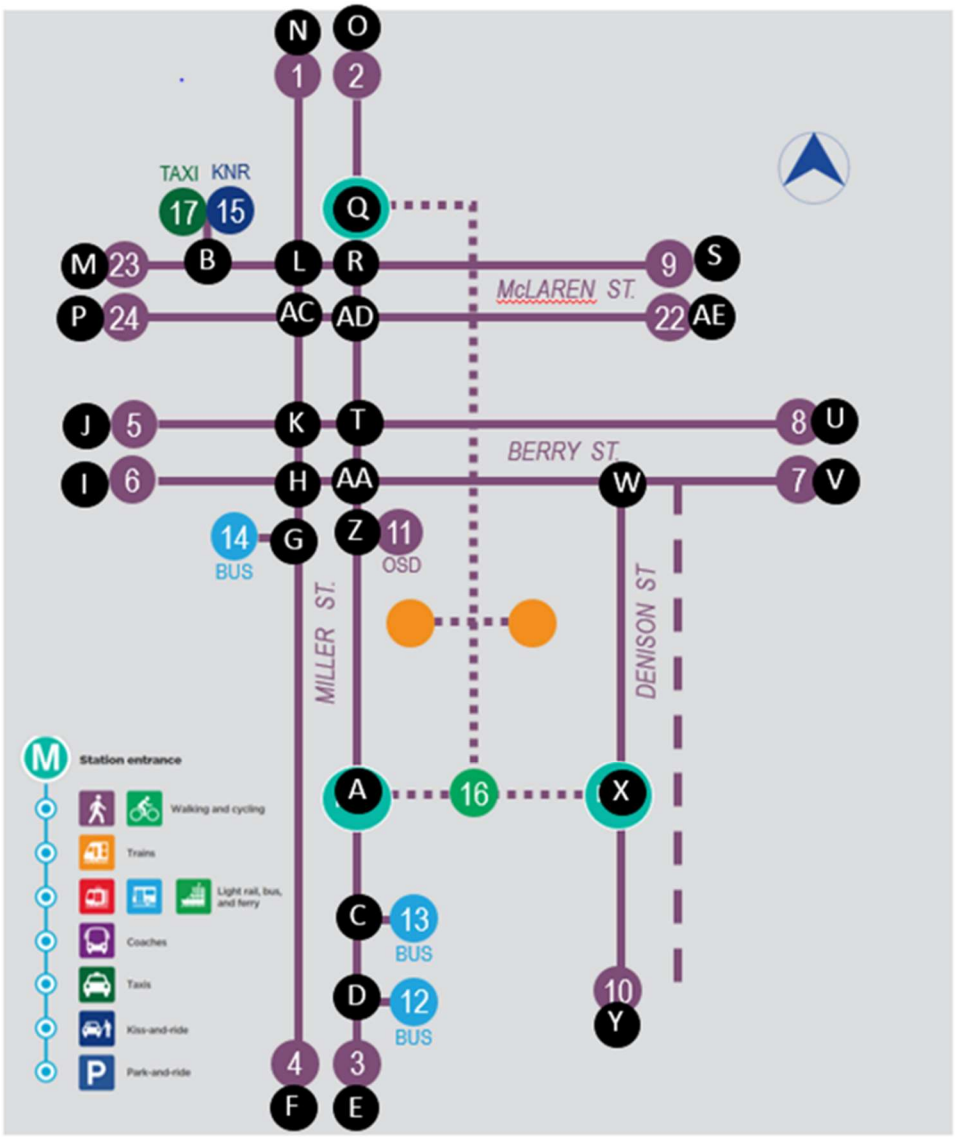
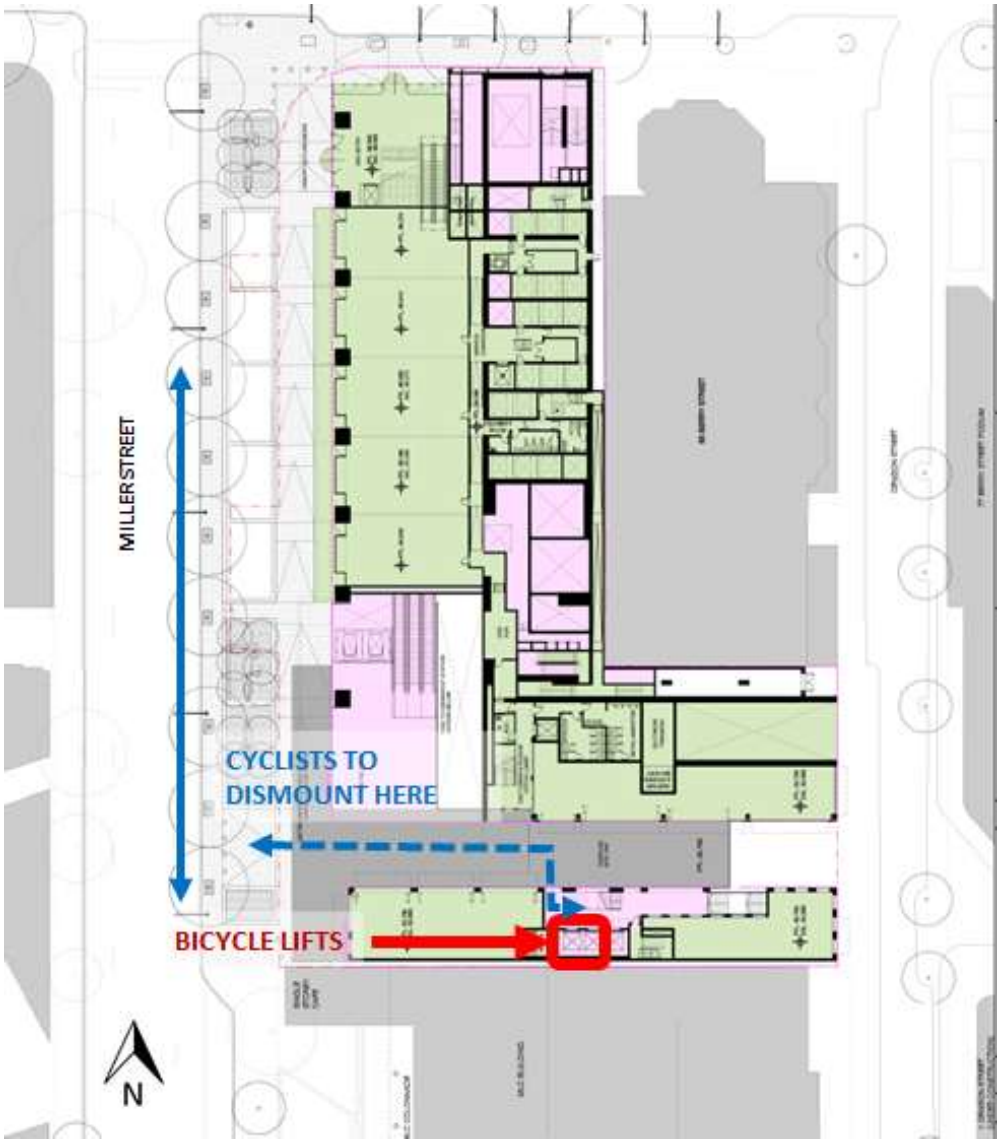


Figure 15 – Map of origins and destinations

4.5 Bicycle parking and access

The main accesses for the bicycle parking and end of trip facilities for the proposed site will be via the laneway from Miller Street, using the lifts and from Denison Street via the vehicle access ramp. The main bicycle parking and end-of-trip facilities will be located on basement level 2 (B2), with facilities for 457 bicycles. Access to these facilities will be provided as follows:

- Two lifts provided from level 1 laneway
- Two lifts provided from level 0 Denison Street Concourse.

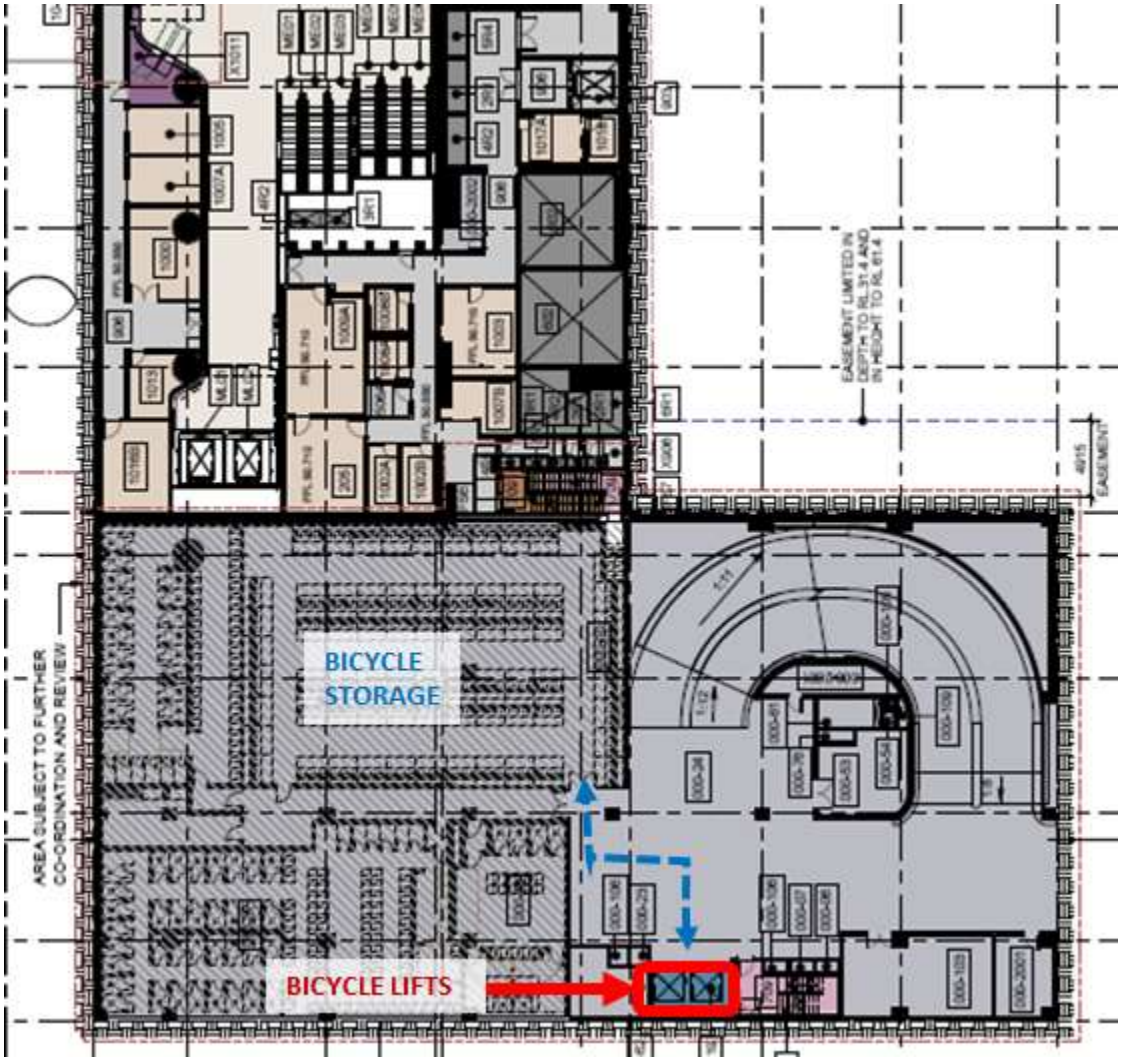


Source: Base plan Bates Smart, 31 May 2019

Figure 16 – Cyclist access from level 1 laneway

Source: Base plan Bates Smart, 31 May 2019

Figure 17 – Cyclist access from level 0 Denison St Concourse



Source: Base plan Cox, 12 June 2019

Figure 18 – End of trip facilities and bicycle storage, B2 basement level

End of trip facilities and bicycle parking will be provided for employees of the new development in accordance with GBCA 6 Star Green Star requirements. Based on a regular occupant density of one person per 10 m^2 (Lend Lease, 22 February 2019) and 7.5 per cent of staff use bicycles, the provisions for bicycle parking and end of trip facilities is summarised in Table 10 and is based on Gross Leasable Area (GLA)/ Net Floor Area (NFA).

Table 10 – Green Star bicycle requirements

Use	GLA/ NFA (m^2)	Regular occupant density m^2/ person	Regular occupants	Bicycle parking spaces	Lockers	Showers
Office	55,190	10	5,519	414	497	49
Retail	2,423	20	121	10	12	5
Podium office	1,933	10	193	15	18	6
Total	**59,546**	**-**	**5,833**	**439**	**527**	**60**

The North Sydney DCP provides minimum bicycle parking and end-of-trip facility rates for a variety of land uses.

Table 11 – North Sydney Council DCP bicycle facility minimum requirements

Type	Rate		Minimum requirement		Total minimum requirement	Proposed provision
	Office (60,100 m^2)	Retail (1,400 m^2)	Office	Retail		
Occupants	1 space/ 150 m^2 GFA	1 space/ 25 m^2 GFA	394	96	490	439
Visitors	1 space/ 400 m^2 GFA	2 spaces + 1 space/ 100 m^2 GFA	148	26	174	Nil (visitor spaces to be provided in public realm)
Lockers	1 personal locker for each space		490*		490*	527
Showers and change cubicles	2 showers and change cubicles for 11-20 or more spaces, plus 2 shower and change cubicles for each additional 20 spaces		49*		49*	60

Note:
*Excludes visitor spaces.

Council's DCP requirements relating to bicycle parking and lockers are marginally higher than the requirements of the Green Star requirements however not so for showers. Given the site's

accessibility to high-frequency public transport, the proposed provisions in accordance with the Green Star requirements are considered appropriate for the proposed development.

Class 2 secure bicycle parking spaces will be provided for the employees of the building while Class 3 bicycle racks for visitors and Metro users will be provided, which are easily accessible and clearly signposted. Additional bike parking for Metro users is provided at the Northern Portal station entrance.

4.6 Car park requirements

The proposed development would provide an appropriate number of car parking spaces in accordance with the DCP. The DCP encourages developments to have a lower parking supply if there is good access to public transport services, and on this basis provides a maximum parking rate for each type of land use. Based on the Council DCP 2013 – Part B, the parking rates indicated are detailed in Table 13.

Table 12 – DCP car parking provision

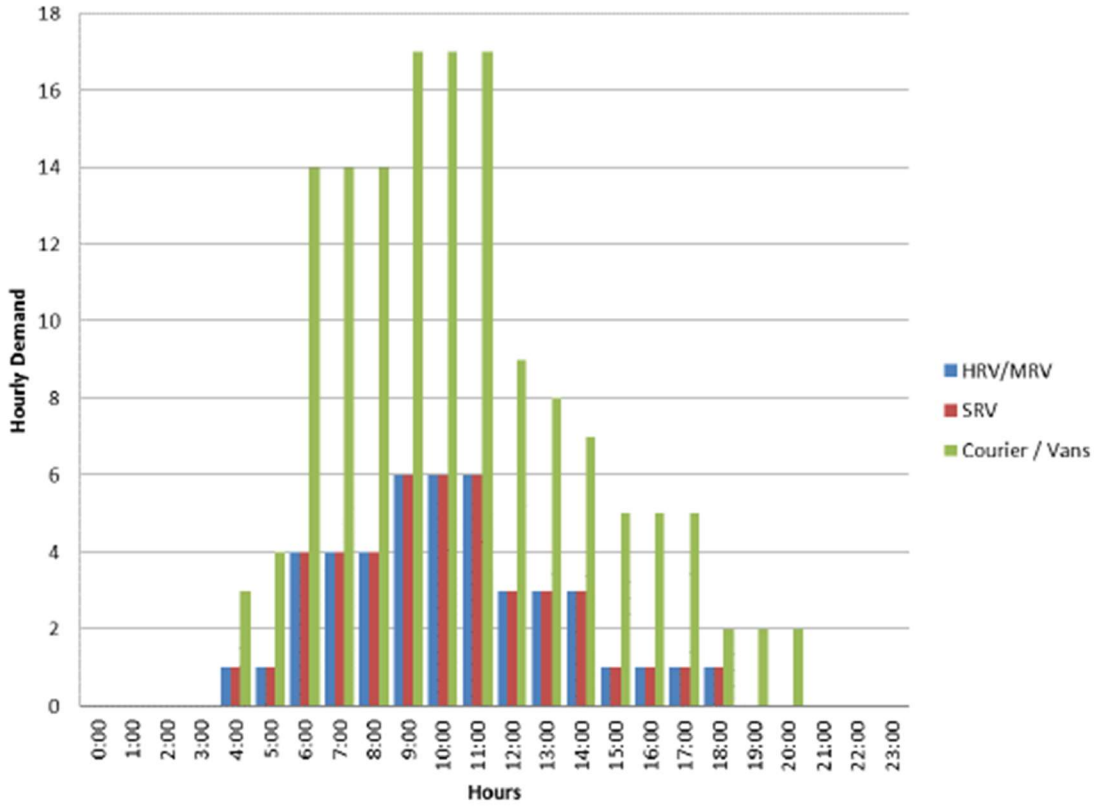
Type	Rate		Yield		Upper limit of parking space
	Office (59,100 m^2)	Retail (2,400 m^2)	Office	Retail	
Car parking	1 space/ 400 m^2 GFA		148	6	154
Accessible parking	1 space/ 100 car parking spaces				2

Based on the analysis, up to 156 parking bays (154 car parking plus two accessible parking spaces) can be provided on site to comply with the DCP requirements. It is proposed that the OSD development will provide a total of 161 parking bays (150 spaces for office and 11 spaces for retail). This is slightly higher than the maximum specified by the DCP, but less parking than what was on site before the buildings were demolished. The site would not create for a nett effective increase in terms of development traffic as the proposed number of parking bays are less than what was initially on site before the site was demolished.

4.7 Vehicular site access and loading dock

Transport for NSW prepared an *Options Analysis and Concept Delivery Service Plan* for Victoria Cross Station with an objective of determining the demand profile for freight and servicing activity for existing commercial development. Based on demand data obtained from a comparable development, which was adjusted to accommodate predicted future growth trends for courier deliveries, it was determined that a loading dock for the proposed OSD site (plus the metro station including associated retail) would generate up to 240 service vehicle trips per day and up to 34 service vehicle trips in the AM peak hour. The loading dock peak hour occurs outside of general AM peak commuter period, between 9am and 12pm (AECOM, 2018).

The freight and servicing activity are unchanged from the Concept Approval. Based on the demand profile for deliveries illustrated in Figure 19, the service vehicle generation between the hours of 6am and 9am was approximately 95 service vehicles. These trips can be evenly spread across the period to determine the AM peak hour rate. The adopted approach highlights that the AM peak hour would generate 46 (23 vehicles per hour entering and 23 vehicles per hour exiting) service vehicle trips per hour. This equates to an AM network peak hour service vehicle trip rate of 0.07 service vehicle trips per 100 metres squared of Commercial GFA per hour. When this rate was applied to the previous existing development on the OSD site, it was estimated to generate 14 service vehicle trips in the AM peak hour (seven vehicles per hour entering and seven vehicles per hour exiting).



Source: Transport for NSW, 2018

Figure 19 – Forecast service vehicle delivery profile

4.8 Emergency vehicle access

Emergency vehicle access would continue to be possible via both Denison and Miller Streets. It is not anticipated that there would be any impacts to emergency vehicle access as a result of the OSD proposal. An emergency response plan will be prepared for the OSD development, which will consider the metro station specific emergency response plan.

Further details of the likely impacts and its staging would be assessed by Council as part of its Laneways investigations having regard to other public domain enhancements and pedestrianisation proposals.

5. Transport assessment

5.1 Traffic generation and road network impact

As no new car parking spaces and fewer spaces than the number provided on the site prior to demolition are proposed to be provided, traffic generation will be mainly related to servicing and delivery trips. It is therefore assumed that a similar number of car trips during peak times compared to the existing situation. The impact is therefore considered to be negligible.

The proposed OSD site is expected to generate up to 43 deliveries per hour (based on the proposed 61,500 GFA), which equates to about one vehicle every two minutes. Vehicles travelling to and from the site are likely to approach and depart using the Pacific Highway via Walker Street, Miller Street or Berry Street. Given this traffic generation and the distribution across the road network, it is not expected that the proposed development would have a substantial impact on network performance. Therefore, no external road/ intersection improvements are considered to be required in accordance with the *Guide to Traffic Generating Developments* (Roads and Maritime, 2002). This is supported by the operating conditions of existing intersections, which are identified to operate at level of service C or better and unlikely to be impacted by a minor increase of this extent.

Delivery vehicle movements will need to be managed throughout the day due to the limited number of bays available. A pre-booking system is proposed to be utilised to assist in managing delivery arrival times and ensuring efficient use of the loading dock in the site. Refer to the Loading Dock Management Plan in Section 6 for further details.

In consideration of the estimated number of servicing and delivery trips, the provision of a pre-booking system and the timing of deliveries throughout the day, the impact to the road network is considered negligible.

Road Safety Audits will be carried out throughout the design and construction process to ensure that safety for all road users is considered.

5.2 Public transport

The Sydney Metro and the North Shore railway at Victoria Cross and North Sydney stations, respectively, will provide a very high level of accessibility by train. Bus stops and taxi ranks in Miller Street, Blue Street and the Pacific Highway will provide good opportunities for other modes of access. The station and supporting intermodal facilities will create a highly accessible public transport precinct. On this basis, the proposed concept OSD is considered to offer high levels of public transport connectivity. The benchmark public transport mode share of Pitt Street and Martin Place provide aspirational targets for the OSD.

5.3 Walking

The increased number of pedestrian movements generated by the OSD is not expected to be significant, with less than 10 per cent of that forecast to be generated by the Metro Station. The station modelling undertaken as part of the EIS for the CSSI and subsequent station design process, captures this related pedestrian movement.

The footways at the Victoria Cross Station Precinct have been assessed statically under normal operations for the 2036 peak minute demand, using the following assumptions:

- 2036 peak hour OD matrices taken from the Concept Approval assessment (see Figure 11 and Figure 12)
- Peak minute OD matrix calculated using a surge factor of 1.2, as was applied throughout the Concept Approval assessments and mentioned in the Victoria Cross SWTC Appendix B6 – *Fire and Life Safety and Fire Services Systems*, clause 2.4.r.
- Routes deduced from peak minute OD
- Pedestrians with a choice of which side of Miller Street to walk on (between Berry Street and McLaren Street) split 50:50
- Footway widths taken from CAD for each section based on the narrowest part of available space (exclusive of any obstructions). A 0.2-metre buffer is added to both sides of available space, and either side of any obstructions (e.g. trees). This is best practice in accordance with the *Pedestrian Comfort Guidance for London* (Transport for London) and is considered appropriate for this assessment.

The impact of pedestrians waiting at road crossings and bus stops has not been assessed and will be considered within the dynamic modelling of the precinct.

Each section of Figure 15 has been given a level of service rating as detailed in Figure 20 (Fruin, 1971). This scale ranges from A (virtually unrestricted movement, ≤0.08 pedestrians per square metre) to F (very slow walking speed with overtaking impossible, ≥1.66 pedestrians per metre).

A minimum level of service of C is required according to the criteria in the Victoria Cross SWTC *Appendix B1.4 Station Precinct and Public Domain Spatial and Functional Requirements* section (clause 2.1.b.vi).

LoS Walkways	Flow Rate (pedestrians/minute/metre)
A	0 - 13
B	13 - 23
C	23 - 33
D	33 - 49
E	49 - 82
F	> 82

Figure 20 – Fruin level of service for walkways boundaries

Figure 21 illustrates the results for the level of service achieved along each section of the precinct area (refer to Figure 15 for locations of each section).

Section	Worst Case Flow Rate Across AM and PM (p/min/m)	LoS
O - Q	10.6	A
Q - R	15.6	B
R - S	2.2	A
AC - K	5.3	A
AD - AE	0.7	A
AD - T	11.0	A
J - K	10.9	A
T - U	7.9	A
I - H	6.6	A
H - G	6.1	A
AA - Z	26.0	C
AA - A	22.6	B
Z - W	8.1	A
W - X	12.9	A
G - F	8.3	A
A - C	23.3	C
X - Y	96.3	F
C - D	34.2	D
D - E	31.7	C

Figure 21 – Static assessment results

Most Sections achieve the required level of service of C or better, with the following exceptions:

- One of the bus stops on the east side of Miller Street in front of 105 Miller St (C - D section), shown in Figure 22 reaches level of service D in the AM peak and level of service C in the PM period, due to the bus stop (noted by 13 in Figure 15) obstructing the pavement, leaving under 2.3 metres of available width. It would only have to be 0.1 metres wider to reach level of service C during the AM peak, so is only marginally over the threshold for level of service C. Hence due to the insignificant impact and change in LoS it is anticipated that sufficient walkway width exists to accommodate the anticipated pedestrian demand whilst maintaining adequate pedestrian flow and circulation. However, it is noted that pedestrians waiting at the bus shelter may further reduce the available footway width.

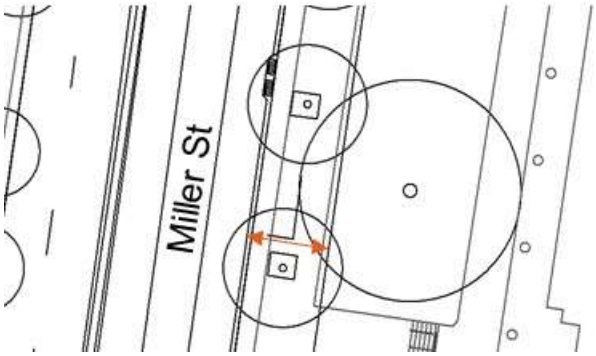


Figure 22 – Bus stop at 105 Miller Street

- The southern end of Denison Street (X - Y), shown in Figure 23, operates at a level of service F under the assumption that all pedestrians use the west footway only. This section of Denison Street is outside the scope of this proposal. It could achieve a level of service B if the footway on both sides of the road is available for station access. However, it is likely that a crossing point would need to be implemented close to the station access to encourage this movement, which may have subsequent implications on traffic flows. Further consultation would be required with Council to determine an appropriate mitigation, though we understand that Council has plans to pedestrianise Denison Street in the future which would mitigate this.

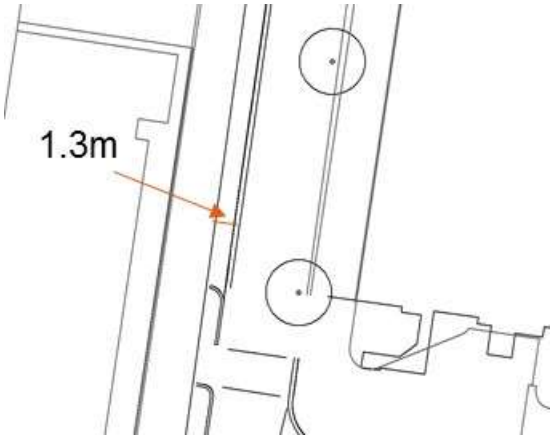


Figure 23 – Southern end of Denison Street

The width of the footway some sections cannot be verified from the CAD data. However, in these cases the minimum width requirement to achieve level of service C has been calculated and is presented in Figure 24.

Section	Flow Rate (p/min)	Minimum Width to be C or better (m)
N - L	27.84	0.84
M - B	2	0.06
B - L	5.16	0.16
P - AC	2	0.06
W - V	37.88	1.15

Figure 24 – Minimum width requirements for level of service C

The minimum width needed for all cases shown in Figure 24 is very low. Transport for London suggests, that the recommended minimum footway width (total width) for a site with low flows is 2.9 metres, which can be reduced to two metres if there is no street furniture (*Pedestrian Comfort Guidance for London*, Appendix B). A total width of two metres is sufficient for two users to pass comfortably and would easily achieve the required level of service for the 2036 demand data used.

Road crossings have not been assessed in the static calculations. These are to be considered as part of the dynamic modelling undertaken and would be assessed in relation to the queuing level of service scale.

5.4 Cycling

The location of the bicycle parking and end of trip facility access on Denison Street is away from the main station access points, reducing potential conflicts between cyclists and the pedestrians. For cyclists accessing the bicycle parking and end of trip facilities from Miller Street, they will be required

to dismount prior to entering the pedestrian area to reduce potential conflicts between cyclists and pedestrians. This would be managed with the placement of appropriate bollards and signage to encourage cyclists to dismount.

Additional bicycle parking will be provided within the station precinct and public domain, which can be used by visitors to the OSD.

The site is served by the North Sydney bicycle network and planned cycleway facilities in North Sydney. The development would be located adjacent to designated on-road cycle routes along Miller Street and planned changes to the road and cycle networks.

5.5 Green Travel Plan

A green travel plan has been prepared for the proposed Victoria Cross OSD and is included in Appendix B. The plan details specific measures to encourage workers to use more sustainable modes to and from the development.

Given the limited provision of staff parking, central location, high levels of public transport accessibility and quality of proposed end of trip facilities, the development is ideally placed to achieve the future travel mode share targets set out in this document.

6. Loading dock operation

6.1 Operation management

The loading dock will be managed by the Facilities Manager in accordance with the requirements outlined in this report. The loading dock will have a dock master on-site during the hours of operation to coordinate the safe movement of goods, vehicles and personnel within the loading dock area.

6.2 Delivery and servicing arrangements

The OSD will require a variety of goods delivery and servicing. Table summarises the goods type and the proposed arrangement to facilitate access to the site.

Table 13 – Delivery and servicing arrangement overview

Delivery/ servicing type	Access arrangement
Retail goods	Received by loading dock during specific times
Food and beverage	Received by loading dock during specific times
Office goods	Received by loading dock
Bulky goods	Received by loading dock outside of operating hours by prior arrangement and booking
Sydney Metro deliveries	Exclusive use of designated bay with booking
Motorcycle courier delivery/ collection	Redirected to off-site parking in surrounds
Bicycle courier delivery/ collection	Redirected to bicycle parking within public domain
Mail	Received by loading dock for target users within the OSD with booking
Personal deliveries	Redirected to off-site parking in surrounds
Long dwell vehicles, such as servicing, maintenance and trades	Redirected to a nominate local car park suitable for the vehicle type, unless emergency maintenance is required to have a vehicle on site. For planned maintenance outside of hours, use of a space shall be booked.

6.3 Hours of operation

The loading dock will be available 24 hours per day, with an operational window of 14 hours per day – 6am to 8pm, seven days per week. This period allows for operational flexibility to schedule deliveries with non-priority deliveries scheduled to occur during lower demand periods.

The provision of access outside of operational hours will be at the discretion of, and special arrangement by, the Facilities Manager who may grant access as required, with booking required.

6.4 Booking system

For the OSD to be adequately serviced, a delivery booking system will be utilised. The implementation of a booking system will enable the demand for the loading bay to be managed and optimised. The allocation of deliveries to specific timeslots prevents peak arrivals for delivery vehicles accessing the loading dock, which can lead to congestion at the entrance to the site, circulation within the site, delays and potential incidents. It also mitigates the risk of vehicle queues forming on Denison Street waiting to enter the site. It is assumed that 30-minute booking intervals will operate for the loading dock spaces and that the Sydney Metro loading bay, will also implement the booking system.

The implementation of a booking system also contributes to streamlining internal logistics for the site (the onward goods distribution from the loading dock to target users), as the input of goods to the loading dock is known in advance and sufficient manual handling equipment and resources can be available to meet the demand.

6.4.1 Typical operation

There are numerous commercial delivery booking systems available, which generally comprise the following operational principles:

- A delivery or service vehicle operator logs a delivery or service requirement with the loading dock through an online/ mobile app and selects from a list of available timeslots. The delivery or service vehicle operator is provided with:
  - The loading dock entry address and allocated a loading bay for delivery
  - A security code to be used at the entrance or instructions to enter the loading dock
  - Contact information for the Facilities Manager and instructions in the case that a timeslot is unable to be met
  - The vehicle operator is sent a reminder notification or text message to alert them that their timeslot is upcoming
  - Upon arrival at the loading dock, the vehicle operator uses the security code or instructions provided to gain access to the site, unload goods or provide service.

6.5 Access control

The proposed OSD will maintain a consistent procedure for controlling access to the loading docks. Outside of operating hours, vehicular and personnel access to the loading dock will be controlled by a roller door shutter. During operating hours (when security and the Facilities Manager are present), the

roller door will remain open and a boom gate will control vehicular access into and out of the loading dock.

Access will be granted only to those vehicles that are booked via the loading dock booking system. Signage to this effect will be displayed prominently at the loading dock entrance to deter entry attempts by unbooked vehicles.

Depending on the software used, drivers will either receive a code which they will be able to use at the boom gate to access the site and will be directed to their pre-booked space by security personnel. Alternatively, they will communicate with the security personnel using the intercom before being granted access and being directed to their pre-booked space.

Vehicles may be refused entry for reasons such as arriving before or after their allocated time slot, not having a booking or entering the driveway by mistake. Rejected vehicles will not be granted entry into the loading dock. Should a vehicle be refused entry at the boom gate, they will be required to wait in a suitable area within the surrounds of the site until advised by security personnel. The dock security personnel will stop the passage of pedestrians on the footpath and instruct the driver of the vehicle to reverse safely into Denison Street and drive towards the waiting area advised.

6.6 Waste collection

Waste and recycling will be collected outside of operating hours to ensure minimal impact on the operation of loading dock. Waste bins will be provided, moved to the loading dock area after hours by the facilities management team and stored in one loading bay ready for collection. The waste contractor will collect the bins before commencement of the dock operations. The facilities management team will return the bins to the waste room.

6.7 Loading dock management

The Facilities Manager and security will ensure the loading dock (including designated safe walking routes) are kept clear of goods at all times and ensure delivery vehicles strictly adhere to their allotted booking slot. Any vehicles overstaying their booking will be moved on to ensure later bookings are not affected.

Safe designated routes for the movement of people and goods between the loading dock bays and lifts that avoid vehicle manoeuvring areas have also been provided. Pavement markings will be implemented to indicate safe access for people and delivery movements through the loading dock area.

Incidents occurring within the loading dock area, or at the loading dock entrance, will be managed in accordance with the Precinct Wide Incident Management Plan.

6.8 Swept path analysis

Swept path analyses of the proposed loading dock arrangements have been carried out to confirm the loading dock bays are suitable for Small Rigid Vehicles (SRVs) and Medium Rigid Vehicles (MRV), which are provided in Appendix A. From the vehicle swept path analysis it was found that the installation of convex mirrors would be required at the ramp entrance. This is where larger delivery vehicles might take up both lanes to make the required turning manoeuvre. This would mainly to allow for enhanced vehicle visibility where sight lines are also restricted.

7. Construction pedestrian traffic management plan

A framework CPTMP has been prepared for the North Site and is included in Appendix C. The framework CPTMP is consistent with the Construction Traffic Management Framework prepared as part of the Sydney Metro City and Southwest and includes the following:

- Loading and unloading, including the locations of all proposed work zones
- Haulage routes
- Construction vehicle access arrangements
- Proposed construction hours
- Estimated number and type of construction vehicle movements, including morning and afternoon peak and off-peak movements, distinguishing concrete pours from other construction activity, and noting that construction vehicles would be restricted from using work zones on Miller Street during certain times of the day
- Construction program, highlighting details of peak construction activities and proposed construction staging
- Details of specific measures to ensure the arrival of construction vehicles to the site does not cause additional queuing on surrounding road network during peak periods
- Details of any construction vehicle marshalling areas
- The staging of works and simultaneous construction with other projects in the area, including 1 Denison Street, the Sydney Metro and other developments nearby, and identify mitigation measures to ensure the proposal can be constructed while the impacts to rail users (and their connections) are appropriately managed
- Any potential impacts to general traffic, cyclists, pedestrians and bus services near the site from construction vehicles during the construction of the proposed works
- Measures proposed to mitigate any associated impacts of traffic, public transport, pedestrians and cyclists should be clearly identified and included in the draft CPTMP.

The Sydney Coordination Office (SCO) will be consulted with in the development of this plan. The final CPTMP plan will be developed by the appointed Contractor for the project.

8. Consultation

Ongoing consultation with Sydney Metro, Transport for NSW, Roads and Maritime and Council is being undertaken in the design development process. This Traffic and Transport Impact Assessment report reflects consultation completed at the time of its issue.

9. Conclusions

This traffic and transport impact assessment report supports the Detailed SSDA for the Victoria Cross OSD. It confirms the SEARs and Concept SSDA conditions of consent have been met through the design.

The proposed OSD commercial tower is proposed to have an employment population of approximately 5,833 based n a density of one person per 10 square metres of commercial floor space (GLA/ NFA) and one person per 20 square metres of retail floor space.

A basement loading dock is proposed which will be accessible from Denison Street. It will have two MRV bays, two SRV bays, two courier spaces and on Sydney Metro staff space. The dock will be managed with a pre-booking system in place. A loading dock management plan has been prepared for the Victoria Cross site.

High quality end of trip facilities, providing bicycle parking, showers and lockers will be located on Level B2 and be accessible from Miller Street using lifts and Denison Street using lifts and the vehicle access ramp. In total, 453 bicycle parking spaces will be provided, with visitors to utilised the bicycle parking to be provided within the public realm.

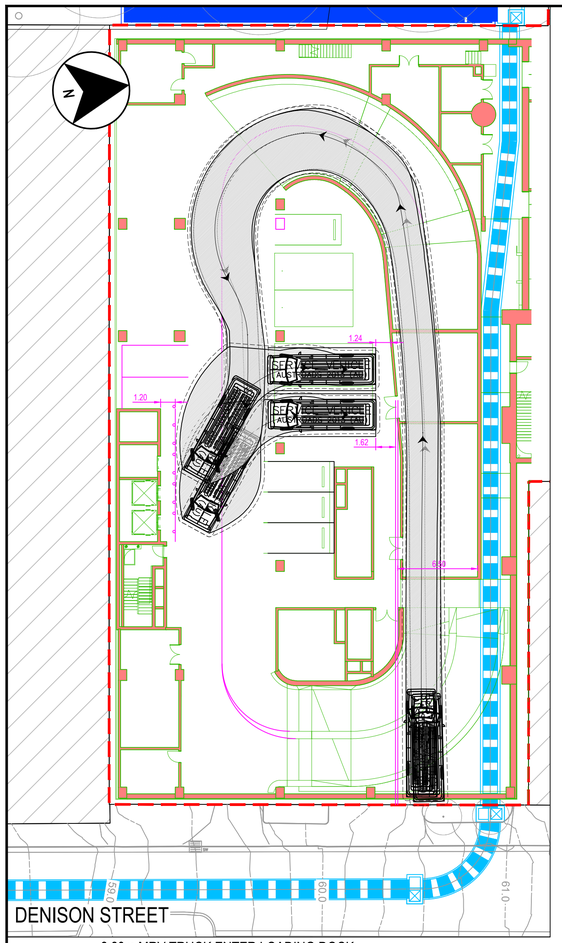
A total of 161 car parking spaces is being provided as part of the development, which is lower that the number of spaces provided within the site prior to its demolition. Therefore, the traffic impact is considered to be negligible, with the main traffic generation related to servicing and deliveries.

A framework Construction Traffic Management Plan has been prepared, describing how it is proposed to manage the impacts to traffic, pedestrians, cyclists and public transport users during the construction stage.

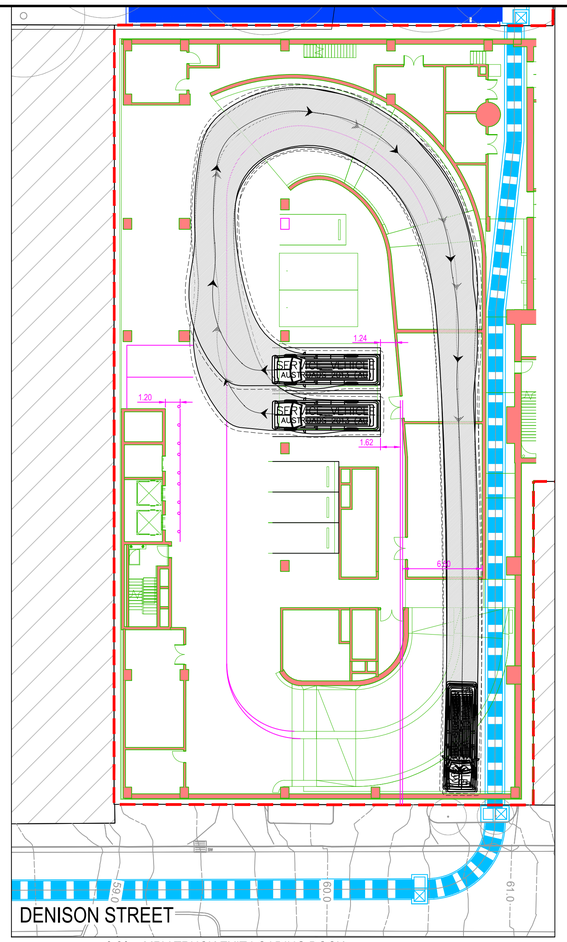
The analysis undertaken shows the impact of increased Victoria Cross population due to the proposed OSD can be accommodated without negatively impacting existing transport or pedestrian infrastructure and systems.

Further, whilst not subject to approval under this SSDA, the design of the Sydney Metro station has been designed to specifically incorporate the increased OSD pedestrian demand.

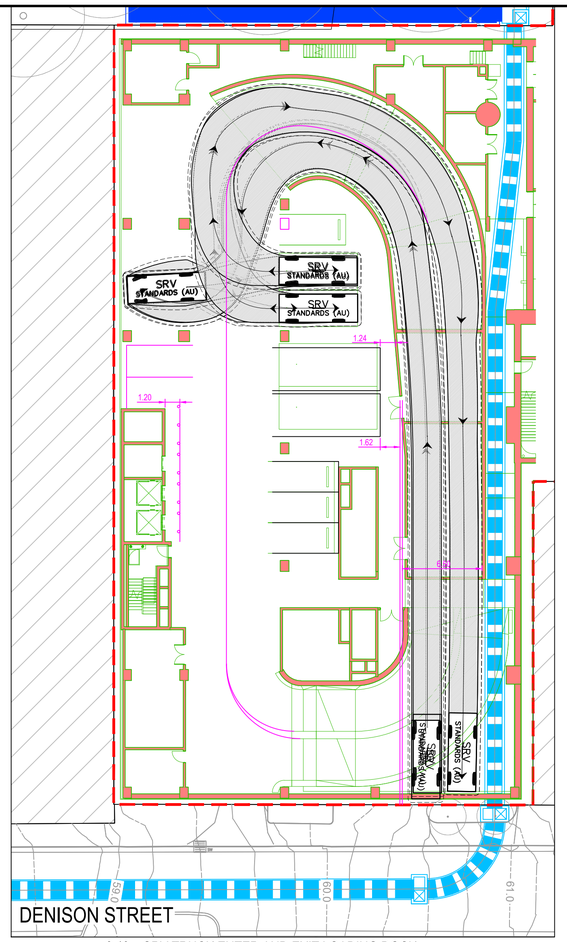
Appendix A: Swept path analysis



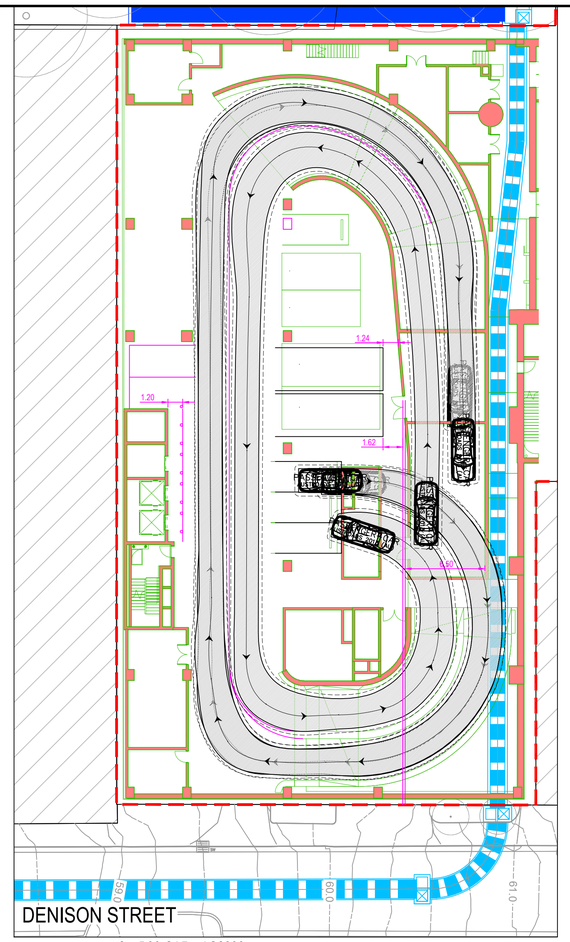
8.80m MRV TRUCK ENTER LOADING DOCK



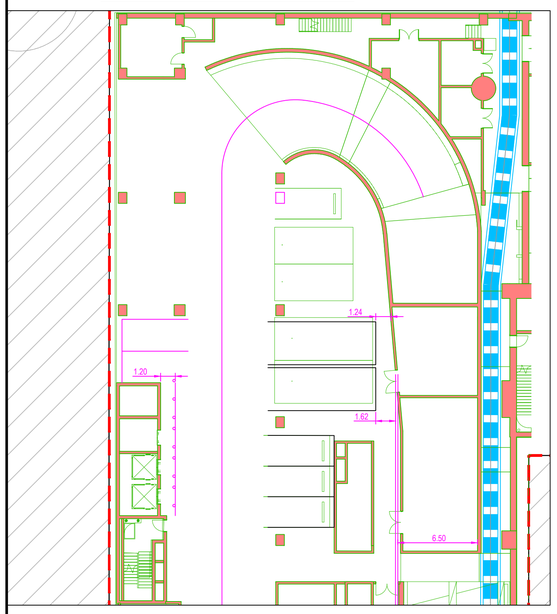
8.80m MRV TRUCK EXIT LOADING DOCK



6.40m SRV TRUCK ENTER AND EXIT LOADING DOCK



5.2m B99 CAR - AS2890



PROPOSED CONNECTION TO MLC BUILDING

Table 3.1 — Recommended minimum widths of circulation roadways kerb to kerb

Dimensions in metres

Design vehicle	Curve radius (inside edge of curve)	Swept path width of design vehicle	Road width, kerb to kerb		Without intervisibility (see Note 2)
			Two-way		
			Single lane	With intervisibility (see Note 1)	
SRV	Less than 12	—	See Note 3	See Note 3	See Note 3
	12 to 25	2.7	3.6	6.9	6.9
	> 25 (including straight)	2.3	3.5	6.2	6.2
MRV	Less than 25	—	See Note 3	See Note 3	See Note 3
	25 to 39	3.3	4.2	7.1	8.1
	40 to 69	3.0	3.9	6.8	7.5
	70 to 100	2.7	3.6	6.5	6.9
	> 100 (including straight)	2.5	3.5	6.5	6.5

NOTE 1 Widths in this column are recommended where drivers approaching each end of a curve can see vehicles approaching the other end. The widths are based on the nominated design vehicle passing a SRV with clearances as specified in Clause 5.4, and assumes that at these widths drivers of two opposing large vehicles will not attempt to occupy the curved roadway simultaneously.

NOTE 2 Widths in this column are recommended where drivers approaching each end of curve cannot see vehicles approaching from the other end and therefore provision needs to be made for two of the nominated design vehicles to pass one another with clearances as specified in Clause 5.4. These widths are also necessary where an uninterrupted two way flow of nominated design vehicles is to be catered for.

NOTE 3 It is not practicable to provide generalized recommendations for small radius turns. Each case needs to be checked individually using turning path parameters as set out in Clause 5.2.

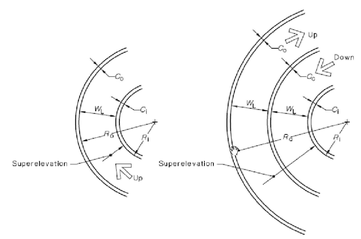
Table 4.1 — Service bay dimensions

Vehicle class	Bay width m min.	Bay length m min.	Platform height m	Vertical clearance m min.
SRV	3.5	6.4	0.75 to 0.90	3.5
MRV	3.5	8.8	0.95 to 1.10	4.5[a]
HRV	3.5	12.5	1.10 to 1.40	4.5[a]
AV	3.5	20.0	1.10 to 1.40	4.5[a]

[a] 4.8 m for animal transport vehicles, vehicle carriers and 4.6 m high vehicles or where access to the top of a tall vehicle, e.g. pantechnicon or load is required.

EXCERPTS FROM AS2890.2-2018 (PART 2 - OFF STREET COMMERCIAL VEHICLE FACILITIES)

(b) *Curved roadways or ramps* Curved roadways and ramps will usually be designed as circular curves. Limiting dimensions shall be as shown in Table 2.2 and Figure 2.9. A separator or median shall be provided on two-way curved roadways or ramps where the radius to the outer kerb (dimension R_o on Figure 2.7(b)) is less than 15 m. A separator or median is optional at larger radii but if not provided, a centre-line pavement marking shall be provided on ramps serving User Class 2 and 3 facilities (see Table 1.1).



(a) Single (b) Double (with separator)

Characteristic	Limiting dimensions, m	
	One-way	Two-way
Outside radius, R_o	7.6 min.	11.8 min.
Inside radius, R_i	4.0 min.	4.0 min.
Lane width, W_t	See Table 2.2	See Table 2.2
Clearance to obstruction—		
(a) inside, C_i	0.3 min.	0.3 min.
(b) outside, C_o (see Note)	0.5 min.	0.5 min.
(c) between paths, C_c	—	0.6 min.
Superelevation	1 in 20 (5%) max.	1 in 20 (5%) max.

NOTE: This clearance will be sufficient to allow the outside front wheel to touch the kerb before the vehicle body can contact the obstruction.

FIGURE 2.9 DIMENSIONS OF CURVED CIRCULATION ROADWAYS AND RAMPS

TABLE 2.2

MINIMUM ROADWAY WIDTHS ON CURVED ROADWAYS AND RAMPS

metres

Turn radius R_o (Note 1)	Single lane		Two-way, no separator All cases (Note 3)
	Public facilities (Note 2)	Domestic property	
7.6 to 11.9	3.9	3.6	—
12.0 to 19.9	3.4	3.1	6.7 (Note 4)
20.0 to 50.0	3.2	3.0	6.3
>50.0	3.0	3.0	5.5

NOTES:

1 See Figure 2.9 for Dimension R_o.

2 In New Zealand only, the widths shown for domestic property shall apply also to public facilities.

3 For parallel roadways with a median or separator, each roadway width shall be determined separately as a single lane.

4 Applies to R_o range 15.0 m to 19.9 m only (see Clause 2.5.2(b)).

EXCERPTS FROM AS2890.1-2004 (PART 1 - OFF STREET CAR PARKING)

FOR DISCUSSION ONLY

REV.	BY	DATE	DESCRIPTION	APPD.
	XY			
	XY			
	XY			
02	MK	25/06/2019	ISSUE FOR INFORMATION	
01	MK	21/06/2019	ISSUE FOR INFORMATION	

WORK IN PROGRESS

SCALES

2.5 0 2.5 5 7.5m

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NOTE: Do not scale from this drawing. | ALT. DRG No. [ALTERNATE DRG. NO.]

CLIENT

NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS

lendlease

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DESIGNED M.KURTZ

DRG CHECK DRG CHECKER

DESIGN CHECK DES CHECKER

APPROVED APPROVER

SYDNEY METRO USDTS

VICTORIA CROSS STATION

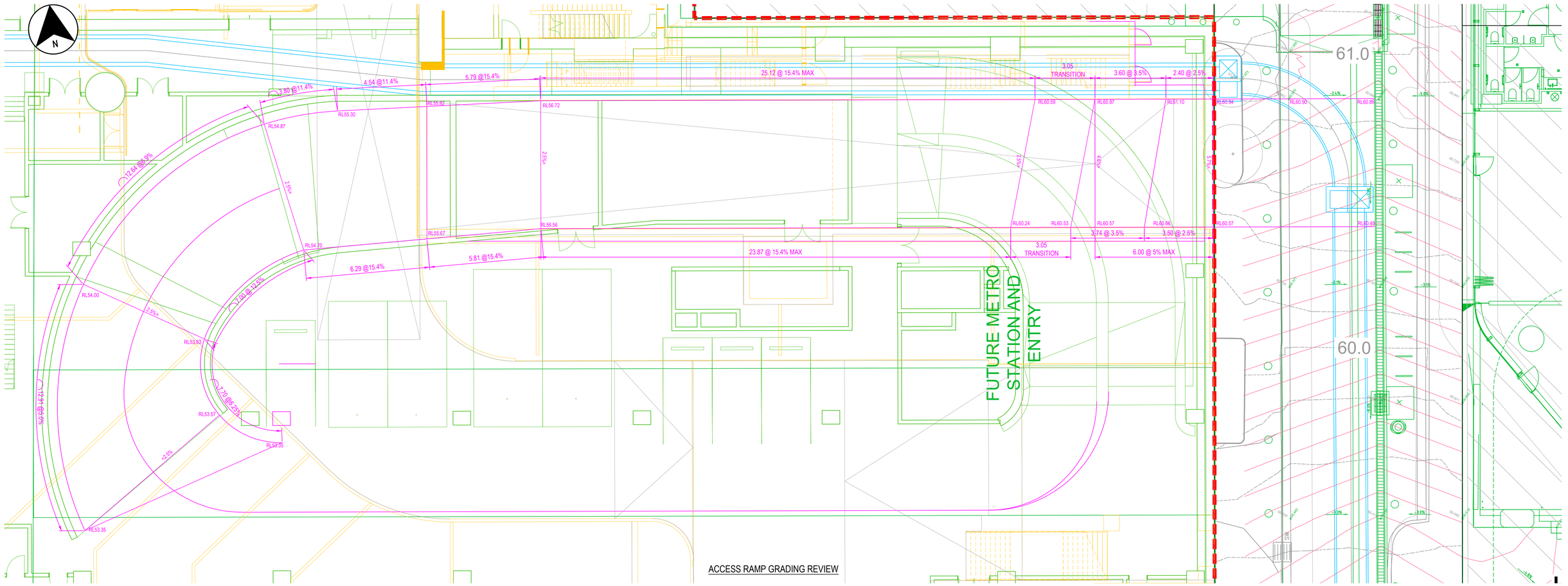
CIVIL WORKS

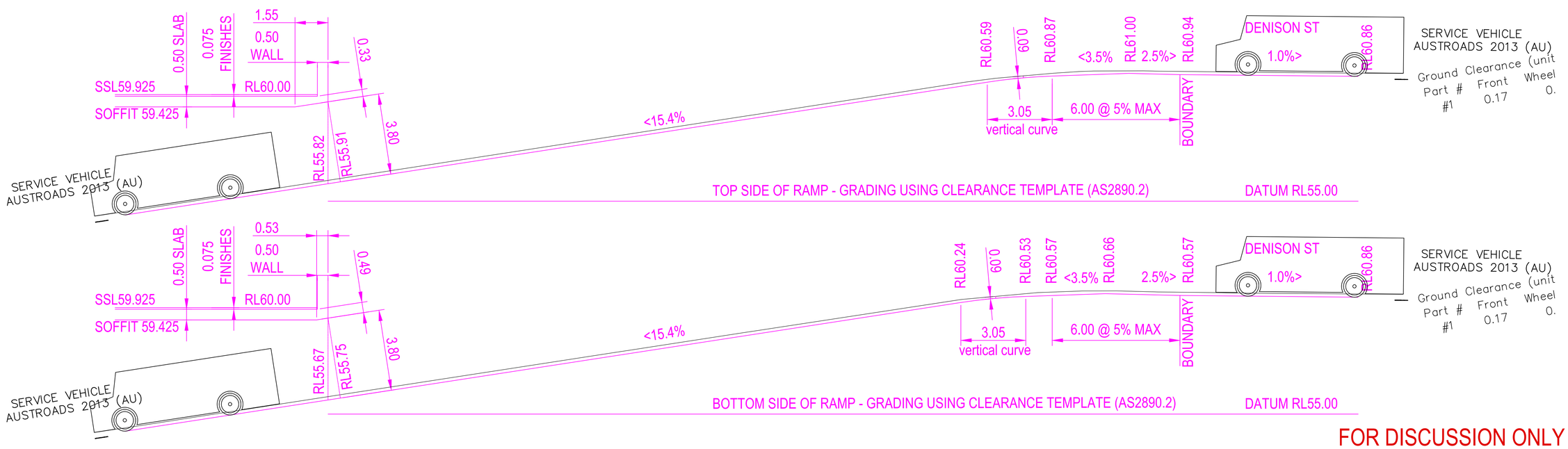
TURNING PATH PLAN - LEVEL B1 (LOADING DOCK) REVISED LAYOUT 1 SOUTH

FILE No. | SHEET 1 OF X | A1

STATUS: PRELIMINARY | ©

DRG No. SMCSWSVI-LLC-SVC-CE-SKC-103 | EDMS No. | 02





FOR DISCUSSION ONLY

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WORK IN PROGRESS

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NOTE: Do not scale from this drawing. | ALT. DRG No. [ALTERNATE DRG. NO.]

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APPROVED APPROVER

SYDNEY METRO USDTS
VICTORIA CROSS STATION
CIVIL WORKS
CARPARK / LOADING DOCK ACCESS RAMP GRADING
SOUTH

FILE No. | SHEET 1 OF X | A1
STATUS: PRELIMINARY | ©
DRG No. SMCSWSVI-LLC-SVC-CE-SKC-107 | EDMS No. | 01

Appendix B: Green Travel Plan

ARCADIS

MOTT MACDONALD

A joint venture between Arcadis Australia Pty Ltd and Mott MacDonald Australia Pty Ltd

OSD Detailed SSD DA - GREEN TRAVEL PLAN

Victoria Cross Over Station Development

Document No: SMCSWSVO-LLC-SVC-TI-REP-000002

Revision - B

Prepared For – Lendlease Building Pty Limited | ABN 97 000 098 162

OSD Detailed SSD DA - GREEN TRAVEL PLAN

Victoria Cross Over Station Development

Client:

Lendlease Building Pty Limited

Level 14, Tower Three, International Towers Sydney, Exchange Place, 300 Barangaroo Avenue, Barangaroo NSW 2000

ABN: 97 000 098 162

Prepared by:

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Level 16, 580 George Street Sydney NSW 2000

ABN: 794 7393 1704

Quality information

Title	OSD Detailed SSD DA - GREEN TRAVEL PLAN
Document No / ref:	SMCSWSVO-LLC-SVC-TI-REP-000002
Zone:	Site wide
Disciplines:	Transport and Traffic
Suitability Code:	Issued for Information

Approval Record

Function	Position	Name	Date
Prepared by	*Transport Planner*	*Wendy Hu*	*3/07/2019*
Technical Checker	*Manager Transport Planning and Traffic Engineering*	*Nicole Vukic*	*3/07/2019*
Reviewed By	*Manager Transport Planning and Traffic Engineering*	*Nicole Vukic*	*3/07/2019*
Approved by	*OSD Design Manager*	*Stephen Canty*	*3/07/2019*

Amendment Record

Changes made to this document since its last revision, which affect its scope or sense, are marked in the right margin by a vertical bar (|).

Date	Rev	Amendment Description	By
03/06/2019	A	For information	Nicole Vukic
03/07/2019	B	Updated For submission	Nicole Vukic

Contents

Acronyms

Abbreviation	Description
ABS	Australian Bureau of Statistics
BTS	Bureau of Transport Statistics
CBD	Central Business District
Council	North Sydney Council
CSSI	Critical State Significant Infrastructure
CPTMP	Construction Pedestrian and Traffic Management Plan
CTMP	Construction Traffic Management Plan
DA	Development Application
DCP	Development Control Plan
DPE	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
GFA	Gross floor area
GSC	Greater Sydney Commission
LEP	Local Environment Plan
LoS	Level of Service
OD	Origin-destination
OSD	Over station development
Roads and Maritime	NSW Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environment Planning Policy
SSD	State Significant Development
SWTC	Scope of Works and Technical Criteria
TfNSW	Transport for NSW
TZ	Travel zone

1. Introduction

This report has been prepared to accompany a detailed State Significant Development (SSD) development application (DA) for a commercial mixed-use Over Station Development (OSD) above the new Sydney Metro Victoria Cross Station. The detailed SSDA is consistent with the Concept Approval (SSD 17_8874) granted for the maximum building envelope on the site, as proposed to be modified.

The Minister for Planning, or their delegate, is the consent authority for the SSDA and this application is lodged with the NSW Department of Planning, Industry and Environment (NSW DPIE) for assessment.

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 6 May 2019. Specifically, this report has been prepared to respond to the SEARs requirements summarised as follows:

> *'measures to be implemented, including a Green Travel Plan, to encourage users of the development to make sustainable travel choices, including walking, cycling, public transport and car sharing, such as the integration with rail and bus infrastructure and provision of adequate bicycle parking and end of trip facilities'*

The detailed SSDA seeks development consent for:

- Construction of a new commercial office tower with a maximum building height of RL 230 or 168 metres (approximately 42 storeys)
- The commercial tower includes a maximum GFA of approximately 61,500 square metres, excluding floor space approved in the CSSI
- Integration with the approved CSSI proposal including though not limited to:
  - Structures, mechanical and electronic systems, and services
  - Vertical transfers
- Use of spaces within the CSSI 'metro box' building envelope for the purposes of:
  - Retail tenancies
  - Commercial office lobbies and space
  - 161 car parking spaces within the basement for the purposes of the commercial office and retail use
  - End of trip facilities
  - Loading and services access
- Utilities and services provision
- Signage locations (building identification signs)
- Stratum subdivision (staged).

1.1 The site

The site is generally described as 155-167 Miller Street, 181 Miller Street, 187-189 Miller Street, and part of 65 Berry Street, North Sydney (the site). The site occupies various addresses/ allotments and is legally described as follows:

- 155-167 Miller Street (SP 35644) (which incorporates lots 40 and 41 of Strata Plan 81092 and lots 37, 38 and 39 of Strata Plan 79612)
- 181 Miller Street (Lot 15/DP 69345, Lot 1 & 2/DP 123056, Lot 10/DP 70667)
- 187 Miller Street (Lot A/DP 160018)
- 189 Miller Street (Lot 1/DP 633088)
- Formerly part 65 Berry Street (Lot 1/DP 1230458).

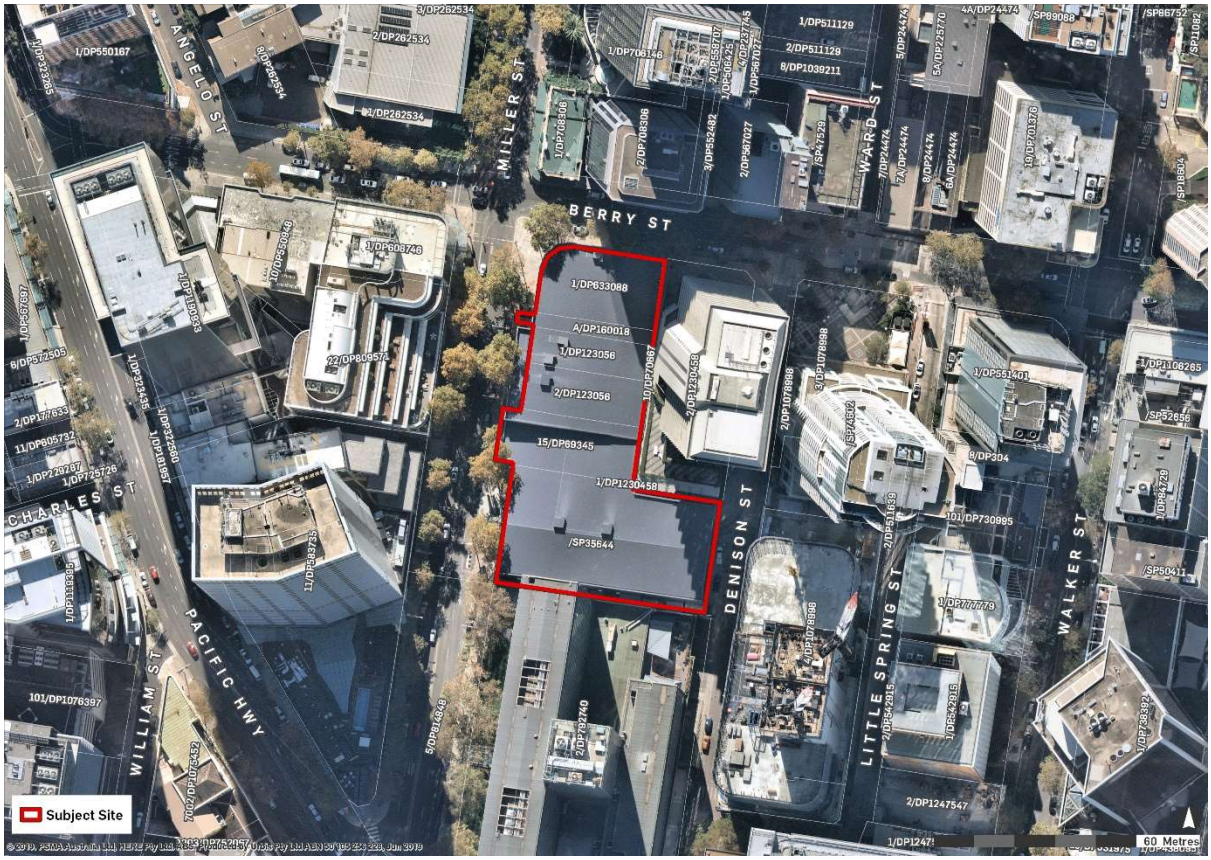


Figure 1 – Site aerial

1.2 Sydney Metro description

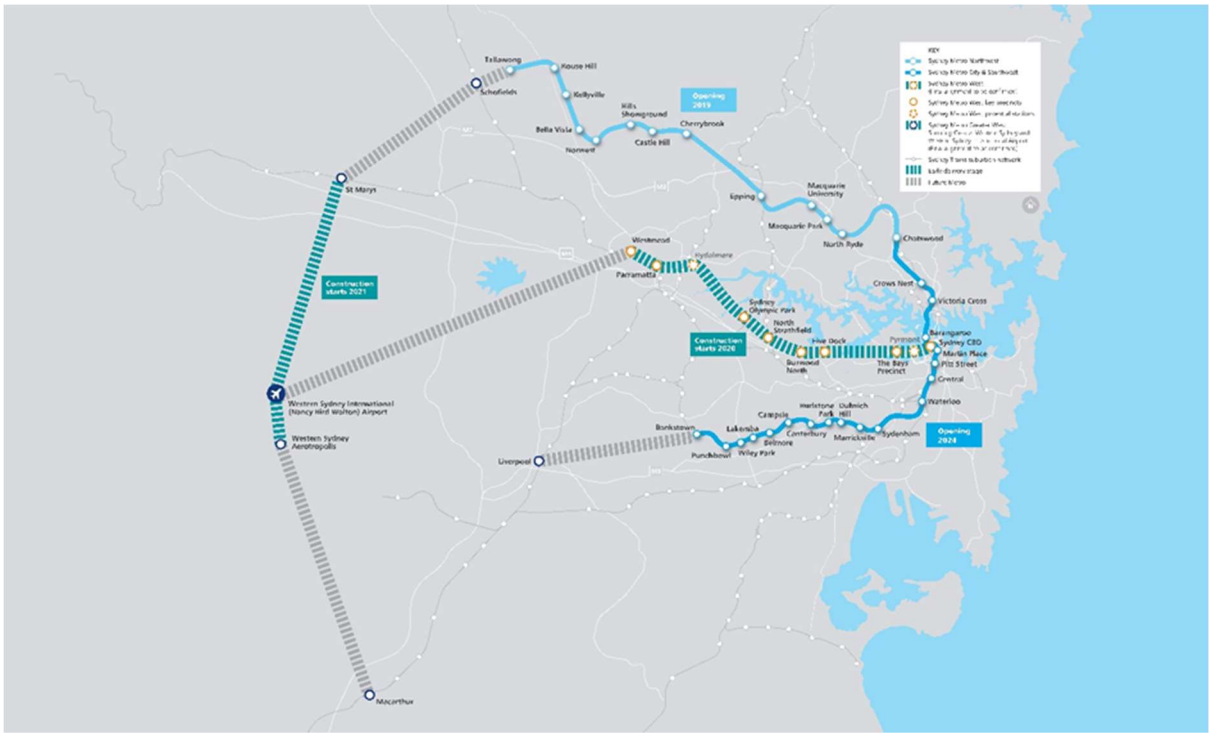
Sydney Metro is Australia's biggest public transport project. In 2024, Sydney will have 31 metro railway stations and a 66km standalone metro railway system – the biggest urban rail project in Australian history. The Sydney Metro Project is illustrated in Figure 2.

Services will start in 2019 in the city's north west with a train every four minutes in the peak. Sydney Metro will be extended into the CBD and beyond to Bankstown in 2024. There will be new metro

railway stations underground at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street, Waterloo and new metro platforms under Central.

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham project as a Critical State Significant Infrastructure project (reference SSI 15_7400) (CSSI Approval). The terms of the CSSI Approval includes all works required to construct the Sydney Metro Victoria Cross Station, including the demolition of existing buildings and structures on both sites. The CSSI Approval also includes construction of below and above ground works within the metro station structure for appropriate integration with the OSD.

With regards to CSSI related works, any component of the detailed design that is contained within the "metro box envelope" and public domain will be pursued in satisfaction of the CSSI conditions of approval and do not form part of the scope of the Detailed SSDA for the OSD, unless otherwise specified in the SSDA.



Source: Sydney Metro

Figure 2 – Sydney Metro alignment map

1.3 Objectives and targets

The use of private vehicles is a major contributor towards both greenhouse gas emissions and traffic congestion on Sydney's roads, with significant environmental and social costs. As well as delivering better environmental outcomes such as reduced air and noise pollution, the promotion of sustainable travel options will provide both health and social benefits to the community and reduce traffic congestion.

The objective of this Green Travel Plan (GTP) is provide information and recommendations on potential green travel options for commuters to the OSD, and to make apparent, encourage and support the use of sustainable travel options.

1.4 Report structure

This report outlines current travel conditions and potential green travel options for commuting to the commercial OSD above the new Sydney Metro Victoria Cross Station. This GTP has been prepared as a package intended to inform and encourage the use of sustainable transport options for travel to and from the development site, taking into consideration location and accessibility to alternative transport modes. It promotes the use of active transport modes such as walking and cycling, and public transport options that service the area. This GTP provides recommendations on sustainable transport initiatives that be undertaken by the OSD, as well as initiatives for the commercial end user to increase sustainable travel options, with the objective of reducing private vehicle use and increasing the use of active or public transport.

This report is structured as follows:

- **Section 2: Existing conditions** discusses existing and future transport conditions
- **Section 3: Green Travel Plan measures** provides an overview of the changes to the existing transport use due to the proposed development and summarises actions to encourage sustainable transport opportunities
- **Section 4: Monitoring and review** provides an overview of ongoing monitoring actions to obtain maximum benefit from the GTP.

2. Existing conditions

2.1 Existing mode split and future target

Census 2011 Journey to Work data collected by the Australian Bureau of Statistics (ABS) has been used to assess the current commuter travel behaviour in the proposed development area and characterise the public transport conditions near the site.

The Bureau of Transport Statistics (BTS) uses ABS data to determine the mode used to travel to work by 'travel zones' (TZs[1]). The TZs that apply to this proposed development site are located within the North Sydney CBD, bounded by Ridge Street in the north, the Warringah Freeway in the east, Union Street in the south and the boundary of the suburb of Waverton in the east and are considered appropriate for determining the travel patterns for the site. The location of the relevant TZs are illustrated in Figure 3.

Source: BTS TZs 1951, 1952, 1953, 1954, 1955, 1956 and 1957

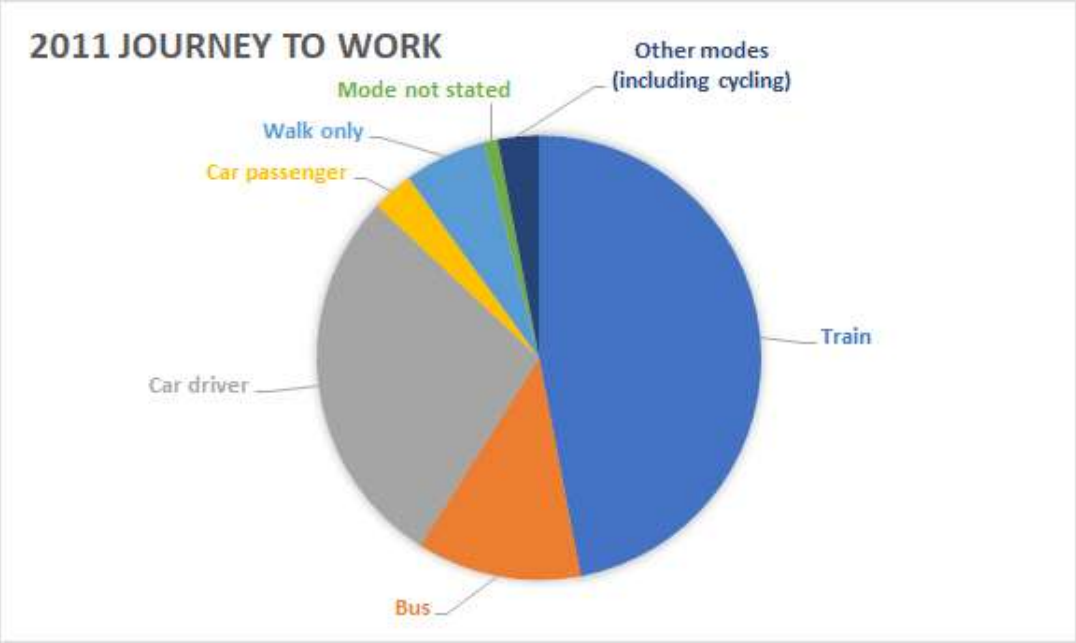
Figure 3 – Census 2011, Journey to Work relevant TZs

At the time of the Census and prior to demolition work for the Sydney Metro, this zone included about 39,511 employees. Their main mode of travel is summarised in Figure 4 and includes the following mode share:

- 47 per cent travelled by train
- 12 per cent travelled by bus
- 28 per cent travelled by car as a driver
- 3 per cent travelled by car as a passenger
- 6 per cent walked only
- 1 per cent did not state their mode of travel

[1] TZs 1951, 1952, 1953, 1954, 1955, 1956 and 1957 used for the purpose of this analysis

- Three per cent travelled by other modes (including by bicycle).



Source: Census 2011

Figure 4 – Census 2011, Journey to Work mode share

The future mode share for the site has been estimated based on the existing journey to work mode share of more established areas with proposed Sydney Metro stations, such as Pitt Street and Martin Place, which the future of North Sydney is expected to tend towards.

The review highlighted that the mode share for access by private vehicle for journey to work purposes was substantially lower (up to 15 per cent) than the portion of trips by car for North Sydney (31 per cent). Parking provision and management together with a concentration of high density, mix of uses and accessibility to other key catchments are attributing factors to this outcome. Given the accessibility of the Metro Victoria Cross railway station from the OSD, a slight increase in work trips undertaken through rail transport would be expected, due to the increased coverage and accessibility to the site by public transport.

Table 1 – Comparison of 2011 Journey to Work mode share for other Sydney Metro stations

Mode	Eastern Harbour City		
	North Sydney	Pitt Street	Martin Place
Train	47%	47%	42%
Bus	12%	21%	22%
Car driver	28%	14%	15%
Car passenger	3%		
Walk only	6%	6%	6%
Mode not stated	1%	11%	11%
Other modes (including cycling)	3%		

Source: Census, 2011

2.2 Existing transport provision

There is a wide range of sustainable transport options including both active and public transport available to travellers to the Victoria Cross OSD site, including:

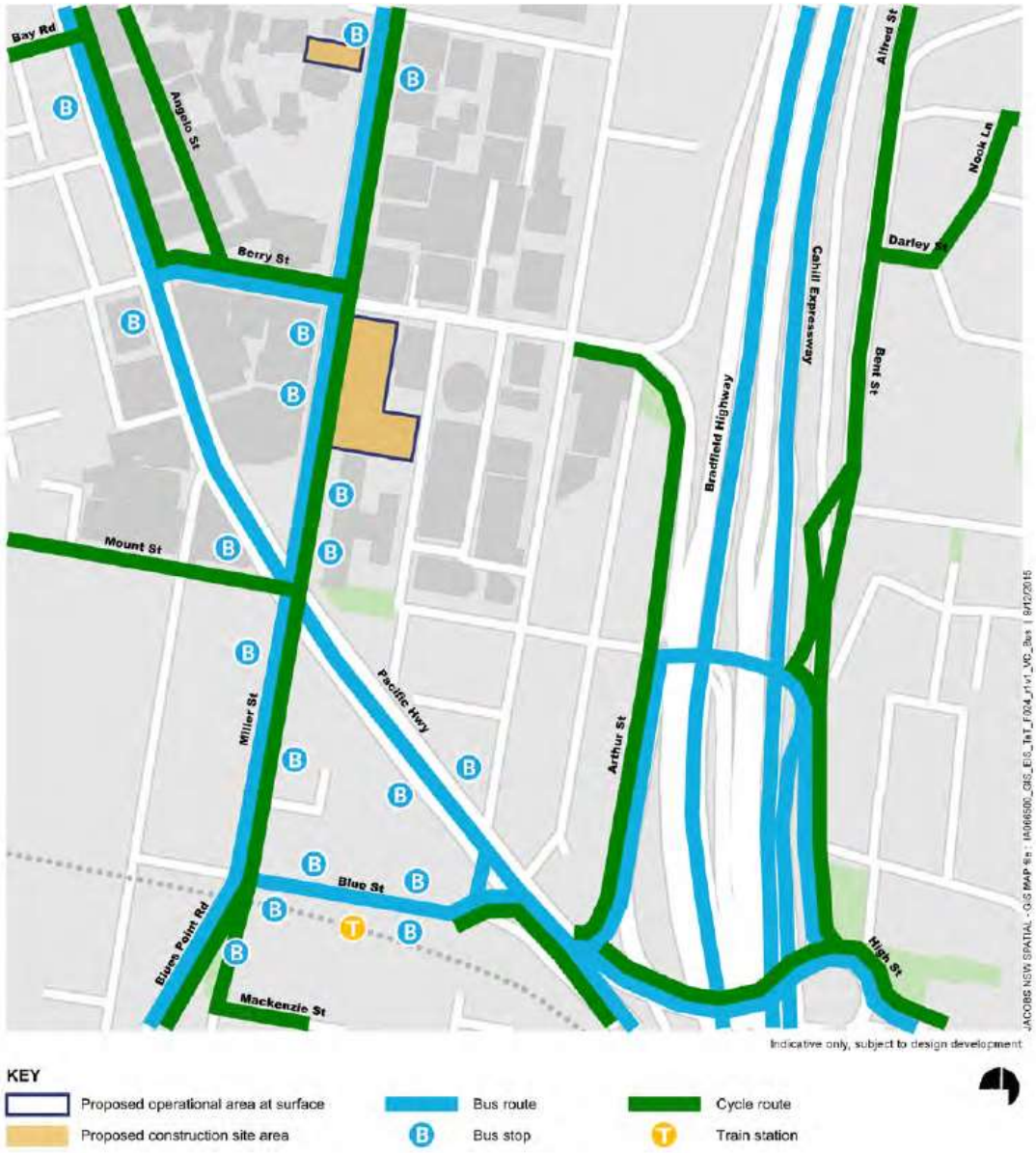
- Bus services
- Train services
- Ferry services
- Walking and cycling
- Car share.

2.2.1 Bus services

North Sydney has over 80 bus routes stopping in the area surrounding the site, with major bus stops located on Miller Street, Pacific Highway and Blue Street. These bus routes are operated by Sydney Buses, as well as private operators Hillsbus and Forest Coach Lines. Immediately near the site, there are four bus stops located on Miller Street. Based on the current bus timetable information, the bus routes servicing these stops are summarised as follows:

- Northbound:
  - Bus stop number 206046: 26 bus routes, providing services to the Lower North Shore and Northern Beaches
  - Bus stop number 206045: 18 bus routes, providing services to the Lower North Shore, Northern Beaches and Ryde in the northern suburbs
- Southbound:
  - Bus stop number 206085: 30 bus routes, providing services from the Lower North Shore, Northern Beaches and Ryde in the northern suburbs
  - Bus stop number 206052: 20 bus routes, providing services from the Lower North Shore, Northern Beaches, The Hills District (Dural, Cherrybrook, West Pennant Hills and Kellyville), the northern suburbs (Epping, Denistone East, Macquarie and Gladesville) and services to the Sydney CBD and Botany.

Figure 5 shows the locations of bus and cyclist routes near the site.



Source: Sydney Metro Chatswood to Sydenham EIS (May 2016)

Figure 5 – Existing public transport and cyclist routes

2.2.2 Train services

The site and its surrounding area is easily accessible via rail, being within reasonable walking distance to North Sydney Railway Station (within a 500-metre radius). North Sydney Station is the fifth busiest train station in the Sydney Trains network during the morning peak period, providing services for morning commuters who work in North Sydney and the surrounding area. Two primary pedestrian access routes between the site and North Sydney Station are grade separated from Pacific Highway, either underground via Miller Street or through a pedestrian overpass via Denison Street.

Alternatively, pedestrian access is provided along Miller Street and along Blue Street for access into North Sydney Station from Blue Street.

North Sydney Station serves the following train lines:

- T1 Western Line – Emu Plains or Richmond to City
- T1 North Shore Line – Berowra to Parramatta
- T1 Northern Line – Hornsby to City, via Strathfield
- T9 Northern Line – Hornsby to North Shore, via City
- CCN Central Coast and Newcastle Line – Newcastle Interchange to Central, via Strathfield or Gordon.

2.2.3 Ferry services

The proposed OSD above the Victoria Cross Sydney Metro Station is accessible via ferry services, with the nearest ferry wharfs being McMahons Point Wharf and Milsons Point Wharf. Both of these wharfs are located about 1.6 kilometres and about a 20-minute walk from the site, outside of the 15 minute walking catchment indicated in Figure 8. McMahons Point Wharf is further accessible via a bus from Miller Street, though services are infrequent at approximately every 30 minutes, and Milsons Point Wharf is most easily reached via train from North Sydney Railway Station to Milsons Point Railway Station.

The two ferry wharfs both form a part of the Parramatta River ferry network, which provides a connection between Circular Quay Wharf and Rydalmere Wharf. The Sydney Ferry Network is presented in Figure 6.

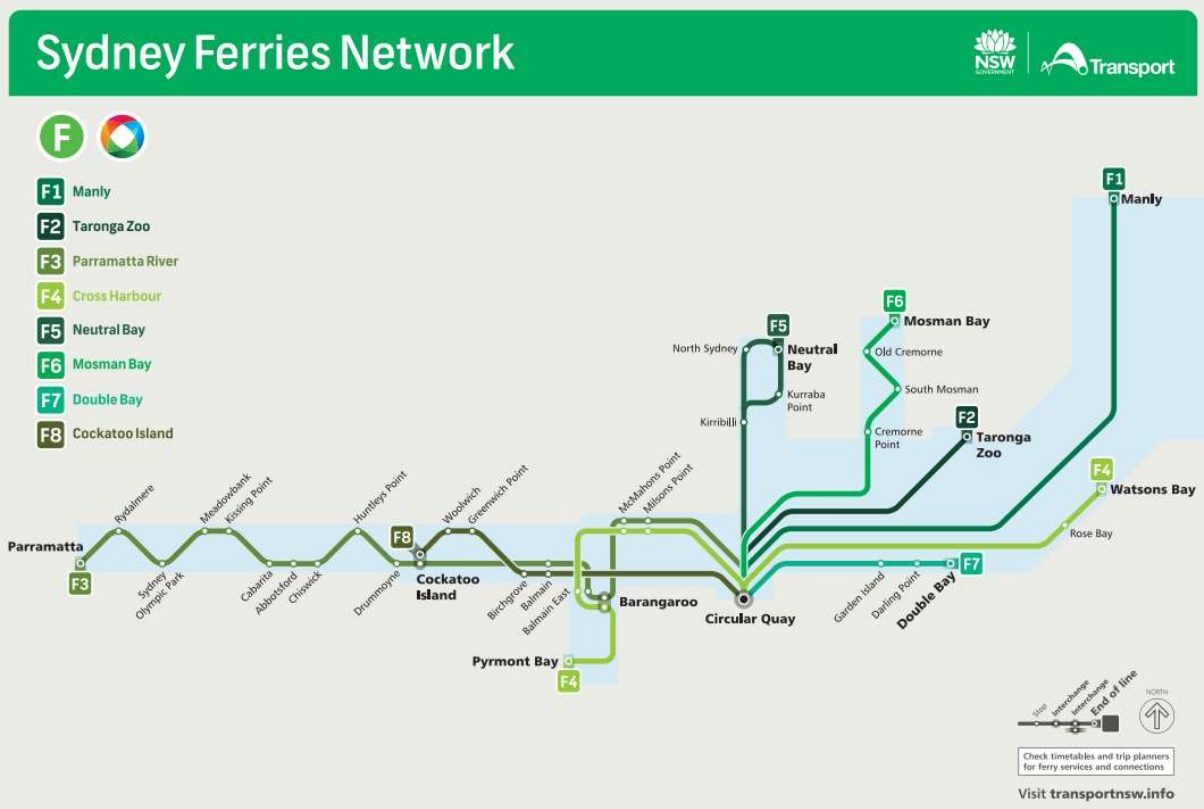


Figure 6 – Sydney ferries network

2.2.4 Pedestrian infrastructure

A walk score is a measure of pedestrian accessibility of a development to retail and entertainment centres, schools, restaurants and public transport. A high walk score value corresponds to a high level of accessibility by non-car options.

The walk score provides a broad indicative insight on the accessibility of a given area. Figure 7 provides an overview of the scores:

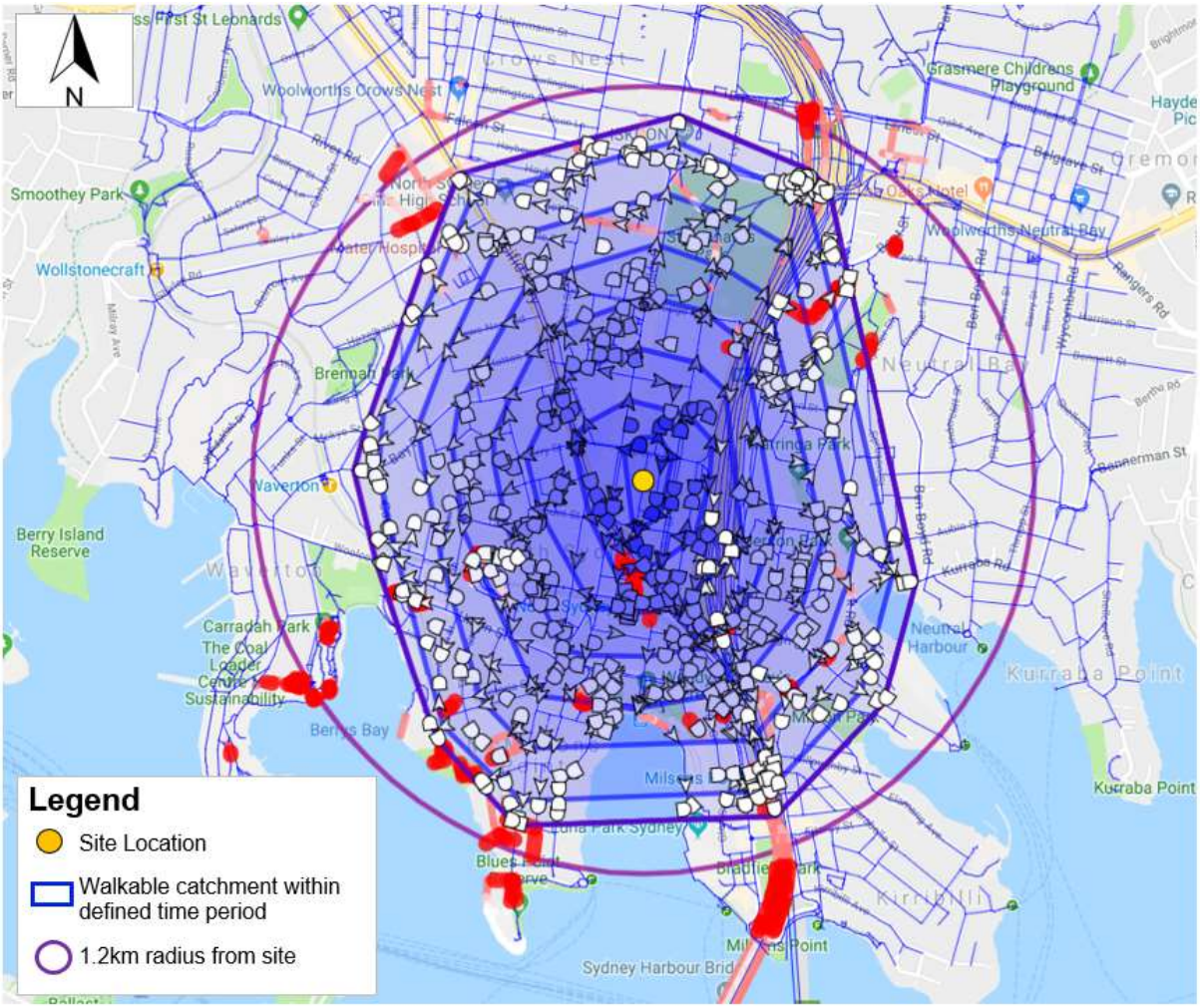
Walk Score®	Description
90–100	**Walker's Paradise** Daily errands do not require a car.
70–89	**Very Walkable** Most errands can be accomplished on foot.
50–69	**Somewhat Walkable** Some errands can be accomplished on foot.
25–49	**Car-Dependent** Most errands require a car.
0–24	**Car-Dependent** Almost all errands require a car.

Figure 7 – Walk score

The proposed OSD above the Victoria Cross Sydney Metro Station is located in central North Sydney, which offers shopping, dining and public transport services within close walking distance. As a result, the development site and surrounding area has been assessed to have achieved a walk score of 92, making it the 25th most walkable neighbourhood in Sydney, and indicating a high level of walkability and accessibility to both public transit and sites visited for daily errands. Residents and those working in the development do not need to rely on private vehicles.

PedCatch is pedestrian accessibility modelling tool that shows the extent of a walking catchment, given speed and time. Using topographical mapping, it takes into consideration physical barriers that may restrict access for pedestrians and present issues for mobility impaired pedestrians.

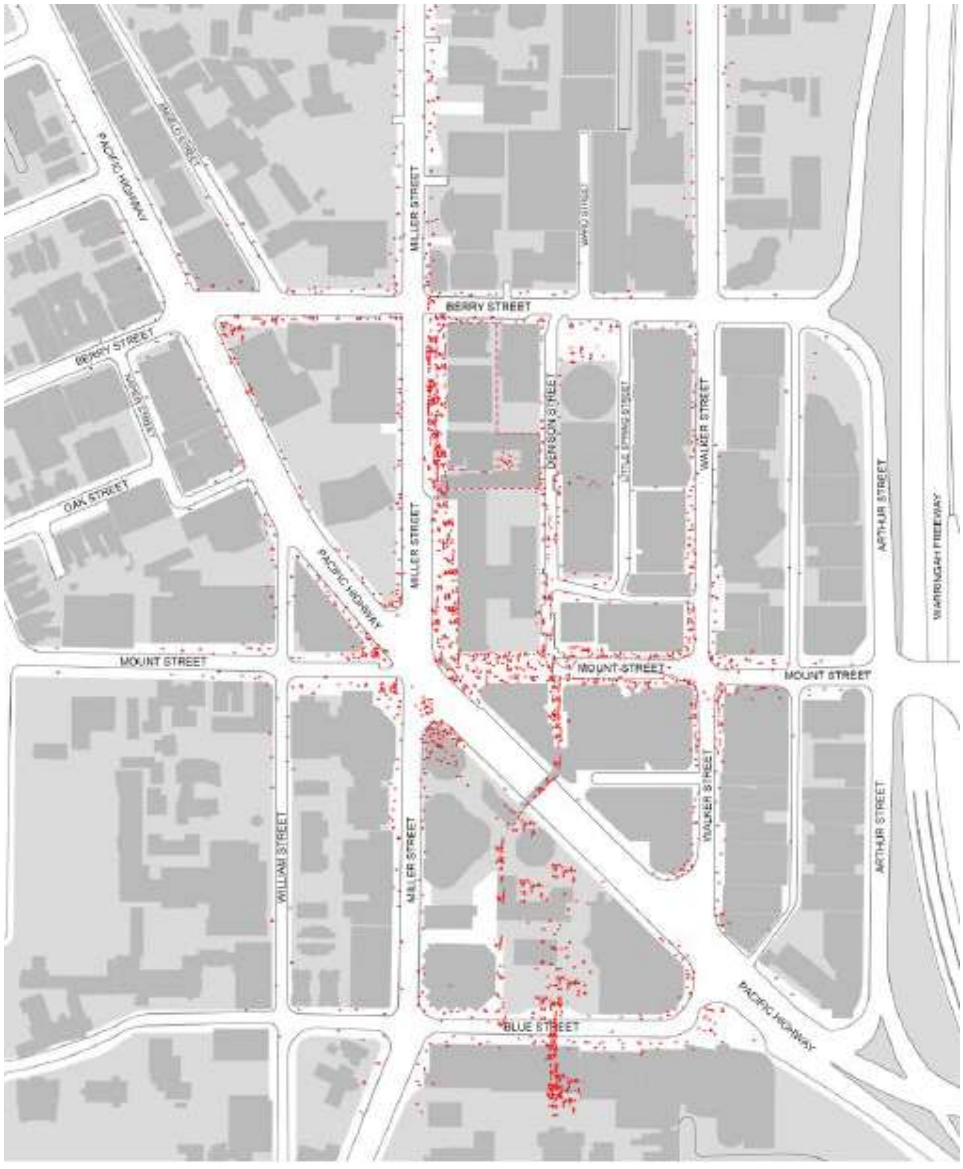
Figure 8 shows the extent of the site's walkable catchment within 15 minutes, assuming a walking speed of 4.8 kilometres per hour.



Source: PedCatch, run 8 May 2019

Figure 8 – Walkable catchment from site

Near the site, the key pedestrian desire lines are located along Pacific Highway, Miller Street, Denison Street, Mount Street and Walker Street, which are all used to access North Sydney Station and the main commercial land uses with North Sydney. Other key pedestrian generators within North Sydney include the educational precincts, west of the Pacific Highway and north of Berry Street and retail/ restaurants and cafes in Greenwood Plaza and along Mount and Walker streets. Figure 9 shows typical pedestrian movements in the area around the site at 9am on a weekday.



Source: Bates Smart, April 2019

Figure 9 – Observed existing pedestrian movements at 9am on a typical weekday

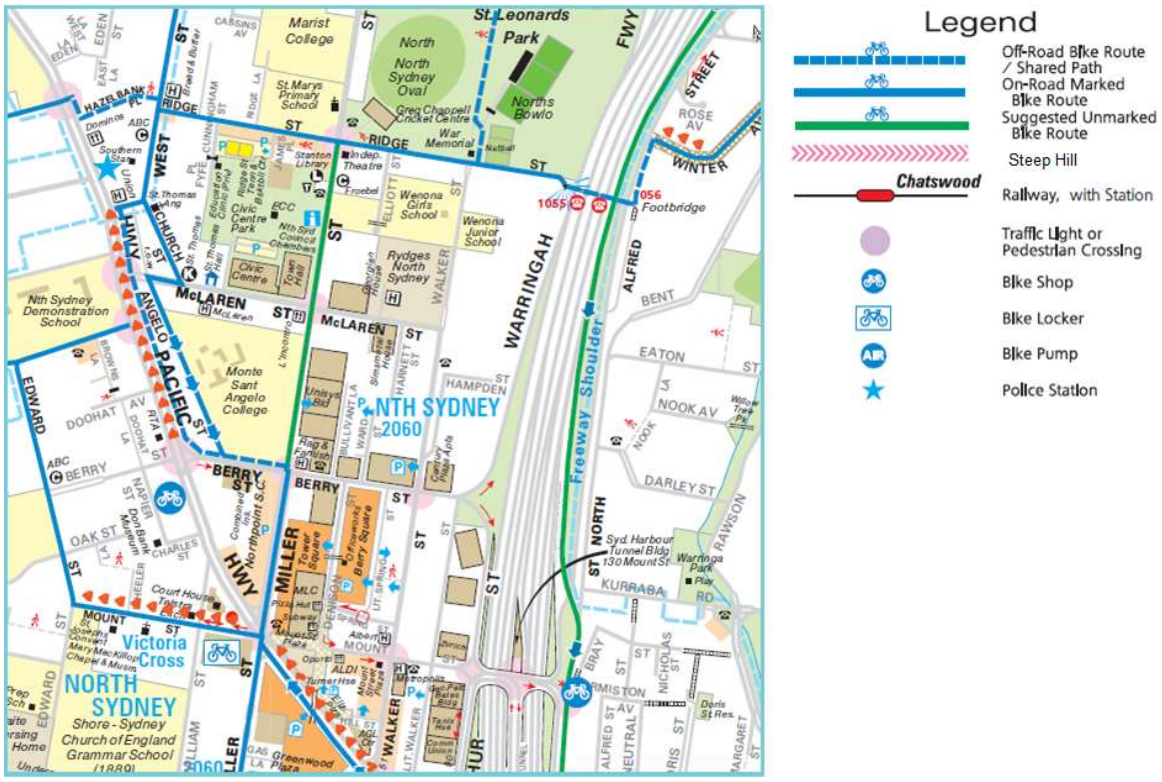
2.3 Cycle infrastructure

The site is situated within a central location in the North Sydney CBD and is served by the North Sydney bicycle network. The OSD site is ideally located to take advantage of the existing and planned cycleway facilities in North Sydney. The development would be located adjacent to designated on-road cycle routes along Miller Street and planned changes to the road and cycle networks.

Bicycle parking facilities such as O-rings, rails and enclosed lockers are available near the site for cyclists. Use of the secure enclosed lockers available on Mount Street is subject to Council approval,

however there is currently a waiting list of people seeking to use these lockers, indicating that the demand for secure bicycle parking is currently higher than the existing facilities.

Figure 10 illustrates the North Sydney cyclist network from the North Sydney Council website, accessed in April 2019.



Source: North Sydney Council, 2012

Figure 10 – North Sydney Cycling Map, 2012

2.3.1 Car share

Car share provides a convenient car rental option, particularly suitable to short periods, with vehicles available from on-street 'pods' or from within car parks for use by residents and local businesses. The North Sydney Council endorses car sharing services as a way to reduce vehicle ownership, which consequently reduces the demand for on-street parking spaces. Within the North Sydney Council area there are car share vehicles available on-street and in car parks, with around 3,500 resident members and 1,500 business members currently in the North Sydney Local Government Area (https://www.northsydney.nsw.gov.au/Transport_Parking/Walking_Transport/Car_Pool_Car_Share). GoGet, the longest established operator in Sydney offers a variety of membership options with hourly charges between $6 and $10.

Figure 11 shows the indicative car share vehicle pod locations in the area surrounding the Victoria Cross Sydney Metro Station OSD site. It can be seen from the map that there is convenient access to car share services within walking distance of the site, with GoGet providing the majority of car share vehicles within the surrounding area, followed by Car Next Door.

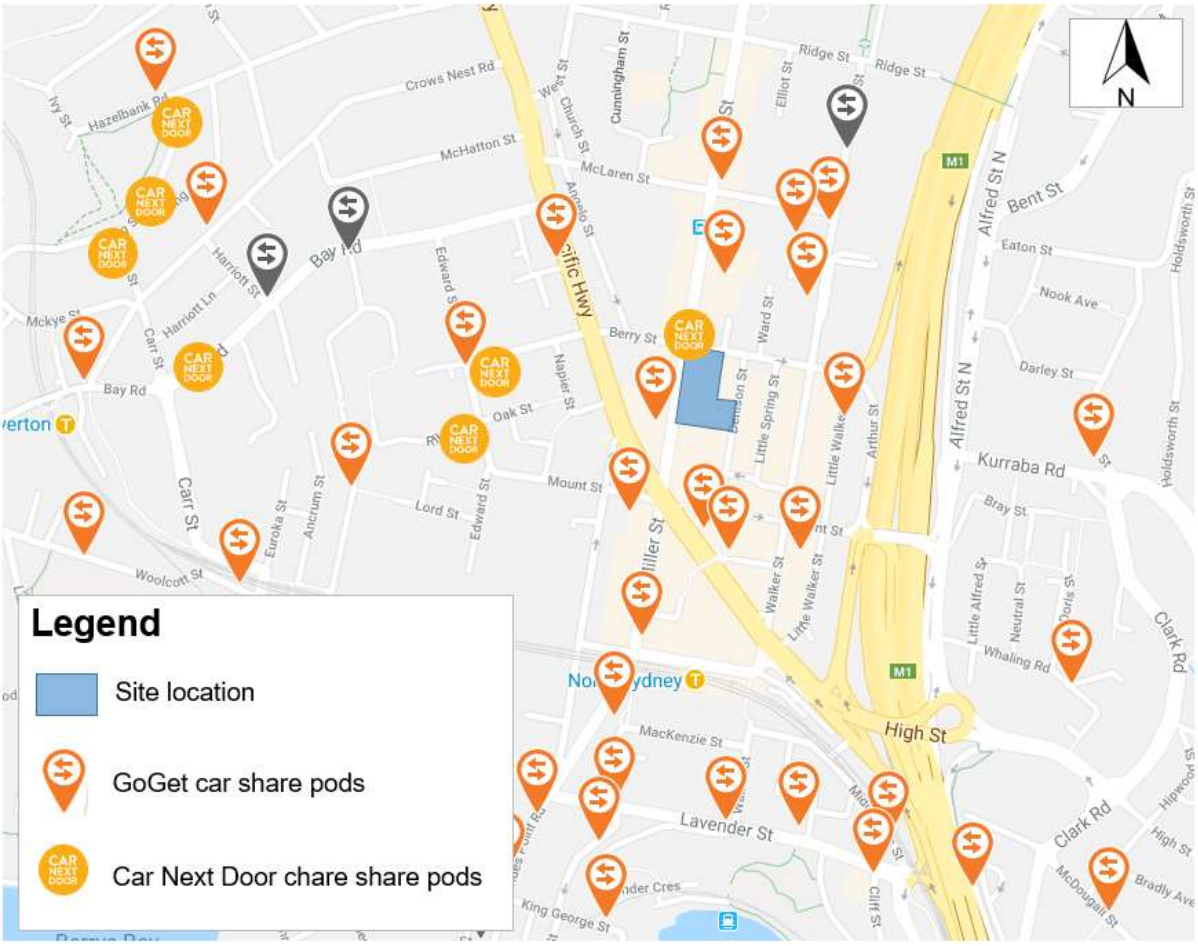


Figure 11 – Car share pods in North Sydney

2.4 North Sydney Council policy

The North Sydney Council promotes the use of sustainable transport modes through its policies, strategies and initiatives. These include, but are not limited to:

- Encouraging walking for transport in North Sydney by upgrading streetscapes and pedestrian amenities to improve walkability. North Sydney Council encourages the use of apps such as the Sydway Walker app, and has produced various recreational walking maps to engage the community
- Resident parking permits are issued by Council, with permit fees varying based on the environmental impact of the private vehicle being owned. This promotes sustainable private vehicle ownership, as lower fees are issued for smaller, low-fuel consumption vehicles
- Bicycle lockers and parking racks are provided at various key nodal points, to provide destination parking for bikes and to encourage the community to use bike travel for shorter trips of 5 kilometres or under

- The use of motorcycles has been promoted as a favourable alternative to single occupancy motor vehicles by Council (with preference to public and active transport modes). Council has actively increased motorbike parking spaces in the LGA by over 100 per cent since 2005, and is continuing to look for opportunities to expand the motorbike parking network
- Encouraging the use of car share programs as a sustainable, affordable and convenient transport option, and installing new car share spaces
- Replacing Council's fleet of trucks with hybrid models, each saving over 30 per cent in total fuel consumption
- The Make Your Move program, an initiative to encourage active travel as part of school children's daily commute to encourage an active lifestyle, better environmental outcomes and a reduction in school peak hour congestion.

3. Bicycle Parking Facility Provision

End of trip facilities and bicycle parking will be provided for employees of the new development in accordance with GBCA 6 Star Green Star requirements. Based on a regular occupant density of one person per 10 m2 (Lend Lease, 22 February 2019) and 7.5 per cent of staff use bicycles, the provisions for bicycle parking and end of trip facilities is summarised in Table .

Table 2 – Green Star bicycle requirements

Use	GFA (m^2)	Regular occupant density m^2/ person*	Regular occupants	Bicycle parking spaces	Lockers	Showers
Office	59,100	10	5,910	444	533	52
Retail	2,400	20	120	9	11	5
Total	**61,500**	**-**	**6,030**	**453**	**544**	**57**

The North Sydney DCP provides minimum bicycle parking and end-of-trip facility rates for a variety of land uses.

Table 3 – North Sydney Council DCP bicycle facility minimum requirements

Type	Rate		Minimum requirement		Total minimum requirement	Proposed provision
	Office (60,100 m^2)	Retail (1,400 m^2)	Office	Retail		
Occupants	1 space/ 150 m^2 GFA	1 space/ 25 m^2 GFA	394	96	457	453
Visitors	1 space/ 400 m^2 GFA	2 spaces + 1 space/ 100 m^2 GFA	148	26	174	Nil (visitor spaces to be provided in public realm)
Lockers	1 personal locker for each space		490*		490*	544

Type	Rate		Minimum requirement		Total minimum requirement	Proposed provision
	Office (60,100 m^2)	Retail (1,400 m^2)	Office	Retail		
Showers and change cubicles	2 showers and change cubicles for 11-20 or more spaces, plus 2 shower and change cubicles for each additional 20 spaces		49*		49*	57

Note:
*Excludes visitor spaces.

North Sydney Council's DCP requirements relating to bicycle parking and lockers are marginally higher than the requirements of the Green Star requirements however not so for showers. Given the site's accessibility to high-frequency public transport, the proposed provisions in accordance with the Green Star requirements are considered appropriate for the proposed development.

Class 2 secure bicycle parking spaces will be provided for the employees of the building while Class 3 bicycle racks for visitors and Metro users will be provided, which are easily accessible and clearly signposted.

In addition to the bicycle parking and end of trip facilities provided within the OSD, accessible bicycle storage will be provided within the site for up to five per cent of peak visitors at the following rates:

- One space for every 750 square metres of office spaces
- One space for every three square metres for retail space.

In summary a total number of 456 bicycle parking spaces will be provided and associated end of trip bicycle facilities for at least 7.5 percent of staff.

4. Green Travel Plan Measures

This section outlines potential opportunities and measures that can be taken to meet the objectives and targets of the GTP. The GTP will support the proposed estimated mode share detailed in the Traffic and Transport Impact Assessment (SMCSWSVO-LLC-SVC-TI-REP-000001). The proposed mode share for the site is based on BTS TZ 1953 and proposed adjustments are summarised in Table 2.

Table 2 – Proposed future mode share for the site

Mode	TZ 1953	Adjustment proposed	Proposed share for site
Train	48%	Adopt 55.5% to reflect introduction of Metro	55.5%
Bus	12.4%	Adopt minor increase to 16% with introduction of bus services along Western Harbour Tunnel, connecting with B-Line	16%
Ferry/ tram	0.4%	Maintain 0.4% for TZ 1953	0.4%
Car driver	26%	6,030 regular occupants on site (based on 10 m^2 per person) with provision of 161 parking spaces on site and use of some surrounding parking, adopt 10% for site	10%
Car passenger	3.2%	Maintain 3.2% for TZ 1953	3.2%
Walk only	6.4%	Maintain 6.4% for TZ 1953	6.4%
Mode not stated	1%	Maintain 1% for TZ 1953	1%
Other modes (including cycling)	2.6%	Adopt 7.5% to reflect 453 bicycle parking spaces on site for 6,030 regular occupants	7.5%
Total	100.00**%**		**100.00**%

4.1 General

General marketing and promotion of the availability and benefits of adopting sustainable travel options is highly important in meeting the objectives of this GTP.

Potential measures	Timeframe
Introduce a travel coordinator role as part of the building's management activities to execute the recommendations of this plan during the operation of the OSD	During operation
The provision of easily accessible travel information about available sustainable transport options and facilities, as well as useful mobile applications and travel information websites. This could potentially be incorporated into the building's management activities. A dedicated	During occupation

Potential measures	Timeframe
website could also be considered to provide a portal for travel information specific for the site	
As part of building management activities, recommendations can be made to tenants of the OSD that staff inductions provide information about sustainable travel options, and potentially a tour of the available bicycle parking and end-of-trip facilities	During operation
Monitor the mode share, use and demand of facilities to inform future updates of the GTP	During operation

4.2 Walking

North Sydney is considered a highly walkable neighbourhood due to the accessibility of public transport and locations required for daily errands. To ensure that tenants can benefit from the walkability of the area, the following measures should be implemented.

Potential measures	Timeframe
Inform potential tenants through marketing and leasing activities of the high walkability of the site to public transport hubs and entertainment centres	Prior to and during occupation
As part of building management activities, promote participation in events such as “National Walk to Work Day”	During operation
As part of building management activities, promote walking for short trips in lieu of using a private vehicle	During operation

4.3 Cycling

The proposed OSD above Victoria Cross Station is well situated to capitalise on the connections provided by the North Sydney bicycle network. In order to support the promotion of cycling as a mode of access to the development, the following measures should be implemented.

Potential measures	Timeframe
As part of building management activities, inform tenants of safe and accessible cycling routes as well as end-of-trip facilities provided by the building	Prior to and during occupation
As part of building management activities, ensure tenants are informed about the about bicycle parking access locations from both Denison Street and Miller Street	Prior to and during occupation

Potential measures	Timeframe
Provide effective internal wayfinding signage to direct tenants and visitors to bike lifts, bicycle parking and end-of-trip facilities	Prior to occupation
As part of building management activities, inform tenants of the presence of cycling clubs and bicycle user groups (BUGs) that may be lobbying for the improvement of cycle facilities in the surrounding area	Prior to and during occupation
Set up a 'Bike Buddies' scheme for less confident staff interested in cycling to work	During operation
Ensure the provided bicycle parking and end-of-trip facilities within the building are secure and maintained	During operation
Ongoing maintenance of end-of-trip facilities and security monitoring systems	During operation
Supply a communal bicycle repair toolkit for tenants	During operation
Promote bicycle share schemes and bicycle pooling schemes for tenants	During operation
Promote participation in events such as "Ride to Work Day" and "National Bike Week"	During operation
Partner with a local bicycle store to provide bicycle maintenance classes and discounted process	During operation

4.4 Public transport

The Sydney Metro and the North Shore railway at Victoria Cross and North Sydney stations, respectively, will provide a very high level of accessibility to the North Sydney area by train, and the bus stops on the Pacific Highway and Miller Street directly in front of the OSD, as well as bus interchange on Blue Street will provide good opportunities for other modes of access. The station and supporting intermodal facilities will create a highly accessible public transport precinct.

Combined with the existing public transport network surrounding the site, it is expected that the mode share to public transport for the site will increase on existing splits.

The proposed OSD is considered to offer high levels of public transport connectivity, especially due to its proximity to the Victoria Cross Metro Station, which would increase coverage and accessibility to the site by public transport due to new Sydney Metro links (Northwest and City and South West lines). Due to the introduction of new tenants, there exists an opportunity to achieve a greater public transport mode share for work trips through early marketing activities.

Potential measures	Timeframe
Inform tenants of the public transport stops in the surrounding area, as well as the expected walk times needed to access the locations. This could be potentially achieved through the provision of a map, and useful applications and travel information websites	Prior to and during occupation
Investigate the possibility of providing shared office Opal Cards for use during business journeys instead of private vehicle travel	During operation

4.5 Carpooling and car share

Carpooling or car share is considered to be a sustainable alternative to the single rider private vehicle. The following measures can be taken to promote the use of car share services to tenants of the building and reduce car ownership.

Potential measures	Timeframe
Promote the cost savings of car share over commuting via private vehicle to residents of the precinct through the tenant website.	During operation
Investigate partnership with GoGet or another provider to offer retail tenants and workers discounted membership options	During operation
Explore the possibility of allocating unleased car spaces within the underground off-street parking areas for car-sharing.	During operation

4.6 Car parking

No additional parking spaces have been proposed by the Sydney Metro Victoria Cross Station OSD concept design, therefore traffic generation will be mainly related to servicing and delivery trips. It is estimated that three per cent of staff will commute by car, resulting in a similar number of car trips during peak times compared to the existing situation.

Potential measures	Timeframe
Provide electric car charging stations within the site	Prior to occupation
Provide clear signage and wayfinding to electric car charging stations	Prior to occupation

4.7 Reducing network travel demand

High travel demand during the morning and afternoon work commuter peak hours produces significant congestion on road and rail networks. North Sydney Station is the fifth busiest station on the Sydney Trains network during the morning peak, experiencing large volumes of pedestrian traffic exiting the station. The following measures would help alleviate the network travel demand across a longer time period and in turn alleviate congestion on the network.

Potential measures	**Timeframe**
As part of building management activities, encouraging the use of office teleconferencing facilities as an alternative to face-to-face meetings to tenants of the building	During operation
Encouraging flexible working hours to tenants of the building, to arrive and leave work outside of peak hours or to work from home where feasible	During operation

5. Monitoring and Review

For this GTP to be effective, it should be reviewed on a regular basis to ensure that the objectives are being met. Travel surveys should be conducted, and the GTP should be updated annually to more effective achieve its goals.

5.1 Responsibility

To ensure the long-term success of implementing the recommendations outlined within this GTP, it is necessary to nominate a group to engage in continual monitoring and review of the various aspects of the plan. This can be achieved through the building management team, who could monitor travel patterns through ongoing travel surveys to assess the effectiveness of the GTP and carry out the initiatives outlined in this plan.

Senior management support from commercial tenants would be highly beneficial in achieving the objectives of this GTP, through providing support to changes and developments to policy documentation, allowing budget allocations for the implementation of measures and leading by example.

5.2 Travel surveys

The purpose of a travel survey is to understand the reasons for which commuters to and from the site select their preferred travel modes. In turn, this allows for more effective incentives and initiatives to be developed in increasing the mode share of sustainable travel options.

An example of a travel survey has been provided below.

Q1. What is your postcode? _____

Q2. How did you travel here today?

- ☐ *Walk only*
- ☐ *Bicycle*
- ☐ *Bus*
- ☐ *Train*
- ☐ *Ferry*
- ☐ *Combination of public transport*
- ☐ *Car driver*
- ☐ *Car passenger*
- ☐ *Other (please explain)* _____

Q3. If you did not arrive via public transport, why not? _____

6. Conclusion

The Sydney Metro Victoria Cross Over Station Development is centrally located in a commercial area within the North Sydney CBD, with high quality end of trip facilities and convenient access to a wide range of public transport modes.

To ensure that the new commuter trips generated by the OSD contribute towards reaching the green travel targets outlined in this GTP, it is necessary to undertake green travel initiatives such as providing information and promoting the benefits of sustainable travel options to new tenants. This GTP will contribute towards improved social and personal health of the commuters to the development site, as well as improved environmental outcomes.

Appendix C: Framework CPTMP

Victoria Cross Over Station Development

Draft Construction Pedestrian and Traffic Management Plan

Prepared for:

Lendlease

26 August 2019

The Transport Planning Partnership

Victoria Cross Over Station Development

Draft Construction Pedestrian and Traffic Management Plan

Client: Lendlease

Version: V01

Date: 26 August 2019

TTPP Reference: 19104

Quality Record

Version	Date	Prepared by	Reviewed by	Approved by	Signature
V01	26/08/19	Santi Botross	Wayne Johnson	Wayne Johnson	

Table of Contents

Tables

Figures

APPENDICES

1 Introduction

1.1 Background

This report has been prepared to accompany a detailed State Significant Development (SSD) development application (DA) for a commercial mixed-use Over Station Development (OSD) above the new Sydney Metro Victoria Cross Station. The detailed SSD DA is consistent with the Concept Approval (SSD 17_8874) granted for the maximum building envelope on the site, as proposed to be modified.

The Minister for Planning, or their delegate, is the consent authority for the SSD DA and this application is lodged with the NSW Department of Planning, Industry and Environment (NSW DPIE) for assessment.

This draft Construction Pedestrian and Traffic Management Plan (CPTMP) report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 6 May 2019. Specifically, this report has been prepared to respond to Condition 8 of the SEARs:

- *provide a draft Construction Pedestrian and Traffic Management Plan to demonstrate the proposed management of impacts during construction.*

Table 1.1 lists the requirements of the consent condition and the corresponding sections of the CPTMP where they are addressed.

Table 1.1: Conditions of Consent – Condition No. 8

Condition 8	Addressed in
The EIS shall provide a draft Construction Pedestrian and Traffic Management Plan to demonstrate the proposed management of impacts during construction. The Plan shall include: • *vehicle routes, peak hour and daily truck movements, hours of operation, access arrangements (including swept path analysis) and traffic control measures for all demolition/construction activities including management of light commercial vehicles attending the site*	Chapter 5 and Appendix A
• *an assessment of road safety at key intersections and locations subject to pedestrian / vehicle / bicycle conflicts*	Chapter 5
• *details of temporary cycling and pedestrian access and end of trip facilities during construction*	Section 2.9 and 2.10
• *an assessment of the impacts associated with any required road / lane closures and diversions, on bus and 'point to point' transport, pedestrian and cycle movement, and taking into account other construction activities within the precinct, and other stations along the Sydney Metro City and Southwest.*	Section 3.2, 3.3 and 3.4

The detailed SSD DA seeks development consent for:

- Construction of a new commercial office tower with a maximum building height of RL 230 or 168 metres (approximately 42 storeys).
- The commercial tower includes a maximum GFA of approximately 61,500m^2, excluding floor space approved in the CSSI.
- Integration with the approved CSSI proposal including though not limited to:
    - Structures, mechanical and electronic systems, and services; and
    - Vertical transfers;
- Use of spaces within the CSSI 'metro box' building envelope for the purposes of:
    - Retail tenancies;
    - Commercial office lobbies and space;
    - 161 car parking spaces within the basement for the purposes of the commercial office and retail use;
    - End of trip facilities; and
    - Loading and services access.
- Utilities and services provision.
- Signage locations (building identification signs).
- Stratum subdivision (staged).

1.2 Site Description

The site is generally described as 155-167 Miller Street, 181 Miller Street, 187-189 Miller Street, and part of 65 Berry Street, North Sydney (the site). The site occupies various addresses/allotments and is legally described as follows and as shown in Figure 1.1:

- 155-167 Miller Street (SP 35644) (which incorporates lots 40 and 41 of Strata Plan 81092 and lots 37, 38 and 39 of Strata Plan 79612)
- 181 Miller Street (Lot 15/DP 69345, Lot 1 & 2/DP 123056, Lot 10/DP 70667)
- 187 Miller Street (Lot A/DP 160018)
- 189 Miller Street (Lot 1/DP 633088)
- Formerly part 65 Berry Street (Lot 1/DP 1230458).

Figure 1.1: Site Aerial

Source: Lendlease, dated 17/08/2019

Sydney Metro is Australia's biggest public transport project. Services started in May 2019 in the city's North West with a train every four minutes in the peak. Metro rail will be extended into the CBD and beyond to Bankstown in 2024. There will be new metro railway stations underground at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street, Waterloo and new metro platforms under Central.

In 2024, Sydney will have 31 metro railway stations and a 66 km standalone metro railway system – the biggest urban rail project in Australian history. There will be ultimate capacity for a metro train every two minutes in each direction under the Sydney city centre. The Sydney Metro project is illustrated in the Figure below.

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham project as a Critical State Significant Infrastructure project (reference SSI 15_7400) (CSSI Approval). The terms of the CSSI Approval includes all works required to construct the Sydney Metro Victoria Cross Station, including the demolition of existing buildings and structures on both sites. The CSSI Approval also includes construction of below and above ground improvements with the metro station structure for appropriate integration with the OSD.

With regards to CSSI related works, any changes to the "metro box envelope" and public domain will be pursued in satisfaction of the CSSI conditions of approval and do not form part of the scope of the detailed SSD DA for the OSD.

1.3 Road Network

The road network surrounding the subject site is described herein.

Pacific Highway is an RMS classified State Road and runs northwest to southeast within proximity of the site. The highway has six lanes, three in each direction, and a carriageway width of 20m. Pacific Highway connects with Warringah Freeway southeast of the site. The sign-posted speed limit is 60 km/h.

Warringah Freeway, Bradfield Highway and Cahill Expressway are all RMS classified state roads and form a cluster of roads which run in a north-south direction, east of the site. The roads combine to provide connections between Sydney's north and the CBD across Sydney Harbour Bridge.

Miller Street is a regional road and fronts the site to the west. It is a four-lane street with two lanes in the north and south directions. Miller Street is located within a 40 km/h High Pedestrian Activity Area. A clearway is in operation for the southbound carriageway between 6:00am-10:00am and for the northbound carriageway between 3:00pm-7:00pm. Restricted on-street parking is permitted at other times. A bus stop is located on the east side of Miller Street (Stop ID: 206085), between the site and Pacific Highway.

Berry Street is a local street with one-way traffic flow in the westbound direction. It forms the northern boundary of the site. Restricted on-street parking is provided on both sides of the street. It has a posted speed limit of 40 km/h.

Denison Street is a local street located on the eastern boundary of the site. It is one-way southbound between Spring Street and Mount Street, and one-way northbound between Spring Street and Berry Street. The southern half of the street is signposted as a 10 km/h Shared Zone. Restricted on-street parking is provided on both sides of the street.

In the vicinity of the site, there is a 40 km/h School Zone on Berry Street and Miller Street which operates Monday to Friday between 8:00am-9:30am and 2:30pm-4:00pm.

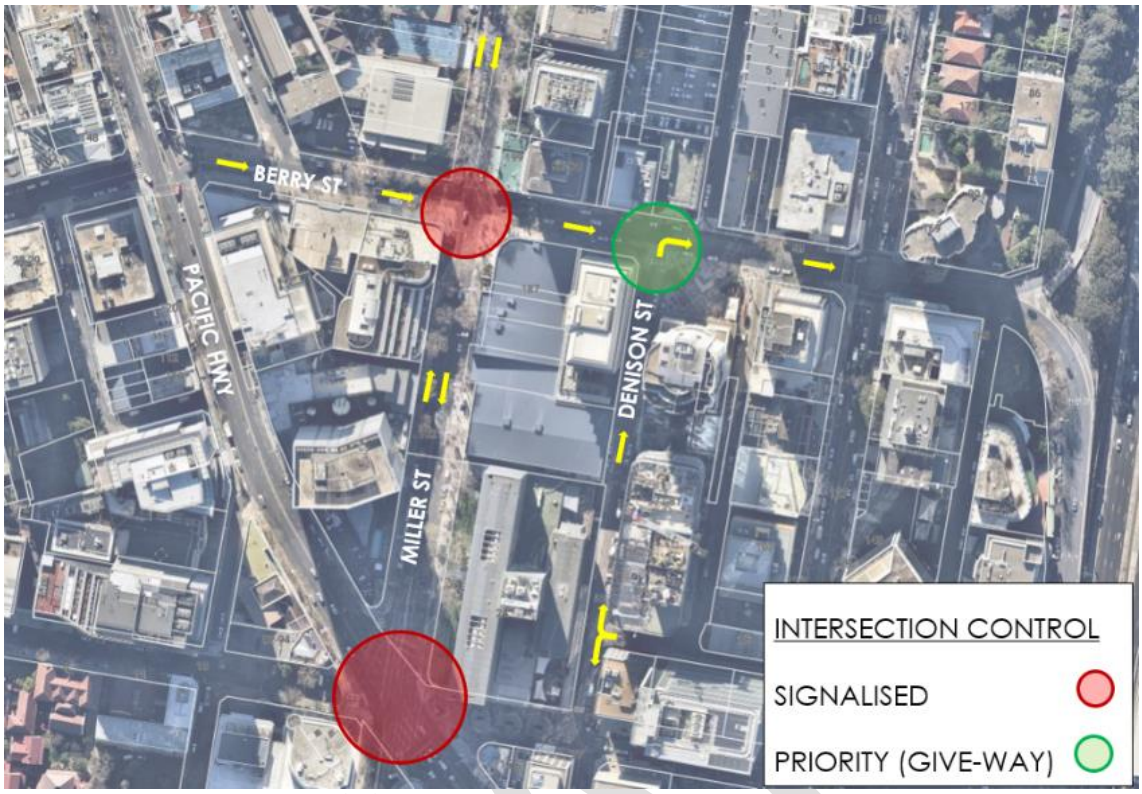
1.4 Surrounding Intersections

Key intersections in the vicinity of the site include the following junctions:

- Berry Street with Miller Street (signalised control)
- Berry Street with Denison Street (priority control – give-way)
- Miller Street with Pacific Highway (signalised control).

The location of these intersections in relation to the subject site are shown in Figure 1.2.

Figure 1.2: Surrounding Intersections



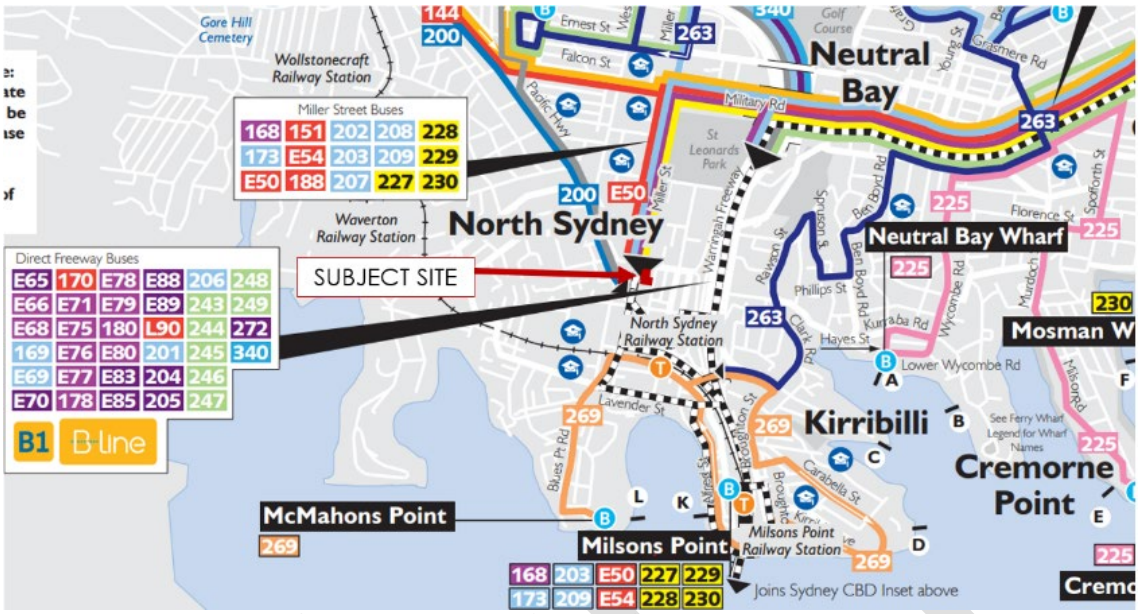
Basemap Source: Nearmap, aerial imagery dated 01/07/2019

1.5 Public Transport

Bus Services

The surrounding road network is served by a number of bus routes operated by State Transit Authority. Regular services are provided with a frequency of 10–20 minutes for each service during AM and PM peak periods. Bus routes in the vicinity of the site are shown in Figure 1.3.

Figure 1.3: Existing Bus Network



Basemap Source: Transport for New South Wales, viewed online 17/06/2019

Train Services

The closest train station is North Sydney station. It is accessed off Blue Street, approximately 450m from the site. North Sydney station services the following lines:

- T1 – North Shore & Western Line
- T9 – Northern Line
- CCN – Central Coast & Newcastle Line.

In peak periods, services between North Sydney station and Central station run every three minutes. During off-peak periods, train services run every 5-10 minutes.

Taxi Services

The nearest taxi set-down/pick-up space is located on the east side of Miller Street along the site frontage.

1.6 Pedestrian and Cycle Infrastructure

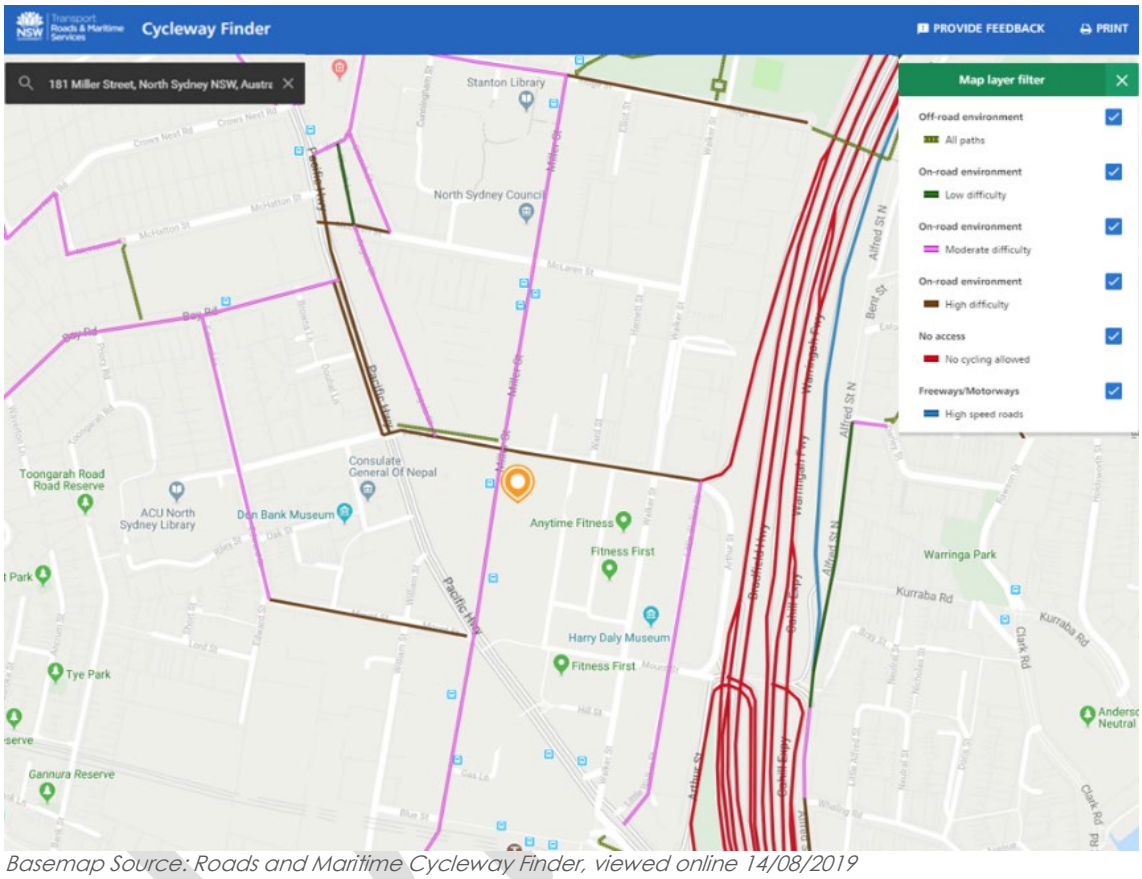
A well-established footpath network surrounds the site, with pathways provided on both sides of all nearby streets. Footpaths that surround the site provide a good level of connectivity to nearby bus stops and North Sydney station.

Hoarding would be provided along the site perimeter as A-Class on Denison Street and B-Class on Berry Street and Miller Street. Beneath B-Class hoardings, the footpath width would be 2.4m. Denison Street is a 10 km/h Shared Zone which will continue to operate as such.

Pedestrian crossing facilities are provided at all nearby signalised intersections, with marked foot crossings provided on most intersection approaches. A continuous footpath treatment is located across Denison Street at the northern end (near Berry Street).

Mixed-traffic cycling is permitted on Miller Street and Berry Street. On the north side of Berry Street, between Pacific Highway and Miller Street, there is a short shared path. Provision of cycling facilities within the vicinity of the site are shown in Figure 1.4.

Figure 1.4: Existing Bicycle Network



Basemap Source: Roads and Maritime Cycleway Finder, viewed online 14/08/2019

2 Overview of Construction Activities

2.1 Description of Works

The OSD is proposed above the new Victoria Cross Sydney Metro Station. The site would have 61,500 m^2 GFA of commercial tower, excluding floor space approved in the Victoria Cross Metro Station ISD. The ISD includes approximately 2,500 m^2 GFA for station retail. This CPTMP covers details of the construction works associated with the OSD development only.

The site perimeter would be boarded by A-Class hoarding on Denison Street and B-Class hoarding on Berry and Miller Street. A construction vehicle access driveway would be provided off Miller Street, south of the work zone. A vehicular driveway would be located off Denison Street providing access to the B1 loading dock of the tower carpark.

Construction works as part of the OSD would include the following:

- Completion of the 42 storey Commercial Tower including
  - Base Build fitout of the 35 Commercial Floor
  - Commissioning of a Mid- & High-Rise Plantroom
  - L29 outdoor terrace.

2.2 Duration and Staging of Works

Construction works are to be carried-out over a duration of 20 months, with some overlap of phases. The key construction stages are summarised in Table 2.1.

Table 2.1: Construction Staging and Duration

Stage	Description of Works	Duration
1	Structure	15 Months
2	Façade	12 Months
3	Fitout	15 Months
4	Commissioning	3 Months
Total		**20 Months**

2.3 Construction Vehicle Types

The proposed construction activities are likely to utilise the vehicles as follows:

- 19m Semi-trailers (Drop deck and Standards)
- 19m Truck and Dog
- Small rigid vehicles (vans, utes) and medium rigid trucks (9.4m in length)
- 12m Hiab crane truck
- 10m Bin trucks.

2.4 Work Hours

Unless otherwise approved, construction activities shall be undertaken during the following periods:

- 7am to 5pm Monday to Friday
- 8am to 1pm Saturdays.

No work shall be undertaken on Sunday and public holidays.

2.5 Work Zone

As per the earlier Victoria Cross Metro Station ISD construction works, a work zone would continue to be implemented on Miller Street at the site frontage. The work zone would be approximately 60m in length from the southern site boundary and would be located off the roadway, maintaining two trafficable lanes at all times. The work zone would result in the removal or relocation of six restricted kerbside parking spaces, one taxi space, trees and streetlight poles.

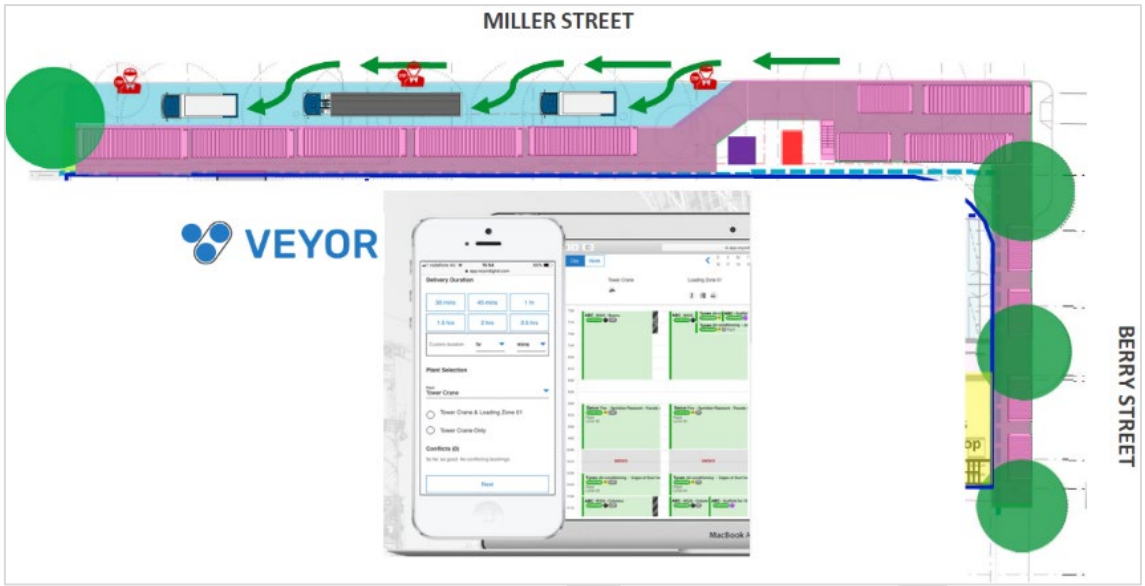
The work zone would be able to accommodate up to one 19m semi-trailer truck (or 19.6m Truck and Dog) plus two 9.4m rigid vehicles at one time. Loading/ unloading via the crane or forklift would be undertaken using the work zone while concrete pumping activities would occur within the site premises.

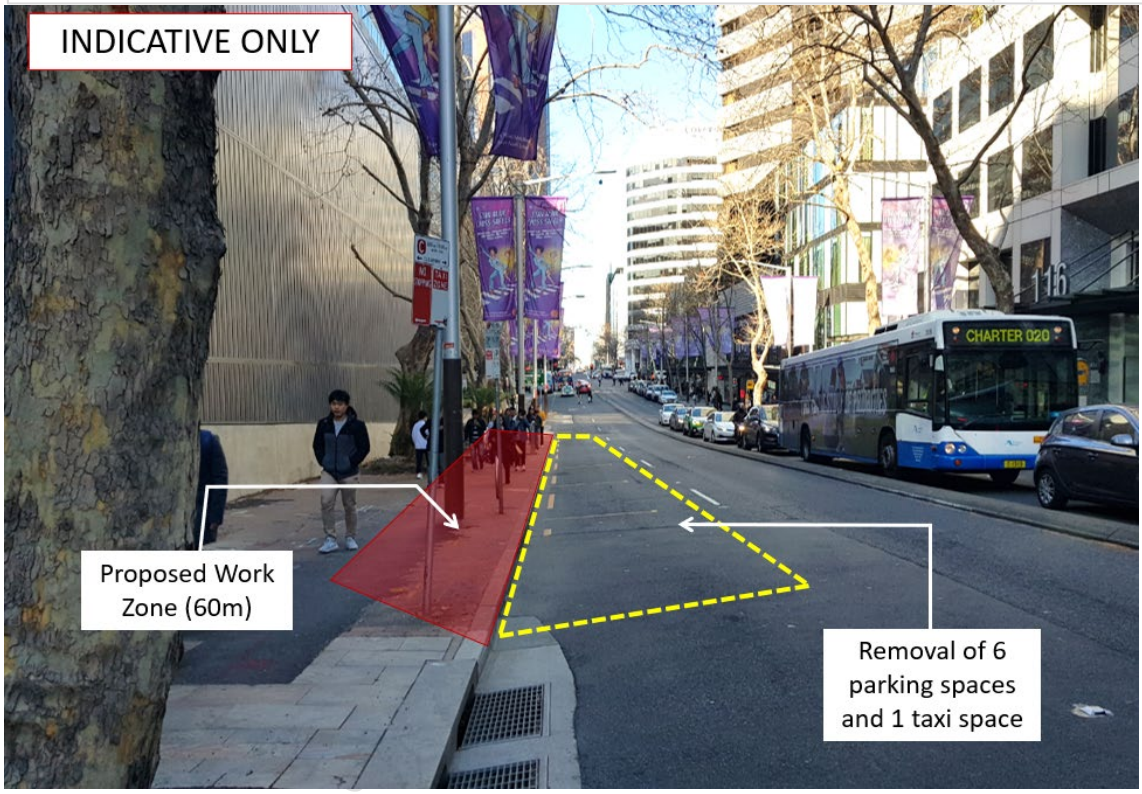
Removable bollards would be installed along the western edge of the work zone and removed as access is required. The work zone would be operated by traffic controllers stationed on Miller Street as shown in Figure 2.1.

Mobile application, Veyor (or similar), would be utilised by site management as a planning tool for scheduling deliveries and utilisation of the work zone and on-site loading spaces.

A swept path analysis of ingress and egress movements at the work zone has been undertaken for the 9.4m rigid truck and 19m semi-trailer truck. The swept path of a 19.6m Truck and Dog accessing the work zone has also been shown. The swept path analysis indicates that turning movements for these vehicles could be adequately accommodated. Swept path plans have been include in Appendix A of this report.

Figure 2.1: Proposed Work Zone





2.6 Vehicular Access

As per the earlier Victoria Cross Metro Station ISD construction works, a construction vehicle access driveway would be provided off Miller Street south of the work zone. The driveway measuring 10.8m in width would provide access for concrete trucks into the site. The driveway would be able to accommodate ingress and egress movements for concrete trucks measuring 8.7m long. A traffic controller would be stationed at the Miller Street access driveway to manage truck movements, general traffic movements and pedestrian movements.

The swept path analysis for concrete truck movements at the construction site access driveway is provided in Appendix A of this report.

A vehicular driveway would be located off Denison Street providing access to the B1 loading dock of the tower carpark. The driveway would be 8m in width and would be used by delivery vans (i.e. small rigid vehicles up to 6.4m in length). The B1 loading dock would have a headroom clearance of 4.8m which would satisfactorily accommodate small rigid vehicles.

A swept path analysis of ingress and egress movements at the construction access driveway has been undertaken for the 8.7m concrete truck. The swept path analysis indicates that turning movements for this vehicle could be sufficiently accommodated. Swept path plans have been include in Appendix A of this report.

2.7 Workforce

During the peak period of construction works there would be a workforce of approximately 500 staff. During all other phases of the project, the number of staff would be estimated to be in the order of 300 employees on average.

2.8 Construction Staff Parking

On-site parking would not be provided for employees working on the project. Staff would be encouraged to use public transport when travelling to/from the site, hence minimising traffic impacts on the surrounding road network.

All vehicles associated with the site would be parked wholly within the site or the work zone while conducting deliveries.

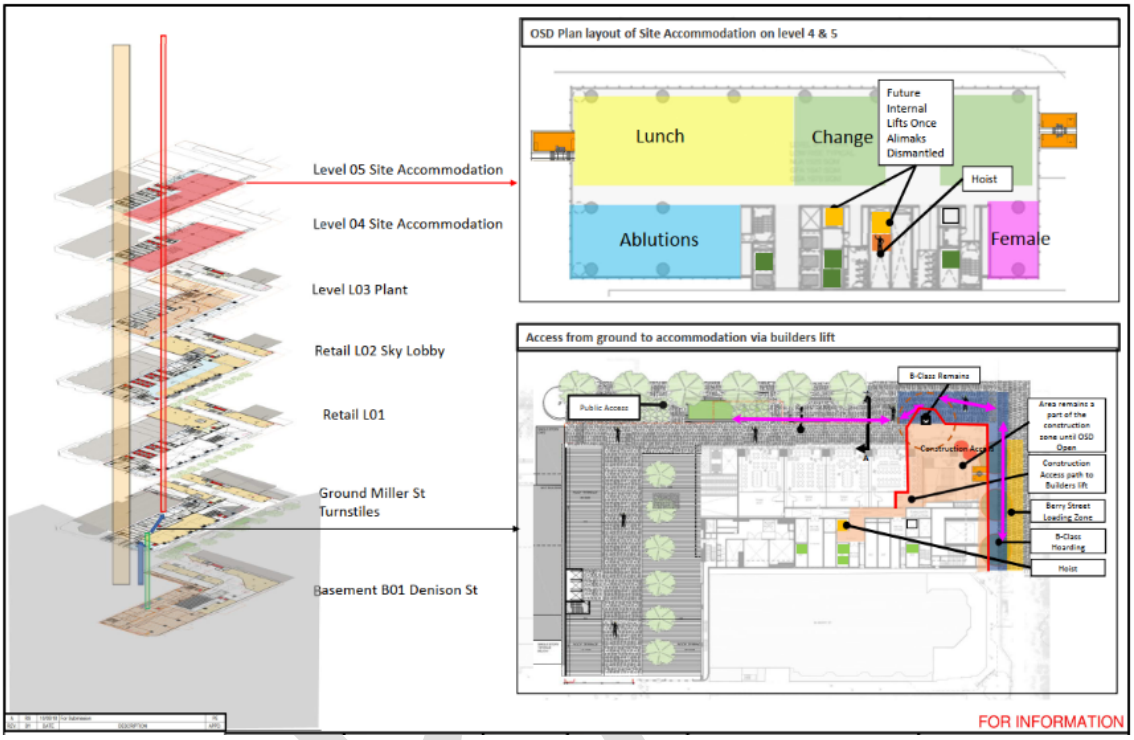
2.9 Pedestrian and Cyclist Site Access

Pedestrian site access for the OSD will continue to operate as per the Victoria Cross Metro Station ISD construction works via turnstiles located on the corner of Miller Street-Berry Street and a second access off Denison Street. Cyclists would access the site via the driveway off Denison Street which is to be used by small rigid vehicles only (i.e. delivery vans). Cyclists would be required to dismount upon entering the driveway.

2.10 Construction Site Facilities

End of trip facilities, including secure bicycle storage spaces, showers and changerooms would be located initially on Level B2 of the basement carpark and footpath gantries. Facilities would then be relocated to Levels 5 and 6 of the building as shown in Figure 2.2.

Figure 2.2: Site Accommodation



Source: Lendlease, dated 17/08/2019

2.11 Site Access and Haul Routes

Normally, construction vehicles would have origins and destinations from various areas across the Greater Sydney region. Current designated heavy vehicle routes to the site would be utilised by construction vehicles travelling from surrounding areas. The arrival and departure haul routes are as follows and as shown in Figure 2.3:

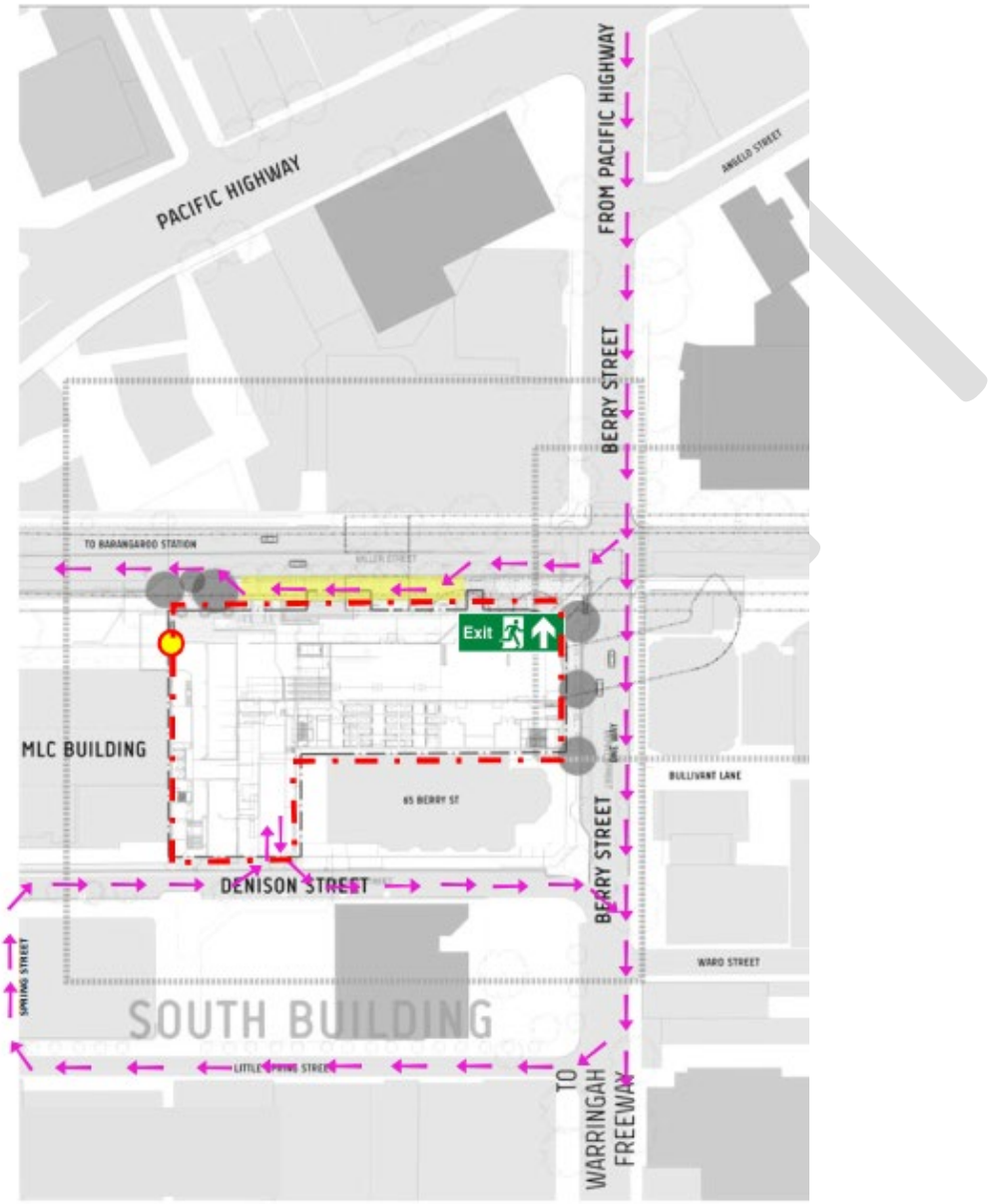
Arrival Routes:

- To access work zone - From Pacific Highway, left/ right onto Berry Street, right onto Miller Street, and left into work zone.
- To access B1 Loading Dock – From Pacific Highway, left/ right onto Berry Street, right onto Little Spring Street, right onto Spring Street, right onto Denison Street, and left into the site.

Departure Routes:

- From work zone – Head southbound on Miller Street, left onto Pacific Highway, left onto Arthur Street and continue onto Warringah Freeway.
- From B1 Loading Dock – Head northbound on Denison Street, right onto Berry Street and continue onto Warringah Freeway.

Figure 2.3: Construction Vehicle Haul Routes



Source: Lendlease, dated 17/08/2019

The largest construction vehicles anticipated to travel to the site via the haul routes would be a 19m semi-trailer truck and 19.6m Truck and Dog. These types of vehicles are permitted access on the roads which form the haul route.

3 Construction Traffic Impact Assessment

3.1 General Traffic Generation

Construction traffic generation is based on the construction works as described in Section 2. The estimated traffic movements associated with each stage of the construction works are summarised in Figure 3.1.

Figure 3.1: Summary of Construction Traffic Movements

Stage	Truck Movements																					
	2022								2023													
	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December		
1. Structure	10	10	10	10	10	12	10	10	10	10	10	10	10	10	10	10						
2. Façade					4	4	4	4	4	4	4	4	4	4	4	4	4					
3. Fitout				14	14	14	14	14	14	16	16	16	14	14	16	12	14	14	14			
4. Commissioning																		2	2	4		
Average Daily Truck Movements	**10**	**10**	**10**	**24**	**28**	**30**	**28**	**28**	**28**	**30**	**30**	**30**	**28**	**28**	**30**	**26**	**18**	**16**	**16**	**4**		
Peak Hourly Truck Movements	**1**	**1**	**1**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**2**	**<1**		

During the busiest period of the construction works there would be approximately 30 truck movements per day. On average, this equates to three truck movements per hour across a 10-hour workday which would have a minor impact on the adjacent road network.

3.2 Cumulative Traffic Generation

Other known major construction projects in the vicinity of the site are expected to be completed before the commencement of OSD construction works. These projects and their anticipated completion dates are as follows:

Project	Description	Completion
▪ No.1 Denison Street	37-level commercial office tower	in 2020
▪ 88 Walker Street	48-storey hotel and commercial tower	September 2021
▪ Victoria Cross ISD	Sydney Metro North and South Site station developments	August 2022

Other concurrent construction projects that become apparent leading up to the works would be assessed in the final CPTMP report.

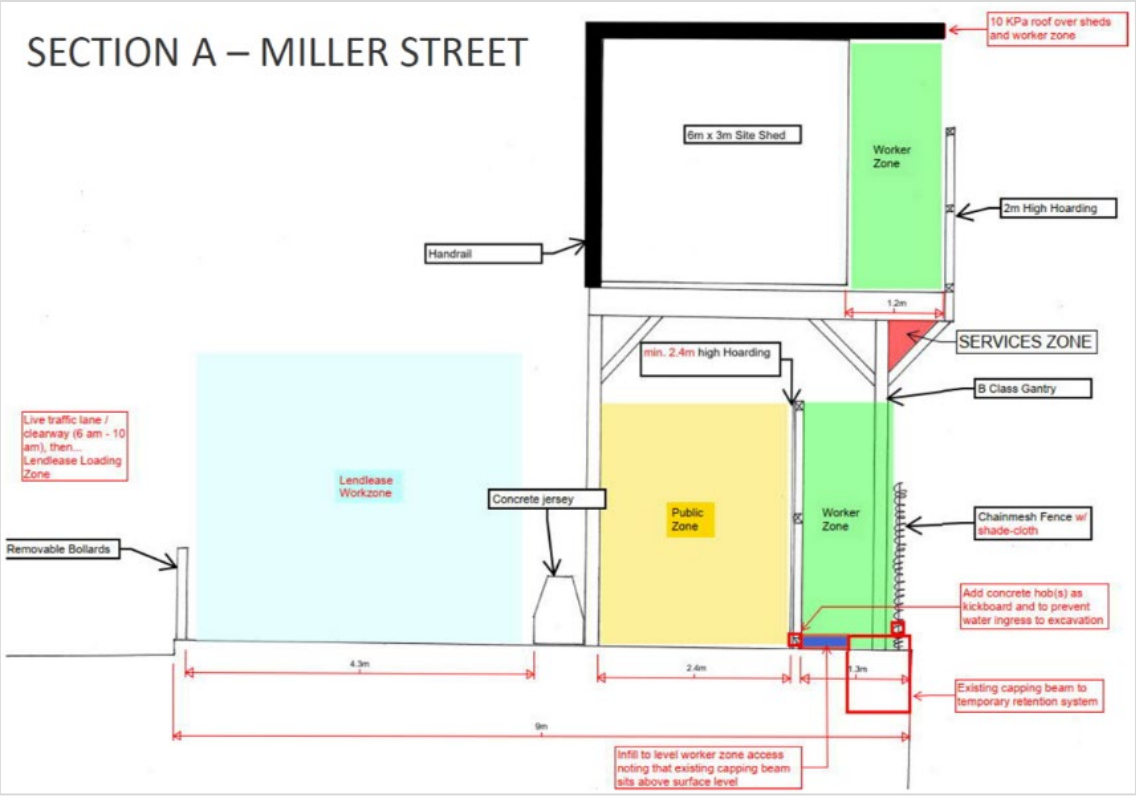
3.3 Public Pedestrian and Cycle Access

A-Class hoarding is proposed along the site boundary on Denison Street which will provide separation of the construction site and the pedestrian walkway. Concertina gates would be used by the traffic controller on both sides of the site access driveway to separate pedestrian and vehicle movements at the driveway. The traffic controller would draw concertina gates to temporarily halt pedestrians until after the construction truck has completed the required turning manoeuvre.

B-Class hoarding would be in place on Berry Street and Miller Street which would provide overhead protection for pedestrians. An indicative cross-section of Miller Street, indicating the work zone, B-Class hoarding and public walkway arrangement, is provided in Figure 3.2.

There would be no changes to existing cycle routes in the vicinity. Truck drivers shall be aware of the presence of cyclists on Berry Street and Miller Street.

Figure 3.2: Miller Street Cross-Section



Source: Lendlease, dated 17/08/2019

3.4 Public Transport

The proposed work zone would be located north of the existing bus stop on Miller Street, and would not extend into the bus stop or interrupt bus operation. Traffic controllers would be stationed at the work zone to facilitate trucks immediately upon arrival as well as assist truck drivers in finding suitable gaps in traffic flow on Miller Street when exiting the work zone.

Upon exit, traffic controllers must prioritise general traffic on the road network including buses therefore avoiding any conflicts between trucks and bus (and general traffic) movements.

'Point to point' transport considers taxis, rideshare and hire cars. The proposed work zone would result in the removal of six car parking spaces and one taxi space. Taxis would be able to utilise existing kerbside space on surroundings streets to set-down and pick-up passengers where it is permitted, unrestricted parking spaces, loading zones and within clearways. Therefore, the removal of the taxi zone space would not have a major impact.

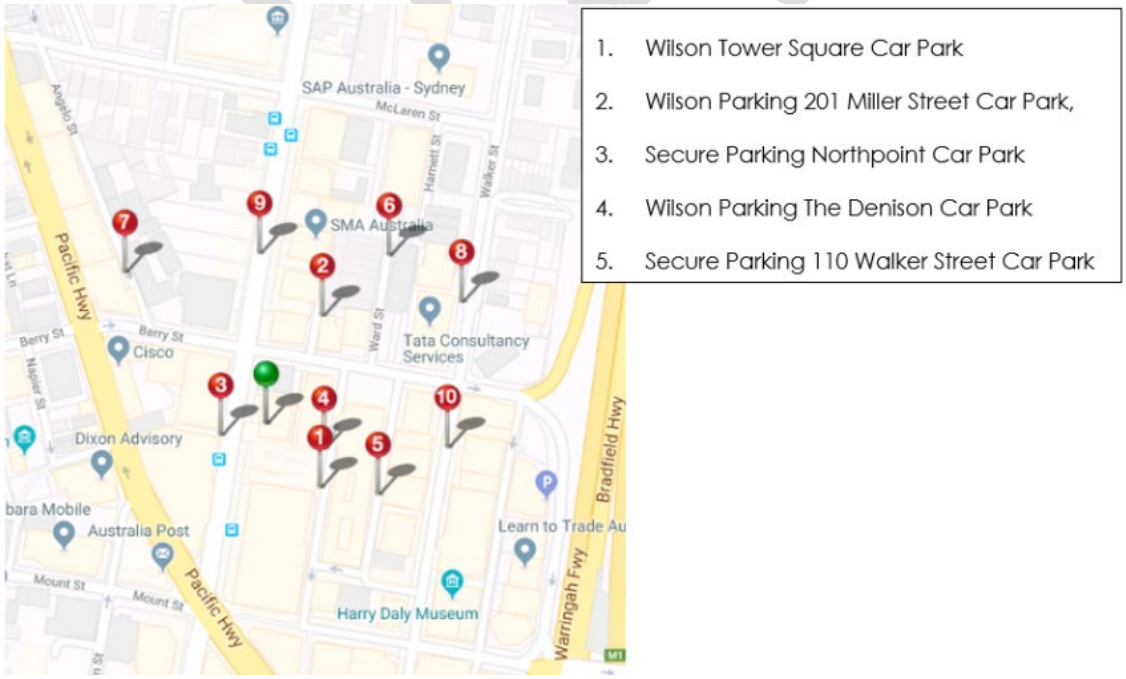
Rideshare drivers are not permitted to stop in taxi zones, and therefore, would continue to stop/park lawfully in unrestricted spaces. There is plenty of on-street parking nearby to the site that can be utilised by rideshare vehicles which will absorb the impact of the removal of Miller Street kerbside parking.

Overall, the proposed construction activities would not impact on public transport and point to point transport in the vicinity of the site.

3.5 Car Parking

In order to accommodate the Miller Street work zone, it is proposed to remove six on-street parking spaces. There is an abundance of parking availability provided as kerbside parking and in public car parks within short walking distance of the site, as shown in Figure 3.3. Hence, the impact due to the removal of these parking spaces would be minor.

Figure 3.3: Nearby Public Car Parks



4 Mitigation Measures

4.1 Construction Traffic Management Measures

The effective management of traffic and the provision of a safe road environment are paramount to the success of this development. General measures that can be applied to minimise traffic disruptions are detailed herein.

Table 4.1: Management and Mitigation Measures

Management & Mitigation Measures	Person Responsible
Designated heavy vehicle routes would be nominated and monitored to minimise impacts on the road network and vehicle kilometres travelled. These routes would be communicated to truck drivers through site induction and induction documentation.	Construction Manager & Site Supervisor
Transportation of construction materials would be managed to maximise vehicle loads and minimise vehicle movements, where practicable.	Site Supervisor
All traffic control plans shall comply with AS1742.3:2002 Traffic Control Devices for Works on Roads and Roads and Maritime's Traffic Control at Work Sites.	Environmental Officer & Construction Manager
Clean-up crews, including street sweepers, would be used to manage material spills.	Site Supervisor
All loads would be covered prior to leaving site, except loads carrying metals (steel reinforcement, heavy steel, etc.)	Site Supervisor
No queuing or parking shall be permitted in any public road. Drivers shall be informed of access arrangements to the Miller Street work zone and B1 loading zone through site induction and induction documentation.	Site Supervisor
Appropriate advanced warning signage would be installed on approach to the site to inform motorists of heavy vehicles turning in/out of the site access driveway.	Construction Manager & Site Supervisor

4.2 Traffic Control Plan

A site-specific traffic control plan (TCP) has been prepared and included in Appendix B. A brief description of the TCP is provided below:

- Advisory road signage would be installed to inform motorists on Denison Street, Berry Street and Miller Street of construction vehicles turning into and out of site access driveways and work zone. This signage is to be temporarily fixed 50m on approach to the access driveways and work zone.
- Advisory signage would be installed to inform construction staff who cycle to work to dismount their bicycle upon entering the driveway off Denison Street.
- Two (2) traffic controllers would be located at the Miller Street work zone to manage truck ingress and egress movements on Miller Street. Removable bollards would be installed along the western edge of the work zone and removed as access is required.
- An additional traffic controller would be located at the Miller Street construction site access to manage the interaction of pedestrian movements on the footpath and concrete truck movements to/from the site. Concertina gates would be used to halt pedestrians on the footpath momentarily whilst concrete trucks turn into and out of the construction access driveway.

- One (1) site personnel would be stationed at the access driveway off Denison Street to manage small delivery vehicle movements and construction staff cyclist movements to/from the site.

All advisory road signage shall be installed in accordance with AS1742.3 Manual of uniform traffic control devices – Traffic control devices for works on roads and the RMS Traffic Control at Worksites Manual. Signs shall be installed and maintained throughout the construction period.

4.3 Vehicle Access

All vehicles would enter and exit the work zone and site access driveways in a forward direction. Vehicles would not be required to reverse into the site as there is sufficient space to circulate internally and exit in a forward direction.

Construction vehicles shall radio/ call the site office on approach to the site to ensure access to the site is available. All loading and unloading shall be undertaken on-site or within the work zone. Queuing of construction vehicles would not be permitted on public roads.

All truck drivers are required to read and sign site induction documentation which details the acceptable behaviour when operating a heavy vehicle. Documentation would provide instructions to truck drivers on where access to the site is permitted and the approved haul routes.

4.4 Truck Routes

Protocols would be in place to ensure:

- Site induction and induction documentation shall include procedures for accessing the site
- Drivers shall adhere to the nominated truck routes, as shown in Figure 2.3
- Drivers shall be aware of pedestrians and cyclists in the vicinity of the site
- Drivers shall be aware of the speed limit on roads along the haul route, including the presence of a 40 km/h High Pedestrian Activity Zone that applies on Berry Street and Miller Street, 10 km/h Shared Zone on Denison Street, and 40 km/h School Zone speed limits which apply at certain times of the day on surrounding roads.

4.5 Site Induction

All staff employed on the site by the Contractor shall be required to undergo a site induction. The induction shall include permitted access routes to and from the construction site for site staff and delivery vehicles, as well as standard environmental, OH&S, driver protocols and emergency procedures.

Upon successful completion, the form is to be signed by both the site inductor and inductee.

4.6 Site Inspection and Record Keeping

The construction operation shall be monitored to ensure that it proceeds as set out in the Construction Management Plan prepared by Lendlease. A daily inspection before the start of construction activity would take place to ensure that conditions accord with those stipulated in the plan and that there are no potential hazards.

To assist the orderly resolution of issues and complaints, the Construction Manager would keep a register itemising all reported incidents and adverse traffic matters. The incident register is to include details such as date and time, location, driver and vehicle details contact details of the persons involved and a recount of the incident.

4.7 Contingency Plans

The types of unplanned incidents that may occur during construction works include, but are not limited to:

- Motor vehicle crashes
- Environmental spills
- Construction type incidents
- Inclement weather conditions.

All issues would be reported to the Construction Manager who would inform the appropriate personnel. The relevant authorities responsible for controlling hazards/ emergencies are shown in Table 4.2.

Table 4.2: Emergency Authorities

Potential Incident	Action Plan	Contact Details
Law enforcement. Emergencies	Police	North Shore Police Station Address: 273 Pacific Highway, Crows Nest 2065 Phone: 02 9956 3199
Fire	Fire and Rescue NSW	Fire and Rescue NSW Crows Nest Fire Station Address: 99 Shirley Rd, Crows Nest NSW 2065 Phone: 02 9436 2021
Hazardous Material	Fire and Rescue NSW	

Table 6.3 outlines an action plan, in respect to traffic management, which would be applied for these types of incidents.

Table 4.3: Contingency Plans

Potential Incident	Action Plan
Equipment Breakdown	Modify traffic control arrangement to accommodate equipment breakdown
Work Vehicle Breakdown	Construction Manager to call tow truck company. Cease work if necessary.
Poor Weather Conditions	Assess all possible risk / hazards, if necessary postpone and reprogram works. Continually monitor working and traffic conditions, and if necessary cease work.
Unplanned Incidents	Where possible, cease work. Modify traffic control and manage site until emergency services arrive. Support emergency services.

5 Monitoring Program

The following monitoring program shall be implemented to ensure that the CPTMP performs effectively and achieves the objectives set out in this Plan.

5.1 Implementation of CPTMP

The CPTMP shall be included with all new site inductions for all heavy vehicle drivers accessing the site. Truck drivers must read and sign induction documentation prior to being granted access to the site. Records of signed documentation will be held by the Site Manager.

5.2 Complaints and Compliments Register

A complaints and compliments register detailing matters such as construction personnel and truck driver behaviour shall be developed and maintained by the Contractor.

The register shall be reviewed every two months to determine if any systematic issues are arising from the implementation of the CPTMP.

Positive and negative feedback shall be documented using a Customer, Community and Stakeholder Complaint/ Compliment Form. Lendlease shall gather as much information as possible which would allow them to take appropriate action. Appropriate action may include:

- Arranging a meeting to discuss and/or resolve issues
- Calling the customer, member of community or stakeholder to acknowledge feedback
- Writing a letter responding to the feedback.

5.3 Hazards and Incidents Register

A hazards and incidents register relating to safety, environment and process during the construction phase shall be maintained by the Contractor as part of the Site Work, Health and Safety (WHS) Management Plan.

The Site WHS Management Plan shall detail the responsibilities specific to all stakeholders involved in the construction phase, including:

- Lendlease, as the principal contractor
- Construction Manager
- Site Supervisor
- Work Health and Safety (WHS) Manager/ Coordinator
- Workers, sub-contractors and visitors.

5.3.1 Hazard Reporting

Hazards are to be either addressed by the worker who first observes it, or if that is not reasonably practicable and safe, then it must be reported to the Construction Manager or Supervisor. This shall apply to all workers including sub-contractors.

5.3.2 Injury Reporting

All injuries are to be reported in the Injuries Register which shall be kept in the site office or with the primary first aid kit. A copy of the page shall be forwarded to the WHS Team within 24 hours of the injury and, where required, it shall be accompanied by a completed Incident Report Form.

5.3.3 Near Miss/ Damage and Environmental Incident Reporting

As soon as is reasonably practicable an Incident Report Form shall be submitted to the WHS Team for any near miss, damage or environmental incidents. The WHS Team shall then deal with all matters accordingly.

6 Conclusion

This CPTMP has been prepared to document the construction activities and associated construction traffic, pedestrian and cyclist management measures necessary to facilitate the construction of the new Victoria Cross Over Station Development.

Based on the findings contained in this CPTMP, it is concluded that:

- During the busiest period of the construction works there would be approximately 30 truck movements per day. On average, this equates to three truck movements per hour across a 10-hour workday which would have a minor impact on the adjacent road network.
- On-site car parking for construction staff would not be provided. Parking on-street would not be permitted on surrounding roads. The site is well served by train and bus services, therefore, staff would be encouraged to travel using public transport.
- Pedestrian or cyclist facilities, and public transport services would not be impacted as a result of the construction activities.
- All loading and unloading of trucks shall occur within the Miller Street work zone or within the site, with no interruption to the surrounding road network.
- Truck drivers would be instructed to use the nominated haul routes to/from the site and shall conform to this, as agreed in the staff induction.

Appendix A

Swept Path Analysis

By: Karl.magistrado
Date: 26 August 2019
Filename: 19104CAD001-SWEPT PATH-190826.dwg

REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	KM	SB	WJ	23/08/19

ttpp transport planning

PROJECT
VICTORIA CROSS METRO STATION

TITLE
SWEPT PATH ANALYSIS
19m PRIME MOVER & SEMI TRAILER - BERRY STREET - MILLER STREET

DWG No. 19104CAD001
FIGURE 1

DATE STAMP
26 AUGUST 2019

PROJECT No.	SCALE	REV.
19104	1:400 @ A3	A

REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	KM	SB	WJ	23/08/19

ttpp transport planning

PROJECT
VICTORIA CROSS METRO STATION

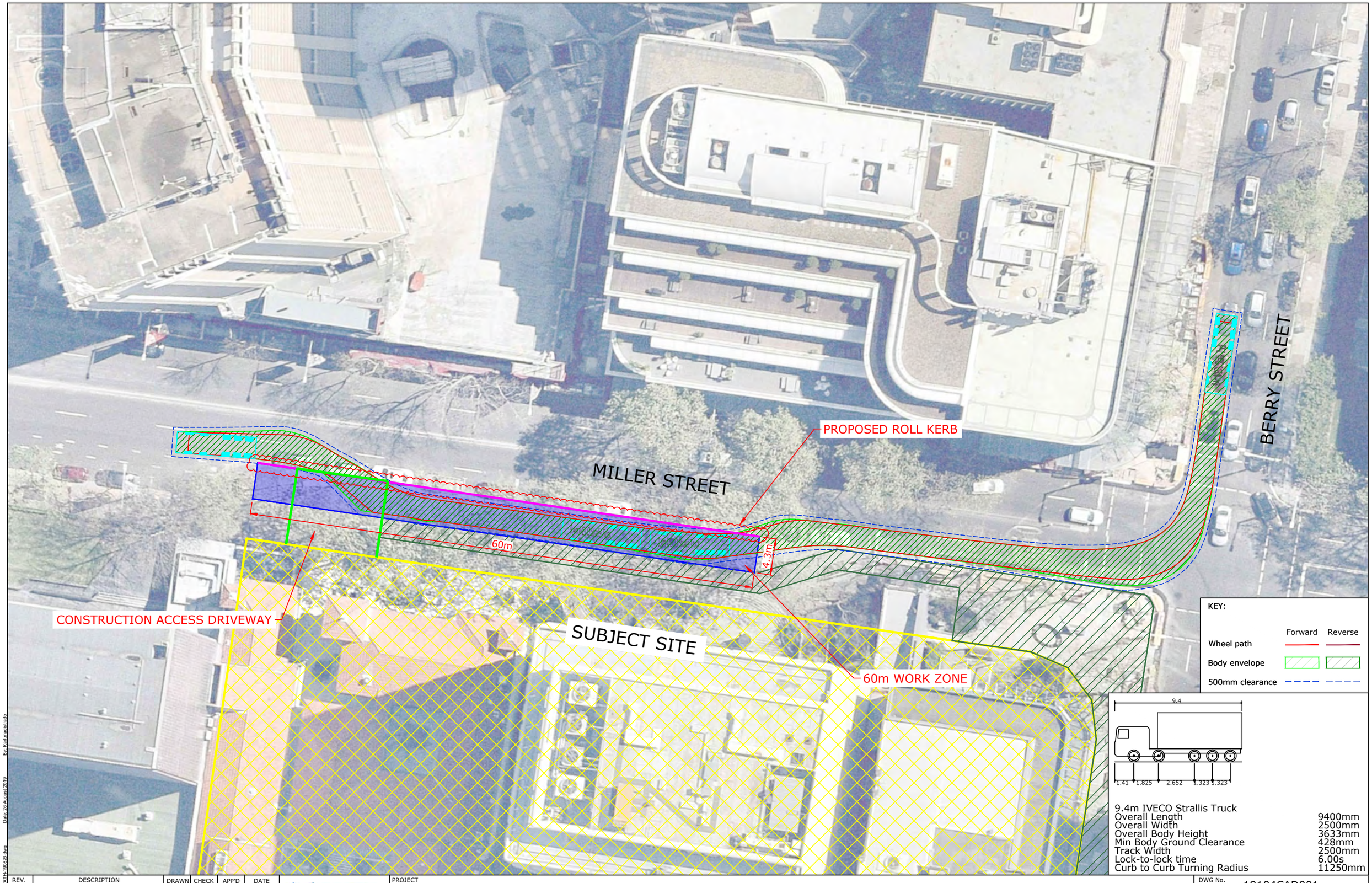
TITLE
SWEPT PATH ANALYSIS
19.6m TRUCK & DOG TRAILER - BERRY STREET - MILLER STREET

DWG No. 19104CAD001
FIGURE 2

DATE STAMP 26 AUGUST 2019

PROJECT No.	SCALE	REV.
19104	1:400 @ A3	A

By: Karl.magistrado
Date: 26 August 2019
Filename: 19104CAD001-SWEPT PATH-190826.dwg



REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	KM	SB	WJ	23/08/19

ttpp transport planning

PROJECT: VICTORIA CROSS METRO STATION

TITLE: SWEPT PATH ANALYSIS
9.4m LONG TRUCK - BERRY STREET - MILLER STREET

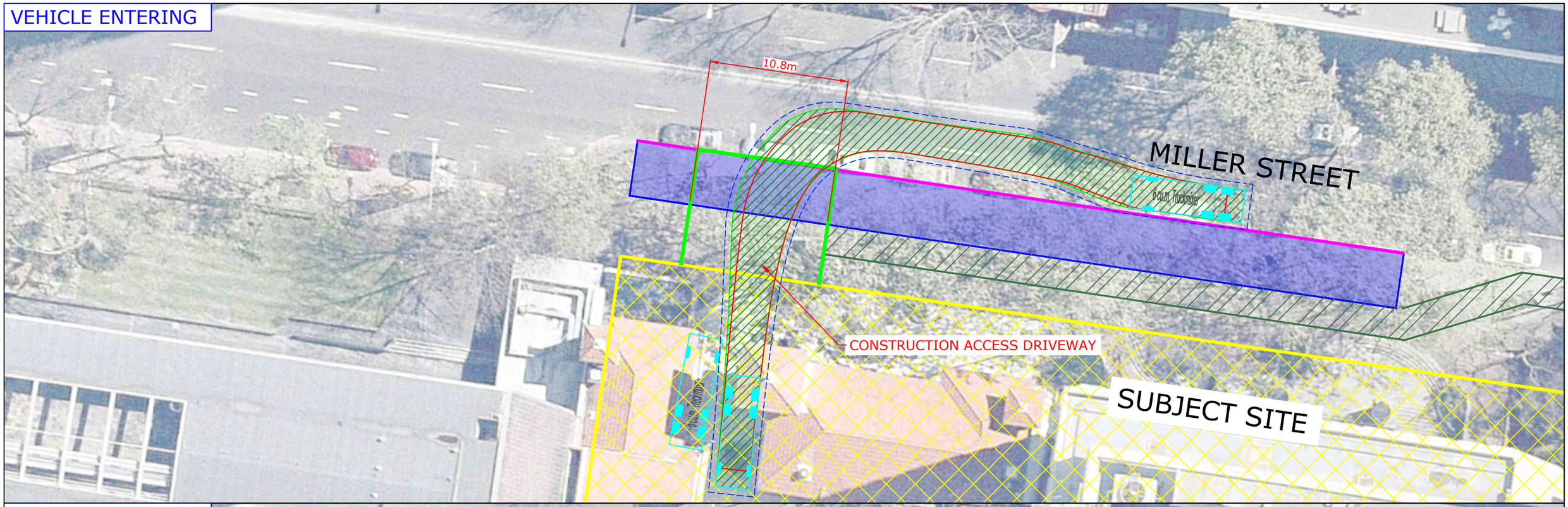
DWG No. 19104CAD001
FIGURE 3

DATE STAMP 26 AUGUST 2019

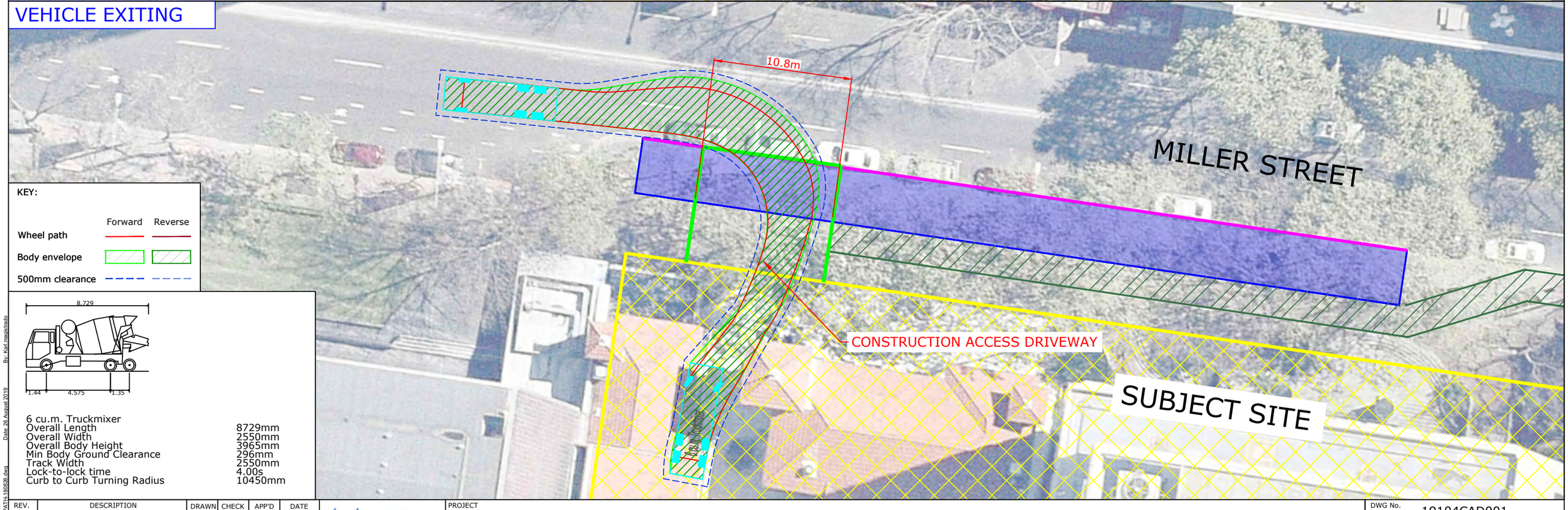
PROJECT No.	SCALE	REV.
19104	1:400 @ A3	A

By: Kiet magistrado
Date: 26 August 2019
Filename: 19104CAD001-SWEPT PATH-190826.dwg

VEHICLE ENTERING



VEHICLE EXITING



KEY:

	Forward	Reverse
Wheel path		
Body envelope		
500mm clearance		

6 cu.m. Truckmixer	
Overall Length	8729mm
Overall Width	2550mm
Overall Body Height	3965mm
Min Body Ground Clearance	296mm
Track Width	2550mm
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	10450mm

REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	KM	SB	WJ	23/08/19

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PROJECT: VICTORIA CROSS METRO STATION

TITLE: SWEPT PATH ANALYSIS
8.729m TRUCK MIXER - MILLER STREET - 10.8m DRIVEWAY

DWG No. 19104CAD001
FIGURE 4

DATE STAMP: 26 AUGUST 2019

PROJECT No.	SCALE	REV.
19104	1:300 @ A3	A

Filename: 19104CAD001-SWEPT PATH-190826.dwg
Date: 26 August 2019
By: Karl magistrado

Appendix B

Traffic Control Plan

CERTIFICATION
THE UNDERSIGNED HAS OBTAINED "PREPARE A WORK ZONE TRAFFIC MANAGEMENT PLAN" CERTIFICATION.

CERTIFICATE NO: 0028912869
MICHAEL LEE

RMS QUALIFIED TRAFFIC CONTROLLERS TO ASSIST VEHICLE ARRIVAL/DEPARTURE. TRAFFIC CONTROLLER TO OPEN/CLOSE CONCERTINA GATES MOMENTARILY WHILE VEHICLE ENTERS/EXITS THE SITE.

SITE PERSONNEL TO MANAGE THE INTERACTION OF PEDESTRIAN/CYCLIST MOVEMENTS AND SITE VEHICLE MOVEMENTS.

MILLER STREET

BERRY STREET

DENISON STREET

SUBJECT SITE

60m

10.8m

15m

15m

15m

END ROADWORK T2-16

T1-34

W5-22

PREPARE TO STOP T1-8

W5-22

30 m W8-5

T1-5

G9-58 CYCLISTS DISMOUNT

LEGEND

- SUBJECT SITE
- WORK ZONE
- PUBLIC ZONE
- CONCRETE BARRIER
- SIGNPOST
- REMOVABLE BOLLARD
- CONCERTINA GATE
- SITE PERSONNEL
- TRAFFIC CONTROLLER

TRAFFIC MANAGEMENT NOTES:

1. NOT ALL DIMENSIONS SHOWN ARE TO SCALE.
2. LOCATION OF SIGNS ARE TO BE CONFIRMED ON-SITE TO ENSURE APPROPRIATE VISIBILITY.
3. ALL SIGNS TO BE MINIMUM SIZE A.
4. ALL SIGNS TO BE CLASS 1 REFLECTIVE OR DIAMOND GRADE.
5. ALL WORKERS WILL BE CONFINED TO THE DEDICATED WORKS AREA SHOWN ON THE PLAN.
6. ALL TRAFFIC CONTROL PLANS ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE RMS "TRAFFIC CONTROL AT WORK SITES" MANUAL, VER5 (RMS 2018) AND AUSTRALIAN STANDARDS AS1742.3:2009 MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, PART 3: TRAFFIC CONTROL DEVICES FOR WORKS ON ROADS.
7. THIS TRAFFIC CONTROL PLAN MUST BE SETUP BY A PERSON HOLDING AN "APPLY TRAFFIC CONTROL PLANS" (YELLOW TICKET) AND THE RTA TRAFFIC CONTROL AT WORK SITES CHECKLIST SHALL BE COMPLETED PRIOR TO IMPLEMENTATION.
8. IT IS THE SITE FOREMAN'S RESPONSIBILITY TO ENSURE THE FOLLOWING:
   - THE INTEGRITY OF ALL TRAFFIC CONTROL MEASURES THROUGH TO THE FINAL REMOVAL. THIS INCLUDES DAILY CHECKS OF ALL SIGNS AND DEVICES. THE CORRESPONDING RECORDS OF CHECKS SHALL BE KEPT ON FILE FOR AUDITING PURPOSES.
   - VEHICULAR ACCESS AND SERVICING REQUIREMENTS ARE TO BE MAINTAINED AT ALL TIMES TO ADJACENT PROPERTIES AFFECTED BY TRAFFIC CONTROL MEASURES
   - PEDESTRIAN ACCESS AROUND THE WORK AREA TO BE MAINTAINED AT ALL TIMES EXCEPT ALONG FOOTPATH CLOSURES INDICATED ON THE PLAN.
   - AT ALL TIMES UP-TO-DATE COPY OF "TRAFFIC CONTROL AT WORK SITES" SHOULD BE AVAILABLE FOR REFERENCE AND IMPLEMENTATION AS REQUIRED ON-SITE
   - IF THERE IS NO DESIGNATED SITE FOREMAN, THE RESPONSIBILITY SHALL FALL ON THE CONTRACTOR OF WORKS
9. ALL WORKERS MUST ADHERE TO THE APPLICABLE SAFE WORK DISTANCE AS DESCRIBED IN AS1742.3:2009
10. ALL DISTANCES BETWEEN SIGNS ARE TO BE IN ACCORDANCE WITH THE SECTION 2.5.2 OF AS1742.3:2009. HOWEVER, MODIFICATIONS MADE TO SUIT SITE CONDITIONS.
11. ALL CONSTRUCTION VEHICLE ACTIVITY SHOULD BE MINIMISED, WHERE POSSIBLE, DURING PEAK PERIODS.
12. TRAFFIC CONTROLLER (T1-34) AND PREPARE TO STOP (T1-18) SIGNS TO BE COVERED OR REMOVED WHEN TRAFFIC CONTROLLER/S ARE NOT ON SITE
13. ROAD WORK SIGNS TO BE COVERED OR REMOVED WHEN WORKERS ARE NOT ON SITE
14. NO TRUCK QUEUING OR PARKING WILL BE PERMITTED IN ANY PUBLIC ROAD
15. WHEN A TRUCK IS ENTERING OR LEAVING THE SITE, CONCERTINA GATES WILL BE USED TO CLOSE THE FOOTPATH ON EITHER SIDE OF THE DRIVEWAY TO CONTROL PEDESTRIAN MOVEMENT
16. VEHICLES ALREADY ON THE ROAD WILL HAVE A RIGHT OF WAY. AS SUCH EVERY VEHICLE LEAVING THE SITE MUST WAIT UNTIL A SUITABLE GAP IN TRAFFIC ALLOWS THEM TO EXIT UNDER THE DIRECTION OF QUALIFIED TRAFFIC AND PEDESTRIAN CONTROLLER
17. PEDESTRIANS WILL ONLY BE HELD FOR SHORT TIME TO ALLOW TRUCKS TO ENTER AND EXIT FROM THE SITE. PEDESTRIANS HAVE THE RIGHT OF WAY ON THE FOOTPATH AND WILL NOT BE STOPPED IN ANTICIPATION

REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	KM	SB	WJ	26/08/19

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PROJECT: VICTORIA CROSS METRO STATION

TITLE: TRAFFIC CONTROL PLAN

DWG No. 19104CAD002 FIGURE 1

DATE STAMP 26 AUGUST 2019

PROJECT No.	SCALE	REV.
19104	1:500 @ A3	A

Filename: 19104CAD002-TCP-190826.dwg Date: 26 August 2019 By: Karl.manistardo

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