Sydney Metro State Significant Development, Development Application (SSD DA) Pitt Street North Over Station Development

Appendix V1 - Transport and Accessibility Impact Assessment

# Pitt Street Developer North Pty Ltd

Reference: 507262 Revision: C – Issue for DPIE 2020-06-23 SMCSWSPS-AUR-OSN-TF-PLN-000001





# **Document control record**

Document prepared by:

#### Aurecon Australasia Pty Ltd

ABN 54 005 139 873 Level 5, 863 Hay Street Perth WA 6000 Australia

- **T** +61 8 6145 9300
- **F** +61 8 6145 5020
- E perth@aurecongroup.com
- W aurecongroup.com

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| Clien            | t contact     | Michael Muller                                | Client refere     | nce                         |                           |             |  |
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| Approval         |                           |                    |                    |
|------------------|---------------------------|--------------------|--------------------|
| Author signature |                           | Approver signature |                    |
| Name             | Iris Brkic                | Name               | Jason Pereira      |
| Title            | Senior Transport Engineer | Title              | Technical Director |

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# Appendices

Appendix A: Delivery Service Plan

# 1 Executive Summary

Aurecon was appointed by Pitt Street Developer North (PS Developer) to undertake a Transport and Accessibility Impact Assessment (TAIA) as part of a State Significant Development Application (SSDA) for the Stage 2 design of the mixed use development above the northern portal of Pitt Street Station, otherwise known as the Pitt Street North Over Station Development (North OSD).

This TAIA has re-assessed the development in accordance with the Secretary's Environmental Assessment Requirements (SEARs) that form part of the essential aspects of the Environmental Impact Statement (EIS), addressing transport, traffic, parking and access. A summary of the assessment against each of the SEARs related to transport, traffic and parking is provided in Section 2.1.

The aim of this study was to assess the transport related impacts of the development; Pitt Street North OSD. The development comprises of 39 floors and approximately 52,951m<sup>2</sup> of commercial space and 1,700m<sup>2</sup> of retail space (the combined commercial and retail total GFA is 54,651m<sup>2</sup>). The dedicated loading dock area is services by seven bays.

The following summarises the transport impacts of the development:

- Public Transport: The site is situated within the centre of Sydney CBD and is accessible (within 400m radius) to high frequency public transport services including buses and trains. With the high frequency service operating from the Pitt Street Metro Station, which will be directly beneath the site, the travel distance and time to public transport services for tenants and visitors will be shortened. The recently opened Sydney CBD and South East Light Rail service has one of its stops (Town Hall) within 400m of the development. There are also three heavy rail stations located within 400m radius from the site, with Town Hall Station sits closest to the site. This provides another public transport option for the development. Overall, the site is accessible to numerous public transport options and is estimated to be the primary travel mode for most tenants and visitors.
- Cycling: According to City of Sydney's Cycleway map, both the adjacent Pitt Street and Castlereagh Street are classified as "direct routes with higher traffic". These routes are considered to be the most direct route to access major land uses within the CBD, and provide connection to other cycling infrastructure. There are numerous public bicycle parking spaces provided within the Sydney CBD, as well as in close proximity to the development. This is estimated to encourage the use of bicycles by tenants of the development for shorter trips within the City of Sydney.
- Bicycle Parking: The opening year (2024) of the development will provide 200 bicycle spaces, with allowance for additional bike parking spaces to be built as site demand increases, to the maximum number in line with the DCP 2012 bike parking requirements. The 200 bike parking bays is equivalent to a 4.1% cycle mode share which is an increase from the baseline 1.4% (based on the 2016 Census).
- Pedestrians: Assessment of the Pedestrian access to the North OSD Development has been undertaken as part of the Pitt Street Metro Development Application which formed part of the Critical State Significant Infrastructure (CSSI) submission. The dynamic pedestrian modelling integrated the metro station, the precinct and both the North and South OSD development. The report has concluded that the pedestrian level of service is generally satisfactory.
- Private Vehicle Parking: The development provides a total of 40 parking bays for commercial tenants only via a car stacker with the two car lifts.
- Private Vehicle Use: The development is estimated to generate less than 40 vehicle trips during the road network peak periods. With this minimal number of trips, the development is an improvement to the road network compared to the previous land uses.
- Loading Dock Provision and Operation: The North OSD has been designed to integrate with the Pitt Street Metro Station. The North OSD development will provide seven loading dock spaces on the ground level of the loading dock and three B99 spaces within the automatic car stacker to accommodate the longer dwell times of B99 vehicles. The seven loading dock spaces on the ground level include a dedicated Sydney Metro bay within the loading dock facility. By using an actively managed approach, the seven bays are estimated to be able to accommodate the peak demand estimated for the North OSD. A service delivery plan has been included in Appendix A.

#### 2 Purpose of this report

#### Alignment with the SEARs and SSD 8875 2.1

#### 2.1.1 **SEARs**

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARS) Dated 25 October 2019. Specifically, this report has been prepared to respond to the SEARS requirements summarised in Table 2-1 below.

| ltem   | Description of Requirement   | Report Section  | Comments  |
|--|--|---|---|
| <b>8a -</b><br>Traffic,<br>parking<br>and<br>access<br>(operation) | Details on the current and<br>likely estimated future mode<br>share for the various users<br>(residents, visitors, etc)<br>accessing the proposed<br>development.  | 5.1 and the Green Travel Plan<br>document: SMCSWSPS-<br>AUR-OSN-EM-REP-000002   | The assessment has been based on<br>the existing transport mode share for<br>the City of Sydney to estimate the<br>expected mode share for the<br>development, considering the existing<br>and future infrastructure in close<br>proximity to the site as well as the<br>future transport facilities.<br>The Green Travel Plan has been<br>included as part of SMCSWSPS-<br>AUR-OSN-EM-REP-000002 |
| 8b   | Details of the current and<br>likely estimated future daily<br>and peak hour vehicle, public<br>transport, point to point<br>transport, pedestrian and<br>bicycle movements to/from<br>the site, including an<br>indication of whether it<br>relates to the station or OSD,<br>and any associated impacts<br>and/or mitigation measures<br>required. | 4 and 5   | The assessment provides a review of<br>potential traffic generation from the<br>development to determine the likely<br>impact on the road network in the<br>vicinity. Traffic generation is limited as<br>a result of limited parking provisions<br>within the development to 40 bays,<br>which in in line with City of Sydney's<br>objectives.   |
| 8c   | Measures to encourage<br>users of the development to<br>make sustainable travel<br>choices, including a green<br>travel plan, walking, cycling,<br>public transport and car<br>sharing, adequate provision<br>of bicycle parking and end of<br>trip facilities and the<br>minimisation of private car<br>trips.                                      | 3, 4, 5 and the Green Travel<br>Plan document: SMCSWSPS-<br>AUR-OSN-EM-REP-000002<br>alongside the Pedestrian<br>Modelling report submitted as<br>part of the Pitt Street Station<br>SSDA: SMCSWSPS-AUR-<br>ALL-TF-REP-000001 | The assessment focuses on the<br>accessibility to sustainable transport<br>options available for the development.<br>The Green Travel Plan has been<br>included as part of SMCSWSPS-<br>AUR-OSN-EM-REP-000002.<br>The Pedestrian Modelling report<br>submitted as part of the Pitt Street<br>Station SSDA: SMCSWSPS-AUR-<br>ALL-TF-REP-000001.  |

Table 2-1: SEARs requirement list

| Item | Description of Requirement   | Report Section   | Comments  |
|------|--|--|---|
| 8d   | Modelling and analysis of<br>pedestrian and cyclist access<br>to the proposed development<br>in consultation with TfNSW,<br>taking into account the<br>existing and planned Sydney<br>Bike Network.  | 3.6.5 and 3.6.6, 5.3 and 5.5   | The assessment has provided a<br>review of the pedestrian analysis<br>undertaken for the Pitt Street Metro<br>Station with the proposed<br>development demands included.<br>The Green Travel Plan has been<br>provided in SMCSWSPS-AUR-OSN-<br>EM-REP-000002.   |
| 8e   | An assessment and details of<br>existing and proposed vehicle<br>access arrangements,<br>including vehicle parking and<br>access, a Delivery Service<br>Plan detailing loading dock<br>and servicing provision,<br>adequacy and management<br>with consideration of precinct<br>wide shared loading docks<br>and/or remote or off-site<br>loading zone hub facilities,<br>ensuring all servicing and<br>loading occurs on-site and<br>does not rely on kerbside<br>controls. | 4.2, 4.3, 5.8 and a Delivery<br>Service Plan has been<br>attached in Appendix A. | The assessment for the proposed<br>loading bays has been checked<br>against the City of Sydney DCP 2012,<br>as well as a loading dock activity<br>study to support the loading bay<br>provision.<br>A Delivery Service Plan has been<br>attached in Appendix A. |
| 8f   | Details of measures to<br>segregate hostile vehicles<br>from public transport users<br>and areas of people<br>congregation.  | N/A  | A detailed assessment has been<br>undertaken to identify the risk<br>locations and provide measures to<br>segregate the hostile vehicles from<br>areas that people occupy.<br>Refer SMCSWSPS-K&C-OSN-SC-<br>REP-000001 Blast Vulnerability<br>Assessment.       |
| 8g   | An assessment of pedestrian<br>and cyclist safety with<br>consideration of the<br>relationship with design,<br>access and operation of the<br>station.   | 4.3.4  | The assessment has included a review of the potential risks for pedestrians and cyclists with respect to the development's access, design and operation.  |

### 2.1.2 Conditions of Consent

This report has also been prepared in response to the following Condition of Consent for the State Significant Development Concept (SSD 8875) for the OSD summarised in Table 2-2.

| Table 2-2: | Concept | approval | of | Conditions | of | Consent |
|------------|---------|----------|----|------------|----|---------|
|------------|---------|----------|----|------------|----|---------|

| ltem   | Description of Requirement  | Section<br>Reference | Comments   |
|--|---|----------------------|--|
| B16/17<br>Traffic,<br>Access<br>and<br>parking | Traffic and Transport Impact<br>Assessment including:<br>consideration of responsibilities,<br>timing and commitments to the<br>development of car share parking,<br>motorcycle parking and<br>preparation of travel plans. | This document.       | This document is the Traffic and Transport<br>Impact Assessment undertaken for OSD<br>North. |

| Traffic,<br>Access<br>and<br>parkingare to be undertaken for all stages<br>of detailed design development<br>involving road operations and<br>traffic issues relevant to the OSD.<br>Any issues identified by the audits<br>shall be closed out in consultation<br>with the Sydney Coordination<br>Office and the City of Sydney to<br>the satisfaction of the relevant<br>road authorities. | development in accordance with Station design process, separate to this report. |
|--|---|
|--|---|

### 2.2 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 Pitt Street North Station. The detailed SSD DA is consistent with the Concept Approval (SSD 17\_8875) 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 report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 25 October 2019.

The detailed SSD DA seeks development consent for:

- Construction of new commercial tower of approximately 38 storeys
- The tower includes maximum GFA, 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 lobby and commercial amenities;
  - Car parking spaces within the podium for the purposes of the commercial premises; and
  - Loading and services access.
- Utilities and services provision.
- Stratum subdivision (staged).

### 2.3 The Site

The site is located within the Sydney CBD. It has three separate street frontages, Pitt Street to the west, Park Street to the south and Castlereagh Street to the east. The area surrounding the site consists of predominantly commercial high-density buildings and some residential buildings, with finer grain and heritage buildings dispersed throughout.

The site has an approximate area of 3,150.1sqm and is legally described as follows:

252 Pitt Street (Lot 20 in DP1255509)



Figure 2-1: Location Plan (Source: Urbis)

## 2.4 Sydney Metro

Sydney Metro is Australia's biggest public transport program. A new standalone railway, this 21st century network will revolutionise the way Sydney travels.

There are four core components:

#### Sydney Metro Northwest (formerly the 36km North West Rail Link)

This project is now complete and passenger services commenced in May 2019 between Rouse Hill and Chatswood, with a metro train every four minutes in the peak. The project was delivered on time and \$1 billion under budget.

#### Sydney Metro City & Southwest

Sydney Metro City & Southwest project includes a new 30km metro line extending metro rail from the end of Metro Northwest at Chatswood, under Sydney Harbour, through new CBD stations and southwest to Bankstown. It is due to open in 2024 with the ultimate capacity to run a metro train every two minutes each way through the centre of Sydney.

Sydney Metro City & Southwest will deliver new metro stations at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street, Waterloo and new underground metro platforms at Central Station. In addition it will upgrade and convert all 11 stations between Sydenham and Bankstown to metro standards.

In 2024, customers will benefit from a new fully-air conditioned Sydney Metro train every four minutes in the peak in each direction with lifts, level platforms and platform screen doors for safety, accessibility and increased security.

#### Sydney Metro West

Sydney Metro West is a new underground railway connecting Greater Parramatta and the Sydney CBD. This once-in-a-century infrastructure investment will transform Sydney for generations to come, doubling rail

capacity between these two areas, linking new communities to rail services and supporting employment growth and housing supply between the two CBDs.

The locations of seven proposed metro stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays.

The NSW Government is assessing an optional station at Pyrmont and further planning is underway to determine the location of a new metro station in the Sydney CBD.

#### Sydney Metro – Western Sydney Airport

Metro rail will also service Greater Western Sydney and the new Western Sydney International (Nancy Bird Walton) Airport. The new railway line will become the transport spine for the Western Parkland City's growth for generations to come, connecting communities and travellers with the rest of Sydney's public transport system with a fast, safe and easy metro service. The Australian and NSW governments are equal partners in the delivery of this new railway.



The Sydney Metro Project is illustrated in Figure 2-2.

Figure 2-2: Sydney Metro Alignment Map (source: Sydney Metro)

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 Pitt Street Station, including the demolition of existing buildings and structures on both sites (north and south). The CSSI Approval also includes construction of below and above ground works within the metro station structure for appropriate integration with over station developments.

The CSSI Approval included Indicative Interface Drawings for the below and above ground works at Pitt Street North Metro Station site. The delineation between the approved Sydney Metro works, generally described as within the "metro box", and the Over Station Development (OSD) elements are illustrated in Figure 2-3 and Figure 2-4. The delineation line between the CSSI Approved works and the OSD envelope is generally described below or above the transfer slab level respectively.



#### LEGEND

- METRO PROPERTY BOUNDARY
- OSD DEVELOPMENT SUBJECT TO SEPARATE ASSESSMENT PROCESS
- STATION
  - SHARED ACCESS BETWEEN OSD AND STATION FOR LOADING AREA AND SERVICE LIFT
- FOR LOADING AREA AND SERVICE LIFT
- Figure 2-3: Pitt Street Station North (East-West Section) (Source: CSSI Preferred Infrastructure Report (TfNSW))



#### LEGEND

- METRO PROPERTY BOUNDARY
  - OSD DEVELOPMENT SUBJECT TO SEPARATE ASSESSMENT PROCESS STATION SUBJECT ACCESS DETWEEN OSD AND STATION
    - SHARED ACCESS BETWEEN OSD AND STATION FOR LOADING AREA AND SERVICE LIFT

Figure 2-4: Pitt Street Station – North (North-South Section) (Source: CSSI Preferred Infrastructure Report (TfNSW))

The Preferred Infrastructure Report (PIR) noted that the integration of the OSD elements and the metro station elements would be subject to the design resolution process, noting that the detailed design of the "metro box" may vary from the concept design assessed within the planning approval.

As such in summary:

- The CSSI Approval provides consent for the construction of all structures within the approved "metro box" envelope for Pitt Street North.
- The CSSI Approval provides consent for the fit out and use of all areas within the approved "metro box" envelope that relate to the ongoing use and operation of the Sydney Metro.
- The CSSI Approval provides consent for the embellishment of the public domain, and the architectural design of the "metro box" envelope as it relates to the approved Sydney Metro and the approved Pitt Street North Station Design & Precinct Plan.
- Separate development consent however is required to be issued by the NSW DPIE for the use and fit-out of space within the "metro box" envelope for areas related to the OSD, and notably the construction and use of the OSD itself.

As per the requirements of clause 7.20 of the *Sydney Local Environmental Plan 2012*, as the OSD exceeds a height of 55 metres above ground level (among other triggers), development consent is first required to be issued in a Concept (formerly known as Stage 1) DA. This is described in Figure 2-5, Figure 2-6 and Figure 2-7 below.



Figure 2-5: Pitt Street North Concept SSD DA – Envelope – South Elevation (Source: SSD 8875 Concept Stamped Plans)



Figure 2-6: Pitt Street North Concept SSD DA – Envelope – East Elevation (Source: SSD 8875 Concept Stamped Plans)



Figure 2-7: Pitt Street North Concept SSD DA – Envelope – West Elevation (Source: SSD 8875 Concept Stamped Plans)

## 2.5 Study Assumptions and Limitations

The assessment is based on the following assumptions and limitations:

- The previous TTIA prepared for the site concept design as part of the SSD application, "Appendix T: Sydney Metro City & Southwest Pitt Street North Over Station Development – Transport and Traffic Impact Assessment Report" dated August 2018 has been used as the main reference for this TIA to ensure consistency of the adopted methodology and analysis approach. It is assumed the data and assumptions remain valid and representative.
- The previous supplementary traffic report prepared for the site concept design as one of the supplementary documents for the SSD application, "Appendix M: Sydney Metro City and Southwest Pitt Street North Over Station Development Transport and Traffic Impact Assessment Report Addendum Alternate Commercial Development" dated 29 November 2018 has been used as the main reference for this TIA to ensure consistency of the adopted methodology and analysis approach. It is assumed the data and assumptions remain valid and representative.
- RMS Traffic Generating Guideline The traffic generation rates recommended in the RMS Guide to Traffic Generating Developments (2002) and the more recent RMS Technical Direction 2013/04a: Guide to Traffic Generating Developments – Updated Traffic Surveys (RMS, 2013) are to be adopted for the trip estimation.
- The land uses are consistent with the detail provided in the DA application for the Pitt Street station and include consideration of the land uses in the CSSI Approval (including station retail).
- The assessment is based on an existing situation and full development of the site as an integrated station development.
- The assessment is limited by the data obtained and identified in this report.
- The Pitt Street North Dock Activity Assessment undertaken by Sydney Coordination Office Planning and Freight has been used to forecast the potential vehicle service profile for the propose development.
- The journey to work data sourced from the Australia Bureau Statistics 2016 is representative for the current transport mode trends.
- The pedestrian data for this TAIA is based on the study undertaken by METRON for Sydney Metro with detailed in "Pedestrian Modelling Report Precinct, Pitt Street Station" dated May 2018. This initial study by Metro was used as the basis for the updated assessment undertaken by Aurecon which reflects the latest layout and pedestrian demands associated with North OSD.

# 3 Existing Situation

This section discusses the existing situation with regards to access and the transport network surrounding the development.

## 3.1 Surrounding Road Network Characteristics

The site is currently surrounded by collector roads and local streets. The characteristics of the surrounding roads are summarised below:

#### Pitt Street

Pitt Street is a one-way northbound corridor with segments of two traffic lanes between Market Street and Park Street, aligned in a north-south direction. It is classified as a local road and has a posted speed limit of 40km/hr. Along the corridor, on-street parking spaces are available on both sides with parking metered and limited to up to four hours, and some spaces restricted as loading zones during the weekdays (6am-6pm) and Saturday (6am-10am). The corridor is to the west of the development and Figure 3-1 outlines the road characteristics for Pitt Street.



Figure 3-1: Pitt Street Road Characteristics

#### Park Street

Park Street is a two-way corridor with segments of six traffic lanes between Pitt Street and Castlereagh Street, with two lanes restricted for bus only. It is classified as a collector road and has a posted speed limit of 40km/hr. The corridor is to the south of the development and Figure 3-2 outlines the road characteristics for Park Street.



Figure 3-2: Park Street Road Characteristics

#### Castlereagh Street

Castlereagh Street is a one-way southbound corridor with segments of three traffic lanes aligned in a northsouth direction, with one lane restricted for bus only between Market Street and Park Street. It is classified as a local road and has a posted speed limit of 40km/hr. Along the corridor, parking metered and limited to up to four hours on both sides, with some of the spaces restricted as loading zones during the weekdays (6am10am and 3pm-6pm) and Saturday (6am-10am). On the eastern side, a clearway from 3pm to 8pm is in place for some sections with "no stopping" signs. The corridor is to the east of the development and Figure 3-3 outlines the road characteristics for Castlereagh Street.



Figure 3-3: Castlereagh Street Road Characteristics

### 3.2 Planning Context

Based on the City of Sydney Planning Controls Map, as shown in Figure 3-4, the Sydney Local Environmental Plans (LEP) 2012 applies to the development, providing guidelines and recommendations on the development design.



Figure 3-4: City of Sydney Planning Controls Map (source: City of Sydney, last modified 13 September 2019)

# 3.3 **Previous Site Development**

The previous land uses had comprised approximately 170 parking spaces, including commercial service spaces. It is understood that these parking spaces were predominantly used by employees with mail delivery vehicles associated with the Australia Post office, located at 175 Castlereagh Street.

As no traffic survey was undertaken for the previous site land use prior to demolition, RMS Traffic Generating Guidelines has been used to estimate the trips that were potentially generated from the previous site assuming "office". Based on this assessment, it is estimated the previous site had generated approximately 55 vehicles in the AM and PM peak hours respectively during the weekday. The estimation has assumed that the on-site parking spaces were only available for employees and based on a traffic generation of 0.33 vehicle/parking space per peak hour. However, the previous site is likely to have generated more trips than the estimated trips as a greater proportion of parking spaces were potentially used for mail and delivery services. The parking spaces were only accessible via the access on Castlereagh Street, approximately 25m to the north of Park Street intersection. The access has been retained and is currently being used as the main access for the Metro construction work on the site.

It is noted that apart from these parking spaces, no other parking spaces or service bays were provided on site for other land uses. It is likely the trips generated by these other land uses were generated by passing pedestrian trade and therefore vehicle trips were expected to be limited. The vehicle trips (including service vehicles) generated by the other land uses such as fast food, retail, hotel and medical centre on the site were potentially utilising the kerbside parking spaces and loading zones available in the vicinity as described in Section 3.4.

### 3.4 Parking Areas and Loading Zones

As mentioned in Section 3.1, kerbside parking spaces are available along the Pitt Street and Castlereagh Street with parking metered and limited to up to four hours. Along these two corridors, other restrictions are in place as well, including Loading Zones, No Parking, and Bus Zones.

There are currently a number of public parking buildings located within 400m from the sites as shown in Figure 3-5 and Figure 3-6. These parking buildings are as tabulated in Table 3-1 below. These parking facilities (totalling 2,227 bays) are available to public with various parking fees required. Additionally, on-street parking spaces are available in the surrounding network as shown in Figure 3-7, with parking metered and limited for set maximum parking durations.

The loading zones shown in Figure 3-6 will only be used by North OSD for loading as a contingency.

| Parking Building           | Address                | Operation Hour   | Number of Parking Space |
|----------------------------|------------------------|------------------|-------------------------|
| Sheraton                   | 123 Castlereagh Street | 24 hours         | 115                     |
| Piccadily                  | 133 Castlereagh Street | 6:00am – 1:00am  | 231                     |
| Citigroup Centre           | 271 Pitt Street        | 6:00am – 7:00pm  | 275                     |
| Hilton                     | 259 Pitt Street        | 24 hours         | 429                     |
| Wilson (St Andrew's House) | 464 Kent Street        | 6:00am – 12:00am | 243                     |
| Wilson (HSBC Centre)       | 14 Wilmot Street       | 7:00am – 7:00pm  | 137                     |
| Queen Victoria             | 111 York Street        | 6.00am – 12.00am | 634                     |
| St Martins Tower           | 190 Clarence Street    | 7.00am – 10.00pm | 163                     |
|                            |                        | Total            | 2,227                   |

Table 3-1: Public parking within 400m of the site

\* Source: TfNSW Tomorrow's Sydney Interactive Map, updated on 30/08/2018



Figure 3-5: Available parking station in the vicinity of the site (Source: City of Sydney Accessibility Map)



Figure 3-6: Available loading bays in the vicinity of the site (Source: TfNSW Tomorrow's Sydney Interactive Map)



Figure 3-7: Available on-street parking spaces in the vicinity of the site (Source: City of Sydney Map of parking meters in the city)

### 3.5 Taxi Zones

According to the TfNSW Tomorrow's Sydney interactive map, there are numerous taxi zones that are currently located within 400m of the site. With the reference to Figure 3-8, the nearest taxi zone located to the southwest of the site (40m away) along Pitt Street. The taxi zone is classified as a taxi rank with 5 parking spaces.



Figure 3-8: Taxi rank locations in the vicinity of the site (Source: TfNSW Tomorrow's Sydney Interactive Map)

# 3.6 Public, Active and Sustainable Transport

The site is situated in the heart of Sydney CBD, which has a range of public transport services. The Australian Bureau Statistics 2016 Census of Population and Housing (ABS 2016 Census) identifies that the majority of commuters (approximately 88%) who reside within the CBD (refer to Figure 3-9) took public transport or active transport to work (refer to Figure 3-10). The public transport stops within the vicinity of the site include bus, light rail, and train, and are shown in Figure 3-11.



Figure 3-9: ABS 2016 State Suburb boundary (basemap: ABS Map)



Figure 3-10: Mode of transport to work for people working within Sydney (source: ABS 2016 Census)



Figure 3-11: Public transport facilities in the vicinity of the site (base map: City of Sydney Accessibility Map)

### 3.6.1 Bus Services

There are several bus stops located within close proximity (400m) from the site along Castlereagh Street, Elizabeth Street, Market Street, York Street, Clarence Street and Park Street. The closest bus stops to the site are as shown in Figure 3-12. These bus stops are served by Sydney CBD high frequency buses during peak and off-peak periods, circulating within and around the Sydney CBD, as well as providing services to other suburbs and regions as summarised in Table 3-2.



Figure 3-12: Bus routes in the vicinity of the site (Source: Transport NSW, effective from 28/07/2019)

#### Table 3-2: Bus services operate within 400m from the site (source: Transport NSW)

| Bus<br>Route | Route Description   | Bus<br>Route | Route Description                           |
|--------------|---|--------------|---|
| M10          | Maroubra Junction to Leichhardt via City                                  | 439          | Mortlake to City Martin Place               |
| M20          | Botany to Gore Hill   | 440          | Bondi Junction to Rozelle                   |
| M30          | Sydenham to Taronga Zoo   | 441          | City Art Gallery to Birchgrove via City QVB |
| M50          | Coogee to Drummoyne   | 442          | City QVB to Balmain East Wharf              |
| 311          | Millers Point to Central Railway Square via<br>Darlinghurst & Potts Point | 461          | Burwood to City Domain                      |
| 324          | Watsons Bay to Walsh Bay via Old South<br>Head Road                       | 470          | Lilyfield to City Martin Place              |
| 325          | Watsons Bay to Walsh Bay via Vaucluse<br>Road                             | 502          | Five Dock to City Town Hall                 |
| 389          | Bondi Junction Pyrmont  | 504          | Chiswick to City Domain                     |
| 412          | City Martin Place via Earlwood  | 508          | Drummoyne to City Town Hall                 |
| 413          | Muswellbrook to Highbrook   | L23          | Kingsgrove to City Martin Place             |
| 423          | Kingsgrove to City Martin Place   | L28          | Cantebry to City Martin Place               |
| 426          | Dulwich Hall to City Martin Place   | L37          | Haberfield to City Town Hall                |
| 428          | Cantebry to City Martin Place   | L38          | Abbotsford to City Martin Place             |
| 431          | Glebe Point to City Martin Place  | L39          | Mortlake to City Martin Place               |
| 438          | Abbotsford to City Martin Place   | X04          | City Domain to Chiswick                     |

### 3.6.2 Train Services

The site has good accessibility to the existing train services within the Sydney CBD. With reference to Figure 3-13, there are three stations located within a 400m radius of the site, with Town Hall Station closest to the site to the southwest, and Museum Station and St James Station close to the 400m radius boundary to the southeast and northeast respectively. In a wider area (within 800m), there is Martin Place Station and Wynyard Station. There are eight railway lines that are currently operate via these stations as tabulated in Table 3-3 and schematically shown in Figure 3-14.



Figure 3-13: Train stations within the vicinity of the site (source: City of Sydney Accessibility Map)

| Rail Service                           | Route Description                              | Weekday Frequency<br>(Peak/ Off-peak) | Weekend<br>Frequency |
|--|--|---------------------------------------|----------------------|
| T1 North Shore Line &<br>Northern Line | Berowra to City via Gordon                     | 5-15 minutes/ 30 minutes              | 15 minutes           |
| T1 Northern Line                       | Hornsby to City via Macquarie<br>University    | 15 minutes                            | 15 minutes           |
| T1 Western Line                        | Emu Plains or Richmond to City                 | 5-20 minutes/ 30 minutes              | 30 minutes           |
| T2 Inner West &<br>Leppington Line     | Parramatta or Leppington to City               | 10 minutes/ 15 minutes                | 15 minutes           |
| T3 Bankstown Line                      | Liverpool or Lidcombe to City via<br>Bankstown | 10-15 minutes/ 30 minutes             | 30 minutes           |
| T4 Eastern Suburbs &<br>Illawarra Line | Waterfall or Cronulla to Bondi Junction        | 20 minutes/ 30 minutes                | 30 minutes           |

| Table 3-3: Railway services | operating at Town | Hall Station (source: | Transport NSW) |
|-----------------------------|-------------------|-----------------------|----------------|
|-----------------------------|-------------------|-----------------------|----------------|

| Rail Service                      | Route Description   | Weekday Frequency<br>(Peak/ Off-peak) | Weekend<br>Frequency |
|-----------------------------------|---|---------------------------------------|----------------------|
| T8 Airport & South Line           | Macarthur to City via Airport or<br>Sydenham                  | 10-15 minutes/ 30 minutes             | 15 minutes           |
| Central Coast &<br>Newcastle Line | Newcastle Interchange to Central via<br>Strathfield or Gordon | 10-15 minutes/ 60 minutes             | 60 minutes           |



Figure 3-14: NSW Railway routes (source: Transport for NSW)

### 3.6.3 Light Rail Services

The Sydney Inner West Light Rail operates between Dulwich Hill and Central. The closest stop from the site is Capital Square at approximately 800m to the south of the site as shown in Figure 3-15. The light rail operates with a service frequency of every eight minutes during the weekday peak periods and 10 minutes during weekday off-peak. On the weekend, it only operates on Saturday with a service every 15 minutes.

The new light rail, Sydney CBD and South East Light Rail, was opened to the public in December 2019. The route and stops are shown in Figure 3-15. The total length of the light rail route is 12km and includes 19 stops. The route extends from Circular Quay along George Street to Central Station, through Surry Hills to the Moore Park precinct, and includes key stops the Sydney Cricket Ground and Allianz Stadium. From Central Station, the route continues in a southbound direction to Kensington and Kingsford (Line 3) via Anzac Parade, Alison Road and High Street to Randwick (Line 2), stopping at the race course, the University of NSW, and the Prince of Wales Hospital. The completion of the light rail to Kingsford (Line 3) in both directions is, however, expected to be delayed until March 2020. The light rail service operates with a frequency of every four to eight minutes between Circular Quay and Central, and every eight to ten minutes between Central and Randwick, from 7:00pm every day. The closest stop from the site is Town Hall stop, located approximately 160m from the site on Druitt Street.



Figure 3-15: Sydney CBD & South East Light Rail (source: Sydney Light Rail Interactive Map)

### 3.6.4 Ferry Services

The Barangaroo Ferry Wharf is located at approximately 1km to the northwest of the site. There are currently two ferry lines operating at the wharf; the Parramatta River line (F3) and the Cross Harbour line (F4), as shown in Figure 3-16 and Figure 3-17. There is currently no public transport servicing between the site and Barangaroo Ferry Wharf. However, the new Sydney Metro line will have a station at Barangaroo and improves accessibility for the site towards the ferry services from Pitt Street Station as shown in Figure 3-18. Alternatively, the users could access all the ferry services at Circular Quay on the north via the train services (T2, T3 and T8) as shown in Figure 3-13, or the new Town Hall light rail stop for the Sydney CBD and South East Light Rail as shown Figure 3-15 to reach Circular Quay.



Figure 3-16: Barangaroo Ferry Hub (source: TfNSW Tomorrow Sydney Interactive Map)



Figure 3-17: Sydney ferry lines (source: TfNSW)



Figure 3-18: Barangaroo Metro Station (source: Pitt Street Over Station Development – Concept State Significant Development Application – Environmental Impact Statement Overview, 23/08/2018)

### 3.6.5 Cycling

Cycling routes on the surrounding network include separated off-road cycle ways, off-road shared paths and on-road bicycle lanes. Based on the City of Sydney's Cycleway map shown in Figure 3-19, the following infrastructure is provided in the vicinity of the site:

- Pitt Street and Castlereagh Street are classified as "direct routes with higher traffic" with no dedicated bicycle infrastructure;
- Park Street on the frontage of the site is classified as a "direct route with higher traffic" with no dedicated bicycle infrastructure;
- Kent Street on the west of the site (approximately 280m) is classified as "separated off-road cycleway", with a solid median strip separating on-street cycling lanes and traffic lanes;
- George Street on the west of the site (approximately 180m) is classified as "low traffic street or bike lane", with no bike lanes available along the corridor; and
- Wide shared paths are available within Hyde Park (east of the site), which are classified as "off-road shared paths".

The "direct routes with higher traffic" adjacent to the site along Pitt Street connects to the "off-street shared path" to the west of Sydney Tower, between the Pitt Street Mall section, and extends to Circular Quay along a "low traffic street or bike lane". Similar infrastructure is also provided circulating the northern suburbs; The Rocks, Miller Points, and Barangaroo, via George Street to the west of Pitt Street.

The "separated off-road cycleway" along Kent Street to the west of the site provides a connection to the northern suburbs as well. While to the south, the facility on Kent Street continues onto Castlereagh Street leading to the Sydney Central Station with an off-street shared path closer to the station.

To reach destinations on the east of the site, Park Street, which is classified as a "direct route with higher traffic" provides the most direct access connecting to numerous "low traffic street or bike lane" corridors, as well as to the Elan Tower on William Street. While to the southwest, similar classification on Liverpool Street provides access to the local "low traffic street or bike lane" corridors and other cycling facilities connecting to multiple significant destinations such as Sydney high schools, Moore Park, stadiums and others.

To the west, Kent Street provides the access to the off-street shared path on Pyrmont Bridge and continues to the Anzac Bridge and Rozelle. While to the southwest, Liverpool Street provides the connectivity towards the cycling facility within the regions.

In addition, substantial numbers of public bicycle parking spaces are available within the City of Sydney as shown in Figure 3-20, with concentrated provision along the corridors that are surrounded by high density developments.

The NSW Government's Sydney City Centre Access Strategy issued in December 2013 has identified that the city centre cycleways will be a significant transport solution for keeping people moving. The strategy has recommended a north-south separated cycleway between Central and Circular Quay that runs along Castlereagh Street to King street, then down Pitt Street as the key north-south connectivity, which sits next to the site. This is also seen as a priority for City of Sydney as outlined in the Cycling Strategy and Action Plan 2018-2030, shown in Figure 3-21.

The cycleway on the south side of Castlereagh Street opened in September 2015, connecting between Central Station (Hay Street) and Liverpool Street. While the northern section of the cycleway has been deferred due to the Sydney CBD and South East Light Rail construction.

The completion of the cycle network connection along Castlereagh Street will provide direct access for cyclists (employees and visitors) to the site and minimise the reliance on private motor vehicles.



Figure 3-19: Sydney cycling map June 2019 version 1.3 (source: City of Sydney)



Figure 3-20: City of Sydney bike parking map (source: City of Sydney, last modified 11/07/2019)



Figure 3-21: Cycling Strategy and Action Plan For a more sustainable Sydney, Priority 1 (source: City of Sydney)

### 3.6.6 Walking Access

The site is surrounded by approximately 3.3m wide footpaths along its frontages, with signalised pedestrian crossings available to the southwest at the Park Street/ Pitt Street intersection and southeast at the Park Street/ Castlereagh Street intersection. Footpaths of similar widths are also available along the surrounding corridors with pedestrian signal protection at signalised intersections, and at the midblocks of corridors that have high pedestrian volumes.

The Sydney CBD has relatively high levels of pedestrian density and demand due to the concentration of businesses in the precinct. During peak periods, the pedestrian crossings on the road network can become congested as a result of limited space provided. For the footpaths on the surrounding network of the site, there is notable pedestrian demand, including along the frontages on Park Street, Pitt Street and Castlereagh Street. Both the signalised intersections on Park Street at Pitt Street and Castlereagh Street have designated signalised pedestrian crossings on all approaches. It is anticipated that with the ongoing implementation of the Sydney City Centre Access Strategy, as well as the future operation of a new Pitt Street Metro Station, there is likely to be growth in pedestrian volumes on the surrounding footpaths. The pedestrian movement within the public domain has been assessed as part of the CSSI planning pathway.

The City of Sydney Council and Transport for NSW have been developing strategies to assist with prioritising pedestrians and their movements such as allocating sufficient space to support the current levels of demand, as well the estimated growth in numbers in the CBD.

The recently completed Sydney CBD and South East Light Rail includes pedestrianisation of George Street that will deliver a significant shift in the priority of spatial allocation towards pedestrians, by providing more space and an alternative route to Pitt Street for pedestrians walking between Hunter Street and Bathurst Street.

# 4 Overview of The Development

The North OSD development consist of 39 floor levels of predominantly commercial land use, with retail. The development comprises of the following.

- Commercial (office) 52,951m<sup>2</sup> GFA
- Retail (ground level and level 2) 1,700m<sup>2</sup> GFA.
- Bicycle parking facilities (level 1):
  - 200 bicycle parking spaces (for opening year 2024);
  - An accessible shower room including 16 showers for each male and female and one Universal Access Toilet (UAT) shower.
- Vehicle parking provision 40 bays, with a fully automated car stacker parking system.
  - Of the 40-vehicle parking provision within the automatic car stacker, 3 of the 40 bays may be used for service vehicle parking, accommodating vehicles no larger than a B99 vehicle.

- Service vehicle parking bays (ground level):
  - 1 Metro Station maintenance bay
  - 3 courier service bays;
  - 2 Small Rigid Vehicle (SRV) loading bays; and
  - 1 Medium Rigid Vehicle (MRV) loading bay suitable for a waste vehicle.

### 4.1.1 Proposed Access Arrangement

The North OSD is proposed to have only one vehicle access. This access will be located on Castlereagh Street with only right-in and right-out movements on the east side of the site, as shown in Figure 4-1 below. The access is to be shared between the commercial tenants parking (i.e. to the automatic car stacker) and the service vehicles for both the North OSD and Pitt Street Metro North.

The loading dock is a shared facility between the North OSD and Sydney Metro Station. A loading dock booking system will be maintained to ensure the Sydney Metro operator has unimpeded access to the loading dock at all times for servicing and maintenance.

The lobby entrance on Pitt Street will provide pedestrian access for North OSD tenants and visitors. Retail access to various retail hubs is available via Pitt Street, Park Street, and Castlereagh Street as shown in Figure 4-1.

Cyclists will access the development via a dedicated access off Castlereagh Street as indicated in Figure 4-1 to use the End-of-Trip (EoT) lifts to access the bicycle parking facilities on level 1.



Figure 4-1: North OSD access locations on the ground floor (Reference: SMCSWSPS-FOS-OSN-AT-DWG-030013 Rev P1)



Figure 4-2: Cyclist route to access on-site EoT facilities (Reference: SMCSWSPS-FOS-OSN-AT-DWG-030013 Rev P1)

# 4.2 Vehicle Parking Provision

The maximum car parking provision allowed for the North OSD development as per the Sydney LEP 2012 Section 7.5 (last updated on 29 November 2019), is summarised in Table 4-1 below. Access to the car park will be via a car stacker.

| Land use                        | Maximum parking rates   | Proposed<br>Gross<br>Floor Area<br>(GFA) | Maximum parking provision allowed |
|---------------------------------|---|--|-----------------------------------|
| Office*<br>(Category D)         | Land Use Area (GFA) × Site Area<br>50 × Total Building Floor Area (GFA) | 52,942m <sup>2</sup>                     | 63 spaces                         |
| Retail land use<br>(Category D) | 1 space per 90m <sup>2</sup>  | 1,700m <sup>2</sup>                      | 19 spaces                         |
|                                 | Total   | 54,642m <sup>2</sup>                     | 82 spaces                         |

| Table 4-1. | Maximum | narking | nrovision | allowed |
|------------|---------|---------|-----------|---------|
|            | Waximum | parking | provision | anoweu  |

\* The site floor area is approximately 3,150m<sup>2</sup>

As the North OSD site is surrounded by numerous multi-modal transport options as illustrated in Section 3.6 and 5.4, private vehicle usage by tenants is estimated to be minimal. The North OSD has been designed to integrate with the Pitt Street Metro Station, a high frequency service, every 3 minutes located directly beneath the North OSD site, which will significantly improve the accessibility to public transport. Furthermore, the North OSD is expecting and promoting employees and visitors to utilise sustainable travel options (public transport and active transport) as their primary transport and therefore is proposing a total of 40 car spaces. Encouraging active transport usage is further documented as part of the Green Travel Plan in SMCSWSPS-AUR-OSN-EM-REP-000002.

The 40 vehicle parking spaces within the development is below the maximum 82 vehicle parking spaces allowed.

### 4.2.1 Estimated Trip Generation for Private Vehicles

As part of the Stage 1 submission for North OSD, a Traffic Impact Assessment (TIA) was prepared by TTPP for the development concept design to support a State Significant Development (SSD) application in August 2018, with a subsequent addendum prepared on 29 November 2018 to include an alternate scenario for commercial as the primary land use instead of residential. The trip rates adopted in the previous TIA have been replicated in Table 4-2 for reference and was based on trip generation rates sourced from the *New South Wales Transport for Roads & Maritime Services (RMS) Technical Direction TD 2013/4a Guide to Traffic Generating Development: Updated Surveys* ('RMS Trip Generation Guidelines).

 Table 4-2: The previous TIA adopted light vehicle trips generation for the network peak hour (Concept Design TIA, August 2018)

| Peak Period | Land Use     | Previous TIA<br>Parking Provision | Previous TIA Adopted Peak Hour<br>Trip Rate | Previously<br>Forecasted Traffic |
|-------------|--------------|-----------------------------------|---|----------------------------------|
| AM Peak     | Office Block | 51 bays                           | 0.65 trips/ bay                             | 32 vehicles                      |
| PM Peak     | Office Diock |                                   | 0.49 trips/ bay                             | 24 vehicles                      |

The adopted trip rates were the average of the surveys conducted across 10 sites within the wider Sydney metropolitan area, which took in to account trips that had vehicles parked elsewhere within the survey sites (e.g. at commercial parking lots). This process of developing the trip generation is referred to as 'road network peak generation' as it is relevant to traffic impact on the wider network, and it is not considered reflective to estimate site specific trips directly in/out from a specific site such as North OSD. It should be noted that the North OSD visitor or tenant trips who may park at nearby car parks are part of the car park trip generation accounted by the car parks, not North OSD. These potential trips are assumed to be minimal.
In line with the previous TIA assessment and assumptions for light vehicle trip generation, the nominated 40 bays equates to up to 26 vehicles during the AM peak and up to 20 vehicles during the PM peak hour.

Table 4-3: Based on the previous TIA assumptions around the adopted peak hour trip rate for the current parking provision of 40 bays

| Peak Period | Land Use     | Current Parking<br>Provision | Previous TIA Adopted Peak Hour<br>Trip Rate | Forecasted Traffic |
|-------------|--------------|------------------------------|---|--------------------|
| AM Peak     | Office Block | 40 bays                      | 0.65 trips/ bay                             | 26 vehicles        |
| PM Peak     | Office Block | 40 bays                      | 0.49 trips/ bay                             | 20 vehicles        |

For this study, it is proposed that peak traffic generation rates specific to OSD North are adopted (i.e. reflective of vehicles parking at the development site). This is referred to as 'site specific trip generation' and is considered more relevant and appropriate for the trip generation associated with North OSD. These trip rates are summarised in Table 4-4.

 Table 4-4: Road and Traffic Authority Trip Generation and Parking Generation survey site peak hour trip generation rates for general traffic

| 0           | Landar         | Site Peak Hour Trip Rates (vehicle/bay) |         |  |  |  |
|-------------|----------------|---|---------|--|--|--|
| Survey Site | Location       | AM Peak                                 | PM Peak |  |  |  |
| Site 1      | North Sydney   | 0.32                                    | 0.24    |  |  |  |
| Site 2      | Chatswood      | 0.28                                    | 0.33    |  |  |  |
| Site 3      | Olympic Park   | 0.20                                    | 0.16    |  |  |  |
| Site 4      | Hurstville     | 0.41                                    | 0.26    |  |  |  |
| Site 5      | Macquarie Park | 0.29                                    | 0.23    |  |  |  |
| Site 6      | Parramatta     | 0.16                                    | 0.14    |  |  |  |
| Site 7      | Liverpool      | 0.32                                    | 0.29    |  |  |  |
| Site 8      | Bella Vista    | 0.22                                    | 0.07    |  |  |  |
| Site 9      | Newcastle      | 0.40                                    | 0.36    |  |  |  |
| Site 10     | Wollongong     | 0.34                                    | 0.38    |  |  |  |

The development is located within the Sydney CBD and has been designed to integrate with Sydney Metro infrastructure. With such high accessibility to public transport and low total car park numbers, North OSD development is expected to generate low volumes of traffic. Therefore, to avoid overestimation it is proposed that survey sites which share a similar environment as the site (i.e. that of a Sydney CBD) are considered for the OSD North development. The survey sites which are considered of similar nature to the Sydney CBD are: North Sydney (Site 1), Chatswood (Site 2) and Parramatta (Site 6), which have been highlighted in bold in Table 4-4. The estimated resulting trip generation for the development is summarised in Table 4-5 and is based on the maximum AM and PM peak hour trip generation rate for the three comparable sites.

Table 4-5: Estimated peak hour light vehicle trips generation for OSD North

| Peak Period | Parking Provision | Trip rate<br>(vehicles/ bay) | Proposed development trips |  |
|-------------|-------------------|------------------------------|----------------------------|--|
| AM Peak     | 10 hovo           | 0.32*                        | 13 vehicles                |  |
| PM Peak     | 40 Days           | 0.33**                       | 14 vehicles                |  |

\* Survey Site 1 (North Sydney); \*\* Survey Site 2 (Chatswood)

As discussed in Section 3.3, the previous land use at the site included 160-170 parking bays, which was estimated to generate approximately 55 trips during both the AM and PM peak hours. The North OSD development is estimated to generate a maximum of approximately 14 vehicle trips during the peak periods. Therefore, in regard to vehicle trips, the development is likely to be an improvement compared to the previous land uses.

As part of the overall loading dock capacity and analysis, the development trips for the car stacker for the AM peak hour may range from 13 - 26 vehicles. For the analysis of the typical automatic car stacker access, the more conservative approach of 26 vehicles during the AM peak hour has been assumed. As the commercial

car parking will be predominantly accessed in the AM peak as commercial tenants arrive to work in the morning, all 40 bays are assumed to be occupied in line with a typical 'start of a working day' for the AM peak between 6 - 9 am with a peak hour between 7 - 8 am and shown in Figure 4-3. The departure of vehicles from the automatic car stacker is assumed with the typical 'end of day' between 4 - 7pm, where the peak hour is from 5 - 6pm.





The above typical automatic car stacker arrival profile has been used when assessing the overall loading dock capacity. This is further described in Section 4.3.

#### 4.2.2 Automatic Car Lift Operations

Access to the commercial parking is provided from Castlereagh Street and shown in Figure 4-4. There are two dedicated automatic car lifts available for a total of 40 car parking bays stacked over three levels. The 40 bays will be utilised by commercial tenants and longer dwell time service delivery vehicles only and no public parking has been allowed for at North OSD.

Prior to access to use the automatic car lift, the specific commercial tenant will need to undertake an induction on '*How to use the Automatic Car Lift*' which will provide them access to the car lift. The induction will cover critical components around where the driver should stop the car and how access the car lift will be undertaken, including any after hour restrictions that may be imposed by the building operations.



Figure 4-4: North OSD Automatic Car Stacker Commercial Vehicle Access

The assumptions associated with the automatic car lift have been provided by the automatic car lift manufacturer as noted in Table 4-6. To assess the potential vehicle queue that may occur at the automatic car lift, each individual stage of the vehicle journey has been considered to estimate the service rate of the automatic car park lift and its operations. As a worst-case scenario, assessment for the car lift has assumed the commercial tenant is required to vacate their car.

| Table 4-6: | Automatic | Car Lift | Assumptions |
|------------|-----------|----------|-------------|
|------------|-----------|----------|-------------|

| Item   | Assumption | Comment  |
|--|------------|--|
| Average time taken for drivers to<br>exit/ enter the lift from waiting area<br>(i.e. parking the car inside the lift).       | 30 seconds | Assumed as the average time. If additional time is<br>required, it is assumed that if the adjacent B99 bays are<br>available that these will be used. In addition, for DDA<br>compliance, these adjacent B99 bays will be used and<br>require the loading dock master to assist. |
| Once the vehicle is within the lift,<br>the average time taken for the<br>driver to exit / enter the vehicle in<br>the lift. | 30 seconds | Assumed as the average time.   |
| Average time taken for the driver<br>to send the lift using the digital<br>screen.   | 30 seconds | Assumed as the average time.   |

| Item                                | Assumption        | Comment                            |
|-------------------------------------|-------------------|------------------------------------|
| Lift service rate for a single lift | 21 vehicles/ hour | Provided by car lift manufacturer. |

With two automatic car lifts in operation, the service rate is assumed to double with the use of both lifts, equating to a total of 42 vehicles per hour which is greater than the available number of commercial parking bays. This capacity has also been shown in Figure 4-3.

As OSD North is a commercial site, it is assumed that during the AM peak usage of the lifts will be for inbound flow, and similarly for the PM peak usage of the lifts will be predominantly for outbound flow.

Based on the arrival rates summarised in section 4.2.1, the estimated demand for the automatic car stacker has been assumed as 26 vehicles/ hour for the inbound AM peak. This is equivalent to 2 cars arriving every 4 to 5 minutes.

The closest signalised intersection to the North OSD loading dock is Market Street and Castlereagh Street. It is assumed that during the AM peak, this signalised intersection has a total cycle time of 110 seconds, and similarly for the PM peak. Both Market Street and Castlereagh Street are one-way streets, as such the likelihood of vehicles arriving can either be equally distributed which equates to a vehicle arriving approximately every minute, or dominant for one approach only which equates to a vehicle arriving approximately every two minutes. Based on the arrival profile for commercial vehicles noted earlier, two commercial vehicles are likely to arrive every 4 to 5 minutes during the peak hour, which is accommodated within 2 signal cycle times at the Market Street / Castlereagh Street intersection and also accommodated by the two automatic car lifts.

To further supplement the commercial tenant queuing, based on the queueing theory outlined in *Austroads Guide to Traffic Management Part 2: Traffic Theory*, Table 4-7 summarises queueing probabilities as estimated for the two lifts for the peak inbound AM Peak demand of up to 26 vehicles/ hour (summarised in section 4.2.1). Based on this, the 95<sup>th</sup> percentile queue for the two automatic car lifts is estimated as 2 vehicles in queue, which can be accommodated as one vehicle per automatic car lift within the overall design.

Table 4-7: Queuing Probabilities based on queuing theory outlined in Austroads Guide to Traffic Management

| Vehicles in Queue | 0   | 1   | 2  | More than 2 |
|-------------------|-----|-----|----|-------------|
| Probability       | 69% | 21% | 7% | 3%          |

As shown in Figure 4-5, the area within the OSD North loading dock on approach to the automatic car lift is estimated to hold up to four B99 vehicles without impacting the Castlereagh Street public domain. It should be noted that this does not include the two vehicles already using the automatic car lift. As such, the automatic car lift is not estimated to have a significant regular impact on the adjacent corridor or access to the loading dock via Castlereagh Street including the pedestrian footpath.



Figure 4-5: North OSD automatic car stacker available queuing space for vehicles (B99)

Furthermore, with the 4 to 5 minute arrival internal to the loading dock during the AM peak for the estimated 26 vehicles, and the operation of each car lift allowing access every 3 minutes, (or with the two lifts this improves access for vehicles to every 1.5 minutes), there is a high probability that the commercial vehicle will be able to arrive and access the automatic car lift with minimal queuing required. The probability of more than two vehicles arriving at the same time is 3% which, over the hour equates to 2 minutes which is likely to clear up before the arrival of the successive vehicle to use the loading dock.

Direct liaison between the commercial tenant and the loading dock master will be beneficial in ensuring minimal impact to the overall loading dock operations. This may be undertaken by providing the commercial tenant with a remote-control dongle or a phone application, which when activated, not only signals to the loading dock master that the automatic car lift is going to be in operation, but it also manages any vehicle queuing of the loading dock to occur off street (i.e. within the loading dock), and not on street (i.e. outside of the loading dock) due to possible conflicting vehicle movements between a loading dock vehicle and a commercial vehicle.

The impact of the use of the automatic car lift on the loading dock use is further discussed in Section 4.3, and proposed operation of the automatic car lift and communication to the commercial tenants is further summarised below.

While the estimated queue that may result from the automatic car stacker will be kept within the development, there is the possibility this may still impact on the loading dock performance as service vehicle movements may at times be restricted. As such the strategy proposed for the operation of the loading dock considers a nominal time period when the arrival of commercial tenants to use the automatic car stacker is likely to occur. A typical arrival profile of the 40 commercial bays has been shown in Figure 4-3 which shows the peak arrival of up to 26 vehicles during a peak hour.

As such a nominated 2-hour period (between 7am – 9am) is proposed where no bookings for the loading dock will be accepted. Although there is no formal booking facility available for loading dock operations, there is contingency within the loading dock and arrival of the commercial tenants to the automatic car stacker to accommodate arrival and departure of loading vehicles such that in the event that a vehicle arrives at the loading dock without a booking, it can still access the loading dock, however the online booking facility is not proposed during this time (except for Sydney Metro Bay access).

The North OSD designers of the automatic car lift have indicated that in the event that the automatic car lift breaks down it will be approximately one week (worst case) for the car lift to be operational again. As part of the loading dock management plan, operational measures will be put in place to minimise any disruption for all loading dock users. During the event that one of the automatic car lifts breaks down and requires serviceability, the peak volume of 26 vehicles per hour will exceed the capacity of one lift. During an event where an automatic car lift has broken down, the commercial tenants will be informed, and encouraged to arrive during the adjacent hour, when access capacity will be available for the car stacker. As no bookings are available during the nominated two hours in the AM peak, this is estimated to have a minimal impact on loading dock operations.

#### 4.3 Loading Dock and Service Vehicles

It is understood that the Sydney LEP 2012 has been referred to as the main policy for the site to comply with. However, as no specification for service vehicle parking provision is outlined in the Sydney LEP 2012, the North OSD has therefore adopted the recommendations from the Sydney Development Control Plan (DCP) 2012. DCP 2012 states the objective for developments is to ensure the potential demand can be adequately accommodated on site and/ or without any adverse implication external to the site.

#### 4.3.1 North OSD Stage 2 Loading Requirements

As noted earlier the DCP 2012 does not provide specific detail around the loading bay requirements. As such, the RMS guidelines were referenced to understand the North OSD Stage 2 loading requirements which are summarised as follows:

- Commercial: 5 bays for the first 20,000m<sup>2</sup>, and then one space per 8,000m<sup>2</sup>
- Retail: one bay per 400m<sup>2</sup>

Table 4-8 provides a summary comparison of the Stage 1 (as reference in section 4.3.1) and current design requirements. For the current design, 13 bays are required for North OSD for the commercial and retail land use.

|            | Stage 1 (as referen                            | ce in section 4.3.1) | Current Design        |                         |  |  |
|------------|--|----------------------|-----------------------|-------------------------|--|--|
| Land Use   | Area (m <sup>2</sup> ) Service<br>Requirements |                      | Area (m²)             | Service<br>Requirements |  |  |
| Commercial | 49,120 m <sup>2</sup>                          | 8.6                  | 52,951 m <sup>2</sup> | 9.1                     |  |  |
| Retail     | 500 m <sup>2</sup>                             | 1.3                  | 1,700 m <sup>2</sup>  | 4.3                     |  |  |
| Total      | 49,620 m <sup>2</sup>                          | 10 bays              | 54,651 m²             | 13 bays                 |  |  |

#### Table 4-8: North OSD Loading Dock requirements

From Table 4-8, the forecast profiles for the current North OSD design show an indicative total maximum of 13 bays are required for commercial and retail land uses without any management and re-arrangement of loading bays. As management measures, including an on-site dock manager, converting 3 bays into courier spaces, and implementing a delivery service plan, are included as part of the loading dock operations strategy, this reduces the loading spaces required if such measures were not in place, as it keeps the loading dock operating with a high utilisation. With the operational management measures in place, a lower provision of 6 bays was considered acceptable and in line with the previous measures recommended for a similar land use. The reduction from 13 to 6 bays assessment is shown in Figure 4-6.



Figure 4-6: Loading bays required with management measures (source: Pitt Street North Dock Activity Assessment – Draft Version 2, 9 April 2018)

#### 4.3.2 Loading Dock Service Bay Provision

North OSD will provide a total of seven on-site service vehicle bays with the bays designed to mainly accommodate the vehicle types below:

- 1 x Sydney Metro operational bay (B99, 99<sup>th</sup> percentile of class of cars);
- 3 x light commercial vehicles (B99, 99<sup>th</sup> percentile of class of cars);
- 2 x Small Rigid Vehicle (SRV);
- 1 x Medium Rigid Vehicle (MRV); and
- 3 x light commercial vehicle bays within the automatic car stacker (B99, 99th percentile size of cars).

The indicative location of each of the loading dock service bays within the loading dock is shown in Figure 4-7 (it should be noted the image reference used for this image is an older drawing but the location of the proposed parking bays within the loading dock remains unchanged).



Figure 4-7: North OSD Loading bay locations (note: the image reference used for this image is an older drawing but the location of the proposed parking bays within the loading dock remains unchanged)

Within the loading zone there is a 'general share use area', highlighted blue, which will be used by all vehicles using the loading dock. This includes the commercial tenants who will access the automatic car stacker (highlighted in red), the B99 bays at the southern section of the loading dock for service deliveries

(highlighted in orange), and larger vehicles and the Sydney Metro Bay in the northern section of the loading dock (highlighted in green).

#### 4.3.3 Loading Dock Service Bay Typical Demand Profile

The North OSD loading dock is estimated, but not limited to the following services via the loading dock bays:

- Grocery deliveries (regularly);
- Goods deliveries for retail (weekly);
- Furniture delivery (prior to opening and rarely occurring after opening);
- Waste collection (daily);
- Cleaning and maintenance service (regularly);
- Building maintenance service (occasionally);
- Mail and parcel delivery (daily where arrival is irregular and difficult to manage); and
- Sydney Metro transformer replacement service (emergency).

The loading dock assessment (excluding the automatic car use) has considered the typical daily maximum number of loading dock vehicles for the proposed land use (including commercial and retail), alongside an hourly maximum number.

Based on research including the Institute of Transport (ITE) trip generation handbook 1992, a local Sydney CBD research study presented at the AITPM National conference, alongside recent development applications in the Sydney CBD including the Sydney Metro Martin Place OSD, for a development of the size of North OSD, between 14 and 17 peak hour service vehicle trips are estimated, with the daily maximum number of vehicles estimated as 101 vehicles per day.

The operation of the loading dock for OSD North can accommodate up to a maximum of 17 vehicles per hour based on operational procedures (this is further explained in Section 4.3.4 below). As such, the loading dock facility is estimated to have sufficient capacity to cater for a peak demand for deliveries, which reduces the risk of external on street loading facilities being used.

There are likely to be periods where the loading dock may operate at a maximum hourly demand of 17 vehicles per hour and outside of these periods the loading dock is likely to operate at a lower demand (i.e. less than 17 vehicles per hour), totalling to a maximum of 101 vehicles per day.

The proposed typical loading dock bookings for the ground floor loading dock bays is shown in Figure 4-8 (excluding the use of the Sydney Metro bay or the three additional bays within the car stacker which are accounted for as part of the automatic car stacker analysis). The capacity of the loading dock, shown as a solid green line, accounts for the typical arrival and departure of the commercial tenants via the automatic car stacker (shown in Figure 4-3). The typical loading dock bookings shows that there is capacity within the loading dock to reach the maximum capacity of 17 vehicles per hour. The total number of proposed typical loading dock bookings is summarised at the base of the table where a maximum of no more than 12 vehicles per hour are proposed for the typical loading dock booking period.



Figure 4-8: Typical Loading Dock Bookings arrival profile for Pitt Street North

As shown by the solid green line in Figure 4-8, the peak service delivery vehicle period where up to 17 vehicles are able to use the loading dock based on a upper managed limit for the loading dock, is proposed to fall outside the period where the highest movement for the automatic car lift is estimated. Within the time where the highest movement for the automatic car lift occurs (assumed to be 7 - 9 am), it is recommended that the online booking facility accepts no bookings during this time (except for Sydney Metro Bay access). Although there is no online booking facility proposed between the assumed 7 - 9am, there is allowance for contingency within the loading dock to accommodate arrival and departure of loading vehicles such that in the event that a vehicle arrives at the loading dock mistakenly during the two hours where the highest movement of vehicles is assumed for the automatic car lift, the loading dock vehicle can still use the loading dock, with no greater than 6 - 8 service vehicles accessing the loading dock during the peak 7 - 9am time period.

To accommodate the provision of loading dock vehicles which require longer dwell times, access to three B99 bays has been allowed for within the automatic car stacker and access to these will also be booked via the loading dock booking system.

With the booking system in place for managing the arrival and departures of the loading dock requirements, a typical loading dock booking activity profile is shown in the diagram below combining the use of the loading dock and the commercial tenant access to the automatic car stacker. As noted earlier, a delivery exclusion period during the peak commercial tenant arrival (i.e. 7 - 9am) is proposed and there is contingency within the loading dock to accommodate the arrival and departure of loading vehicles such that in the event that a vehicle arrives to the loading dock it can still use the loading dock, however the online booking facility is not proposed during this time (except for Sydney Metro Bay access).

Pitt Street North Proposed Typical Loading Dock Bookings



Figure 4-9: Typical Loading Dock Bookings and arrival of automatic car lift arrival profile for Pitt Street North

#### 4.3.4 Loading Dock Management

The Delivery Service Plan (Attached in Appendix A) will be managed by a dedicated on-site loading dock master through an integrated loading dock digital system notifying when deliveries are arriving and time allocation to specific loading requirements. To assist with the development of the Delivery Service Plan, a high-level assessment has been undertaken to understand if there will be any issues with the loading dock, and provide guiding principles to be integrated as part of the Delivery Service Plan.

Access to the loading dock and the automatic car lift usage are intertwined with two customer types. The first are the commercial tenants who will use the automatic car stacker at an ad hoc basis (this is further described in Section 4.2.2 of this document). The second are the loading dock users who can arrive to the loading dock based on a time allocated to them.

The general operation of the loading dock is simplified into a northern loading dock section, a southern loading dock section and the automatic car stacker as shown in Figure 4-10 (it should be noted the image reference used for this image is an older drawing but the location of the proposed parking bays within the loading dock remains unchanged).



Figure 4-10: North OSD Loading operations (note: the image reference used for this image is an older drawing but the location of the proposed parking bays within the loading dock remains unchanged)

As shown in Figure 4-10, 'the general shared use area by all vehicles' shows that the arrival of commercial tenants impacts the use of the loading dock and vice versa. To minimise an arrival overlap of the two customer types arriving at the same time, the following governing principles are proposed to be incorporated as part of the loading dock Delivery Service Plan:

- Arrival of commercial tenants during a dedicated time period where no loading dock bookings are available (except for access to the Sydney Metro Bay). To inform what this time period is, it is recommended that as part of the automatic car stacker induction, that every individual commercial tenant who uses the automatic car stacker will need to undertake, a question regarding the preferred arrival and departure time is included to determine the typical peak arrival time. For example, this may be determined to be between 7am and 9am (as shown in Figure 4-3), during which time the arrival of loading dock vehicles will need to be reduced and actively managed. This is in line with the operations management strategy described in Section 4.2.2.
  - A delivery exclusion period during the peak commercial tenant arrival (i.e. 7 9am) is proposed. There
    is contingency within the loading dock to accommodate arrival and departure of loading vehicles such

that in the event that a vehicle arrives to the loading dock it can still use the loading dock, however the online booking facility will not accept bookings during this time (except for Sydney Metro Bay access).

 Outside of this time period the loading dock will operate based on a booking system to manage loading dock arrivals and departures.

Outside of the commercial tenants, as shown in Figure 4-10, the loading dock design is separated into a north and south loading component where:

- The northern segment requires the use of a turn table for loading for the Sydney Metro (B99) bay, two SRV bays and one MRV bay, and
- The southern segment is used by three B99 bays, preferably accessed by reversing into the bay and egressed by forward movement out of the loading dock.
- To accommodate the provision of loading dock vehicles which may require longer dwell times, access to three B99 bays have been allowed for within the automatic car stacker and access to these will also be booked via the loading dock booking system.

At any given time, a vehicle accessing the northern segment of the loading dock does not hinder the use of the southern segment of the loading dock, however the use of a vehicle in the southern segment of the loading dock does hinder the use of the northern segment of the loading dock. To minimise loading dock northern and southern segment overlap access issues, it is proposed that loading dock arrivals are staggered such that the arrival of two consecutive northern segment vehicles (or southern segment vehicles) do not arrive to the loading dock in less than 10-minute intervals. This allows for the staggering of the northern segment loading activities. In addition, a time limit is recommended to be imposed for vehicles using the loading dock which will need to be defined at the time of booking / arrival. At a minimum this is assumed to be 30 minutes per loading bay (including the time allocated to parking and egress from the bay) for either the northern or southern loading dock segments. Based on this, a total of 12 loading vehicles are able to use the loading dock per hour (6 on the northern segment and 6 on the southern segment), which allows for a maximum of 6 vehicles parked in the loading dock at the same time (excluding the Sydney Metro B99 bay). If loading is required for a longer period for a particular bay (excluding the Sydney Metro B99 bay), it is recommended that this is scheduled in for later in the day when the traditional need to use the loading dock is reduced.

Depending on the loading requirements in particular the deliveries each day, the loading strategy each day may change. To understand the total capacity of the loading dock, the following scenarios logic is outlined (excluding the loading dock being used by the commercial tenants for the automatic car lift):

A 30 minute time allocation for loading for all vehicles. As shown in Table 4-9, this equates to an assumed 12 vehicles per hour for the North OSD loading dock, and over a typical 8-hour day this is equivalent to 96 vehicles accessing the loading dock. Over a 10-hour day this is equivalent to 120 vehicles accessing the loading dock.

Table 4-9: North OSD Loading capacity based on a 30-minute round trip (time allocation in bay is assumed approximately 20-minutes)

| B99 Bay 3  |            |   |              |                 | Out           | In             |                  |              |                 |               | Out           | In         |
|------------|------------|---|--------------|-----------------|---------------|----------------|------------------|--------------|-----------------|---------------|---------------|------------|
| B99 Bay 2  |            |   | Out          | In              |               |                |                  |              | Out             | In            |               |            |
| B99 Bay 1  | Out        | In  |              |                 |               |                | Out              | In           |                 |               |               |            |
| SRV Bay 2  |            |   |              | Out             | In            |                |                  |              |                 | Out           | In            |            |
| SRV Bay 1  |            | Out   | In           |                 |               |                |                  | Out          | In              |               |               |            |
| MRV        | In         |   |              |                 |               | Out            | In               |              |                 |               |               | Out        |
| Metro      |            |   |              |                 |               | Access avai    | lable at all tir | mes          |                 |               |               |            |
| TIME       | 0 - 5min   | 5 - 10min   | 10 - 15min   | 15 - 20min      | 20 - 25min    | 25 - 30min     | 30 - 35min       | 35 - 40min   | 40 - 45min      | 45 - 50min    | 50 - 55min    | 55 - 60min |
| Proposed   | To minim   | ise and mit   | igate any co | nflict, all loa | ding dock vel | hicles will be | provided wit     | h a timeslot | prior to arriva | al. Furthermo | ore the Loadi | ng Dock    |
| Management | Master w   | laster will manage arrival and departure of the two vehicles within each 5 minute window. The role of the Loading Dock Master is beyond the |              |                 |               |                |                  |              |                 |               |               |            |
| Procedure  | traditiona | aditional role of a security guard, and will include knowledge of logistics and traffic management training.                                |              |                 |               |                |                  |              |                 |               |               |            |

A 45 minute time allocation for loading for all vehicles. As shown in Table 4-10, this equates to an assumed 9 vehicles per hour for the North OSD loading dock, and over a typical 8-hour day this is equivalent to 72 vehicles accessing the loading dock. Over a 10-hour day this is equivalent to 90 vehicles accessing the loading dock.

## Table 4-10: North OSD Loading capacity based on a 45 minute round trip (time allocation in bay is assumed approximately 35-minutes)

| B99 Bay 3  | Out      | In        |            |  |            |             |                  |            |              | Out        | In            |              |
|------------|----------|-----------|------------|--|------------|-------------|------------------|------------|--------------|------------|---------------|--------------|
| B99 Bay 2  |          |           |            |  |            |             |                  | Out        | In           |            |               |              |
| B99 Bay 1  |          |           |            |  |            | Out         | In               |            |              |            |               |              |
| SRV Bay 2  |          |           |            | Out  | In         |             |                  |            |              |            |               |              |
| SRV Bay 1  |          | Out       | In         |  |            |             |                  |            |              |            | Out           | In           |
| MRV        | In       |           |            |  |            |             |                  |            | Out          | In         |               |              |
| Metro      |          |           |            |  |            | Access avai | lable at all tir | mes        |              |            |               |              |
| TIME       | 0 - 5min | 5 - 10min | 10 - 15min | 15 - 20min   | 20 - 25min | 25 - 30min  | 30 - 35min       | 35 - 40min | 40 - 45min   | 45 - 50min | 50 - 55min    | 55 - 60min   |
| Proposed   |          |           | Bick bo    | Disk has been mitigated between the arrival and departure of two |            |             |                  |            | Risk has bee |            | as been       |              |
| Management | As pe    | er above  | risk na    | vehicles.  |            |             |                  |            | As per       | above      | mitigated b   | etween the   |
| Procedure  |          |           |            |  |            |             |                  |            |              |            | arrival and o | departure of |

- A 60 minute time allocation for loading for all vehicles. As shown in Table 4-11, this equates to an assumed 6 vehicles per hour for the North OSD loading dock, and over a typical 8-hour day this is equivalent to 48 vehicles accessing the loading dock. Over a 10-hour day this is equivalent to 60 vehicles accessing the loading dock.
  - Table 4-11: North OSD Loading capacity based on a 60 minute round trip (time allocation in bay is assumed approximately 50-minutes)

| B99 Bay 3  |          |  |            |            |            |             |                  |            |            | Out        | In         |            |
|------------|----------|--|------------|------------|------------|-------------|------------------|------------|------------|------------|------------|------------|
| B99 Bay 2  |          |  |            |            |            | Out         | In               |            |            |            |            |            |
| B99 Bay 1  |          | Out  | In         |            |            |             |                  |            |            |            |            |            |
| SRV Bay 2  |          |  |            |            |            |             |                  | Out        | In         |            |            |            |
| SRV Bay 1  |          |  |            | Out        | In         |             |                  |            |            |            |            |            |
| MRV        | In       |  |            |            |            |             |                  |            |            |            |            | Out        |
| Metro      |          |  |            |            |            | Access avai | lable at all tir | mes        |            |            |            |            |
| TIME       | 0 - 5min | 5 - 10min  | 10 - 15min | 15 - 20min | 20 - 25min | 25 - 30min  | 30 - 35min       | 35 - 40min | 40 - 45min | 45 - 50min | 50 - 55min | 55 - 60min |
| Proposed   |          |  |            |            |            |             |                  |            |            |            |            |            |
| Management |          | Risk has been mitigated between the arrival and departure of two vehicles. |            |            |            |             |                  |            |            |            |            |            |
| Procedure  |          |  |            |            |            |             |                  |            |            |            |            |            |

Increasing the loading dock operating hours allows for additional vehicles to access the loading dock, which may be required to manage peak periods of operation. As noted earlier to accommodate the provision of loading dock vehicles which require longer dwell times, access to three B99 bays has been allowed for within the automatic car stacker and access to these will also be booked via the loading dock booking system.

A combination of various time allocation for loading vehicles may be possible such that a different time allocation is assumed for the northern segment to that of the southern segment. Furthermore, the system could also allow loading vehicles to make 'double' or 'triple' bookings or specify a duration of the loading time they require which may be accommodated by the loading dock master if there is adequate capacity to accommodate the request.

As discussed earlier, based on research (ITE, a local Sydney CBD research study and other recent developments in the Sydney CBD), for a development of the size of North OSD, between 14 and 17 peak hour vehicle trips can be expected. During periods where there is little to no automatic car stacker demands, it is anticipated that the loading dock could accommodate up to 17 vehicles per hour (loading of each loading bay is limited to approximately 15 - 18 minutes) which is equivalent to approximately 15% of the total daily requirements for North OSD.

A Delivery Service Plan for North OSD is required in accordance with the SEARs condition. The Delivery Service Plan is recommended to be in place for the loading dock to actively manage the service operations, and to ensure the loading requirements can be undertaken with minimal disruption or adverse impacts to the external road network. The design components associated with a Delivery Service Plan have been attached in Appendix A.

#### **Contingency Responses for Potential Incidents**

A number of potential incidents may limit the operation of the loading dock and automatic car stacker. These are outlined in Table 4-12.

| Incident  | Impact   | Response   |
|---|--|--|
| Blocked Access to Northern<br>Segment of the Loading Dock | A vehicle has broken down within the<br>northern segment of the loading<br>facility.               | If the vehicle is broken down in a<br>particular bay, then all vehicles<br>scheduled to use that particular bay<br>will need to be notified immediately.<br>Towing Service to be called<br>immediately to remove the vehicle.  |
|   |  | If the vehicle is broken down on the<br>turntable, towing service to be called<br>immediately to remove the vehicle.   |
| Blocked Access to Loading Dock                            | Loading Dock and Automatic Car Lift<br>not available due to blocked access<br>to the loading dock. | Towing Service to be called<br>immediately to remove the vehicle<br>that is blocking access to the loading<br>dock. Any scheduled deliveries will<br>need to be rescheduled to following<br>when the broken-down vehicle is<br>removed.  |
| Delivery outside of nominated booking time                | Vehicle blocking access to the loading dock.   | Dock Master to allow vehicle to use<br>turn table to egress from the loading<br>dock area, or if available to<br>undertake required loading in<br>available bay.   |
| Loading taking longer than time<br>limit                  | Arrival and delay of consecutive vehicles arriving to the loading dock.                            | If time is available, the bay may be<br>utilised for the extra time required. If<br>it is impacting the operations of other<br>vehicles, then the loading dock<br>master is to decide if this vehicle is to<br>vacate the bay or notify the next<br>vehicle to come at a different time<br>slot. |
| Failure of the turntable                                  | Northern Segment of loading dock is<br>not able to be utilised due to<br>turntable being broken.   | Determine the time required to fix the turntable.<br>One of the Southern Segment service bays to be allocated to a Sydney Metro bay, and all loading for   |
|   |  | that bay to be managed.  |
|   |  | If it is a short-term fix, loading to<br>recommence for high priority<br>deliveries once the turntable is fixed,<br>followed by lower priority deliveries.   |
|   |  | If it is a long-term fix, high priority<br>loading deliveries to be undertaken at<br>surrounding on-street loading<br>facilities.  |

| Table 4-12: | Contingency | Responses | for Potential | Incidents a | t North | OSD |
|-------------|-------------|-----------|---------------|-------------|---------|-----|
|             |             |           |               |             |         |     |

| Incident                          | Impact   | Response  |
|-----------------------------------|--|---|
| Failure of the automatic car lift | Lowers access time for commercial<br>tenants potentially resulting in an<br>increase in slower operations for the<br>overall loading dock. | In the event the automatic car lift<br>breaks down, a one-week down time<br>is noted (the automatic car lift<br>designer) to fix the automatic car lift.<br>With one lift in operation, there is<br>sufficient capacity to meet the<br>estimated demand for the automatic<br>car stacker. |

#### 4.3.5 Swept Paths Analysis

Swept path analysis was undertaken for a 5.2m length B99 vehicle and a 6.4m length SRV and a 8.8m length MRV.

Figure 4-11 to Figure 4-14 illustrate that the design layout can adequately accommodate the design vehicle movements to service the loading dock. The swept paths show that the vehicles do not require more than three points of turn to manoeuvre in and out from the bays. It should be noted that loading of small goods from the SRV bays may be undertaken on the turntable, and if bulky goods loading is required, these should be undertaken from the MRV service bay.



Figure 4-11: Vehicle swept path analysis for MRV - forward in and forward out from loading area



Figure 4-12: Vehicle swept path analysis for the B99 western bay - reverse in and forward out from bay



Figure 4-13: Vehicle swept path analysis for the B99 eastern bay - reverse in and forward out from bay



Figure 4-14: Vehicle swept path analysis for the SRV – forward in and forward out from loading area

#### 4.3.6 Sydney Metro Vehicle Loading

The Sydney Metro Operation bay will be occasionally occupied to undertake maintenance services for the Pitt Street Station. The Sydney Metro loading bay is for a B99 size vehicle and access to the Sydney Metro Bay is via the turn table within the loading dock.

#### 4.3.7 Waste Vehicle Loading

A detailed Operational Waste Management Plan can be found in SMCSWSPS-TTM-OSN-CE-PLN-000001. All waste loading is noted to occur off street. Waste vehicles are proposed to use the MRV bay for all waste servicing. Swept path analysis for a 9.25m waste vehicle was undertaken and shown in Figure 4-15.



Figure 4-15: Vehicle swept path analysis for the 9.25m waste vehicle – forward in and forward out from loading area

#### 4.3.8 Safety Considerations

Cyclists will access the development via a dedicated access off Castlereagh Street as indicated in Figure 4-1 to use the End-of-Trip (EoT) lifts to access the bicycle parking facilities on level 1.

As the cyclist access is located close to the vehicle access to the east, the users are exposed to some safety risks, particularly the on-street cyclists who travel in a southbound direction will ride across the vehicle access crossover from Castlereagh Street to access the development loading dock. It is recommended that awareness improvements be implemented in the area to reduce the risk, such as a warning system and convex mirror mounted onto street poles as shown in Figure 4-16. This has been included as part of the Green Travel Plan recommendations in SMCSWSPS-AUR-OSN-EM-REP-000002 as it impacts North OSD cyclists who use the EoT facilities. It is however noted that public domain measures fall under the planning pathway of the CSSI and are not a matter for consideration under this SSDA application.



Figure 4-16: Suggested safety\measures at loading dock access (Reference: SMCSWSPS-FOS-OSN-AT-DWG-030013 Rev P1)

## 4.4 Bicycle Parking Facilities

The North OSD has adopted the recommendations from the Sydney Development Control Plan (DCP) 2012 to ensure adequate spaces are provided on site to accommodate the demand for cycling<sup>1</sup>. The recommended bicycle parking provision required for the North OSD development as per the Sydney DCP 2012 Section 3.11.3, is summarised in Table 4-13 below.

Table 4-13: Bicycle parking provision required

| Land<br>use | Bicycle parking space<br>rates                | Proposed North OSD Gross Floor<br>Area (GFA) | Minimum service parking<br>provision required |
|-------------|---|--|---|
| Office      | Employees – 1 per 150m <sup>2</sup>           | 52 951m <sup>2</sup>                         | 353 spaces                                    |
|             | Visitor – 1 per 400m <sup>2</sup>             | 02,00111                                     | 133 spaces                                    |
| Shop        | Employees – 1 per 250m <sup>2</sup>           |  | 7 spaces                                      |
|             | Customers – 2 plus 1 per<br>100m <sup>2</sup> | 1,700m <sup>2</sup>                          | 19 spaces                                     |
| Total       |   | 54,651m <sup>2</sup>                         | 512 spaces                                    |

The development allows for a total of 512 bicycle parking spaces in line with the Sydney DCP requirements. It is proposed that 200 bicycle spaces are provided upon opening of the development, with allowance for additional bike parking spaces to be built as demand increases, to the maximum number in line with the DCP 2012 bike parking requirements. The location of bicycle End Of Trip (EOT) facilities upon opening of the development in 2024 is shown in Figure 4-17 and Figure 4-18.





<sup>&</sup>lt;sup>1</sup> It is understood the Sydney LEP 2012 has been referred as the main policy for the site to comply. However, as no specification for bicycle parking provision is outlined in the Sydney LEP 2012, the Sydney DCP 2012 has been used.



Figure 4-18: Level 2 End of Trip Facilities for opening year (2024) of the development (Reference: Foster & Partners)

A designated area has been allocated to increase the number of bike parking spaces and EOT facilities to accommodate future demand as required. Figure 4-17 shows the location for additional bike parking spaces and EOT facilities for future upgrades. The existing automatic car parking will be repurposed to provide bike parking facilities to provide increased capacity. This is proposed to be undertaken based on bike parking demand which will be regularly monitored and reported. This is further discussed within the Green Travel Plan for North OSD.

A lower provision for bicycle parking upon opening of the development is considered appropriate. The North OSD is a Transport Orientated Development (TOD) where a Metro Station is being developed below the North OSD. Typically at TOD locations, the walking and cycling (active transport) mode share is higher than average, with walking and cycling as first/last mile options for people using public transport. Given the location of North OSD adjacent to multiple public transport options, for people living near and working at the site, it is likely that these traditionally active transport mode trips could be replaced by public transport (including short trips). This trend can be seen from Figure 3-10 where 1.4% of those who work in the Sydney SA2 area travel by bicycle to work, whereas a total of 77% use public transport.

It should be noted that the Sydney DCP 2012 also refers to the mode share target for trips by bike in the *Cycle Strategy and Action Plan 2007-2017*, which has been superseded by the more recent plan, the *City of Sydney Cycle Strategy and Action Plan 2018-2030* (City of Sydney, 2018). Figure 4-19 below is extracted from the *City of Sydney Cycling Strategy and Action Plan 2018 – 2030*, which shows a bike mode share target of 10% for the City of Sydney (LGA) by 2030 with interim targets in 2021.

| Proportion of trips made by bike  |                             |                    |      |             |                   |  |
|---|-----------------------------|--------------------|------|-------------|-------------------|--|
| Indicator   | Baseline                    | Interim<br>targets | 2030 | Data source | Data<br>frequency |  |
| proportion of journeys to work by bike by City residents  | 1.9% (2006)<br>3.4% (2016)  | 5% (2021)          | 10%  | Census      | Every 5 years     |  |
| proportion of journeys to work by bike by people working in the City  | 1.01% (2006)<br>1.8% (2016) | 3% (2021)          | 10%  | Census      | Every 5 years     |  |
| Note: Census data is used as a proxy for cycling for all trip purposes, since NSW has no reliable data on non-work cycling trips. |                             |                    |      |             |                   |  |

Figure 4-19: Proportion of trips made by bike

The earliest the OSD North development will be operational is in 2024, with the opening of the Pitt Street Metro. Linear interpolation of the *City of Sydney Cycle Strategy and Action Plan 2018-2031* using a baseline 2016 value of 1.4% (which is based on the 2016 Census mode share statistics for the Sydney, Haymarket

and The Rocks (refer to Figure 3-10)), equates to a target bike mode share of 4.0% in 2024. The provision for 200 bicycle spaces upon opening corresponds to a mode share of 4.1% for cycling based on the estimated number of staff with the development fully occupied which represents an approximate 300% increase from the travel mode share as measured in 2016. In line with the above, the development is targeting a significant shift in mode share for cycling, with the provision of sufficient bicycle parking to effect this change.

Furthermore, recent trends towards the use of bike share offers may see an increase in this mode share but this relies upon on-street parking and therefore does not require bike parking facilities. There are numerous public bike parking facilities located surrounding the development, as shown in Figure 4-20.



Figure 4-20: Location of public bicycle parking facilities surrounding the development

## 5 Transport Assessment

This section outlines the discussions on the transport impacts resulting from the development, as well as the integration with the surrounding transport infrastructure.

#### 5.1 Mode Share

The existing and target mode share with resulting total number of both commercial and retail staff per travel mode for North OSD is shown in Table 5-1.



| Mode                | Existing* | Proposed and<br>Total Number of<br>Staff |        |  |
|---------------------|-----------|--|--------|--|
|                     | %         | %  | Volume |  |
| Train               | 54%       | 35%                                      | 1691   |  |
| Metro               | 0%        | 25%                                      | 1224   |  |
| Bus                 | 21%       | 18%                                      | 870    |  |
| Ferry               | 2%        | 2%                                       | 97     |  |
| Light Rail          | 0%        | 4%                                       | 190    |  |
| TOTAL PT            | 77%       | 84%                                      | 4072   |  |
| Taxi                | 1%        | N/A                                      |        |  |
| Car as passenger    | 2%        | 3%                                       | 145    |  |
| Car as driver       | 12%       | 1% 40                                    |        |  |
| Truck               | 0%        | 0%                                       | 0      |  |
| Motorbike / Scooter | 1%        | 1%                                       | 46     |  |
| Bike                | 1%        | 4%                                       | 200    |  |
| Walked              | 6%        | 7%                                       | 330    |  |
| Total               | 100%      | 100%                                     | 4833   |  |

Table 5-1: Existing and target mode share with resulting total number of staff (commercial and retail) per travel mode for North OSD

The target mode share for the site is likely to have similar mode splits as the current trend observed in the surrounding developments, however, it is estimated to fluctuate in association with the development infrastructure (i.e. vehicle and bicycle parking provision) and future changes (i.e. public transport accessibility and frequency). While it is noted that the active and public transport facilities within the City of Sydney have been well developed, these are constantly improving to match the growth in demand and to maintain high usage and reliability.

With the existing parking provisions and restrictions within the CBD, people are encouraged to travel in and around Sydney via sustainable transport modes of travel, as evidenced by the ABS 2016 Census data, where a considerably high proportion of commuters (88%) who live within Sydney are using sustainable transport to travel to work, which includes bus (11%), train (25%), tram (1%), ferry (<1%), walk (50%) and bicycle (1%). While the remaining 12% of commuters travel to work via private vehicle or taxi.

The site is surrounded by and accessible to numerous public transport facilities and sustainable transport options. It is noted that currently some of the facilities that have been identified are outside the comfortable walking distance (400m), these can still be accessed via other intermediate public transport services such as trains, buses, or trams to reduce the walking distance. It should be noted that the new Pitt Street Metro Station that sits beneath the site and the new Sydney CBD and South East Light Rail in close proximity (see Figure 3-15) will increase the accessibility to public transport and replace the need for intermediate travel modes.

Regarding the public transport options, as the new metro station (Pitt Street North) will be located directly below the development (OSD North), it is assumed that the Metro specific mode share will be approximately 25%, which is in line with the Stage 1 of the pedestrian modelling assessment undertaken for Pitt Street Metro. Furthermore, the mode share of the new light rail has been assumed to be 4%, based on estimated uptake due to the proximity of the development. Ferry as a further option of public transport has been kept at 2%, as no increase in patronage is expected there due to the distance of the ferry terminals from the site. As a consequence, the train and bus mode shares were reduced to 35% and 18% respectively.

As the parking provided within the North OSD development is limited to a total of 40 parking bays, the mode share for car as a driver is estimated to be generated from occasional use for specific trips. The proportion will be considerably less than the current trend (12%). This reduction is likely to cause a mode shift towards public transport and active transport, given the high accessibility available at the site.

Similarly, the primary transport mode for visitors and customers are likely to be via active or public transport, with a similar mode share as work trips.

Overall, with the parking control planned in the vicinity (maximum parking rates recommended by the Sydney LEP 2012) and the very high accessibility to public transport and walkable destinations, a substantial proportion of work trips generated by the North OSD development are estimated to commute via public transport and active travel modes.

With respect to the active transport options, as mentioned in Section 3.4, the development is targeting a significant shift in mode share for cycling. The development allows for a total of 531 bicycle parking spaces in line with the Sydney DCP requirements. It is that 200 bicycle spaces are provided upon opening of the development, with allowance for additional bike parking spaces to be built as demand increases, to the maximum number in line with the DCP 2012 bike parking requirements. The provision for 200 bicycle spaces upon opening corresponds to a mode share of 4% for cycling based on the estimated number of staff with the development fully occupied, which is approximately and increase of 300% from the 2016 mode share value. This has been considered based on the current journey to work trends from 2016 Census mode share statistics for the Sydney SA2 where the development site falls. Due to the close proximity of the OSD South development and surrounding changes in land use, the mode share for walking was slightly increased to 7%.

The mode share by taxi was added to 'car as passenger', taking on a value of 3%, which contains taxi as well as ride share and ride hailing options. There are currently 2,227 bays available to public, located within 400m from the site, with various parking fees required. Additionally, on-street parking spaces are available in the surrounding network, with parking metered and limited for set maximum parking durations. However, as only 40 unlimited car parking bays are provided within the Pitt Street North OSD development, the mode share for 'car as a driver' for employees working within the building is estimated to be generated from the full utilisation of these car bays only. Although no parking for motorbikes or scooters is provided within the

development, this mode share was kept at 1%, assuming there will be a low number who will travel via scooter or motorbike but utilise the nearby public parking facilities.

#### 5.2 Traffic generation and road network impacts

The development includes a total of 40 parking bays for commercial tenants and seven service vehicle bays. As discussed in Section 4.2 and 4.3, the development is forecast to generate approximately 14 vehicle trips/ hour and 8 service trips / hour during peak periods. Given these low trip volumes, the impact of any new primary trips generated by the development is considered negligible within the wider road network, and is an improvement compared to the previous land uses.

The pick-up and drop-off demand is unlikely to be substantial, given the ABS 2016 Census indicated only 2% of commuters who lived within Sydney arrive at work via car as a passenger.

#### 5.2.1 Private Vehicle Use Assessment

The development will provide limited parking provision of 40 parking bays for use by tenants. Due to the limited nature of parking spaces, these bays are likely to only be utilised by a specific group of users. Access to the private vehicle car park is via a dedicated automatic car lift which is further discussed in Section 4.2.1.

#### 5.3 Pedestrian Assessment

The existing and potential future pedestrian infrastructure within Sydney CBD is as illustrated in Section 3.6.6. As most of the trips generated from the site are estimated to travel via walking or other transport modes that require walking from/to the site (see Section 5.1), the pedestrian demand is estimated to be the main mode of travel occurring directly to/from the development.

A modelling assessment was initially undertaken by METRON and updated by Aurecon to reflect the latest station and precinct design to assess the potential impact by/to pedestrians. This assessment was documented in the *Pedestrian Modelling Report*, dated 28 January 2020 and included as part of the Station SSD DA application. The modelling assessment includes the pedestrian trip generation and movements that are likely to result from the Pitt Street Metro Station and OSD developments (including South OSD).

The pedestrian modelling assessment included a review of the footpath capacity of the network within the vicinity of the Pitt Street Metro station. This includes the pedestrian entry / exit points within the North OSD development on Park Street and Pitt Street. The analysis adopted a 2036 peak hour scenario with 0.85% annual background growth forecast from 2015 existing demands. The impact and operation conditions of the footpaths are measured as Fruin Pedestrian Level of Service (LoS) Criteria in two aspects; walkway and queueing, as illustrated in Table 5-2. The outputs were assessed against the design requirement of a minimum performance of LoS C. The result outputs for the surrounding network are as presented in Figure 5-1 and Figure 5-2 for the AM peak and similarly Figure 5-3 and Figure 5-4 for the PM peak.

| Level of service | Description (for queuing areas, walkways and stairways)  |
|------------------|--|
| A                | Free circulation.  |
| В                | Uni-directional flows and free circulation. Reverse and cross-flows with only minor conflicts.                           |
| с                | Slightly restricted circulation due to difficulty in passing others.<br>Reverse and cross-flows with difficulty.         |
| D                | Restricted circulation for most pedestrians. Significant difficulty for reverse and cross-flows.                         |
| E                | Restricted circulation for all pedestrians. Intermittent stoppages and serious difficulties for reverse and cross-flows. |
| F                | Complete breakdown in traffic flow with many stoppages.  |

Table 5-2: Level of service description (source: London Underground – Station Planning Standards and Guidelines 2012 Edition)



Figure 5-1: Pitt Street Precinct Area – Pitt St / Park St Intersection Level of Service (2036 AM) - Fruin Queuing LoS Map



Figure 5-2: Pitt Street Precinct Area – Pitt St / Park St Intersection Level of Service (2036 AM) - Fruin Walkways LoS Map



Figure 5-3: Pitt Street Precinct Area – Pitt St / Park St Intersection Level of Service (2036 PM) - Fruin Queuing LoS Map



Figure 5-4: Pitt Street Precinct Area – Pitt St / Park St Intersection Level of Service (2036 PM) - Fruin Walkways LoS Map

From the AM and PM peak queueing analysis, it identified that pedestrians experience up to a Queueing LoS D and this highest level occurs at the Pitt Street / Park Street intersection. The report has suggested that the high densities could be reduced by modifying the signal cycle times and changing the signal phasing/timings to favour pedestrians, noting that the Park Street / Pitt Street intersection is being widened to 10.0m as part of the Station Precinct Development.

For the AM and PM peak walkway analysis, the footpaths along the corridors are observed to generally experience Walkways LoS A to LoS C, while at some isolated areas, the pedestrians experience drops to a LoS D. Overall the pedestrian performance is considered satisfactory and the North OSD development

entries along Pitt Street, Park Street and Castlereagh Street are not estimated to affect general footpath operations in the immediate surrounds, or the Pitt Street North Metro Station operations.

#### 5.4 Public Transport Assessment

As illustrated in Section 3.6, the North OSD site is currently highly accessible by public transport. The site is located within the centre of Sydney CBD and is accessible (within 400m radius) to high frequency public transport services including buses, trains and light rail. Accessibility to public transport will be further increased with the new Pitt Street Metro Station directly beneath the site, which will significantly shorten the travel distance to public transport services for tenants and visitors and will provide an average service frequency of 4 minutes throughout the day. In addition, the recently opened Sydney CBD and South East Light Rail service has one of its stops (Town Hall) within 400m of the proposed development, which will provide another public transport option for development tenants and users. Overall, the site is accessible to numerous public transport options and this is expected to be the primary travel mode for most tenants and visitors. Therefore, the development is considered to offer high levels of public transport accessibility and connectivity.

### 5.5 Cycling Assessment

The site is situated within the centre of Sydney CBD which presently has some cycling infrastructure, which will be further enhanced following construction of the planned cycling infrastructure, with the most notable of these the cycleway along Castlereagh Street. A Green Travel Plan has been prepared as a separate document in SMCSWSPS-AUR-OSN-EM-REP-000002to encourage and ensure the tenants are aware of the alternative transport options that are available within the vicinity of the site.

## 5.6 Taxi facilities and pick-up / drop-off operations

As described in Section 3.5, existing taxi ranks are available at the site's frontage along Pitt Street. These can be used to facilitate any pick-up and drop-off demand from the site. Rideshare services such as Uber and Ola can also be accessed from the site via the adjacent on-street public facilities on the adjacent corridors. As shown in Figure 5-5, there are parking spaces, loading zones, and mail zones spaces available on all surrounding road corridors.



Figure 5-5: On-street public parking and loading facilities available at the site's frontage (basemap: Bing Map)

## 6 Summary and Conclusion

The aim of this study was to assess the transport related impacts of the development; Pitt Street North OSD. The development comprises of 39 floors, 52,951m<sup>2</sup> of commercial space, 1,700m<sup>2</sup> of retail space (the combined commercial and retail total GFA is 54,651m<sup>2</sup>), and seven service bays in a dedicated loading dock area.

The following summarises the transport impacts of the development:

- Public Transport: The site is situated within the centre of Sydney CBD and is accessible (within 400m radius) to high frequency public transport services including buses and trains. With the high frequency service operating from the Pitt Street Metro Station, which will be directly beneath the site, the travel distance and time to public transport services for tenants and visitors will be shortened. The recently opened Sydney CBD and South East Light Rail service has one of its stops (Town Hall) within 400m of the development. There are also three heavy rail stations located within 400m radius from the site, with Town Hall Station sits closest to the site. This provides another public transport option for the development. Overall, the site is accessible to numerous public transport options and is estimated to be the primary travel mode for most tenants and visitors.
- Cycling: According to City of Sydney's Cycleway map, both the adjacent Pitt Street and Castlereagh Street are classified as "direct routes with higher traffic". These routes are considered to be the most direct route to access major land uses within the CBD, and provide connection to other cycling infrastructure. There are numerous public bicycle parking spaces provided within the Sydney CBD, as well as in close proximity to the development. This is estimated to encourage the use of bicycles by tenants of the development for shorter trips within the City of Sydney.
- Bicycle Parking: The opening year (2024) of the development will provide 200 bicycle spaces, with allowance for additional bike parking spaces to be built as demand increases, to the maximum number in line with the DCP 2012 bike parking requirements. The 200 bike parking bays is equivalent to a 4.1% cycle mode share which is an increase from the baseline 1.4% (based on the 2016 Census).
- Pedestrians: Assessment of the Pedestrian access to the North OSD Development has been undertaken as part of the Pitt Street Metro Development Application which formed part of the Critical State Significant Infrastructure (CSSI) submission. The dynamic pedestrian modelling integrated the metro station, the precinct and both the North and South OSD development. The report has concluded that the pedestrian level of service is generally satisfactory.
- Private Vehicle Parking: The development provides a total of 40 parking bays for commercial tenants only via a car stacker with two car lifts.
- Private Vehicle Use: The development is estimated to generate less than 40 vehicle trips during the road network peak periods. With this minimal number of trips, the development is an improvement to the road network compared to the previous land uses.
- Loading Dock Provision and Operation: The North OSD has been designed to integrate with the Pitt Street Metro Station. The North OSD development will provide seven loading dock spaces on the ground level of the loading dock and three B99 vehicle spaces within the automatic car stacker to accommodate the longer dwell times of B99 vehicles. The seven loading dock spaces on the ground level include a dedicated Sydney Metro bay within the loading dock facility. Through a managed approach, the seven bays are estimated to be able to manage the demand estimated for the North OSD. A Service Delivery Plan has been included in Appendix A.

Appendix A: Delivery Service Plan

## **Pitt Street North OSD**

Service Delivery Plan

(Appendix A)

# Pitt Street Developer North Pty Ltd

Reference: 507262 Revision: C – Issue for DPIE 23 June 2020





# **Document control record**

Document prepared by:

#### Aurecon Australasia Pty Ltd

ABN 54 005 139 873 Level 5, 863 Hay Street Perth WA 6000 Australia

- **T** +61 8 6145 9300
- F +61 8 6145 5020
- E perth@aurecongroup.com
- W aurecongroup.com

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|------------------|---------------------------|--------------------|-----------------------------------|--|--|
| Author signature |                           | Approver signature |                                   |  |  |
| Name             | Iris Brkic                | Name               | Antony Johnstone                  |  |  |
| Title            | Senior Transport Engineer | Title              | Associate – Transport<br>Services |  |  |

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# 1 Introduction

The purpose of this document is to provide context associated with the service delivery plan for North OSD as defined during the Pitt Street Over Station Development North Stage 2 Design process. The information provided in SMCSWSPS-AUR-OSN-TF-PLN-000001 provides detailed information to the referenced information provided in this Service Delivery Plan.

## 1.1 The Site

The site is located within the Sydney CBD. It has three separate street frontages, Pitt Street to the west, Park Street to the south and Castlereagh Street to the east. The area surrounding the site consists of predominantly commercial high-density buildings and some residential buildings, with finer grain and heritage buildings dispersed throughout.

The site has an approximate area of 3,150.1sqm and is legally described as follows:

252 Pitt Street (Lot 20 in DP1255509)



Figure 1-1: Location Plan (Source: Urbis)

## 2 North OSD Vehicle Access

### 2.1 North OSD Vehicle Access Overview

The North OSD is proposed to have only one vehicle access which includes access to the loading dock and the dedicated car parking for the site. This access will be located on Castlereagh Street with only right-in and right-out movements on the east side of the site as shown in Figure 2-1 below. The access is to be shared between the tenants parking and the service vehicles.

The loading dock is a shared facility between the North OSD and Sydney Metro Station. A loading dock booking system will be maintained to ensure the Sydney Metro operator has unimpeded access to the loading dock at all times for servicing and maintenance.

The lobby entrance on Pitt Street will provide pedestrian access for North OSD tenants and visitors. Retail access to various retail hubs is available via Pitt Street, Park Street, and Castlereagh Street as shown in Figure 2-1.

Cyclists will access the development via a dedicated access off Castlereagh Street as indicated in Figure 2-1 to use the End-of-Trip (EoT) lifts to access the bicycle parking facilities on level 1.



Figure 2-1: North OSD access locations on the ground floor (Reference: SMCSWSPS-FOS-OSN-AT-DWG-030013 Rev P1)

### 2.2 Automatic Car Lift

Access to the commercial parking is provided from Castlereagh Street and shown in Figure 2-2. There are two dedicated automatic car lifts available for a total of 40 car parking bays stacked over three levels. The 40 bays will be utilised by commercial tenants only and no public parking has been allowed for at North OSD.

Prior to access to use the automatic car lift, the specific commercial tenant will need to undertake an induction on '*How to use the Automatic Car Lift*' which will provide them access to the car lift. The induction will cover critical components around where the driver should stop the car and how access the car lift will be undertaken, including any after hour restrictions that may be imposed by the building operations.


Figure 2-2: North OSD Automatic Car Stacker Commercial Vehicle Access

The assumptions associated with the automatic car lift have been provided by the automatic car lift manufacturer as noted in Table 2-1. To assess the potential vehicle queue that may occur at the automatic car lift, each individual stage of the vehicle journey has been considered to estimate the service rate of the automatic car park lift and its operations. As a worst-case scenario, assessment for the car lift has assumed the commercial tenant is required to vacate their car.

| Table 2-1: | Automatic | Car Lift | Assumptions |
|------------|-----------|----------|-------------|
|------------|-----------|----------|-------------|

| Item   | Assumption        | Comment  |
|--|-------------------|--|
| Average time taken for drivers to exit/<br>enter the lift from waiting area<br>(i.e. parking the car inside the lift). | 30 seconds        | Assumed as the average time. If additional time is<br>required, it is assumed that if the adjacent B99 bays<br>are available that these will be used. In addition, for<br>DDA compliance, these adjacent B99 bays will be<br>used and require the loading dock master to assist. |
| Once the vehicle is within the lift, the average time taken for the driver to exit / enter the vehicle in the lift.    | 30 seconds        | Assumed as the average time.   |
| Average time taken for the driver to send the lift using the digital screen.   | 30 seconds        | Assumed as the average time.   |
| Lift service rate for a single lift  | 21 vehicles/ hour | Provided by car lift manufacturer.   |

With two automatic car lifts in operation, the service rate is assumed to double with the use of both lifts, equating to a total of 42 vehicles per hour which is greater than the available number of commercial parking bays.

As OSD North is a commercial site, it is assumed that during the AM peak usage of the lifts will be for inbound flow, and similarly for the PM peak usage of the lifts will be predominantly for outbound flow.

As part of the overall loading dock capacity and analysis, the development trips for the car stacker for the AM peak hour may range from 13 - 26 vehicles. For the analysis of the typical automatic car stacker access, the more conservative approach of 26 vehicles during the AM peak hour has been assumed. As the commercial car parking will be predominantly accessed in the AM peak as commercial tenants arrive to work in the

morning, all 40 bays are assumed to be occupied in line with a typical 'start of a working day' for the AM peak between 6 - 9am with a peak hour between 7 - 8am and shown in Figure 2-3. The departure of vehicles from the automatic car stacker is assumed with the typical 'end of day' between 4 - 7pm, where the peak hour is from 5 - 6pm.



Figure 2-3: Typical Automatic Car Lift arrival profile for Pitt Street North

The typical automatic car stacker arrival profile as shown in Figure 2-3 has been used when assessing the overall loading dock capacity.

Based on the arrival rates, the estimated demand for the automatic car stacker has been assumed as 26 vehicles/ hour for the inbound AM peak. This is equivalent to 2 cars arriving every 4 to 5 minutes.

The closest signalised intersection to the North OSD loading dock is Market Street and Castlereagh Street. It is assumed that during the AM peak, this signalised intersection has a total cycle time of 110 seconds, and similarly for the PM peak. Both Market Street and Castlereagh Street are one-way streets, as such the likelihood of vehicles arriving can either be equally distributed which equates to a vehicle arriving approximately every minute, or dominant for one approach only which equates to a vehicle arriving approximately every two minutes. Based on the arrival profile for commercial vehicles noted earlier, two commercial vehicles are likely to arrive every 4 to 5 minutes during the peak hour, which is accommodated within 2 signal cycle times at the Market Street / Castlereagh Street intersection and also accommodated by the two automatic car lifts.

To further supplement the commercial tenant queuing, based on the queueing theory outlined in *Austroads Guide to Traffic Management Part 2: Traffic Theory*, Table 2-2 summarises queueing probabilities as estimated for two lifts for the peak inbound AM Peak demand of 13 vehicles/ hour (summarised in Table 2-2). Based on this, the 95<sup>th</sup> percentile queue for the two automatic car lifts is estimated as 2 vehicles in queue, which can be accommodated as one vehicle per automatic car lift within the overall design.

Table 2-2: Queuing Probabilities based on queuing theory outlined in Austroads Guide to Traffic Management

| Vehicles in Queue | 0   | 1   | 2  | More than 2 |
|-------------------|-----|-----|----|-------------|
| Probability       | 69% | 21% | 7% | 3%          |

As shown in Figure 2-4, the area within the OSD North loading dock on approach to the automatic car lift is estimated to hold up to four B99 vehicles without impacting the Castlereagh Street public domain. It should be noted that this does not include the two vehicles already using the automatic car lift. As such, the

automatic car lift is not estimated to have a significant regular impact on the adjacent corridor or access to the loading dock via Castlereagh Street including the pedestrian footpath.



Figure 2-4: North OSD automatic car stacker available queuing space for vehicles (B99)

Furthermore, with the 4 to 5 minute arrival internal to the loading dock during the AM peak for the estimated 26 vehicles, and the operation of each car lift allowing access every 3 minutes, (or with the two lifts this improves access for vehicles to every 1.5 minutes), there is a high probability that the commercial vehicle will be able to arrive and access the automatic car lift with minimal queuing required. The probability of more than two vehicles arriving at the same time is 3% which, over the hour equates to 2 minutes which is likely to clear up before the arrival of the successive vehicle to use the loading dock.

Direct liaison between the commercial tenant and the loading dock master will be beneficial in ensuring minimal impact to the overall loading dock operations. This may be undertaken by providing the commercial tenant with a remote-control dongle or a phone application, which when activated, not only signals to the loading dock master that the automatic car lift is going to be in operation, but it also manages any vehicle queuing of the loading dock to occur off street (i.e. within the loading dock), and not on street (i.e. outside of the loading dock) due to possible conflicting vehicle movements between a loading dock vehicle and a commercial vehicle.

The impact of the use of the automatic car lift on the loading dock use is further discussed in Section 2.3, and proposed operation of the automatic car lift and communication to the commercial tenants is further summarised below.

While the estimated queue that may result from the automatic car stacker will be kept within the development, there is the possibility this may still impact on the loading dock performance as service vehicle movements may at times be restricted. As such the strategy proposed for the operation of the loading dock considers a nominal time period when the arrival of commercial tenants to use the automatic car stacker is likely to occur. A typical arrival profile of the 40 commercial bays has been shown in Figure 2-3 which shows the peak arrival of up to 26 vehicles during a peak hour.

As such a nominated 2-hour period (between 7am – 9am) is proposed where no bookings for the loading dock will be accepted. Although there is no formal booking facility available for loading dock operations, there is contingency within the loading dock and arrival of the commercial tenants to the automatic car stacker to accommodate arrival and departure of loading vehicles such that in the event that a vehicle arrives at the loading dock without a booking, it can still access the loading dock, however the online booking facility is not proposed during this time (except for Sydney Metro Bay access).

The North OSD designers of the automatic car lift have indicated that in the event that the automatic car lift breaks down it will be approximately one week (worst case) for the car lift to be operational again. As part of the loading dock management plan, operational measures will be put in place to minimise any disruption for all loading dock users. During the event that one of the automatic car lifts breaks down and requires serviceability, the peak volume of 26 vehicles per hour will exceed the capacity of one lift. During an event where an automatic car lift has broken down, the commercial tenants will be informed, and encouraged to arrive during the adjacent hour, when access capacity will be available for the car stacker. As no bookings are available during the nominated two hours in the AM peak, this is estimated to have a minimal impact on loading dock operations.

### 2.3 Loading Dock and Service Vehicles

The development will provide a total of seven on-site service vehicle bays with the bays designed to mainly accommodate the vehicle types below:

- 1 x Metro operational bay (B99, 99<sup>th</sup> percentile of class of cars);
- 3 x light commercial vehicles (B99, 99<sup>th</sup> percentile of class of cars);
- 2 x Small Rigid Vehicle (SRV);
- 1 x Medium Rigid Vehicle (MRV); and
- 3 x light commercial vehicle bays within the automatic car stacker (B99, 99th percentile size of cars).

The indicative location of each of the loading dock service bays within the loading dock is shown in Figure 2-5 (it should be noted the image reference used for this image is an older drawing but the location of the proposed parking bays within the loading dock remains unchanged).



Figure 2-5: North OSD Loading bay locations (note: the image reference used for this image is an older drawing but the location of the proposed parking bays within the loading dock remains unchanged)

Within the loading zone there is a 'general share use area', highlighted blue, which will be used by all vehicles using the loading dock. This includes the commercial tenants who will access the automatic car stacker (highlighted in red), the B99 bays at the southern section of the loading dock for service deliveries (highlighted in orange), and larger vehicles and the Metro Bay in the northern section of the loading dock (highlighted in green).

#### 2.3.1 Loading Dock Service Bay Typical Demand Profile

The North OSD loading dock is estimated, but not limited to the following services via the loading dock bays:

- Grocery deliveries (regularly);
- Goods deliveries for retail (weekly);
- Furniture delivery (prior to opening and rarely occurring after opening);
- Waste collection (daily);
- Cleaning and maintenance service (regularly);
- Building maintenance service (occasionally);
- Mail and parcel delivery (daily where arrival is irregular and difficult to manage); and
- Sydney Metro transformer replacement service (emergency).

The loading dock assessment (excluding the automatic car use) has considered the typical daily maximum number of loading dock vehicles for the proposed land use (including commercial and retail), alongside an hourly maximum number.

Based on research including the Institute of Transport (ITE) trip generation handbook 1992, a local Sydney CBD research study presented at the AITPM National conference, alongside recent development applications in the Sydney CBD including the Sydney Metro Martin Place OSD, for a development of the size of North OSD, between 14 and 17 peak hour service vehicle trips are estimated, with the daily maximum number of vehicles estimated as 101 vehicles per day.

The operation of the loading dock for OSD North can accommodate up to a maximum of 17 vehicles per hour based on operational procedures (this is further explained in Section 4.3.4 below). As such, the loading dock facility is estimated to have sufficient capacity to cater for a peak demand for deliveries, which reduces the risk of external on street loading facilities being used.

There are likely to be periods where the loading dock may operate at a maximum hourly demand of 17 vehicles per hour and outside of these periods the loading dock is likely to operate at a lower demand (i.e. less than 17 vehicles per hour), totalling to a maximum of 101 vehicles per day.

The proposed typical loading dock bookings for the ground floor loading dock bays is shown in Figure 2-6 (excluding the use of the Sydney Metro bay or the three additional bays within the car stacker which are accounted for as part of the automatic car stacker analysis). The capacity of the loading dock, shown as a solid green line, accounts for the typical arrival and departure of the commercial tenants via the automatic car stacker (shown in Figure 2-3). The typical loading dock bookings shows that there is capacity within the loading dock to reach the maximum capacity of 17 vehicles per hour. The total number of proposed typical loading dock bookings is summarised at the base of the table where a maximum of no more than 12 vehicles per hour are proposed for the typical loading dock booking period.





As shown by the solid green line in Figure 2-6, the peak service delivery vehicle period where up to 17 vehicles are able to use the loading dock based on a upper managed limit for the loading dock, is proposed to fall outside the period where the highest movement for the automatic car lift is estimated. Within the time where the highest movement for the automatic car lift occurs (assumed to be 7 - 9 am), it is recommended that the online booking facility accepts no bookings during this time (except for Sydney Metro Bay access). Although there is no online booking facility proposed between the assumed 7 - 9am, there is allowance for contingency within the loading dock to accommodate arrival and departure of loading vehicles such that in the event that a vehicle arrives at the loading dock mistakenly during the two hours where the highest movement of vehicles is assumed for the automatic car lift, the loading dock vehicle can still use the loading dock, with no greater than 6 - 8 service vehicles accessing the loading dock during the peak 7 - 9am time period.

To accommodate the provision of loading dock vehicles which require longer dwell times, access to three B99 bays has been allowed for within the automatic car stacker and access to these will also be booked via the loading dock booking system.

With the booking system in place for managing the arrival and departures of the loading dock requirements, a typical loading dock booking activity profile is shown in the diagram below combining the use of the loading dock and the commercial tenant access to the automatic car stacker. As noted earlier, a delivery exclusion period during the peak commercial tenant arrival (i.e. 7 - 9am) is proposed and there is contingency within the loading dock to accommodate the arrival and departure of loading vehicles such that in the event that a vehicle arrives to the loading dock it can still use the loading dock, however the online booking facility is not proposed during this time (except for Sydney Metro Bay access).

Pitt Street North Proposed Typical Loading Dock Bookings



Figure 2-7: Typical Loading Dock Bookings and arrival of automatic car lift arrival profile for Pitt Street North

## 2.4 Sydney Metro Loading

The Sydney Metro Operation bay will be occasionally occupied to undertake maintenance services for the Pitt Street Station. The Sydney Metro loading bay is for a B99 size vehicle and access to the Sydney Metro Bay is via the turn table within the loading dock.

Any possession of the loading dock for occasional major services, such as a transformer replacement that needs to be undertaken by Sydney Metro, Sydney Metro is to consult with the North OSD loading dock manager.

#### 2.5 Waste Management

A detailed Operational Waste Management Plan can be found in SMCSWSPS-TTM-OSN-CE-PLN-000001. All waste loading is noted to occur off street. Waste vehicles are proposed to use the MRV bay for all waste servicing. Swept path analysis for a 9.25m waste vehicle was undertaken and shown in Figure 2-8.



Figure 2-8: Vehicle swept path analysis for the 9.25m waste vehicle – forward in and forward out from loading area

## 3 Loading Dock Management

The Delivery Service Plan (Attached in Appendix A) will be managed by a dedicated on-site loading dock master through an integrated loading dock digital system notifying when deliveries are arriving and time allocation to specific loading requirements. To assist with the development of the Delivery Service Plan, a high-level assessment has been undertaken to understand if there will be any issues with the loading dock, and provide guiding principles to be integrated as part of the Delivery Service Plan.

Access to the loading dock and the automatic car lift usage are intertwined with two customer types. The first are the commercial tenants who will use the automatic car stacker at an ad hoc basis. The second are the loading dock users who can arrive to the loading dock based on a time allocated to them. The general operation of the loading dock is simplified into a northern loading dock section, a southern loading dock section and the automatic car stacker as shown in Figure 3-1 (it should be noted the image reference used for this image is an older drawing but the location of the proposed parking bays within the loading dock remains unchanged).



Figure 3-1: North OSD Loading operations (note: the image reference used for this image is an older drawing but the location of the proposed parking bays within the loading dock remains unchanged)

As shown in Figure 3-1, 'the general shared use area by all vehicles' shows that the arrival of commercial tenants impacts the use of the loading dock and vice versa. To minimise the arrival overlap of the two customer types arriving at the same time, the following governing principles are proposed to be incorporated as part of the loading dock Delivery Service Plan:

- Arrival of commercial tenants during a dedicated time period where no loading dock bookings are available (except for access to the Sydney Metro Bay). To inform what this time period is, it is recommended that as part of the automatic car stacker induction, that every individual commercial tenant who uses the automatic car stacker will need to undertake, a question regarding the preferred arrival and departure time is included to determine the typical peak arrival time. For example, this may be determined to be between 7am and 9am (as shown in Figure 2-3), during which time the arrival of loading dock vehicles will need to be reduced and actively managed. This is in line with the operations management strategy described in Section 4.2.2.
  - A delivery exclusion period during the peak commercial tenant arrival (i.e. 7 9am) is proposed. There is contingency within the loading dock to accommodate arrival and departure of loading vehicles such that in the event that a vehicle arrives to the loading dock it can still use the loading dock, however the online booking facility will not accept bookings during this time (except for Sydney Metro Bay access).

 Outside of this time period the loading dock will operate based on a booking system to manage loading dock arrivals and departures.

Outside of the commercial tenants, as shown in Figure 3-1, the loading dock design is separated into a north and south loading component where:

- The northern segment requires the use of a turn table for loading for the Sydney Metro (B99) bay, two SRV bays and one MRV bay, and
- The southern segment is used by three B99 bays, preferably accessed by reversing into the bay and egressed by forward movement out of the loading dock.
- To accommodate the provision of loading dock vehicles which may require longer dwell times, access to three B99 bays have been allowed for within the automatic car stacker and access to these will also be booked via the loading dock booking system.

At any given time, a vehicle accessing the northern segment of the loading dock does not hinder the use of the southern segment of the loading dock, however the use of a vehicle in the southern segment of the loading dock does hinder the use of the northern segment of the loading dock. To minimise loading dock northern and southern segment overlap access issues, it is proposed that loading dock arrivals are staggered such that the arrival of two consecutive northern segment vehicles (or southern segment vehicles) do not arrive to the loading dock in less than 10-minute intervals. This allows for the staggering of the northern segment loading activities. In addition, a time limit is recommended to be imposed for vehicles using the loading dock which will need to be defined at the time of booking / arrival. At a minimum this is assumed to be 30 minutes per loading bay (including the time allocated to parking and egress from the bay) for either the northern or southern loading dock segments. Based on this, a total of 12 loading vehicles are able to use the loading dock per hour (6 on the northern segment and 6 on the southern segment), which allows for a maximum of 6 vehicles parked in the loading dock at the same time (excluding the Metro B99 bay). If loading is required for a longer period for a particular bay (excluding the Metro B99 bay), it is recommended that this is scheduled in for later in the day when the traditional need to use the loading dock is reduced.

Depending on the loading requirements in particular the priority of deliveries each day, the loading strategy each day may change. To understand the total capacity of the loading dock, the following scenarios logic is outlined (excluding the loading dock being used by the commercial tenants for the automatic car lift):

- A 30 minute time allocation for loading for all vehicles. As shown in Table 3-1, this equates to an assumed 12 vehicles per hour for the North OSD loading dock, and over a typical 8-hour day this is equivalent to 96 vehicles accessing the loading dock. Over a 10-hour day this is equivalent to 120 vehicles accessing the loading dock.
  - Table 3-1: North OSD Loading capacity based on a 30-minute round trip (time allocation in bay is assumed approximately 20-minutes)

| B99 Bay 3  |  |  |            |            | Out        | In         |            |            |            |            | Out        | In         |
|------------|--|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| B99 Bay 2  |  |  | Out        | In         |            |            |            |            | Out        | In         |            |            |
| B99 Bay 1  | Out  | In   |            |            |            |            | Out        | In         |            |            |            |            |
| SRV Bay 2  |  |  |            | Out        | In         |            |            |            |            | Out        | In         |            |
| SRV Bay 1  |  | Out  | In         |            |            |            |            | Out        | In         |            |            |            |
| MRV        | In   |  |            |            |            | Out        | In         |            |            |            |            | Out        |
| Metro      | etro Access available at all times   |  |            |            |            |            |            |            |            |            |            |            |
| TIME       | 0 - 5min   | 5 - 10min  | 10 - 15min | 15 - 20min | 20 - 25min | 25 - 30min | 30 - 35min | 35 - 40min | 40 - 45min | 45 - 50min | 50 - 55min | 55 - 60min |
| Proposed   | To minimise and mitigate any conflict, all loading dock vehicles will be provided with a timeslot prior to arrival. Furthermore the Loading Dock |  |            |            |            |            |            |            |            |            |            |            |
| Management | Master will manage arrival and departure of the two vehicles within each 5 minute window. The role of the Loading Dock Master is beyond the      |  |            |            |            |            |            |            |            |            |            |            |
| Procedure  | traditional  | traditional role of a security guard, and will include knowledge of logistics and traffic management training. |            |            |            |            |            |            |            |            |            |            |

A 45 minute time allocation for loading for all vehicles. As shown in Table 3-2, this equates to an assumed 9 vehicles per hour for the North OSD loading dock, and over a typical 8-hour day this is equivalent to 72 vehicles accessing the loading dock. Over a 10-hour day this is equivalent to 90 vehicles accessing the loading dock.

## Table 3-2: North OSD Loading capacity based on a 45 minute round trip (time allocation in bay is assumed approximately 35-minutes)

| B99 Bay 3  | Out  | In        |  |            |            |             |                  |            |             | Out        | In            |              |
|------------|--|-----------|--|------------|------------|-------------|------------------|------------|-------------|------------|---------------|--------------|
| B99 Bay 2  |  |           |  |            |            |             |                  | Out        | In          |            |               |              |
| B99 Bay 1  |  |           |  |            |            | Out         | In               |            |             |            |               |              |
| SRV Bay 2  |  |           |  | Out        | In         |             |                  |            |             |            |               |              |
| SRV Bay 1  |  | Out       | In   |            |            |             |                  |            |             |            | Out           | In           |
| MRV        | In   |           |  |            |            |             |                  |            | Out         | In         |               |              |
| Metro      |  |           |  |            |            | Access avai | lable at all tir | mes        |             |            |               |              |
| TIME       | 0 - 5min   | 5 - 10min | 10 - 15min   | 15 - 20min | 20 - 25min | 25 - 30min  | 30 - 35min       | 35 - 40min | 40 - 45min  | 45 - 50min | 50 - 55min    | 55 - 60min   |
| Proposed   | Disk has been mitigated between the arrival and departure of two |           |  |            |            |             |                  |            | Risk ha     | as been    |               |              |
| Management | As pe  | er above  | Risk has been miligaled between the arrival and departure of two |            |            |             | As per above     |            | mitigated b | etween the |               |              |
| Procedure  |  |           |  |            | venio      | JICO.       |                  |            |             |            | arrival and o | departure of |

- A 60 minute time allocation for loading for all vehicles. As shown in Table 3-3, this equates to an assumed 6 vehicles per hour for the North OSD loading dock, and over a typical 8-hour day this is equivalent to 48 vehicles accessing the loading dock. Over a 10-hour day this is equivalent to 60 vehicles accessing the loading dock.
  - Table 3-3: North OSD Loading capacity based on a 60 minute round trip (time allocation in bay is assumed approximately 50-minutes)

| B99 Bay 3  |  |           |            |            |            |            |            |            |            | Out        | In         |            |
|------------|--|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| B99 Bay 2  |  |           |            |            |            | Out        | In         |            |            |            |            |            |
| B99 Bay 1  |  | Out       | In         |            |            |            |            |            |            |            |            |            |
| SRV Bay 2  |  |           |            |            |            |            |            | Out        | In         |            |            |            |
| SRV Bay 1  |  |           |            | Out        | In         |            |            |            |            |            |            |            |
| MRV        | In   |           |            |            |            |            |            |            |            |            |            | Out        |
| Metro      | Access available at all times  |           |            |            |            |            |            |            |            |            |            |            |
| TIME       | 0 - 5min   | 5 - 10min | 10 - 15min | 15 - 20min | 20 - 25min | 25 - 30min | 30 - 35min | 35 - 40min | 40 - 45min | 45 - 50min | 50 - 55min | 55 - 60min |
| Proposed   |  |           |            |            |            |            |            |            |            |            |            |            |
| Management | Risk has been mitigated between the arrival and departure of two vehicles. |           |            |            |            |            |            |            |            |            |            |            |
| Procedure  |  |           |            |            |            |            |            |            |            |            |            |            |

Increasing the loading dock operating hours allows for additional vehicles to access the loading dock, which may be required to manage peak periods of operation. As noted earlier to accommodate the provision of loading dock vehicles which require longer dwell times, access to three B99 bays has been allowed for within the automatic car stacker and access to these will also be booked via the loading dock booking system.

A combination of various time allocation for loading vehicles may be possible such that a different time allocation is assumed for the northern segment to that of the southern segment. Furthermore, the system could also allow loading vehicles to make 'double' or 'triple' bookings or specify a duration of the loading time they require which may be accommodated by the loading dock master if there is adequate capacity to accommodate the request.

As discussed earlier, based on research (ITE, a local Sydney CBD research study and other recent developments in the Sydney CBD), for a development of the size of North OSD, between 14 and 17 peak hour vehicle trips can be expected. During periods where there is little to no automatic car stacker demands, it is anticipated that the loading dock could accommodate up to 17 vehicles per hour (loading of each loading bay is limited to approximately 15 - 18 minutes) which is equivalent to approximately 15% of the total daily requirements for North OSD.

### 3.1 Booking System

A digital booking system will be implemented to manage loading dock operations. This section to be updated by the loading dock manager once the formal loading dock booking system is known.

### 3.2 Swept Path Analysis

Swept path analysis was undertaken for a 5.2m length B99 vehicle, a 6.4m length SRV, a 8.8m length MRV and a 9.25m waste vehicle.

Figure 3-2 to Figure 3-6 illustrate that the design layout can adequately accommodate the designed vehicle movement to service the loading dock. The swept paths show that the vehicles do not require more than three points of turn to manoeuvre in and out from the bays. It should be noted that loading from the SRV bays may be undertaken on the turntable and if bulky goods loading is required, these should be undertaken from the MRV service bay.



Figure 3-2: Vehicle swept path analysis for MRV – forward in and forward out from loading area



Figure 3-3: Vehicle swept path analysis for the B99 western bay - reverse in and forward out from bay



Figure 3-4: Vehicle swept path analysis for the B99 eastern bay - reverse in and forward out from bay



Figure 3-5: Vehicle swept path analysis for the SRV - forward in and forward out from loading area



Figure 3-6: Vehicle swept path analysis for the 9.25m waste vehicle – forward in and forward out from loading area

### 3.3 Safety Considerations

Cyclists will access the development via a dedicated access off Castlereagh Street as indicated in Figure 2-1 to use the End-of-Trip (EoT) lifts to access the bicycle parking facilities on level 1.

As the cyclist access is located close to the vehicle access to the east, the users are exposed to some safety risks, particularly the on-street cyclists who travel in a southbound direction will ride across the vehicle access crossover from Castlereagh Street to access the development loading dock. It is recommended that awareness improvements be implemented in the area to reduce the risk, such as a warning system and convex mirror mounted onto street poles. This has been included as part of the Green Travel Plan recommendations in SMCSWSPS-AUR-OSN-EM-REP-000002 it impacts North OSD cyclists who use the EoT facilities. It is however noted that public domain measures fall under the planning pathway of the CSSI and are not a matter for consideration under this SSDA application.

# 4 Contingency Response to Potential Incidents

A number of potential incidents may limit the operation of the loading dock and automatic car stacker. These are shown in Table 4-1.

| Table 4-1: Co | ntingency | Responses | for Potential | Incidents at | North OSD |
|---------------|-----------|-----------|---------------|--------------|-----------|
| 10010 1 11 00 |           |           |               | monaomico a  |           |

| Incident  | Impact   | Response   |
|---|--|--|
| Blocked Access to Northern<br>Segment of the Loading Dock | A vehicle has broken down within the<br>northern segment of the loading<br>facility.               | If the vehicle is broken down in a<br>particular bay, then all vehicles<br>scheduled to use that particular bay<br>will need to be notified immediately.<br>Towing Service to be called<br>immediately to remove the vehicle.<br>If the vehicle is broken down on the<br>turntable, towing service to be called<br>immediately to remove the vehicle.  |
| Blocked Access to Loading Dock                            | Loading Dock and Automatic Car Lift<br>not available due to blocked access<br>to the loading dock. | Towing Service to be called<br>immediately to remove the vehicle<br>that is blocking access to the loading<br>dock. Any scheduled deliveries will<br>need to be rescheduled to following<br>when the broken-down vehicle is<br>removed.  |
| Delivery outside of nominated booking time                | Vehicle blocking access to the loading dock.   | Dock Master to allow vehicle to use<br>turn table to egress from the loading<br>dock area, or if available to<br>undertake required loading in<br>available bay.   |
| Loading taking longer than time<br>limit                  | Arrival and delay of consecutive vehicles arriving to the loading dock.                            | If time is available, the bay may be<br>utilised for the extra time required. If<br>it is impacting the operations of other<br>vehicles, then the loading dock<br>master is to decide if this vehicle is to<br>vacate the bay, or notify the next<br>vehicle to come at a different time<br>slot.  |
| Failure of the turntable                                  | Northern Segment of loading dock is<br>not able to be utilised due to<br>turntable being broken.   | Determine the time required to fix the<br>turntable.<br>One of the Southern Segment<br>service bays to be allocated to a<br>Metro bay, and all loading for that<br>bay to be managed.<br>If it is a short-term fix, loading to<br>recommence for high priority<br>deliveries once the turntable is fixed,<br>followed by lower priority deliveries.<br>If it is a long-term fix, high priority<br>loading deliveries to be undertaken at<br>surrounding on-street loading<br>facilities. |

| Incident                          | Impact   | Response   |
|-----------------------------------|--|--|
| Failure of the automatic car lift | Lowers access time for commercial<br>tenants potentially resulting in an<br>increase in slower operations for the<br>overall loading dock. | In the event the automatic car lift<br>breaks down, a one-week down time<br>is noted by LCI (the automatic car lift<br>designer) to fix the automatic car lift.<br>With one lift in operation, there is<br>sufficient capacity to meet the<br>estimated demand for the automatic<br>car stacker. |

## 5 Next Steps

As the building becomes operational, the Delivery Service Plan will be updated accordingly to reflect any changes within the site, in particular as the commercial and retail tenants become known. This Service Deliver Plan is proposed to be updated in line with the developing design and once the Loading Dock master is appointed for North OSD. The role of the Loading Dock Master is beyond the traditional role of a security guard, and will include knowledge of logistics and traffic management training.

#### Document prepared by

Aurecon Australasia Pty Ltd ABN 54 005 139 873 Level 5, 863 Hay Street Perth WA 6000 Australia

**T** +61 8 6145 9300 **F** +61 8 6145 5020 **E** perth@aurecongroup.com **W** aurecongroup.com



Aurecon offices are located in: Angola, Australia, Botswana, China, Ghana, Hong Kong, Indonesia, Kenya, Lesotho, Macau, Mozambique, Namibia, New Zealand, Nigeria, Philippines, Qatar, Singapore, South Africa, Swaziland, Tanzania, Thailand, Uganda, United Arab Emirates, Vietnam.

#### Document prepared by

#### Aurecon Australasia Pty Ltd

ABN 54 005 139 873 Level 5, 863 Hay Street Perth WA 6000 Australia

T +61 8 6145 9300 F +61 8 6145 5020 E perth@aurecongroup.com Waurecongroup.com



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Angola, Australia, Botswana, China, Ghana, Hong Kong, Indonesia, Kenya, Lesotho, Mozambique, Namibia, New Zealand, Nigeria, Philippines, Qatar, Rwanda, Singapore, South Africa, Swaziland, Tanzania, Thailand, Uganda, United Arab Emirates, Vietnam, Zambia,