Pitt Street North OSD

AA – Structural Statement

State Significant Development, Development Application (SSD DA)

Prepared for: Pitt Street Developer North Pty LTD

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Issue for DPIE

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Tables

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 1.

Table 1 - SEARs requirements

Item	Description of Requirement	Section Reference
4. Integration with Sydney Metro station infrastructure	b) Demonstrate how the SSD will integrate with the CSSI infrastructure such as structural design.	3. Structural Philosophy (page 9)

2 Updates Since Previous Submission

This section of the report describes the changes that have been made to this report since Round 1 Submission to Sydney Metro, due to the following reasons:

Table 2 - Updates to previous submission

Type of Change	Description of Change	Section Reference
Updated information	Update to Figure 2 – Sydney Metro Alignment Map to latest map.	Section [3.2] – Page [8]
Updated information	Update to Sydney Metro description	Section [3.2] – Page [7]
Removal of information	Removal of Pitt Street North Over Station Development (OSD) development overview	

3 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).

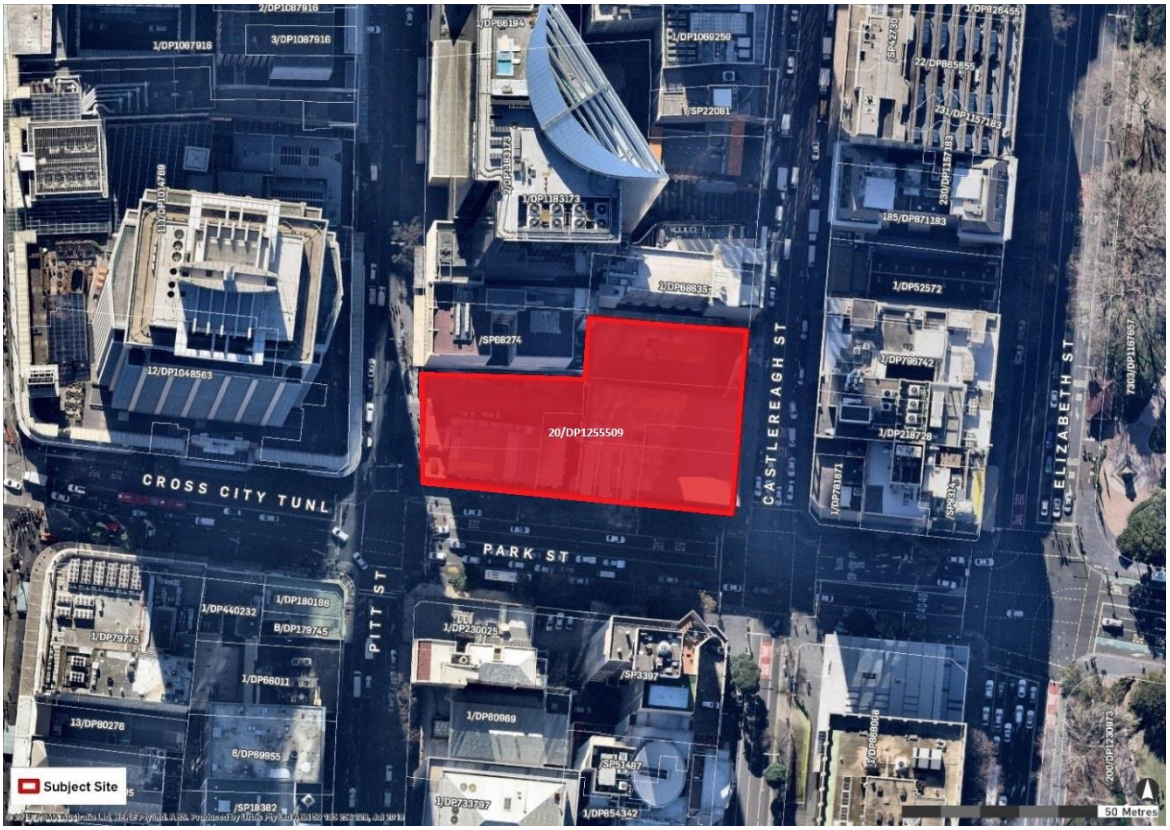
3.1 The Site

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 - Location Plan



Source: Urbis

3.2 Sydney Metro Description

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:

1. 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.

2. 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.

3. 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.

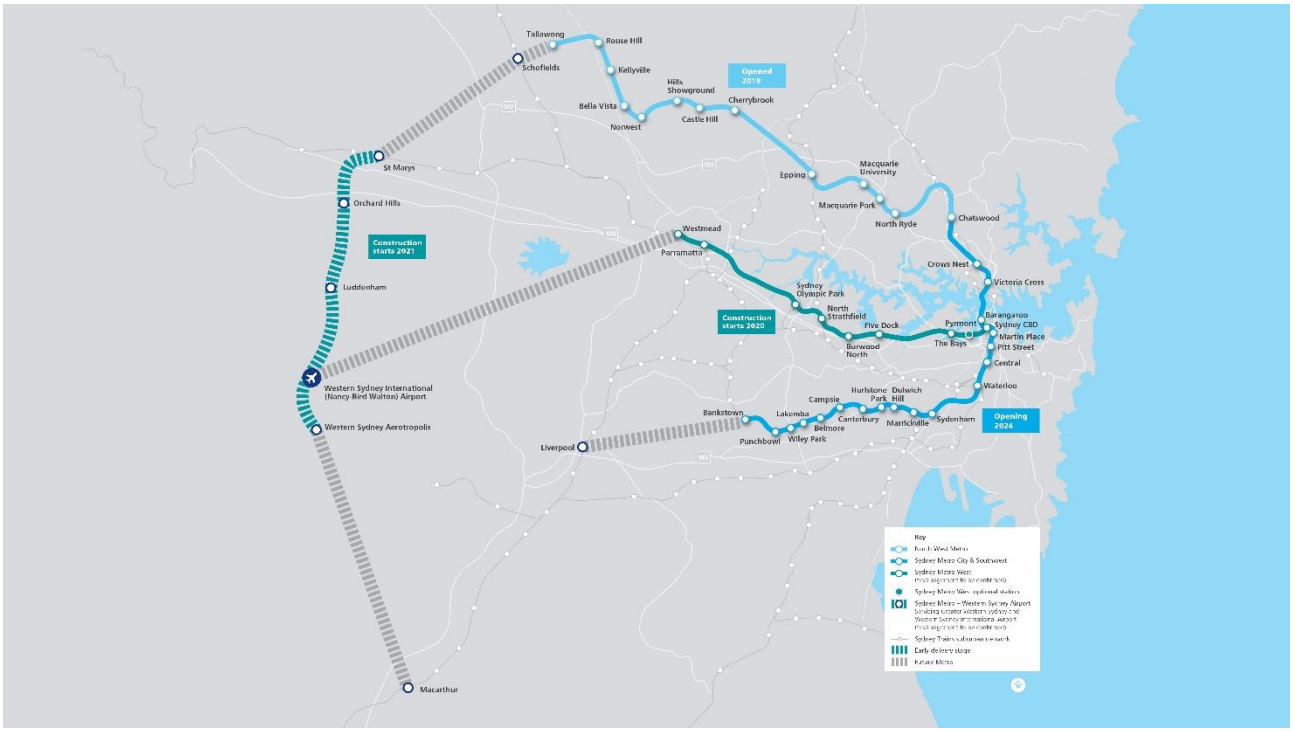
The NSW Government is assessing an optional station at Pyrmont and further planning is underway to determine the location of a new metro station in the Sydney CBD.

4. 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 the figure below.

Figure 2 - Sydney Metro Alignment Map

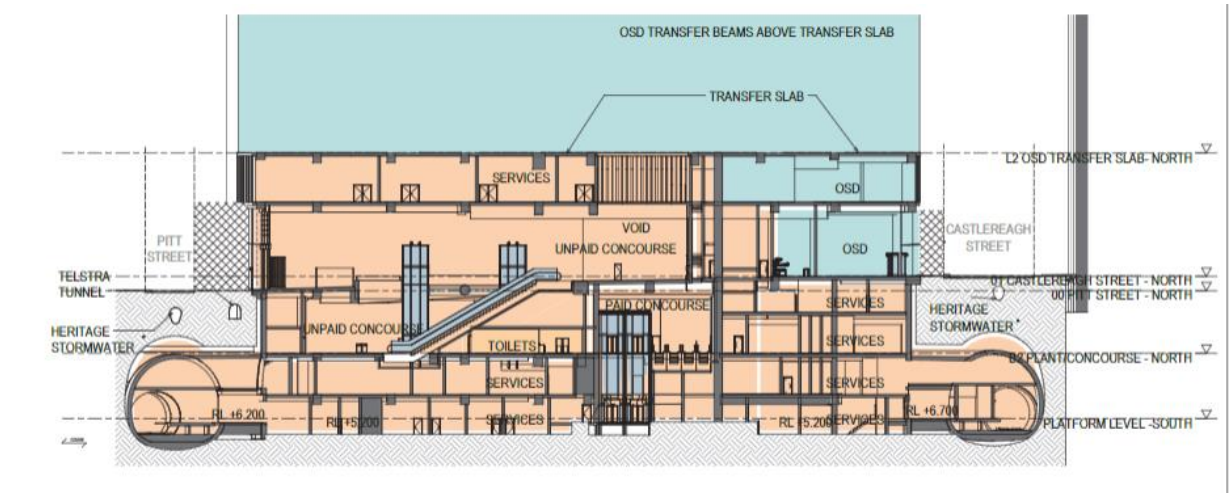


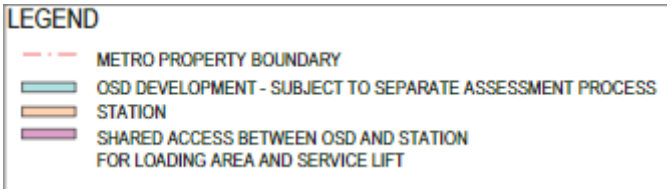
Source: Sydney Metro

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 below. The delineation line between the CSSI Approved works and the OSD envelope is generally described below or above the transfer slab level respectively.

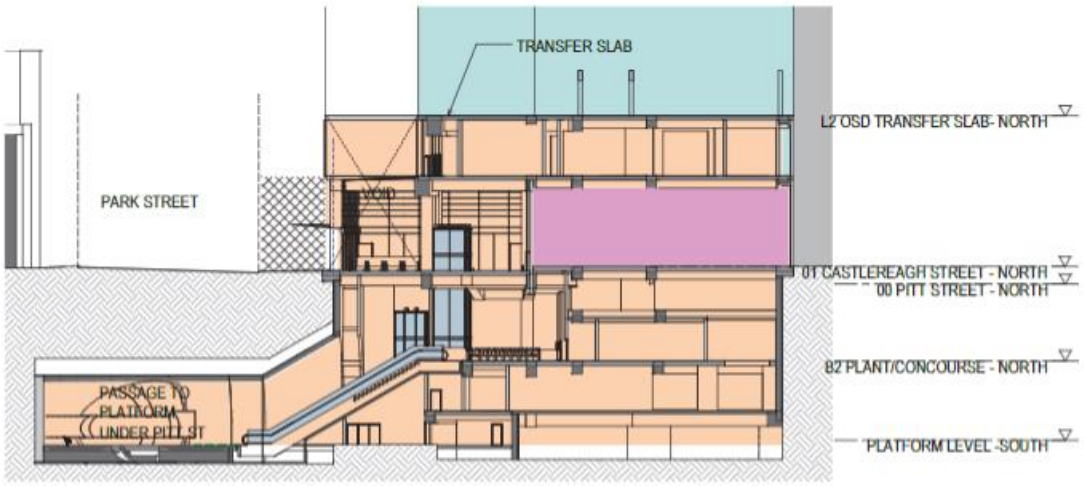
Figure 3 - Pitt Street Station – North (East-West Section)

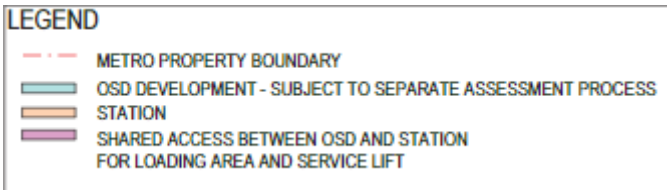




Source: CSSI Preferred Infrastructure Report (TfNSW)

Figure 4 - Pitt Street Station – North (North-South Section)





Source: CSSI Preferred Infrastructure Report (TfNSW)

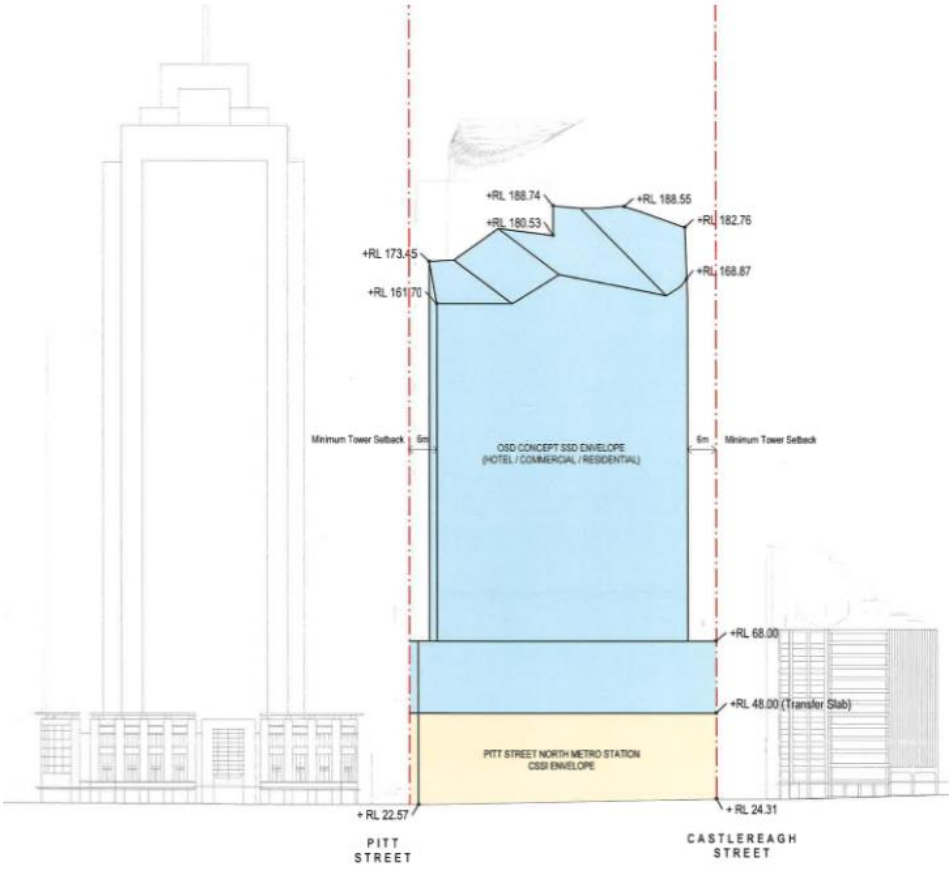
The Preferred Infrastructure Report (PIR) noted that the integration of the OSD elements and the metro station elements would be subject to the design resolution process, noting that the detailed design of the "metro box" may vary from the concept design assessed within the planning approval.

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.

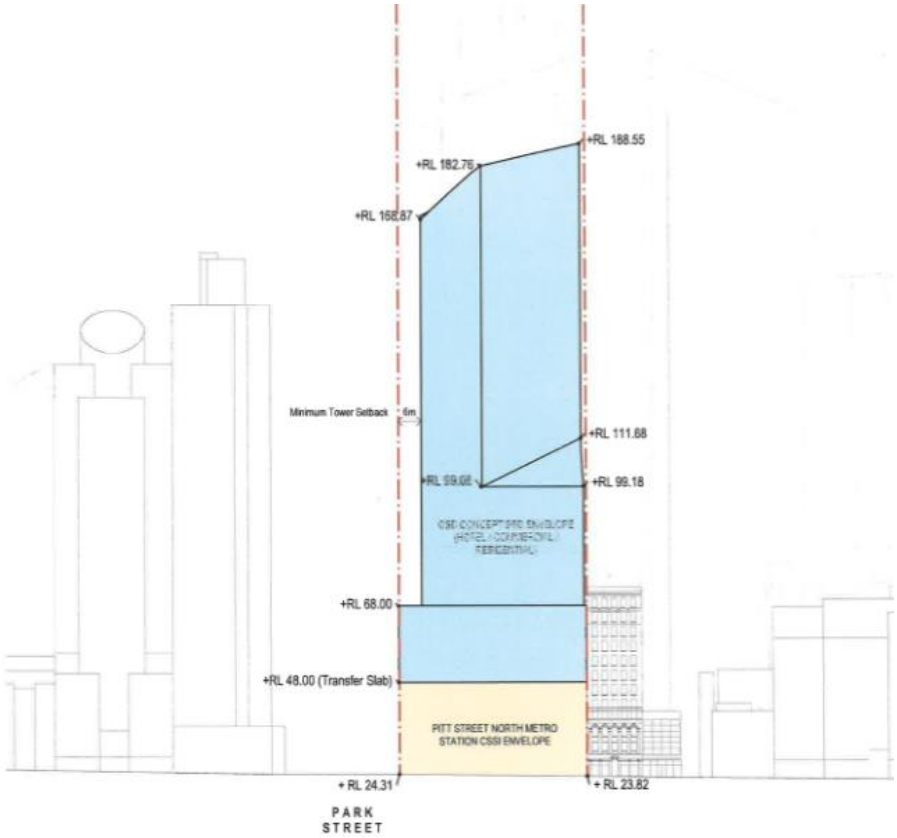
As per the requirements of clause 7.20 of the *Sydney Local Environmental Plan 2012*, as the OSD exceeds a height of 55 metres above ground level (among other triggers), development consent is first required to be issued in a Concept (formerly known as Stage 1) DA. This is described below.

Figure 5 - Pitt Street North Concept SSD DA – Envelope – South Elevation



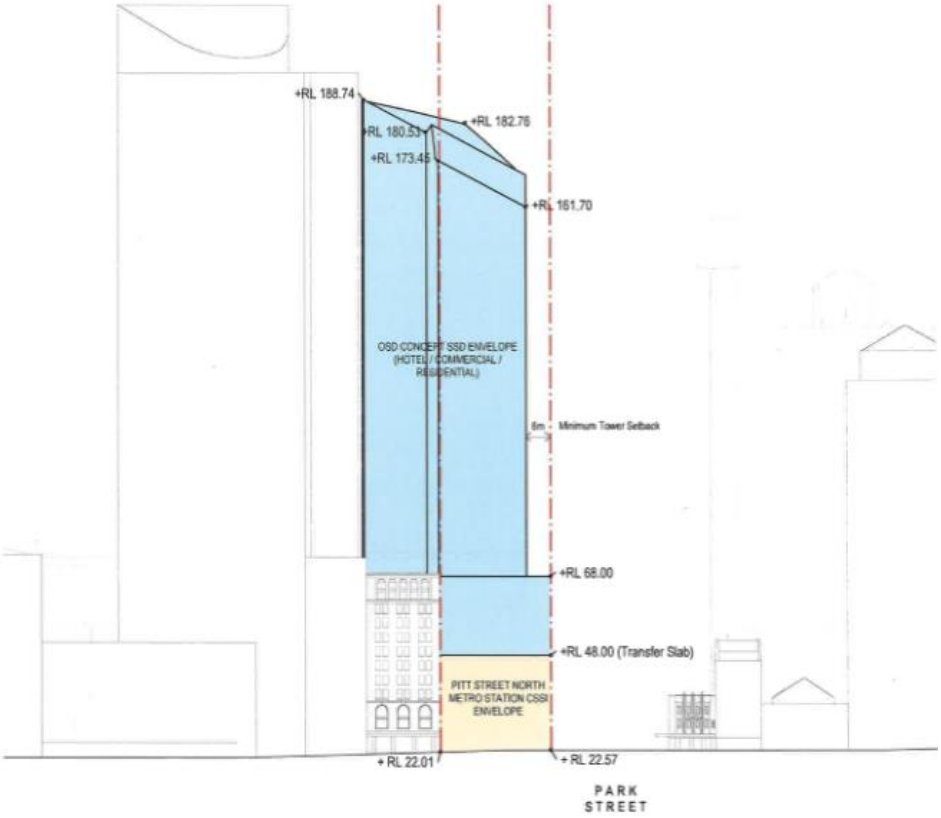
Source: SSD 8875 Concept Stamped Plans

Figure 6 - Pitt Street North Concept SSD DA – Envelope – East Elevation



Source: SSD 8875 Concept Stamped Plans

Figure 7 - Pitt Street North Concept SSD DA – Envelope – West



Source: SSD 8875 Concept Stamped Plans

4 Structural Philosophy

4.1 Introduction

The structural philosophy for the Pitt St Station North OSD has been developed in conjunction with the requirements of the transport authorities for the Pitt St Station development and the requirements of the Developer for the retail and commercial components of the building.

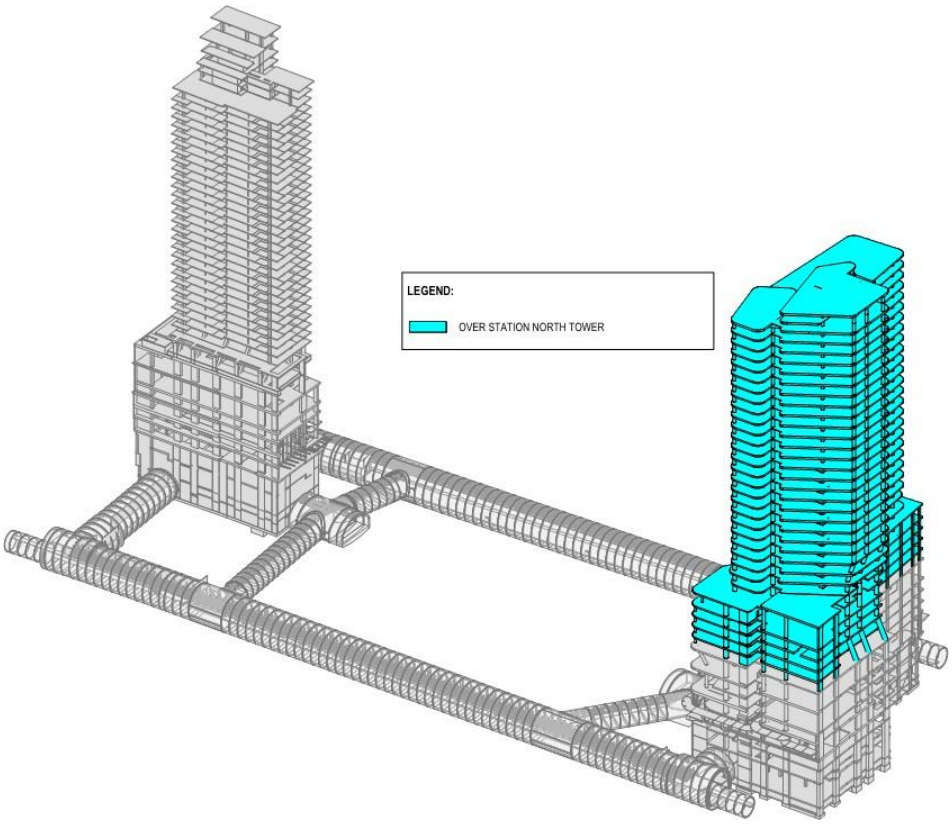
4.2 Excavation

The Pitt St North station box will be an open cut excavation undertaken by the TSE contractor. The typical near surface ground conditions are characterised by variable fill material for up to 2 metres in depth with residual soil to 6 metres. Hawkesbury sandstone bedrock is observed below the residual soils. The station box excavation is connected to pedestrian adit tunnels which then connect to the platform caverns.

4.3 Pitt St North OSD Overview

The Pitt St North OSD is a reinforced concrete braced frame structure that is consistent with the structural philosophy of the Pitt St Station. Figures 8 below identify the delineation between the Pitt St Station North and the Over Station Development. The interface between the Pitt St Station and the Over station Development occurs at level 5. However, there is an overlap of function between the station and the office tower between the Basement Level 1 through to Level 5 that include a substation, tower lobby, loading dock, car stacker and goods lift. The Pitt St North OSD consists of 33 levels above the level 5 interface.

Figure 8 - Pitt Street North OSD Delineation



4.4 Design Criteria

The design of the structure complies with:

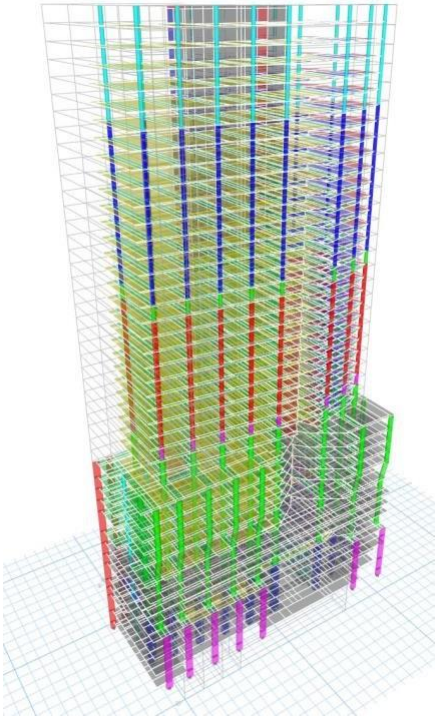
- All current relevant Australian Standards
- Building Code of Australia NCC 2019
- Heritage requirements
- Sydney Metro & TfNSW standards and requirements where applicable
- Sydney Metro Pitt St Station Scope of Works and Technical Criteria where applicable

4.5 lateral System

The structure has been developed with the lateral load-resisting structure for the Pitt Street North as a reinforced concrete braced frame core and shear wall system. This utilises the concrete walls in the east and west podium cores, escalator box walls and low-rise and high-rise lift cores from level 1 and above. The core walls are an interconnected system with header beams that link the walls across major openings in the walls. The closed arrangement of the core boxes that form the lateral load-resisting structure at each level also provides global torsional resistance.

The lateral load-resisting system has been designed to resist wind and earthquake loads for both strength and serviceability requirements, as well as satisfy robustness requirements.

Figure 9 - Lateral Analysis Model



4.6 Column Arrangement

The proposed column arrangement considers that there are no tower column transfers through any floor plates with the columns having a direct load path through to the foundation. This has been achieved either through coordination of tower columns through the station box or discontinuation of columns through the podium cores. This approach has seen that there is no adverse impact of deep transfer beam members effecting space planning of the station.

The podium columns that support the podium floor plate extent, extend between the interface level 5 and subsequently transfer or continue through to the foundation. These columns have varying shapes but are predominantly circular or rectangular.

4.7 Floor Plate Structure

The floor plates of the Pitt St North OSD consist of one-way post-tensioned slabs supported on post-tensioned band beams. Notches have been incorporated into the band beams to allow for services reticulation to the individual floors.

Figure 10 - Typical Floor Perspective

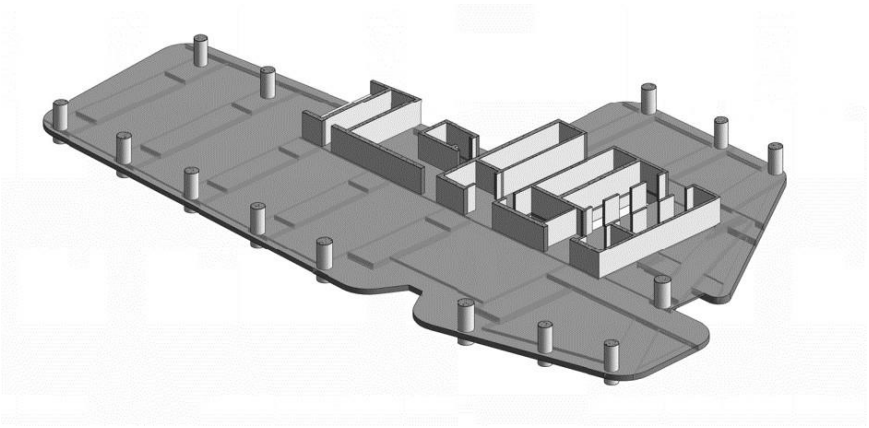
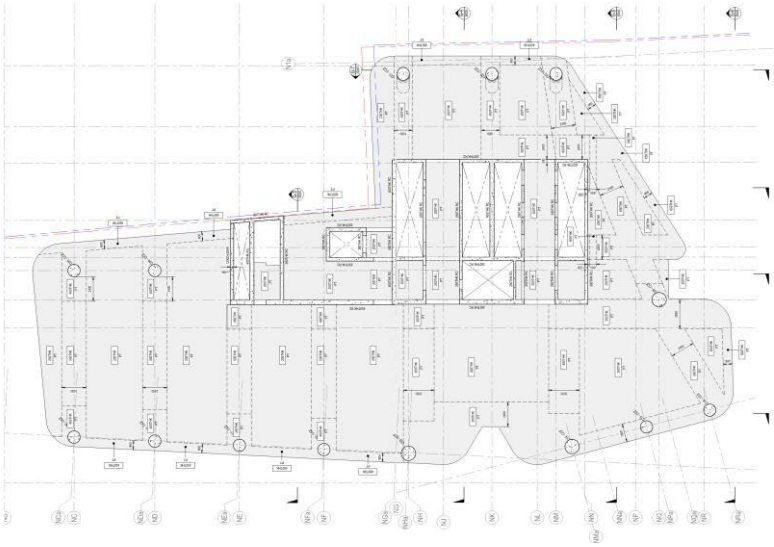


Figure 11 - Typical Floor GA Plan



4.8 Transfer Structure

The tower low-rise and high-rise lift core is transferred above the station north escalators and is supported by the perimeter escalator box walls and four lozenge mega-columns. These mega-columns penetrate through the station box escalators. The core transfer consists of a grillage of transfer walls that form the low-rise and high-rise lift pits and subsequent tower core. The transfer wall grillage is idealized from level 1 through to level 3.

4.9 Conclusion

The structural design of the Pitt Street North OSD is fully integrated with the design of Pitt Street North Station and has been developed to support the architectural and engineering aspirations of the Pitt Street North Integrated Station Development. The design gives full consideration to all relevant design and planning criteria and industry standards, guidelines and legislation.

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