

CONCEPT PLAN - MODIFICATION APPLICATION STRUCTURAL STATEMENT

Victoria Cross Over Station Development



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Victoria Cross Over Station Development

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<i>Approved by</i>	<i>OSD Design Manager</i>	<i>Stephen Canty</i>	<i>25 July 2019</i>

Amendment Record

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

Date	Rev	Amendment Description	By
31 May 2019	A	Issue to Lendlease	Francis Ayan
7 June 2019	B	Updated for Submission	Stephen Canty
12 June 2019	C	Updated for Submission	Stephen Canty
24 July 2019	D	Sydney Metro comments incorporated	In Young Suh

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Acronyms

Abbreviation	Description
OSD	Over Station Development
ISD	Integrated Station Development
TfNSW	Transport for New South Wales
CSSI	Critical State Significant Infrastructure
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
DA	Development Application
GFA	Gross Floor Area
TSE	Tunnel and Station Excavation

1. Introduction

This report has been prepared to accompany a section 4.55(2) modification application to the State Significant Development (SSD) Concept Approval (reference SSD 17_8874) granted for a commercial mixed-use Over Station Development (OSD) above the new Sydney Metro Victoria Cross Station. This report has been prepared having regard to the Secretary's Environmental Assessment Requirements dated 30 November 2017.

The Minister for Planning granted development consent to the Concept SSD Development Application (DA) on 18 December 2018. Concept Approval was granted for:

- A maximum building envelope, including street-wall and setbacks for the OSD
- A maximum building height of RL 230 or 168 metres, providing:
 - Approximately 40 commercial storeys and 2 additional storeys for rooftop plant for the high-rise portion of the building envelope
 - Approximately 13 storeys for the lower eastern portion of the building envelope at RL 118 or 55 metres
 - A maximum gross floor area (GFA) of 60,000sqm, excluding station floorspace
 - Basement car parking for a maximum 150 parking spaces.

Following Sydney Metro's appointment of Lendlease (Victoria Cross) Pty Limited as the preferred development partner to deliver the Victoria Cross OSD, and ongoing design development, minor modifications to the approved building envelope are now required.

The section 4.55(2) modification application proposes the following changes to the approved building envelope:

- Reduction in the massing and overall dimensions of the building cantilever above the Miller Street special area setback;
- Relocation of building massing from the low-rise levels the tower, north of the through-site link, to the high-rise levels of the tower;
- Reduction of the Berry Street setback from 5 metres to 4.5 metres, extending the building envelope marginally to the north; and
- Increasing the approved maximum GFA for the over station development from 60,000sqm to 61,500sqm.

It is noted that the Concept SSD DA instrument of approval does not consent to any physical works commencing on site until a Detailed SSD DA is granted for the site. A Detailed SSD DA seeking consent for the detailed construction of the proposed development is lodged under a different cover concurrently with this Concept SSD DA modification application.

The Site

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

- 155-167 Miller Street (SP 35644) (which incorporates lots 40 and 41 of Strata Plan 81092 and lots 37, 38 and 39 of Strata Plan 79612)

- 181 Miller Street (Lot 15/DP 69345, Lot 1 & 2/DP 123056, Lot 10/DP 70667)
- 187 Miller Street (Lot A/DP 160018)
- 189 Miller Street (Lot 1/DP 633088)
- Formerly part 65 Berry Street (Lot 1/DP 1230458)

Sydney Metro Description

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

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

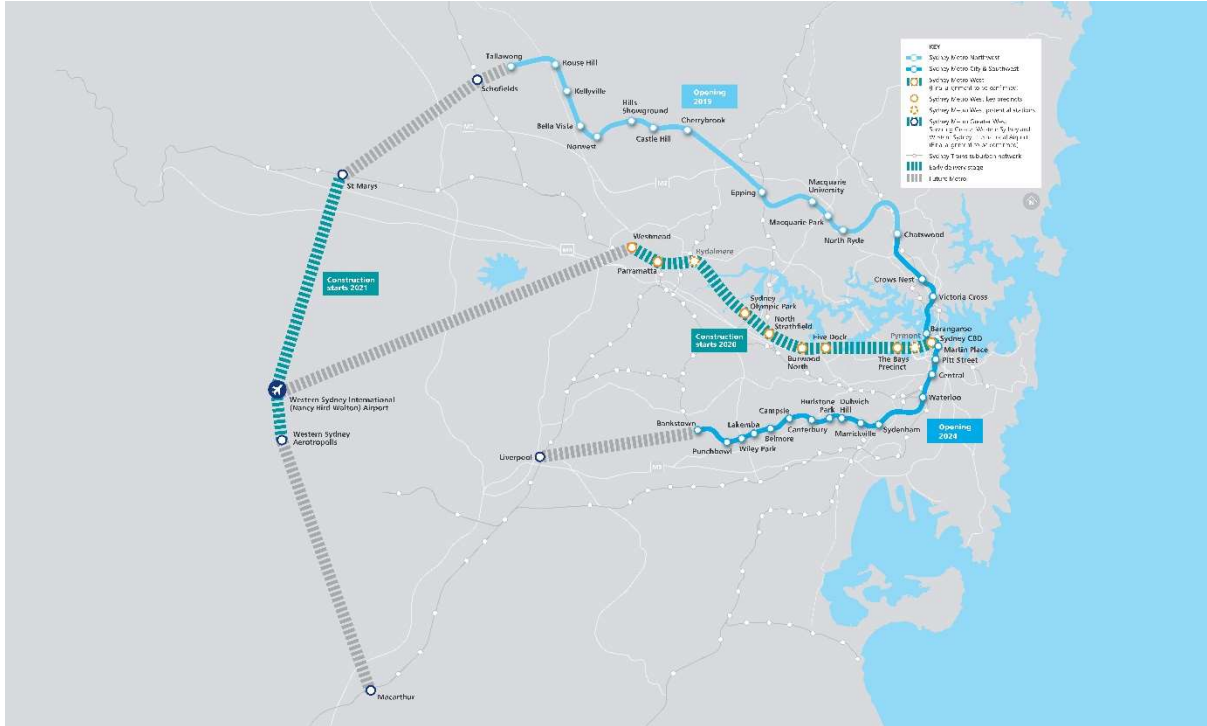
On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham project as a Critical State Significant Infrastructure project (reference SSI 15_7400) (CSSI Approval). The terms of the CSSI Approval includes all works required to construct the Sydney Metro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

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



Figure 01 – Site Aerial

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Source: Sydney Metro

Figure 02 – Sydney Metro Alignment Map

2. Structural Philosophy

The structural philosophy of the project is developed around the requirements of the transport authorities for the station development and the requirements of Lendlease for the retail and commercial office tower components of the buildings. Whilst the development is integrated in terms of architecture and functionality, the definition of the station elements as CSSI as distinct from the OSD elements as SSD will mean differences in a number of aspects of the design and design criteria.

2.1 Excavation

The southern station entrance shaft will be carried out as an open cut excavation by the Sydney Metro TSE contractor. The upper section of the excavation will be situated in layers of weathered sandstone and residual/fill material which will be retained by temporary retaining walls. The majority of the excavation below this will be in vertically cut, Class I and II Hawkesbury sandstone. Mined pedestrian adit tunnels connect the lower section of the shaft to the main rail platform cavern beneath Miller Street.

Note that excavation work is approved under separate CSSI consent and is not proposed with this SSD DA; however, it is included for context.

2.2 OSD Tower Overview

The OSD Tower is a reinforced concrete structure consisting of 35 levels of commercial floors, a mid rise plant level and two levels of plant at the top. It is subdivided into 3 commercial zones namely: low-rise, mid-rise and high-rise zones. It interfaces with the Station Structure at Level 04.

The structural design of the OSD Tower is driven by the architectural and station spatial requirements. For instance, while vertical continuity is a key aspect for structural design, 'transfer' elements are introduced in some locations to satisfy the station structures' requirements. The stations' requirements of an open space for public use at the podium level (Ground Floor to Level 04) also influenced the selection of the structural floor system in these areas. This meant that internal columns are avoided whenever possible. These design philosophies are reflected in the current structural scheme.

The Victoria Cross Station OSD Tower shaft forms the base of the Tower itself. The two structures are both designed, and are to be constructed, as one integrated structure from foundation to rooftop.

The following figure shows a snapshot of the OSD Tower:

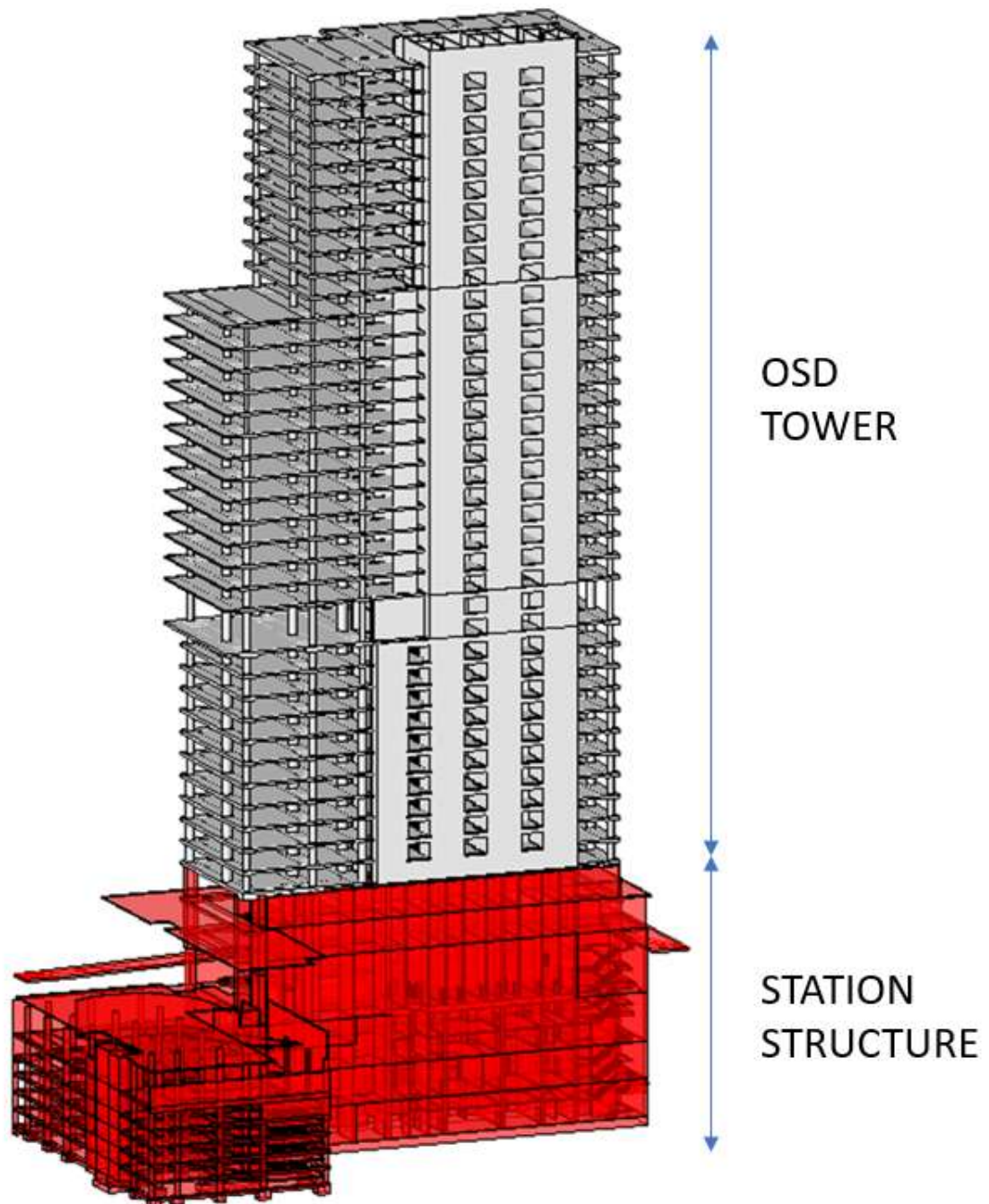


Figure 04 – OSD Tower Perspective

2.3 OSD Tower Main Structural Stability System

A coupled core-wall system together with perimeter basement walls form the main lateral stability system of the OSD Tower. These elements are designed to cope with the vertical gravity loads and lateral loads imposed by wind or earthquake forces.

Along with the main core-wall, the OSD Tower also has perimeter and internal columns. These elements are designed to take compression loads from combined actions of gravity and lateral loads.

Given the height of the structure, this structural stability system provides is ideally suited to provide the required strength and stiffness to transfer the gravity and lateral loads from the superstructure to the foundation.

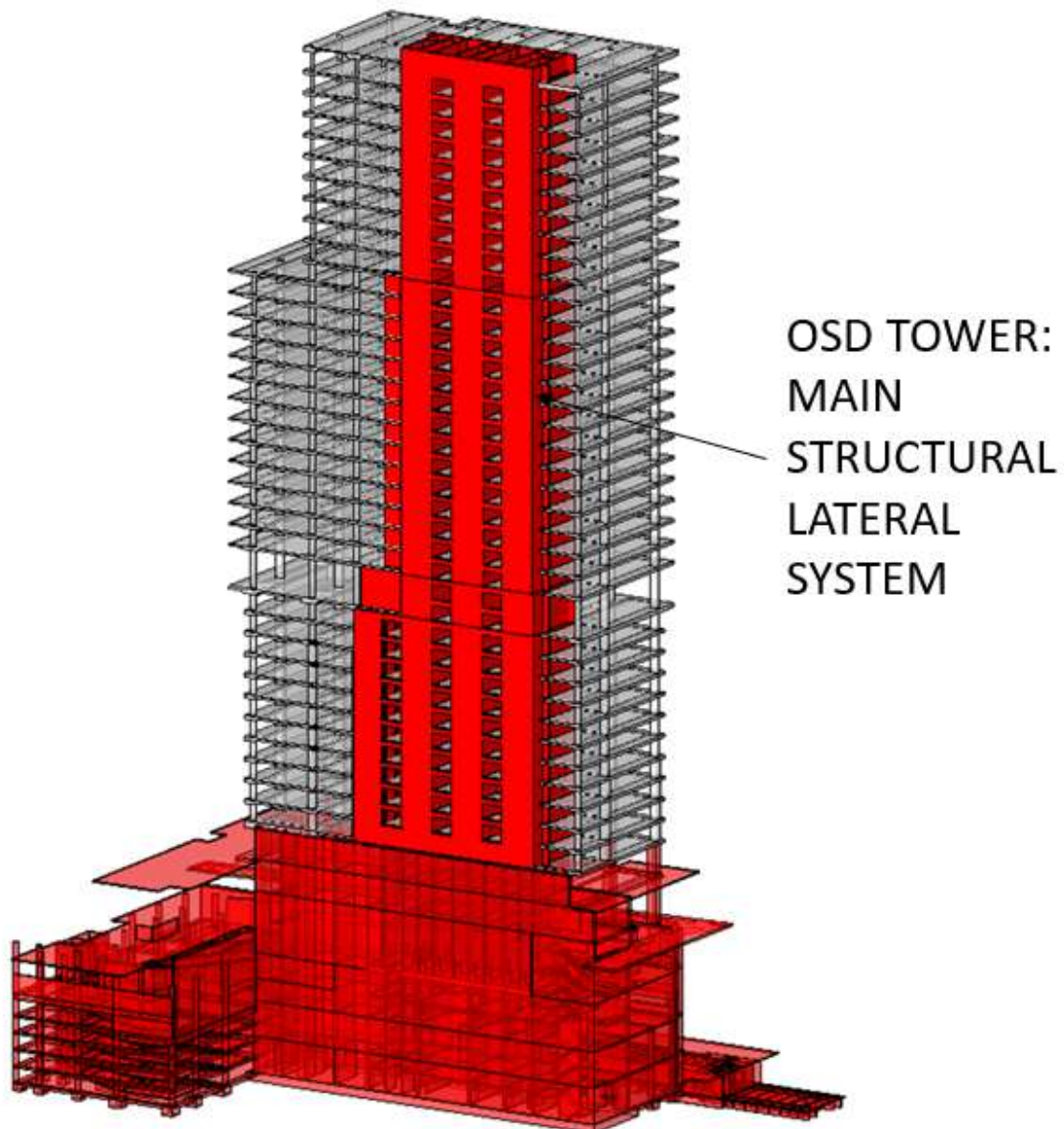


Figure 05 – OSD Tower Main Structural Stability System

2.4 Gravity Load Transfer

Gravity loads from the self-weight of the structure, plant and equipment loads, superimposed dead loads and live loads are transferred by floor slabs to the band beams then to the reinforced concrete columns and walls, and down to the foundation pads. Where columns transitions are offset, tie beams are introduced to tie back the horizontal loads into the main core-wall.

2.5 Transfer Systems

The spatial requirements of the Station Structure required some of the OSD Tower columns to be 'transferred' to walls or slabs. These transfer elements include the following:

- a full height transfer wall above the Station adit (between Denison Street to B01 Level) supporting an OSD Tower column
- a thick floor plate transfer slab above the ventilation shafts at Level 4 supporting an OSD Tower column
- a thick floor plate slab at Miller Street Level supporting internal core walls which terminate at this location.

Any impacts associated with OSD Tower building services on the Sydney Metro rail corridor are addressed through the design. The OSD Tower building services are designed to be independent of the station building services, with the interfaces to be managed via building management control systems interfaces and the Building Management Statement, developed concurrently with the design.

3. Design Criteria

The structures will comply with:

- All current relevant Australian Standards;
- Building Code of Australia NCC 2019;
- Sydney Metro/TfNSW standards and requirements where applicable;
- Metro Victoria Cross Scope of Works and Technical Criteria

4. Agency Consultations

4.1 Engagement with Sydney Metro

Lendlease continues to engage with Sydney Metro throughout the Metro Victoria Cross ISD design phase including OSD concept design and station Design Stage 2. The approved station Stage 1 design provided by Sydney Metro has been submitted and approved by the Sydney Metro Configuration Control Board Gate 2 (CCB 2). The purpose of CCB 2 is for the designer to assure Sydney Metro that the proposed development is a safe design solution, which is compatible with existing and future proposed railway infrastructure and has satisfies requirements established by Sydney Metro.

CCB 2 was conducted on 18 October 2017, where the scheme was passed by the CCB. The next CCB gateway, CCB Gate 3, must be passed prior to issuing “for-construction” documentation. This will be conducted prior to commencement of construction.

4.2 Engagement with TSOM and Linewide

Engagement with TSOM and Line Wide is ongoing. The Stage 1 designers provided technical input to Sydney Metro throughout the CCB2 phase, which was used by Sydney Metro to inform engagement with TSOM and Line wide. TSOM and Linewide are a key stakeholder at CCB3.

4.3 Engagement with Tunnels and Stations Excavation Contractor

Excavation, piling, and foundation works will be undertaken by the Sydney Metro Tunnel and Station Excavation (TSE) Contractor and as such will be fully assured and procured by the TSE Contractor as an AEO. ARCMAC has provided technical input to the TSE Contractor via Sydney Metro. As the design develops coordination and collaboration between the Metro Victoria Cross team and the TSE Contractor will continue.

5. Conclusion

The design of the OSD Tower integrated with the construction of the future Sydney Metro City and Southwest rail corridor has been developed in line with the architectural intent of the OSD Tower.

The structural design considered all relevant design and planning criteria as well as integration with the other engineering services.

The proposed changes to the approved building envelope and reduction in building setbacks do not require any changes to the structural philosophy or design basis for the OSD Tower.