

Macquarie

**Sydney Metro Martin Place
integrated station development**

**North Tower, SSD DA Stage 2:
Fire Engineering Brief Report**

CSWSMP-MAC-SMN-FL-BRF-999902

Revision 01| 23 August 2018

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 247838

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1 Introduction

This report supports a State Significant Development (SSD) Development Application (DA) (SSD DA) submitted to the Minister for Planning (Minister) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on behalf of Macquarie Corporate Holdings Pty Limited (Macquarie), who is seeking to create a world class transport and employment precinct at Martin Place, Sydney.

The SSD DA seeks approval for the detailed design and construction of the **North Site** Over Station Development (OSD), located above and integrated with Metro Martin Place station (part of the NSW Government's approved Sydney Metro project). The northern entrance to Metro Martin Place station will front Hunter Street, Elizabeth Street and Castlereagh Street, with the North Site OSD situated above.

This application follows the approval granted by the Minister for a Concept Proposal (otherwise known as a Stage 1 SSD DA) for two OSD commercial towers above the northern and southern entrances of Metro Martin Place station (SSD 17_8351). The approved Concept Proposal establishes building envelopes, land uses, Gross Floor Areas (GFA) and Design Guidelines with which the detailed design (otherwise known as a Stage 2 SSD DA) must be consistent.

This application does not seek approval for elements of the Metro Martin Place Precinct (the Precinct) which relate to the Sydney Metro City and Southwest project, which is subject to a separate Critical State Significant Infrastructure (CSSI) approval. These include:

- Demolition of buildings on the North Site and South Site;
- Construction of rail infrastructure, including station platforms and concourse areas;
- Ground level public domain works; and
- Station related elements in the podium of the North Tower.

However, this application does seek approval for OSD areas in the approved Metro Martin Place station structure, above and below ground level, which are classified as SSD as they relate principally to the OSD. These components are within the Sydney Metro CSSI approved station building that will contain some OSD elements not already approved by the CSSI Approval. Those elements include the end of trip facilities, office entries, office space and retail areas, along with other office/retail plant and back of house requirements that are associated with the proposed OSD and not the rail infrastructure.

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to create a world class transport and employment precinct at Martin Place, Sydney.

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This report details the fire engineering brief for the North Tower developed to date in consultation with project stakeholders, including Sydney Metro and FRNSW.

Context

The New South Wales (NSW) Government is implementing Sydney's Rail Future (Transport for NSW, 2012), a plan to transform and modernise Sydney's rail network so that it can grow with the city's population and meet the needs of customers in the future.

Sydney Metro is a new standalone rail network identified in Sydney's Rail Future. The Sydney Metro network consists of Sydney Metro Northwest (Stage 1) and Sydney Metro City and Southwest (Stage 2).

Stage 2 of Sydney Metro entails the construction and operation of a new metro rail line from Chatswood, under Sydney Harbour through Sydney's CBD to Sydenham and onto Bankstown through the conversion of the existing line to metro standards. The project also involves the delivery of seven (7) new metro stations, including Martin Place.

This step-change piece of public transport infrastructure once complete will have the capacity for 30 trains an hour (one every two minutes) through the CBD in each direction catering for an extra 100,000 customers per hour across the Sydney CBD rail lines.

On 9 January 2017 the Minister approved the Stage 2 (Chatswood to Sydenham) Sydney Metro application lodged by Transport for NSW (TfNSW) as a Critical State Significant Infrastructure (CSSI) project (reference SSI 15_7400). Work is well underway under this approval, including demolition of buildings at Martin Place.

The OSD development is subject to separate applications to be lodged under the relevant provisions of the EP&A Act. One approval is being sought for the North Site – this application – and one for the South Site via a separate application.

Site Description

The Metro Martin Place Precinct relates to the following properties (refer to Figure 1):

- 50 Martin Place, 9 – 19 Elizabeth Street, 8 – 12 Castlereagh Street, 5 Elizabeth Street, 7 Elizabeth Street, and 55 Hunter Street (North Site);
- 39 – 49 Martin Place (South Site); and
- Martin Place (that part bound by Elizabeth Street and Castlereagh Street).

This application relates **only to the North Site**, being the city block bounded by Hunter Street, Castlereagh Street, Elizabeth Street, and Martin Place (refer to Figure 1).

The South Site (39 – 49 Martin Place) is the subject of a separate Stage 2 SSD DA.



Figure 1: Aerial Photo of the North and South Site of the Martin Place Metro Station Precinct

Background

Sydney Metro Stage 2 Approval (SSI 15_7400)

The Sydney Metro CSSI Approval approves the demolition of existing buildings at Martin Place, excavation and construction of the new station (above and below ground) along with construction of below and above ground structural and other components of the future OSD, although the fit-out and use of such areas are the subject of separate development approval processes.

On 22 March 2018, the Minister approved Modification 3 to the Sydney Metro CSSI Approval. This enabled the inclusion of Macquarie-owned land at 50 Martin Place and 9-19 Elizabeth Street within Metro Martin Place station, and other associated changes (including retention of the opening to the existing MLC pedestrian link).

Concept Proposal (SSD 17_8351)

On 22 March 2018, the Minister approved a Concept Proposal (SSD 17_8351) relating to Metro Martin Place Precinct. The Concept Proposal establishes the planning and development framework through which to assess the detailed Stage 2 SSD DAs.

Specifically, the Concept Proposal encompassed:

- Building envelopes for OSD towers on the North Site and South Site comprising:
 - 40+ storey building on the North Site (see Figure 2)
 - 28+ storey building on the South Site
 - Concept details to integrate the North Site with the existing and retained 50 Martin Place building (the former Government Savings Bank of NSW)
- Predominantly commercial land uses on both sites, comprising office, business and retail premises
- A maximum total GFA of 125,437m² across both sites
- Design Guidelines to guide the built form and design of the future development
- A framework for achieving design excellence
- Strategies for utilities and services provision, managing drainage and flooding, and achieving ecological sustainable development
 - Conceptual OSD areas in the approved Martin Place Metro Station structure, above and below ground level¹

¹ Refers to those components within the Metro CSSI approved station envelope that will contain some OSD elements not approved in the CSSI consent. Those elements include the end of trip facilities, office entries, office space and retail areas, along with other office/retail plant and back of house requirements that are associated with the proposed OSD and not the rail infrastructure.

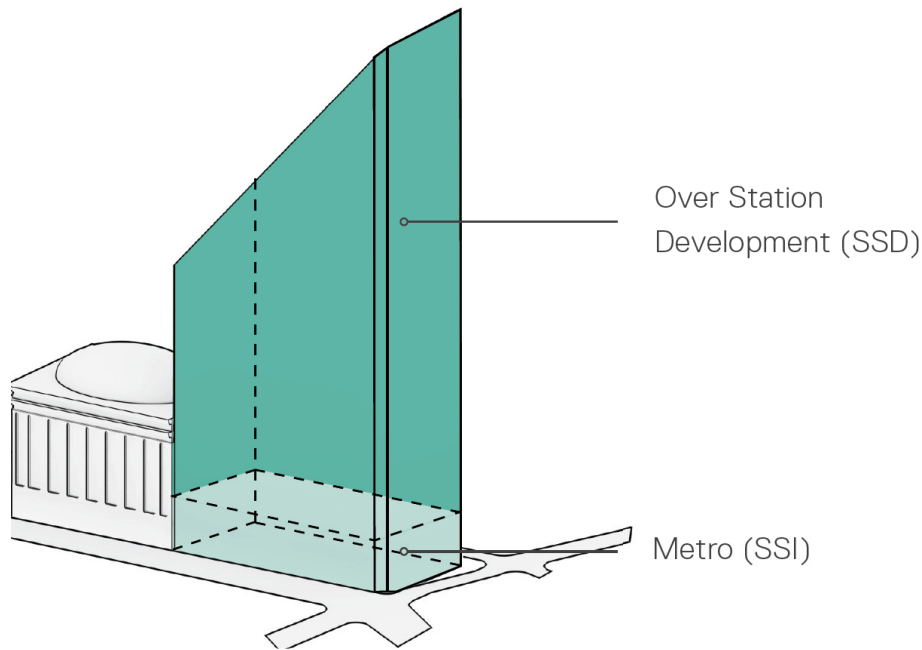


Figure 2: North Site Approved OSD Building Envelope

Planning Proposal (PP_2017_SYDNE_007_00) - Amendment to Sydney LEP 2012

The Planning Proposal (PP_2017_SYDNE_007_00) sought to amend the development standards applying to the Metro Martin Place Precinct through the inclusion of a site-specific provision in the Sydney Local Environmental Plan (LEP) 2012. This site-specific provision reduced the portion of the **South Site** that was subject to a 55 metre height limit from 25 metres from the boundary to Martin Place, to 8 metres, and applies the Hyde Park North Sun Access Plane to the remainder of the South Site, forming the height limit of the tower. It also permits a revised FSR of 22:1 on the South Site and 18.5:1 on the North Site. These amendments were gazetted within Sydney LEP 2012 (Amendment No. 46) on 8 June 2018 and reflect the new planning controls applying to the Precinct.

Overview of the Proposed Development

The subject application seeks approval for the detailed design, construction and operation of the North Tower. The proposal has been designed as a fully integrated station and OSD project that intends to be built and delivered as one development, in-time for the opening of Sydney Metro City and Southwest in 2024. This application seeks consent for the following:

- The design, construction and operation of a new 39 storey commercial OSD tower (plus rooftop plant) within the approved building envelope for the North Site, including office space and retail tenancies.
- Physical connections between the OSD podium and the existing 50 Martin Place building, to enable the use of the North Site as one integrated building.
- Vehicle loading areas within the basement levels.

- Extension and augmentation of physical infrastructure / utilities as required.
- Detailed design and delivery of ‘interface areas’ within both the approved station and Concept Proposal envelope that contain OSD-exclusive elements, such as end of trip facilities, office entries, office space and retail areas not associated with the rail infrastructure.

Planning Approvals Strategy

The *State Environmental Planning Policy (State and Regional Development) 2011* (SEPP SRD) identifies development which is declared to be State Significant. Under Schedule 1 and Clause 19(2) of SEPP SRD, development within a railway corridor or associated with railway infrastructure that has a capital investment value of more than \$30 million and involves commercial premises is declared to be State Significant Development (SSD) for the purposes of the EP&A Act.

The proposed development (involving commercial development that is both located within a rail corridor and associated with rail infrastructure) is therefore SSD.

Pursuant to Section 4.22 of the EP&A Act a Concept DA may be made setting out concept proposals for the development of a site (including setting out detailed proposals for the first stage of development), and for which detailed proposals for the site are to be the subject of subsequent DAs. This SSD DA represents a detailed proposal and follows the approval of a Concept Proposal on the site under Section 4.22 of the EP&A Act.

Submitted separately to this SSD DA is a SSD DA for the South Site (Stage 2 South Site SSD DA). A Stage 1 Amending SSD DA to the Concept Proposal (Stage 1 Amending DA) has also been submitted that has the effect of aligning the approved South Site envelope with the new planning controls established for the South Site (achieved through the site specific amendment to the Sydney LEP 2012).

Figure 3 below is a diagrammatic representation of the suite of key planning applications undertaken or proposed by Macquarie and their relationship to the subject application (the subject of this report).

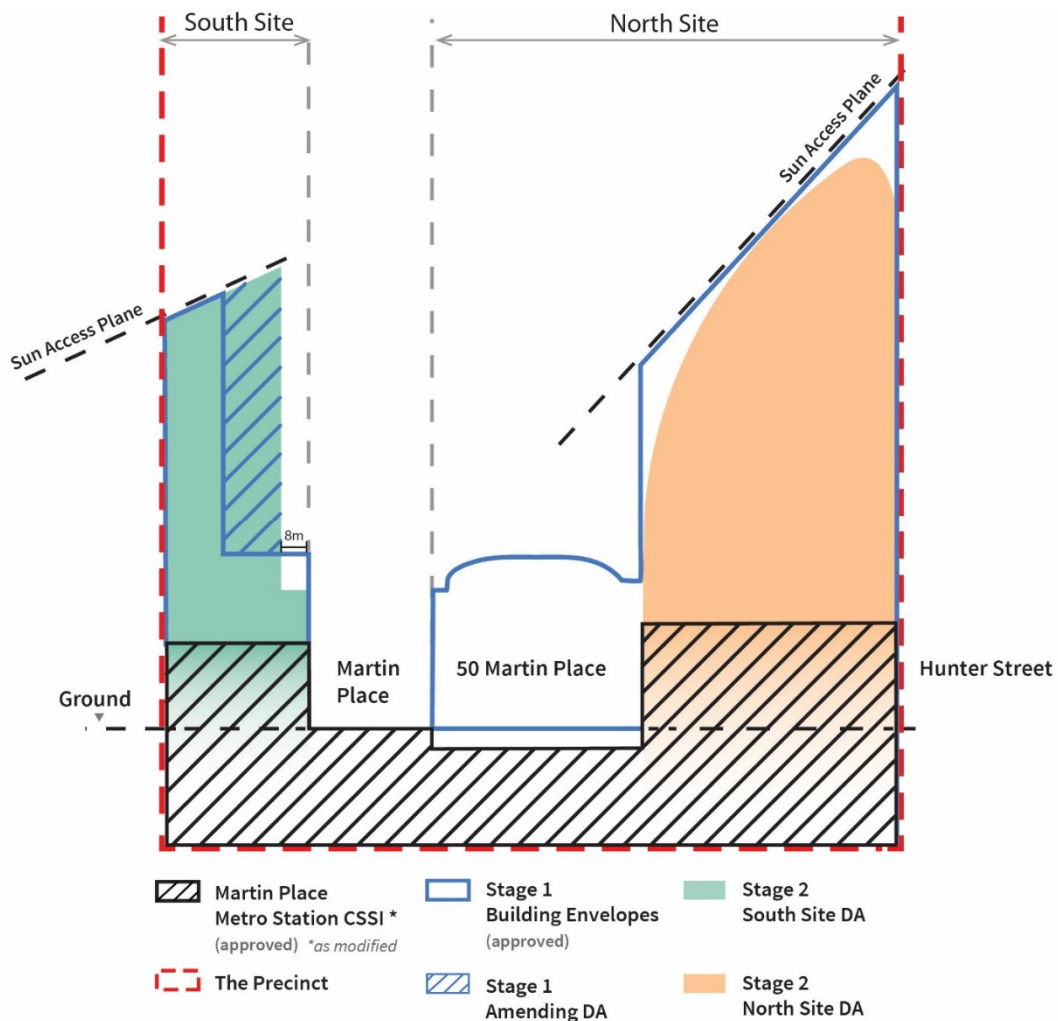


Figure 3: Relationship of key planning applications to the Stage 2 North Site DA (this application)

The Department of Planning and Environment have provided Secretary's Environmental Assessment Requirements (SEARs) to the applicant for the preparation of an Environmental Impact Statement for the proposed development. This report has been prepared having regard to the SEARs as follows:

During the preparation of the EIS, you are required to consult with the relevant local, State or Commonwealth Government authorities, service providers, and the local community. In particular, early consultation is required through meeting(s) with the Government Architect NSW, RMS, TfNSW (including Sydney Metro, Sydney Trains and Sydney Light Rail), Heritage Council of NSW, **Fire and Rescue NSW**, State Emergency Services and City of Sydney Council.

Furthermore, Condition B11 of the Development consent, Section 4.38 of the Environmental Planning and Assessment Act 1979, states:

B11. Future Development Application(s) for the detailed building design shall be accompanied by a draft Fire and Rescue assessment / engineering brief, prepared in consultation with FRNSW, providing details of:

- the various sectors within the Martin Place Station Precinct served by independent fire systems (such as the over station development, underground metro sector, etc) – *refer to Section 3.3.*
- fire engineering analysis of the pedestrian connection interfaces between the sectors and the sectors themselves, having regard to emergency occupant egress, fire and smoke compartmentation, smoke hazard management and fire fighting intervention – *refer to Section 3.3.*
- adequacy of fire and life safety systems within the Martin Place Station Precinct in relation to the fire hazards associated with the Sydney Metro – *Not applicable to the North Tower as it is fire and smoke separated from the Metro Station development. This will be addressed in the Station Report.*
- design of fire hydrant systems for over station development that exceeds 135 m – *refer to Section 3.4 and conversations undertaken with Fire & Rescue NSW to date.*
- future consultation with Fire & Rescue NSW in respect of the final design and construction of the buildings and operational compatibility of the Martin Place Station Precinct's proposed fire and life safety systems – *refer to Section 3.4.*

Note, a draft Fire and Rescue assessment / engineering brief will be provided in the form of a Fire Engineering Brief Questionnaire. This submission can be made to FRNSW on receipt of a DA number.

2 Executive Summary

This fire and life safety report has been prepared on behalf of Macquarie, as part of the submission for a SSD DA for the proposed Sydney Metro Martin Place Integrated Station Development. This report sets out the primary aspects of the fire safety strategy that relate to planning and the approval of the SSD DA.

The fire safety design of the North Tower will generally satisfy the Performance Requirements of the Building Code of Australia (BCA)^[1] by complying with the Deemed-to-Satisfy (DtS) Provisions. However, there are some aspects of the design that are developed using performance based fire engineering to achieve compliance with the Performance Requirements of the BCA. Detailed assessments of these fire engineering Performance Solutions will be provided in subsequent reports following approval of the SSD DA.

Based on fire engineering assessment to date, it is considered that there are no issues that would affect the building layout arising from fire safety and hence no impediments to the Consent Authority issuing development consent. Engagement with Fire and Rescue NSW has been undertaken via a preliminary Fire Engineering Brief meeting and they have not expressed any concerns with the proposed design. Further engagement will occur formally throughout the design process at FEB and at Construction Certificate stage.

3 Proposed Fire Safety Design Approach

3.1 General

Arup has been engaged by Macquarie to develop a performance based fire safety strategy for the Metro Martin Place station. The purpose of this Fire and Life Safety SSD DA Report is to provide an overview of the fire safety design of the proposed development, and specifically those aspects of the fire safety design that impact upon planning and hence are SSD DA related issues for the building.

Required fire safety measures are advised on a broad level, with more detail to be provided in subsequent fire engineering briefs and reports as the design progresses. This report sets out the primary aspects of the fire safety strategy that relate to planning and the approval of the SSD DA.

The approach adopted by Arup is generally in accordance with the International Fire Engineering Guidelines (IFEG) ^[2] by adopting worldwide best practice and standards as outlined in Section 0.1.1 (of the IFEG). The document is used as general guidance on the analysis process without strictly following each individual sub-system as outlined in Section 1.3 of the IFEG which permits different approaches to demonstrate compliance. In addition, the approaches outlined in the earlier Fire Engineering Guidelines ^[3] as well as the Society of Fire Safety Code of Practice ^[4] are adopted where appropriate.

The design for the building will incorporate the prescriptive Deemed-to-Satisfy (DtS) Provisions of the BCA where appropriate. However, where the DTS provisions are either inappropriate, or prove overly onerous or restrictive to the design e.g. the station/retail areas, it will be demonstrated that the Performance Requirements of the BCA are achieved by a fire engineered Performance Solution. By satisfying the Performance Requirements of the BCA, an acceptable level of life safety will be achieved by the design. In addition, the fire safety strategy for the station portion of the development will also reference the Rail Safety National Law and the broadly used international fire safety guidance for rail fire safety, NFPA 130.

In relation to the strategies, criteria and methodologies to be applied, in principle agreement will be sought with project stakeholders and appropriate regulatory authorities regarding their applicability and suitability.

Arup makes all reasonable efforts to incorporate practical and advanced fire protection concepts into its advice. It is to be recognised, however, that fire protection is not an exact science, and that no building design can guarantee freedom from either ignition or fire damage.

3.2 Design Philosophy

The concept of the fire safety strategy is to provide a design that gives a satisfactory level of occupant life safety, protection to other property and can facilitate fire brigade intervention. Fire engineering allows an increased level of design innovation and flexibility over a strictly code compliant design and can be used to design strategies that are particularly relevant to the fire safety risks of this building.

An important part of the development is the interface with the station below and how the buildings form an integrated precinct. This is described in more detail elsewhere in this report.

More details of the fire safety strategy are provided in the following sections. The fire safety strategy is based on the assumption that the fire safety provisions for the building will largely comply with the DtS Provisions of the Building Code of Australia (BCA) except for the nominated departures described below. Note that more details of the required fire safety measures, including identification of all performance solutions, will be outlined in subsequent reports later in the design. The fire safety measures described serve to outline the fire safety strategy for the SSD DA and do not necessarily reflect the final set of required fire safety measures.

3.3 North Tower Interfaces

Ground level serves as the main entrance to both North Tower and station occupants. Entrance points at ground level for both tower and station occupants are from Castlereagh Street, Elizabeth Street and Hunter Street.

The tower building shall be separated from the station below via a combination of fire and smoke separation. These two buildings shall be considered as separate buildings in terms of fire spread and their separation addressed under a performance solution. This allows for a fire incident in the station or South Tower to not have an adverse effect on the North Tower, and vice versa. This is to minimise disruption and impact on emergency services, and to keep the public transport system operating without disruption for incidents in the towers.

A through-site link is located on ground level and abuts the external wall of 50 Martin Place; this is the lowest level at which 50 Martin Place and the North Tower interact. 50 Martin Place and the North Tower are fire separated at ground level.

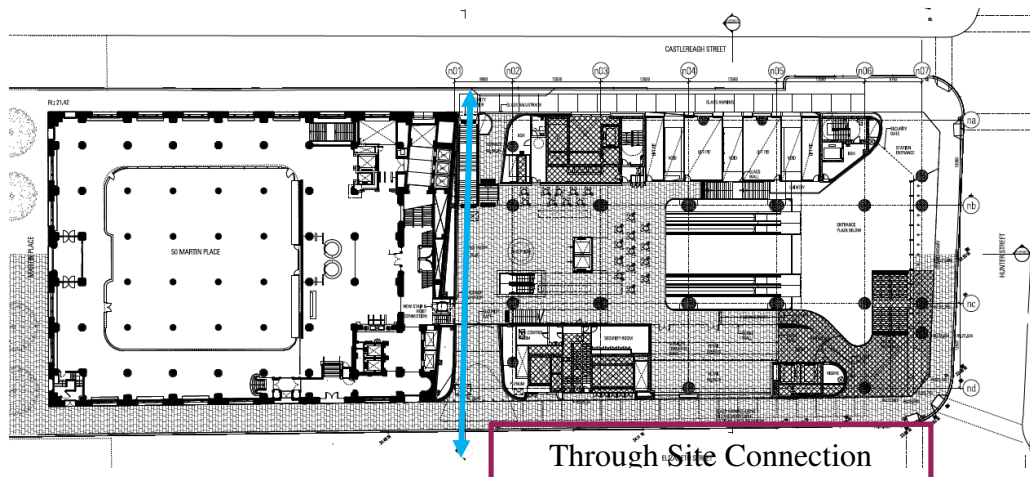


Figure 4: Ground level plan showing 50MP and North Tower access to through site connection

50 Martin Place is further connected to the tower via bridge links at Level 5 and Level 10. Fire protection to the bridge links may be fire engineered and therefore subject to a performance solution. The intention of the design will be to not spread fire or smoke between the two buildings.

3.4 North Tower General

1. A combination of escalators, lifts and stairs provide access for occupants up through the building after they have entered the building via one of the North Tower entrances.

Level 1 to Level 2 are served by two fire isolated stairs; the number of fire isolated stairs increases to three at Level 3 and Level 4. Levels 3 and 4 contain a multi-purpose room which is to be used for training, presentations, large meetings and events. The multi-purpose room is intended to serve 1000 occupants in total and will be served by both vertical and horizontal exits to accommodate this, as well as a performance based smoke exhaust system being incorporated into the design.

Level 5 up to Level 37 are used as office levels (with the exception of a partial plant level and full plant level located on Levels 15 and 28 respectively) which have access to two fire isolated stairs.

Level 38 and 39 are plant space and mezzanine plant space respectively. Two non-fire isolated stairs serve Level 39 which discharge at Level 38 where occupants can access both fire-isolated stairs.

All fire-isolated stairs discharge at ground level directly to outside (at both Castlereagh Street and Elizabeth Street). The stairs are adequate in size for the anticipated occupant numbers in the building.

2. Travel distances are anticipated to be in the order of:
 - 30m to a point of choice (in lieu of 20m); and
 - 50m to the nearest exit (in lieu of 40m).

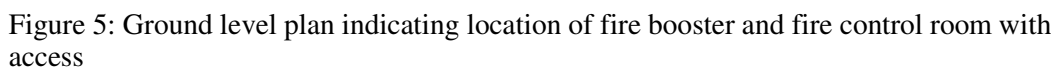
A Performance Solution is proposed to justify these travel distances as they exceed the DtS limits.

3. There are a series of voids throughout the building. The primary interconnections include:
 - North Tower entrance – connects double height entrance space down through to B5 in the station.
 - ‘Lower’ atrium – currently proposed to connect Level 5 to Level 14. (Note that the atrium will be separated from the office floors with fire protection on all but 3 levels, i.e. 3 storeys will remain open to the void.)
 - ‘Upper’ atrium – currently proposed to connect Level 16 to Level 27 (Note that the atrium will be separated from the office floors with fire protection on all but 3 levels, i.e. 3 storeys will remain open to the void.)
 - Glazed lift shaft – currently proposed to connect ground level to Level 37
 - Multiple small office atria – proposed to connect up to 3 storeys from Level 29 upwards

A performance based design will accommodate the inclusion of these interconnections to minimise smoke and fire spread adequately to allow for both safe evacuation and safe brigade intervention. An individual strategy will be adopted for each void tailored to their shape and location within the building.

4. The Fire Resistance Levels (FRLs) of the construction elements are generally in accordance with the DtS Provisions of the BCA, other than retail areas and portions of glazed flooring, which have the potential to have a reduced FRL based on fire engineering analysis.
5. A zone smoke control system to AS1668.1-2015 and the BCA DtS provisions shall be provided to the commercial tower. It will allow for 3 floors to form a single fire compartment.
6. An automatic stair pressurisation system in accordance with AS1668.1-2015 shall be provided to the fire-isolated exit stairs that serve the commercial tower. It will allow for 3 floors of evacuation from a single fire compartment at a time.
7. Smoke exhaust will be provided at the top of the lower and upper atria; the exhaust rate will be determined using a performance based design and detailed analysis. Sufficient make-up air will be provided in all locations at which smoke exhaust is provided.
8. The building is to be provided with sprinklers throughout in accordance with AS2118.6-2012 utilising parts of AS2118.101999 that are relevant. Exposed fast response sprinkler heads will be provided throughout. Ordinary Hazard spacing shall be used throughout the building. Note that the office level sprinkler heads are Light Hazard number and densities but on Ordinary Hazard spacing.

9. A combined sprinkler and hydrant system is currently proposed and shall be provided as per BCA Clause E1.3 and AS2419.6-2012, and subject to FRNSW endorsement. All fire hydrants shall be fitted with storz couplings. Minor technical non-compliances related to the hydrant and sprinkler design may arise during the design to minimise complexity or increased functionality. These will be addressed as a Performance Solution.
10. A smoke detection system in accordance with AS1670.1-2015 (10 m grid) will be installed throughout the building, including above ceiling spaces where required under the standard.
11. A Sound System and Intercom System for Emergency Purposes (SSISEP) shall be installed throughout the development in accordance with AS 1670.4:2015. As the tower and station are separately owned with their own operating systems, the intent is that the tower may remain operational for a station fire. However, in the very unlikely event that a fire in the station did grow out of control and smoke entered the tower, then the detection system contained therein should activate and trigger evacuation. The tower alarm system shall not cascade automatically to the station, to avoid disrupting the station unnecessarily (as the buildings are being designed not to spread fire and smoke between them). The activation of smoke detectors in the office areas shall trigger a cascading evacuation regime up the tower.
12. Fire hose reels in accordance with BCA Clause E1.4 and AS 2441:2005 shall be installed throughout the building. In achieving compliant coverage, fire hose reels may not pass through fire or smoke doors.
13. Fire extinguishers shall be provided in accordance with BCA E1.6 and AS 2444:2001, particularly where a water-based firefighting medium is inappropriate.
14. Emergency lifts shall be installed in accordance with BCA Clause E3.4, as the effective height of the building is more than 25m.
15. The fire booster cabinet shall be located on Elizabeth Street. The non-compliant location of the booster will be addressed as a performance solution, and has been discussed with Fire and Rescue NSW. This is indicated on Figure 5 below.
16. The fire control room shall be located on ground level with access direct from outside (from Elizabeth Street) or internally from the main entrance to the North Tower; this has been discussed with Fire and Rescue NSW. This is indicated on Figure 5 below.
17. At each fire control room (North Tower, South Tower and station), fire mimic panels would be provided such that any alarm in the North Tower would also be displayed in the mimic panel in the station fire control room and South Tower fire control room, and vice versa. A dedicated communications system will interconnect the fire panels and the mimic panels serving both the towers and station.
18. The façade will be non-combustible and all attachments, at this stage, are understood to be non-combustible.



The tower owner must maintain all systems serving the tower (even if they are located within Metro Martin Place station), including, but not limited to, the following:

- The maintenance of fire and other safety systems is a mandatory requirement for building owners under the provisions of the Environmental Planning and Assessment Act 1979 and the Environmental Planning and Assessment Regulation 2000.

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AS1851-2012 is recommended to be followed for maintenance of all fire safety features of the proposed building.

The building should be managed in accordance with a fire safety policy that includes as a minimum:

- A fire safety management plan in accordance with AS 3745-2010 for the building; including procedures for the safety of people in buildings, structures and workplaces during emergencies, the appointment of an Emergency Planning Committee and setting up of an Emergency Control Organization.
- Good house-keeping and fire prevention procedures such as maintaining clear evacuation routes free of obstructions and combustibles.
- Regular maintenance of all fire safety systems to relevant Australian Standards for each system.
- Fire training of staff, including evacuation procedures and use of fire-fighting equipment (where applicable), undertaken at regular intervals.
- The pre-function space located adjacent the multi-function room on Level 3 shall have limitations imposed; the pre-function space shall not be used for trade exhibitions or the like. The pre-function space may be used for cocktail receptions or the like.

The above requirements and responsibilities shall be clearly communicated to the building occupier. It is noted that these fire safety management measures are recommended measures which should be established in the operation of the building, are not required to be implemented prior to the occupation of the building.

The fire strategy for the tower will be developed further into a Fire Engineering Brief Questionnaire report / Fire Engineering Report for future consultation with FRNSW regarding the final design and construction of the building.

4 Agency Consultations

FRNSW have been consulted throughout the design process with specific items such as hydrant design being resolved through multiple engagements.

FRNSW were briefed on the Metro Martin Place SSD DA submission on 31 May 2018 and raised no objections to the proposed submission strategy.

5 Conclusion

Based on review of the North Tower design, and consultations held with FRNSW, it is appropriate that performance based fire engineering can be used to demonstrate compliance with the Performance Requirements of the BCA.

Non-compliances the DtS Provisions of the BCA may be identified as the design further develops that will require additional Performance Solutions. However, it is not considered likely that these Performance Solutions will materially affect the North Tower SSD DA design.

6 References

- [1] "Building Code of Australia 2016", NCC, Australian Building Codes Board, Canberra, Australia, 2016
- [2] "International Fire Engineering Guidelines, Edition 2005", Australian Building Codes Board, Canberra, Australia, 2005.
- [3] "Fire Engineering Guidelines", First Edition, Fire Code Reform Centre Limited, Australia, 1996.
- [4] "Code of Practice for Fire Safety Design, Certification and Peer Review", Institution of Engineers, Australia – Society of Fire Safety, 2003.