
Appendix 0

Solar Impact Study

Engineering
Design Solutions



APPENDIX O - SOLAR IMPACT STUDY



Sydney
Metro
West

Sydney Olympic Park Over and
Adjacent Station Development

Appendix O - Solar Impact Study

SMWSTEDS-SMD-OLP-SN400-SB-RPT-044002

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Sydney Metro West

Sydney Olympic Park Over and Adjacent Station Development

Table of contents

Sydney Olympic Park Over and Adjacent Station Development

Table of contents	ii
Executive summary	iii
1 Introduction	01
1.1 Sydney Metro West	01
1.2 Background and planning context	01
1.3 Purpose and scope	02
2 The proposal	03
2.1 Site location and description	03
2.2 Overview of this proposal	04
3 Policy context	05
4 Development context and methodology	07
4.1 Development context	07
4.2 Methodology	07
5 Conclusion	09
5.1 Development solar access	09
5.2 Public space solar access	11

List of Tables and Figures

Figure E-1 Sun path diagram of the proposed development	iv
Figure 1-1 Sydney Metro West	01
Table 2-1 Site legal description	03
Figure 2-1 Sydney Olympic Park metro station location precinct	03
Table 2-2 Sydney Olympic Park proposed development overview	04
Figure 2-2 SSD and CSSI scope under the proposed development master plan	04
Figure 3-1 Public space solar access - Draft SOP Master Plan 2030 (Interim Metro Review)	06
Figure 4-1 Existing development context [grey]	08
Figure 4-2 SOP Master Plan 2030 (2018 Review) development context [green]; SSD scope [highlighted area]	08
Figure 4-3 SSD [yellow] and CSSI [purple] scope within the SOP Master Plan 2030 (2018 Review) development context	08
Figure 4-4 CSSI [purple], SSD [yellow], Sites 46 and 48 [white] and SOP Masterplan [green]	08
Figure 5-1 SSD scope within the existing context	09
Figure 5-2 SSD and Interim Metro Review scope within the SOP Master Plan 2030 (2018 Review) context	09
Figure 5-3 Baseline solar access performance of the SOP Master Plan 2030 (2018 Review) context - south west perspective	10
Figure 5-4 SSD scope solar access impact on the SOP Master Plan 2030 (2018 Review) context - south west perspective	10
Figure 5-5 Baseline solar access impact of the SOP Master Plan 2030 (2018 Review) context - north east perspective	10
Figure 5-6 SSD scope solar access impact on the SOP Master Plan 2030 (2018 Review) context - north east perspective	10
Table 5-1 Solar access performance of the primary public spaces	11
Figure 5-7 Solar access to primary public spaces - north east perspective	11
Figure 5-8 Solar access to primary public spaces - south west perspective	11
Figure 5-9 Solar access to primary public spaces - plan perspective	12

Executive summary

Purpose and scope

This study supports a Concept State Significant Development Application (Concept SSDA) submitted to the Department of Planning and Environment (DPE) pursuant to part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Concept SSDA is made under section 4.22 of the EP&A Act.

Sydney Metro is seeking to secure concept approval for an over station development (OSD) and adjacent station development (ASD) on an area defined as Site 47 within the Central Precinct of Sydney Olympic Park (referred collectively as the 'proposed development'). The proposed development will comprise of one new commercial and retail building (Building 1) above the Sydney Olympic Park metro station and two residential accommodation buildings (Buildings 2 and 3) with retail and commercial space, adjacent to the Sydney Olympic Park metro station.

The Concept SSDA seeks consent for a building envelope and mixed-use purposes, maximum building height, a maximum gross floor area (GFA), pedestrian and vehicular access, circulation arrangements and associated car parking and the strategies and design parameters for the future detailed design of development.

This Solar Impact Study has been prepared in response to the Secretary's Environmental Assessment Requirements (SEARs), issued for this Concept SSDA on 18 February 2022, the Sydney Olympic Park (SOP) Master Plan 2030 (2018 Review) and Draft SOP Master Plan (Interim Metro Review).

Figure E-1 illustrates the sun path diagram for the proposed development. An advanced computational design workflow has been applied to determine the solar access impact associated with the proposed development.

This study specifically presents a response to:

- Secretary's Environmental Assessment Requirements (SEARs), Key issues 4. Environmental amenity, specifically:
 - Assess amenity impacts on the surrounding locality, including... solar access... A high level of environmental amenity for any surrounding residential or other sensitive land uses must be demonstrated.
- SOP Master Plan 2030 (2018 Review), Appendix A - Development Requirements, Solar Impact Analysis
 - For any building over 25m, describe the impact of development on solar access to surrounding development to a radius of 100m
- Draft SOP Master Plan (Interim Metro Review), section 8.7 Solar Access
 - The prescribed proportions of primary public spaces within the Metro Site Area are to achieve a minimum of 2 hours of sunlight between 9am and 3pm at the winter solstice (21 June)

Development solar access

When evaluating the solar access impact of the building envelope of the proposed development on the surrounding development to a radius of 100m, this must consider the solar access impact on the:

1. Existing context (see Figure 4-1)
2. SOP Master Plan 2030 (2018 Review) context (see Figure 4-2)

It must be demonstrated that the building envelope of the proposed development does not negatively impact on the solar access performance.

Figure 5-1 illustrates that there is no existing context within a 100m radius of the proposed development. The proposed development does not negatively impact on the solar access performance of the existing context.

Figures 5-4 and 5-6 demonstrate that the proposed development has a negligible impact on the solar access performance of the SOP Master Plan 2030 (2018 Review) context.

Public space solar access

When evaluating the solar access impacts of the building envelope of the proposed development on the primary public spaces within the metro site area, it must be demonstrated that the proportion of the primary public spaces that achieve a minimum of 2 hours of sunlight between 9am and 3pm at the winter solstice meet or exceed the minimum proportions detailed in the SOP Master Plan 2030 (Interim Metro Review), section 8.7 Solar Access.

The proposed development demonstrates an improvement to the solar access performance of the primary public spaces (see Table 5-1 and Figure 5-9).

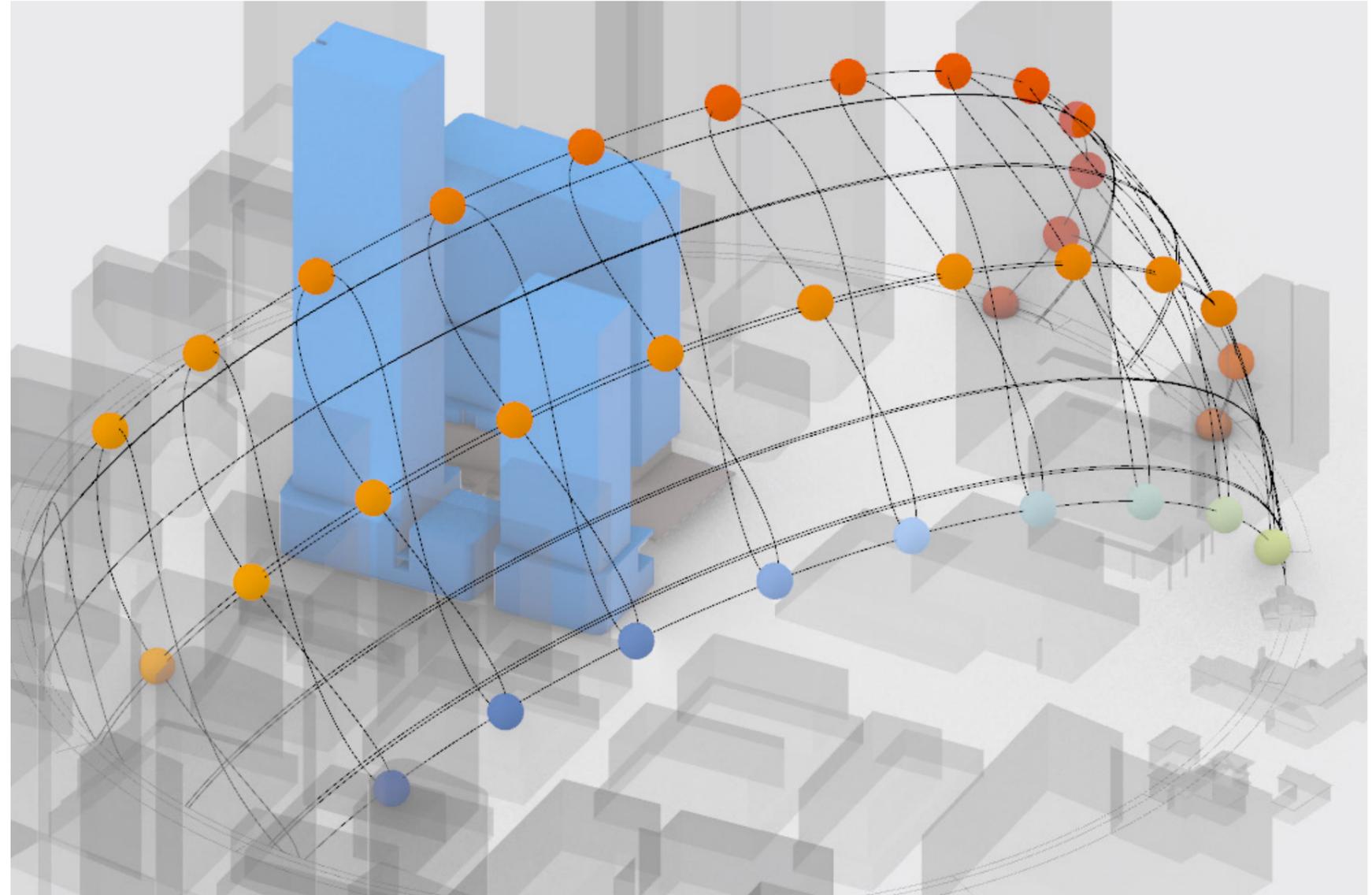


Figure E-1 Sun path diagram of the proposed development

1 Introduction

1.1 Sydney Metro West

Sydney Metro West will double rail capacity between Greater Parramatta and the Sydney Central Business District (CBD), transforming Sydney for generations to come. The once in a century infrastructure investment will have a target travel time of about 20 minutes between Parramatta and the Sydney CBD, link new communities to rail services and support employment growth and housing supply.

Stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Hunter Street (Sydney CBD).

Sydney Metro West station locations are shown in Figure 1-1.

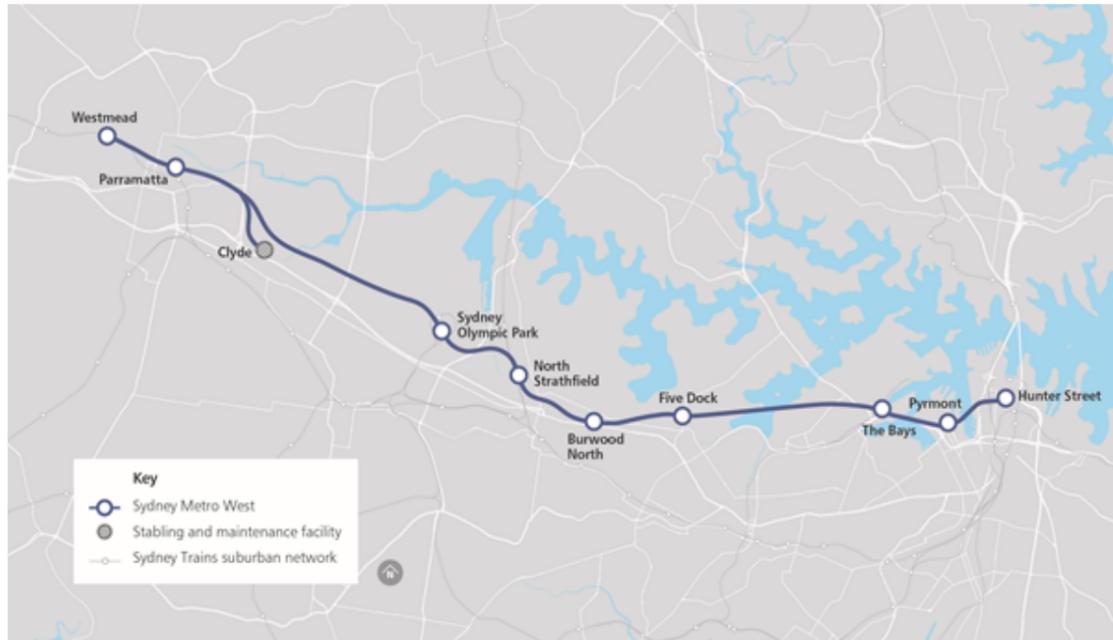


Figure 1-1 Sydney Metro West

1.2 Background and planning context

Sydney Metro is seeking to deliver Sydney Olympic Park metro station under a two-part planning approval process. The station fit-out infrastructure is to be delivered under a Critical State Significant Infrastructure (CSSI) application subject to provisions under division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), while the over and adjacent station developments are to be delivered under a State Significant Development (SSD) subject to the provisions of part 4 of the EP&A Act.

1.2.1 Critical State Significant Infrastructure

The State Significant Infrastructure (SSI) planning approval process for the Sydney Metro West metro line, including delivery of station infrastructure, has been broken down into a number of planning application stages, comprising the following:

- Concept and Stage 1 CSSI Approval (SSI-10038)
 - All major civil construction works between Westmead and The Bays including station excavation, tunnelling and demolition of existing buildings (approved 11 March 2021)
- Stage 2 CSSI Application (SSI-19238057) – All major civil construction works between The Bays and Hunter Street Station (under assessment)
- Stage 3 CSSI Application (SSI-22765520)
 - Tunnel fit-out, construction of stations, ancillary facilities and station precincts between Westmead and Hunter Street Station, and operation and maintenance of the Sydney Metro West line (under assessment).

1.2.2 State Significant Development Application

The SSD will be undertaken as a staged development with the subject Concept State Significant Development Application (Concept SSDA) being consistent with the meaning under section 4.22 of the EP&A Act and seeking conceptual approval for a building envelope, land uses, maximum building heights, a maximum gross floor area, pedestrian and vehicle access, vertical circulation arrangements and associated car parking. A subsequent detailed SSD/s is to be prepared by a future development partner which will seek consent for detailed design and construction of the development.

1.3 Purpose of the report

This Solar Impact Study supports a Concept SSDA submitted to the Department of Planning and Environment (DPE) pursuant to part 4 of the EP&A Act. The Concept SSDA is made under section 4.22 of the EP&A Act.

This study has been prepared in response to the Secretary's Environmental Assessment Requirements (SEARs) issued for the Concept SSDA on 18 February 2022, the Sydney Olympic Park (SOP) Master Plan 2030 (2018 Review) and the Draft SOP Master Plan 2030 (Interim Metro Review).

This study specifically presents a response to:

- Secretary's Environmental Assessment Requirements (SEARs), Key issues 4. Environmental Amenity, specifically:
 - Assess amenity impacts on the surrounding locality, including... solar access... A high level of environmental amenity for any surrounding residential or other sensitive land uses must be demonstrated.
- SOP Master Plan 2030 (2018 Review), Appendix A - Development Requirements, Solar Impact Analysis
 - For any building over 25m, describe the impact of development on solar access to surrounding development to a radius of 100m
- Draft SOP Master Plan 2030 (Interim Metro Review), section 8.7 Solar Access
 - The prescribed proportions of primary public spaces within the Metro Site Area are to achieve a minimum of 2 hours of sunlight between 9am and 3pm at the winter solstice (21 June)

2 The site and proposal

2.1 Site location and description

The site is located within Sydney Olympic Park and is situated within the City of Parramatta Local Government Area. The site is in the Central Precinct of Sydney Olympic Park and defined as Site 47 in the Draft SOP Master Plan (Interim Metro Review). The broader metro site is bound by Herb Elliot Avenue to the north, Olympic Boulevard to the west and Figtree Drive to the south as shown in Figure 2-1.

As described in Table 2-1, the site comprises part of Lot 59 in DP 786296 and Lot 58 in DP 786296, and comprises approximately 11,407m² of land.

Table 2-1 Site legal description

STREET ADDRESS	LEGAL DESCRIPTION
5 Figtree Drive, Sydney Olympic Park	Lot 58 in DP 786296
7 Figtree Drive, Sydney Olympic Park	Lot 59 in DP 786296



Figure 2-1 Sydney Olympic Park metro station location precinct

2.2 Overview of this proposal

The Concept SSDA will seek consent for three building envelopes and the delivery of Precinct Street A as detailed in Table 2-2 and Figure 2-2.

Table 2-2 Sydney Olympic Park proposed development overview

ITEM	DESCRIPTION
Land use	Building 1: Commercial and retail Building 2: Commercial, retail and residential Building 3: Commercial, retail and residential
Building height (RL)/ Number of storeys	Building 1: 120.20 / 21 storeys Building 2: 116.90 / 27 storeys Building 3: 171.50 / 45 storeys
Gross floor area (m ²)	Building 1: 28,517 Building 2: 12,089 Building 3: 27,384 TOTAL: 68,000
Car parking spaces	358

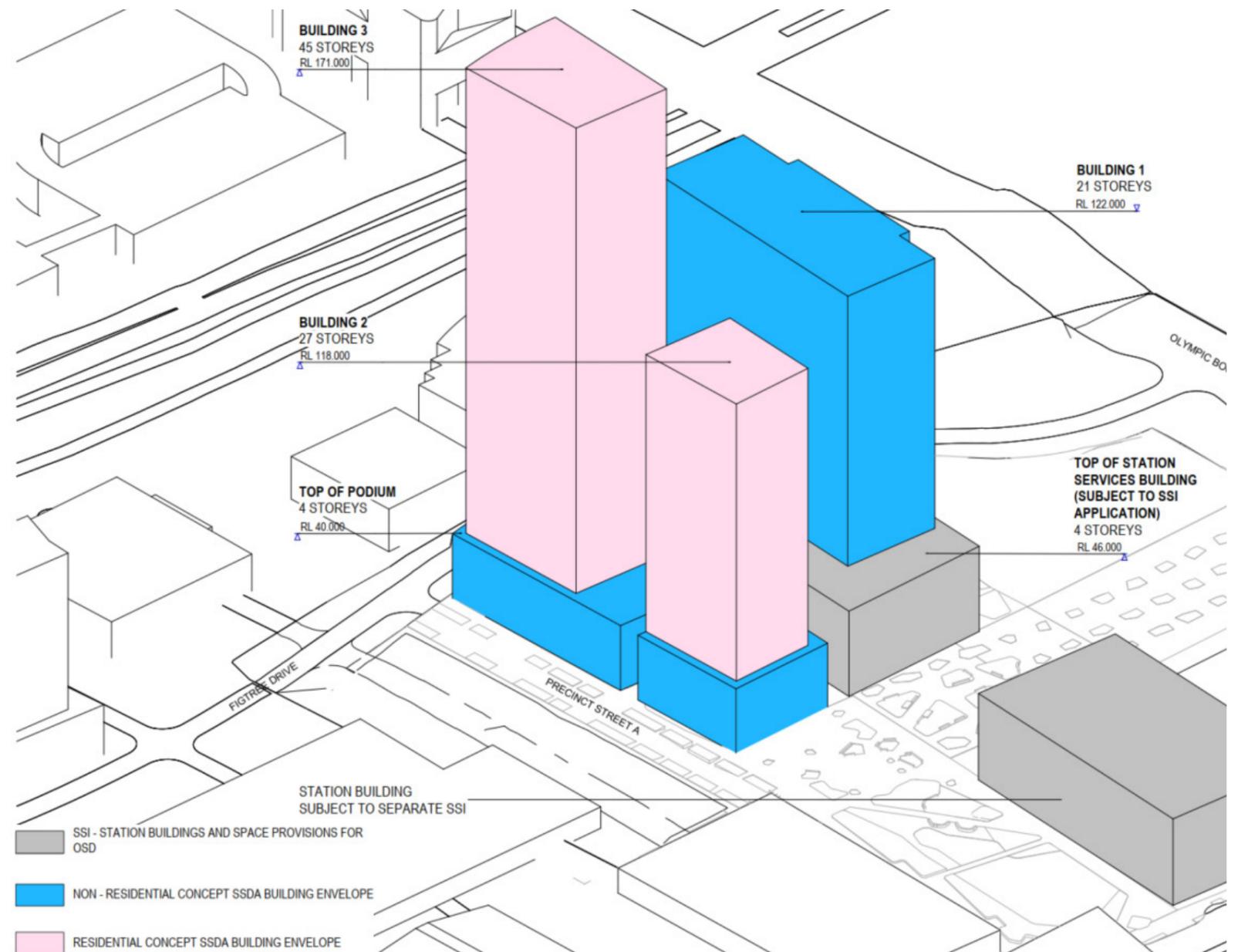


Figure 2-2 Proposed Concept SSDA development and CSSI scope

3 Policy context

This section outlines the policy drivers relevant to the proposed development.

This study specifically presents a response to:

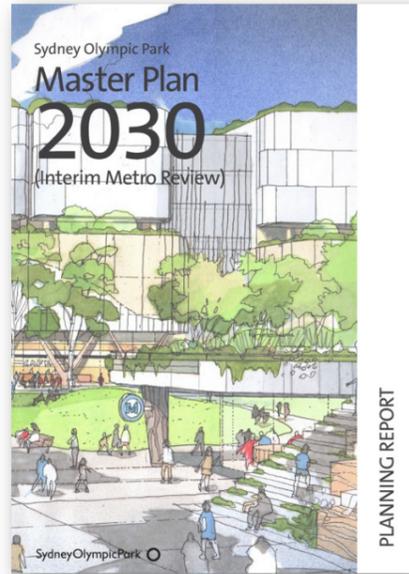
- SEARs, Key issues 4. Environmental Amenity
- SOP Master Plan 2030 (2018 Review), Appendix A - Development Requirements, Solar Impact Analysis
- Draft SOP Master Plan 2030 (Interim Metro Review), section 8.7 Solar Access

Planning Secretary's Environmental Assessment Requirements	
Section 4.12(B) of the Environmental Planning and Assessment Act 1979 Schedule 2 of the Environmental Planning and Assessment Regulation 2000	
Application Number	ESD-3028399
Project Name	Sydney Olympic Park Metro Station - Over & Adjacent Station Development
Location	Lot 58 DP736226 and Lot 59 DP736226 within City of Parramatta
Applicant	Sydney Metro
Date of Issue	18/02/2022
General Requirements	<p>The Environmental Impact Statement (EIS) must meet the minimum form and content requirements as prescribed by Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) and must have regard to the State Significant Development Guidelines.</p> <p>Notwithstanding the key issues specified below, the EIS must include an environmental risk assessment to identify the potential environmental impacts associated with the development.</p> <p>Where relevant, the assessment of key issues below, and any other significant issues identified in the risk assessment, must include:</p> <ul style="list-style-type: none"> - adequate baseline data - consideration of the potential cumulative impacts due to other developments in the vicinity (completed, underway or proposed); - measures to avoid, minimise and if necessary, offset predicted impacts, including detailed contingency plans for managing any significant risks to the environment; and - a health impact assessment of local and regional impacts associated with the development, including those health risks associated with relevant key issues. <p>The EIS must also be accompanied by a report from a qualified quantity surveyor providing:</p> <ul style="list-style-type: none"> - a detailed calculation of the capital investment value (CV) as defined in clause 3 of the Regulation of the proposal, including details of all assumptions and components from which the CV calculation is derived. The report shall be prepared on company letterhead and indicate

- Assess amenity impacts on the surrounding locality, including... solar access... A high level of environmental amenity for any surrounding residential or other sensitive land uses must be demonstrated.



- For any building over 25m, describe the impact of development on solar access to surrounding development to a radius of 100m



The public spaces in the Metro Site Area are to achieve a minimum of 2 hours of sunlight between 9am and 3pm at the winter solstice (21 June) for the following minimum proportions (see Figure 3-1):

- 75% of the Central Urban Park
- 60% of the West End Plaza
- 55% of the Central Plaza
- 90% of the East End Plaza

Figure 3-1 shows the minimum proportions for each primary public space in the Metro Site Area to meet the sun hour requirements detailed in the Draft SOP Master Plan 2030 (Interim Metro Review).

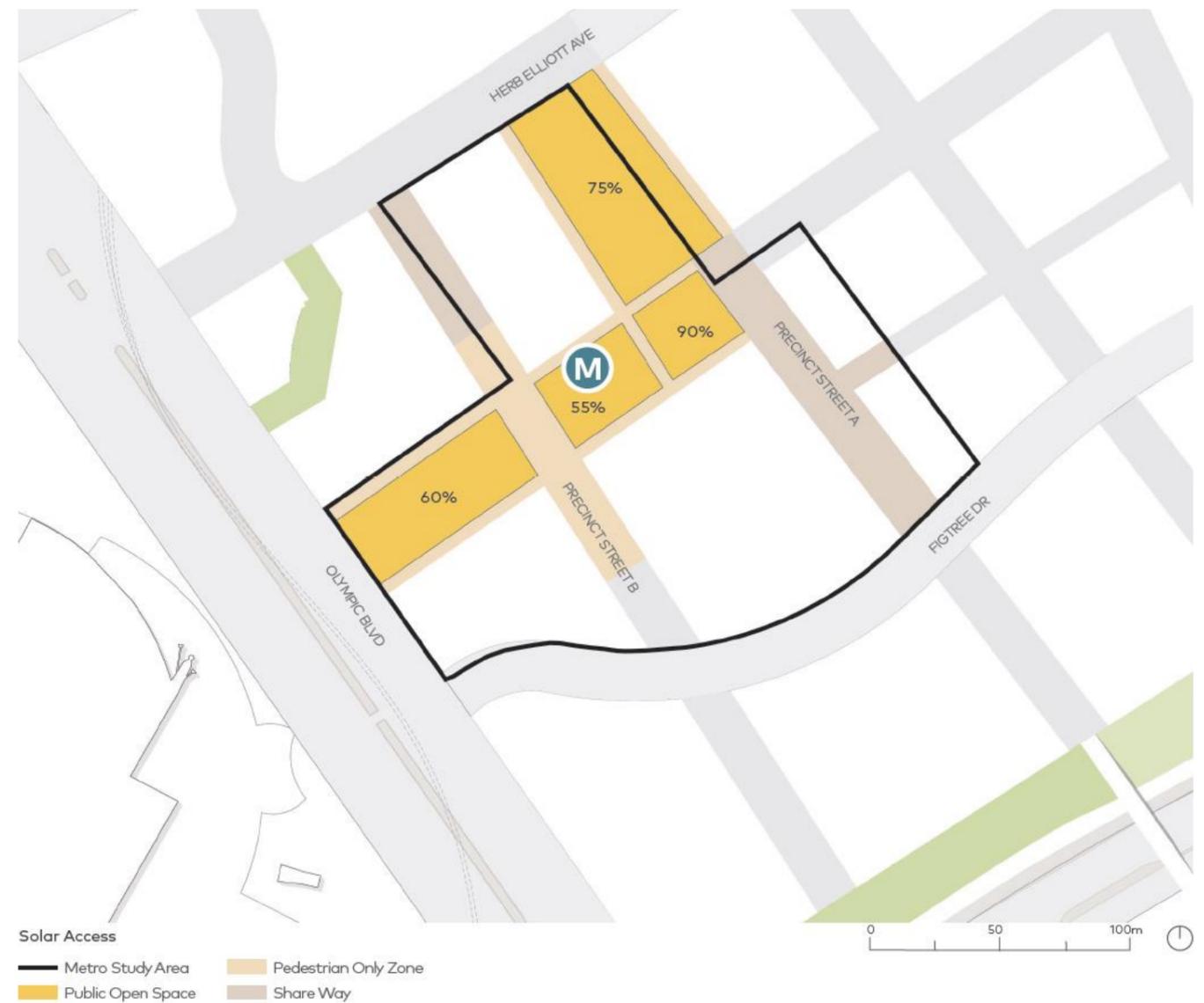


Figure 3-1 Public space solar access - Draft SOP Master Plan 2030 (Interim Metro Review)

4 Development context and methodology

4.1 Development context

Figure 4-1 illustrates the existing context in and adjacent to the Central Precinct, consisting of a mix of residential and commercial buildings, and sporting facilities.

Figure 4-2 illustrates the SOP Master Plan 2030 (2018 Review) context. The highlighted area represents the SSD scope of this Concept SSDA.

Figure 4-3 illustrates the SSD (yellow) and CSSI (purple) scope within the SOP Master Plan 2030 (2018 Review) context.

Figure 4-4 illustrates the Draft SOP Master Plan 2030 (Interim Metro Review) context (yellow and white).

4.2 Methodology

When evaluating the solar access impact of the building envelope of the proposed development on the surrounding development to a radius of 100m, this must consider the solar access impact on the:

1. Existing development context (see Figure 4-1)
2. SOP Master Plan 2030 development context (see Figure 4-2)

It must be demonstrated that the building envelope of the proposed development does not negatively impact on the solar access performance.

When evaluating the solar access impacts of the building envelope of the proposed development on the primary public spaces within the Metro Site Area (see Figure 3-1), it must be demonstrated that the proportion of the primary public spaces that achieve a minimum of 2 hours of sunlight between 9am and 3pm at the winter solstice meet or exceed the minimum proportions detailed in the Draft SOP Master Plan 2030 (Interim Metro Review), section 8.7 Solar Access.

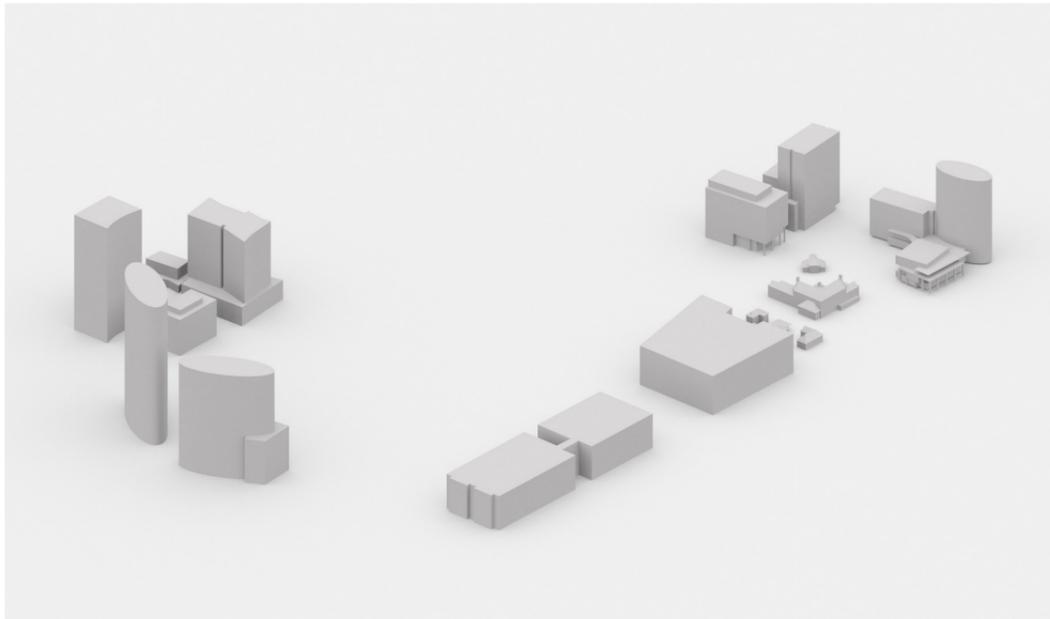


Figure 4-1 Existing development context [grey]



Figure 4-3 SSD [yellow] and CSSI [purple] scope within the SOP Master Plan 2030 (2018 Review) development context

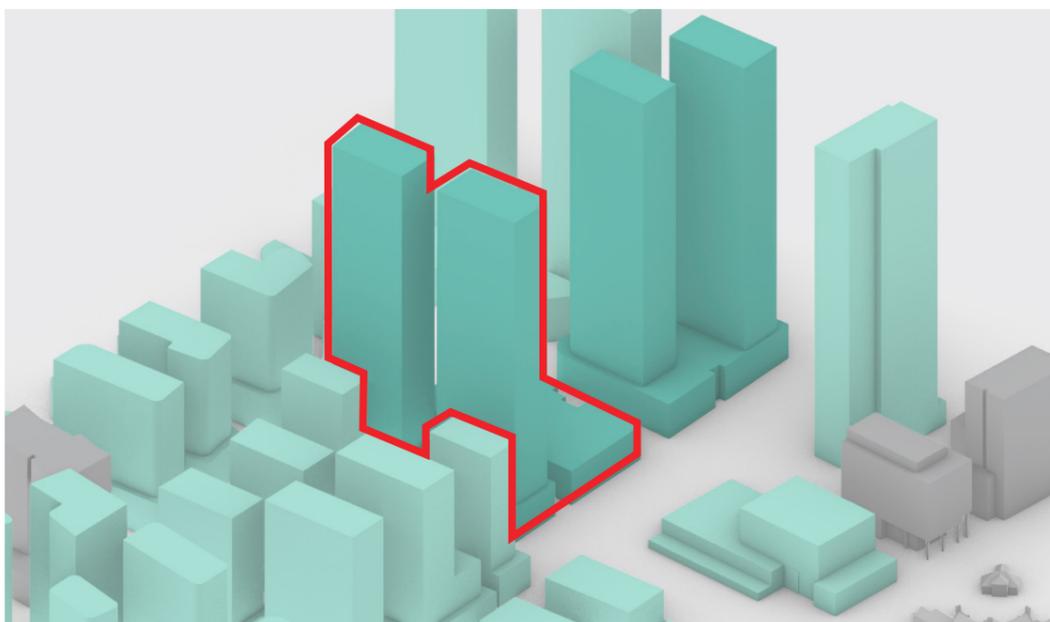


Figure 4-2 SOP Master Plan 2030 (2018 Review) development context [green]; SSD scope [highlighted area]



Figure 4-4 CSSI [purple], SSD [yellow], Sites 46 and 48 [white] and SOP Masterplan [green]

5 Conclusion

5.1 Development solar access

The solar impact of the proposed development on the surrounding locality has been assessed in response to the relevant key issues of the SEARs and the SOP Master Plan 2030 (2018 Review).

Figure 5-1 illustrates that there is no existing context within a 100m radius of the proposed development. The proposed development does not negatively impact on the solar access performance of the existing context.

Figure 5-2 illustrates that there is SOP Master Plan 2030 (2018 Review) development context within a 100m radius of the proposed development (including the Draft SOP Master Plan 2030 (Interim Metro Review) context).

Figures 5-3 and 5-5 demonstrate that the solar access performance of the SOP Master Plan 2030 (2018 Review) development context within the Metro Site Area.

Figures 5-4 and 5-6 demonstrate that the proposed development has no net impact on the solar access performance of the SOP Master Plan 2030 (2018 Review) development context.

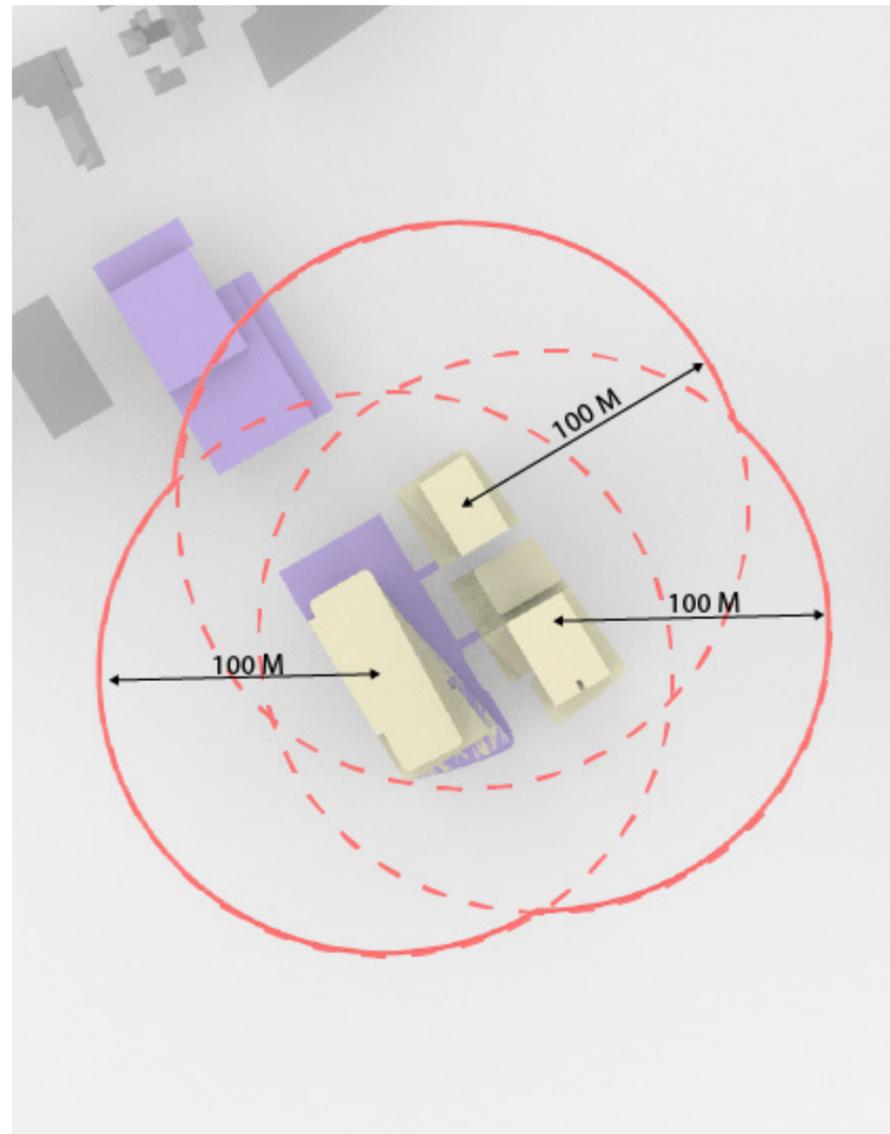


Figure 5-1 SSD scope within the existing context

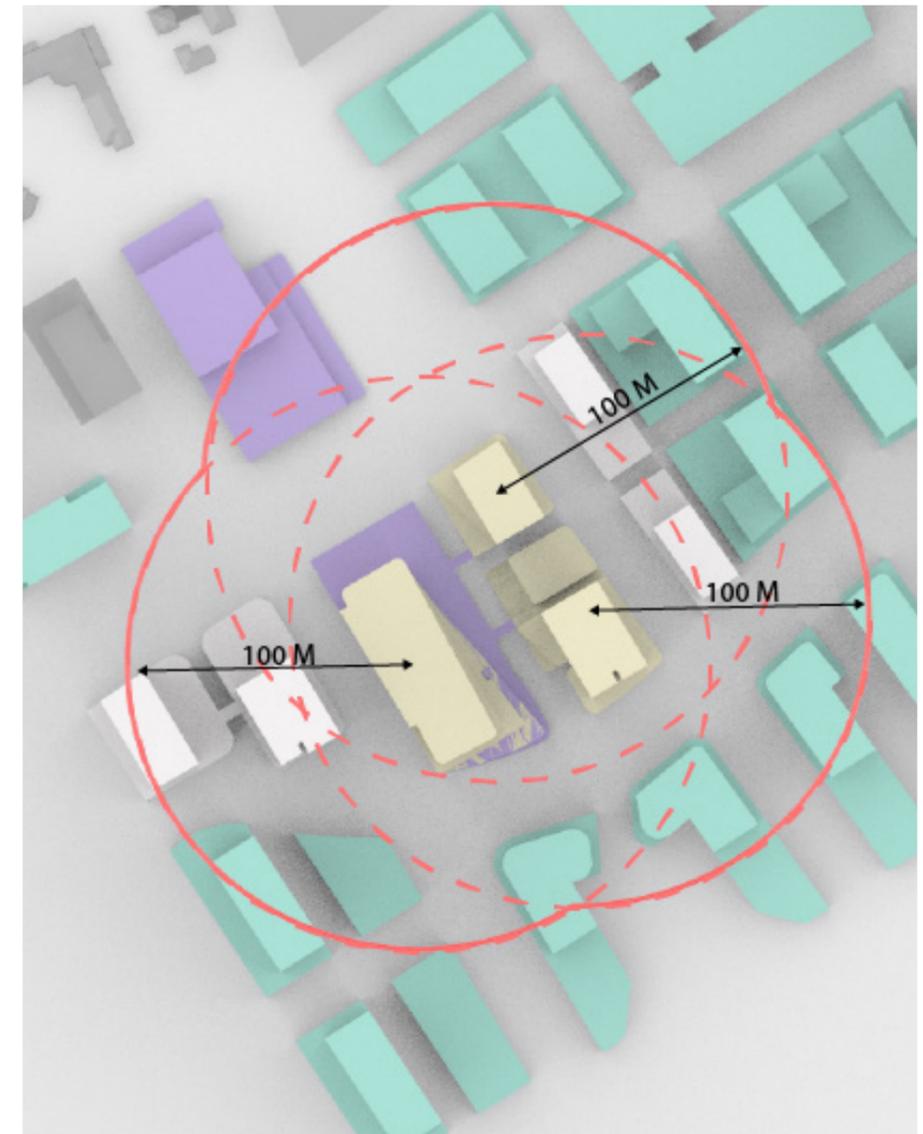


Figure 5-2 SSD and Interim Metro Review scope within the SOP Master Plan 2030 (2018 Review) context

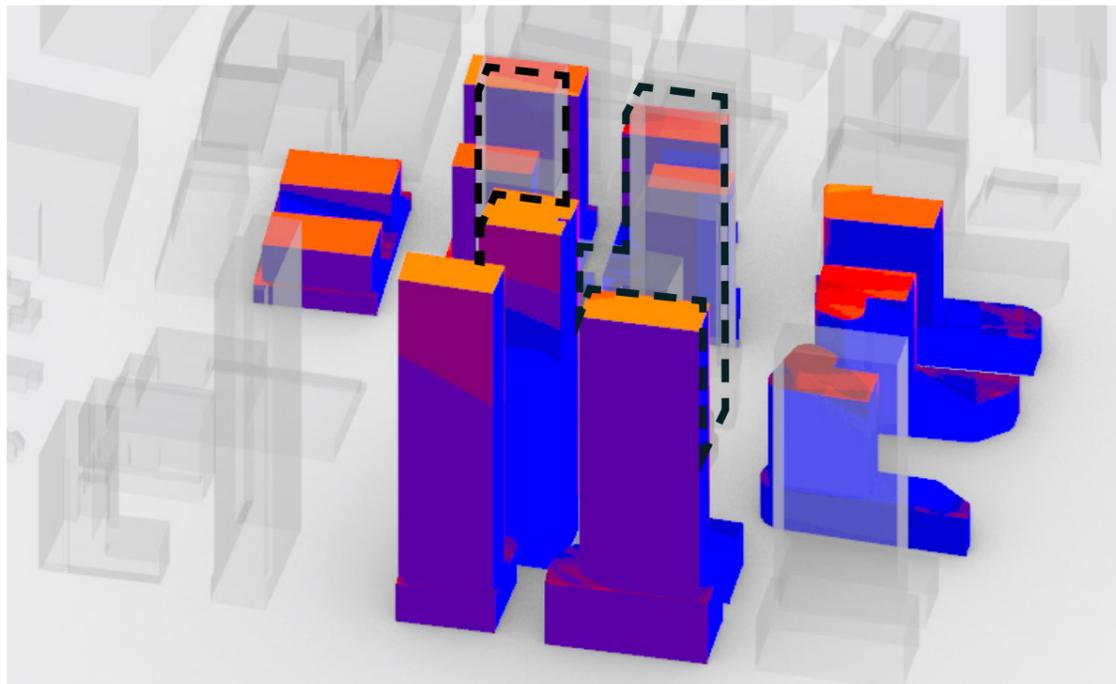
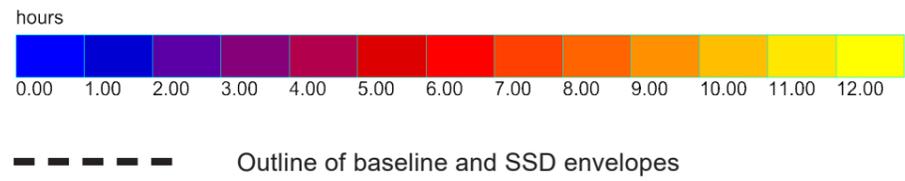


Figure 5-3 Baseline solar access performance of the SOP Master Plan 2030 (2018 Review) context - south west perspective

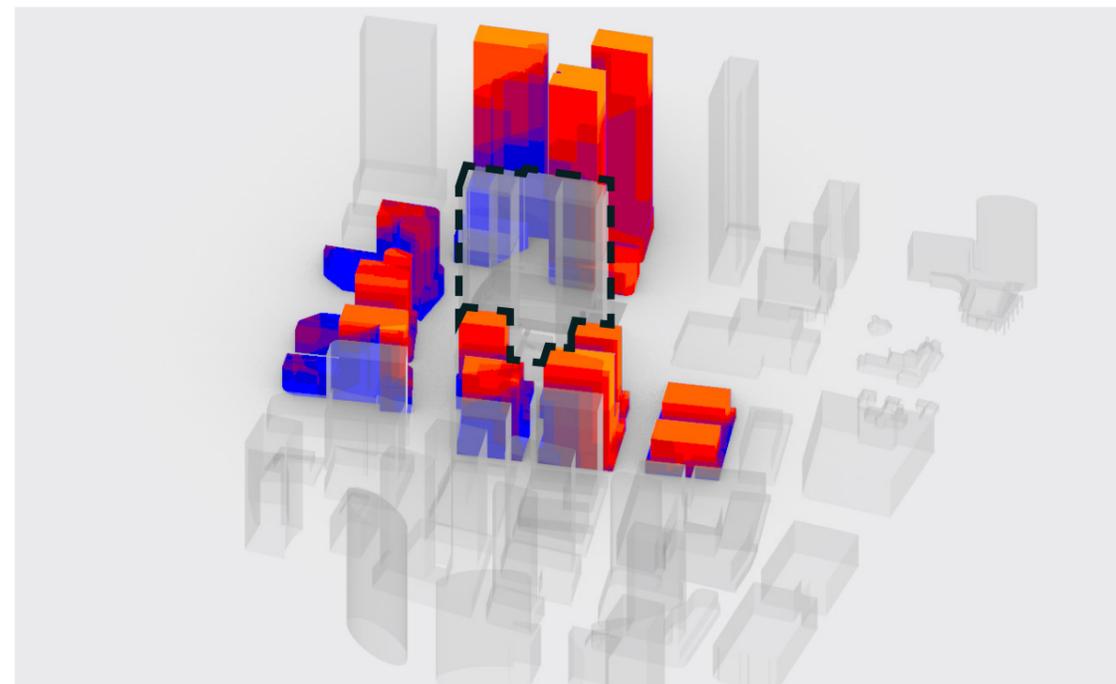


Figure 5-5 Baseline solar access impact of the SOP Master Plan 2030 (2018 Review) context - north east perspective

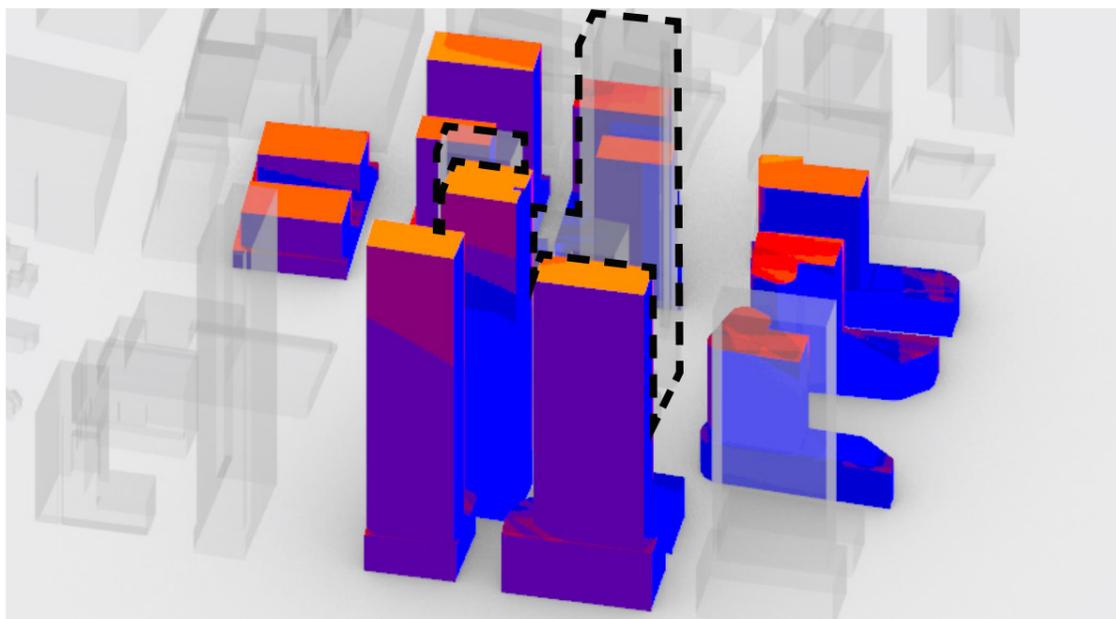


Figure 5-4 SSD scope solar access impact on the SOP Master Plan 2030 (2018 Review) context - south west perspective

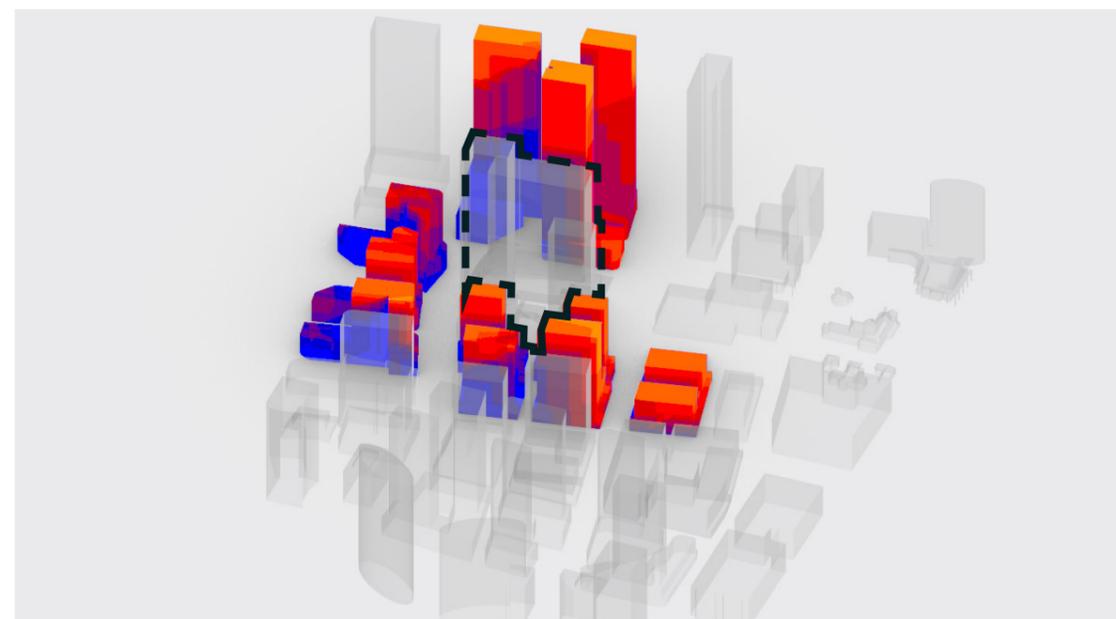


Figure 5-6 SSD scope solar access impact on the SOP Master Plan 2030 (2018 Review) context - north east perspective

5.2 Public space solar access

Figures 5-7 to 5-9 illustrate that the proposed development does not negatively impact on the primary public spaces identified in the Metro Site Area, i.e. the nominated proportion of primary public spaces maintain a minimum of 2 hours of sunlight between 9am and 3pm at the winter solstice.

Table 5-1 details the required proportion of the primary public spaces identified in the Metro Site Area that must achieve a minimum of 2 hours of sunlight between 9am and 3pm at the winter solstice. The proportion of the primary public spaces that achieve the solar access requirements when considering the proposed development is presented as a comparison.

The proposed development demonstrates a significant improvement to the solar access performance of the primary public spaces. This exceeds the requirements stipulated under the Interim Metro Review and demonstrates a high level of environmental amenity with respect to solar access.

Table 5-1 Solar access performance of the primary public spaces

PUBLIC SPACE	REQUIRED	ACHIEVED
Central Urban Park	75%	100%
West End Plaza	60%	89%
Central Plaza	55%	92%
East End Plaza	90%	100%

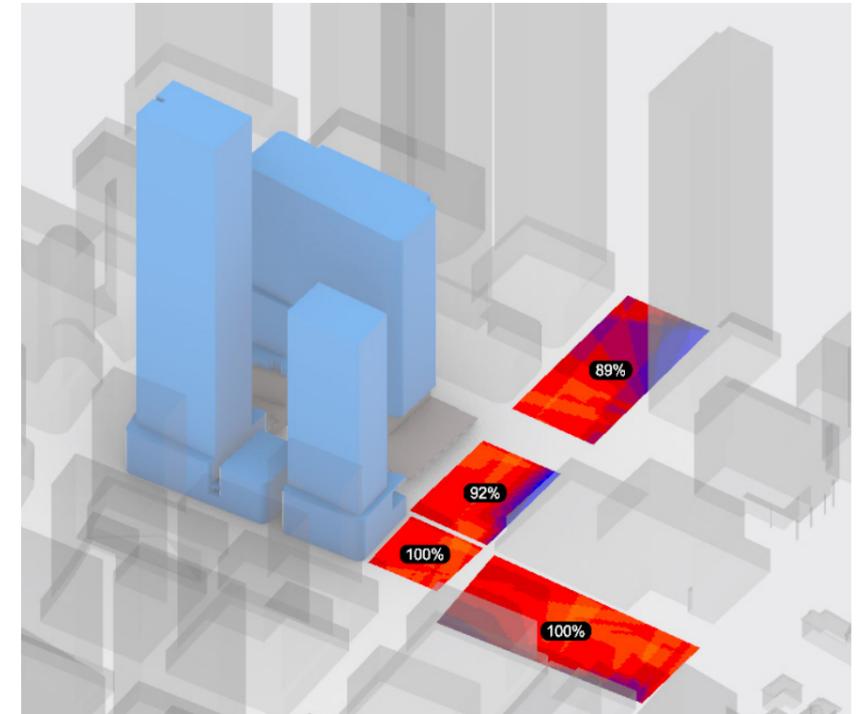


Figure 5-7 Solar access to primary public spaces - north east perspective

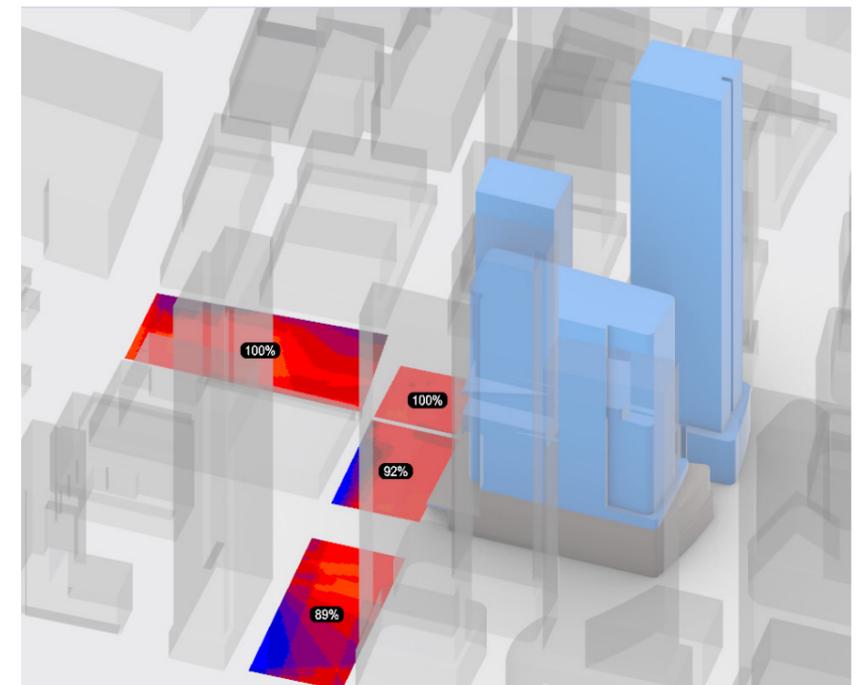


Figure 5-8 Solar access to primary public spaces - south west perspective

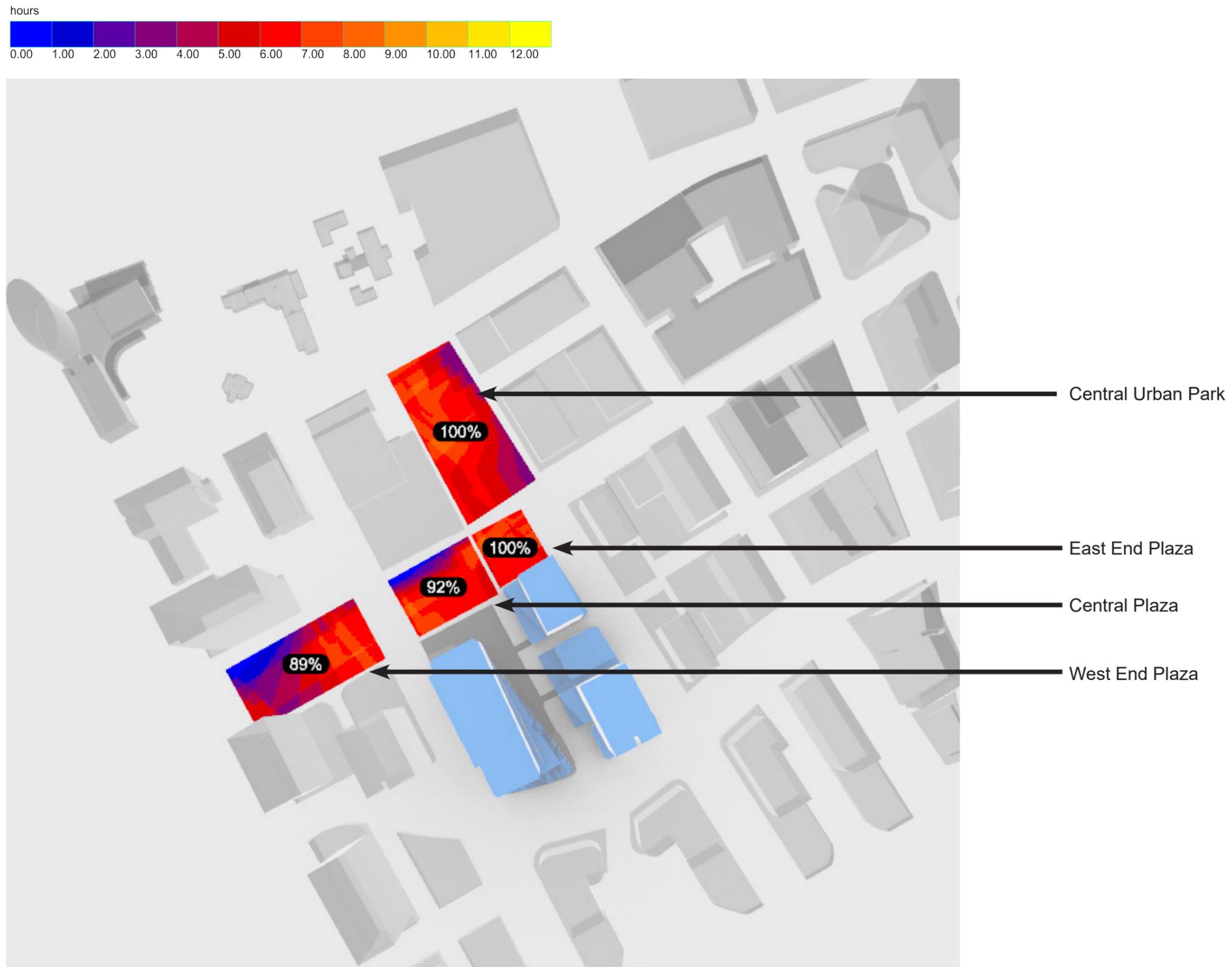


Figure 5-9 Solar access to primary public spaces - plan perspective

Sydney Metro West