

## **Skyview Factor Assessment**

### **Sydney Metro Martin Place Integrated Station Development**

#### **Macquarie**

Stage 2 North Site

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#### **Prepared for**

Savills

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## 1. Executive Summary

This Sky View Factor (SVF) Report has been prepared by Surface Design on behalf of Savills for MP Metro development North site, Sydney.

This report provides a study of the sky visible around the North site as a percentage of the sky's hemisphere. The SVF is the extent of sky at a given location or point, with a SFV of 0% representing a fully obstructed sky and 100% represent no obstruction (e.g. in a grass field).

This assessment analysed a total of seven (7) points at ground level located around the North Site to compare the impact of Sky View Factor for the following models:

- Model 1: Existing city (as of 2014)
- Model 2: Proposed Amending Stage 1 SSDA (PA)
- Model 3: Detailed North Site with Proposed Amending Stage 1 SSDA South Site

The detailed North Site, Model 3 was compared with the Existing City Model 1 and the Proposal Amending Stage 1 SSDA Model 2.

The analysis found that the Architectural Detailed North Design Model 3 has negligible reduction of visible sky at the relevant test points in reference to the Existing City Model 1 and the Proposed Amending Stage 1 SSDA Model 2.

The seven (7) points experience Typical to Low Sky View Factors which are similar to the current conditions experienced at these locations in the city Central Business District. The views stay within the banding (Typical or Low) with negligible sky view difference between models.

## 2. Stage 2 North Site SSDA

This section of this report has been provided by Savills.

### 2.1. 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.

The Sky View Factor (SVF) was assessed by Surface Design for various key locations of the MP Metro development site to understand the levels of sky view achieved for the North site of the Macquarie Bank development proposal. The developments SVF has been assessed against the allowable City of Sydney DCP envelope limits.

### 2.2. 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.

### 2.3. 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 Metro Martin Place Precinct



## 2.4. 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.

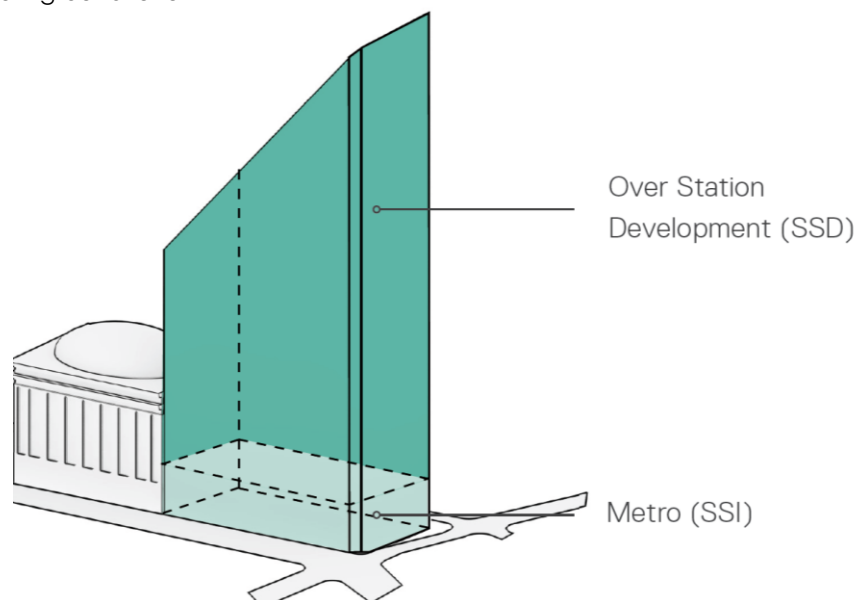
On 22 March 2018, the Minister approved Modification 3 to the Sydney Metro CSSI Approval. This enabled the inclusion of Macquarie-owned land at 50 Martin Place and 9-19 Elizabeth Street within Metro Martin Place station, and other associated changes (including retention of the opening to the existing 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 125,437m<sup>2</sup> 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 Metro Martin Place Metro station structure, above and below ground level<sup>1</sup>



**Figure 2 – North Site Approved OSD Building Envelope**

<sup>1</sup> 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.



## 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**

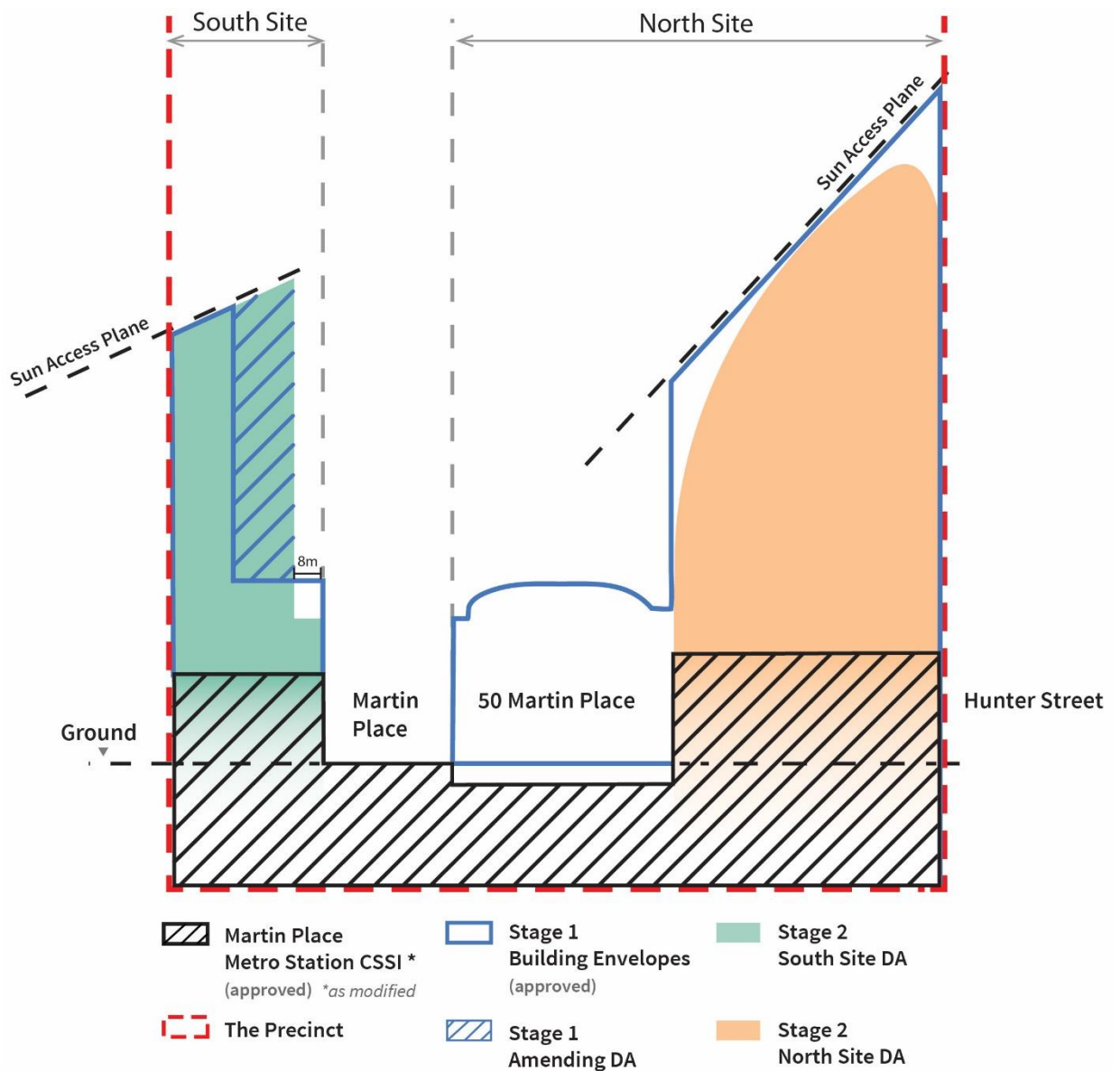
The *State Environmental Planning Policy (State and Regional Development) 2011* (SEPP SRD) identifies development which is declared to be State Significant. Under Schedule 1 and Clause 19(2) of SEPP SRD, development within a railway corridor or associated with railway infrastructure that has a capital 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:

- Assess and report on the sky view factor at fourteen (14) points on Martin Place and provide comments and supporting Sky View Factor Diagram. These models include:
  - Stage 2 DA: Assess and report on the sky view factor for the Proposed Building (North Tower). Provide 1 report; North Site DA report.

### 3. Sky View Factor Introduction

The City of Sydney has development conditions that define allowable building envelope limits. These limits have been set to enable appropriate levels of sky views to be provided to the public at the street level. Sky views throughout the City enables the public to experience the benefits of natural daylighting and environmental views. The Sydney Metro Martin Place project recognises the importance of providing appropriate levels of sky views to the public with the proposed development.

This study has assessed the Sky View Factor (SVF) achieved for various key locations of the MP Metro development site to understand the levels of sky view achieved for the North site of the Macquarie Bank development proposal. The developments SVF has been assessed against the allowable City of Sydney DCP envelope limits.

This report summarises guiding principles in the Sky view factor assessment, the different models assessed, the points of interest, the method of assessment and a discussion on the results.

This report does not comment on planning decisions and overshadowing limits and is responding to limits set by the Authorities.

This report has been prepared on behalf of Savills for the Stage 2 Development Application submission for the North Site.

#### 3.1. Reference Documents

This report has been prepared in reference to the following documents:

**Table 1: Reference documents**

Description	Drawing Number/File Name	Issue	Reference
Existing Model	GAS_170721_Existing	October 2017	Grimshaw
Approved Stage 1 SSD 17_8351 Model Envelope	SSDA ENVELOPES_DXF	April 2018	
Amending DA envelope drawing	PP ENVELOPE_DXF	October 2017	
Detailed North Envelope	180713 3D Model tower DXF R12	July 2017	JPW
Existing Street Frontage Height and setback controls	Appendix D Street Frontage Height and Setback	2016	City of Sydney
Skyview Factor Assessment	Stage 1 Amending DA	21 <sup>th</sup> June 2018	SFD

### 3.2. Terms of Reference

**SVF** – Sky View Factor, is the extent of sky observed above a point as a proportion of the total possible sky hemisphere above the point.

**CoS** – City of Sydney.

**Sydney LEP** – Sydney Local Environmental Plan 2012.

**SSD DA** – Approved Stage 1 State Significant Development.

**PA** – Proposed Amending Stage 1 SSDA Model.

**NS** – Detailed Architectural Design of the North Site

### 3.3. Site Description

The Sydney Metro Martin Place Precinct includes two towers, a North Site between 50 Martin Place and Hunter Street and a South site adjacent to Martin Place as shown in Figure 1. The Architectural North Site Detail design with the South site modelled with the Proposed Amending Stage 1 SSDA Sky View Factor was assessed.

It is understood that the development is to consider the building extent to local and state planning. The proposed MP Metro Towers have been designed with consideration of the City of Sydney Development Control Plan (DCP) envelope limits and State Application. The models used in this assessment reflects these City of Sydney guidelines built by Grimshaw.

#### 3.3.1. Model Description

The planning provisions that are to be considered for the development are summarised as follows:

##### **Model 1: Existing buildings**

The existing Sydney CBD as of 2014 was assessed to understand the current sky views around the proposed site. This assessment confirms the current conditions experienced and has been used as a validation of the Surface Design study by comparing these results to the Street Frontage Heights and Setback Study by the City of Sydney dated 2016.

##### **Model 2: Proposed Amending Stage 1 SSDA (PA)**

The PA model is a variation of SSD DA, with the design applying site-specific provisions based from Sydney LEP 2012. This site-specific provision reduced the setback 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. These amendments were published within Sydney LEP 2012 and reflect the new planning controls applying to the precinct.

##### **Model 3: Architectural North Site Detailed Design**

This model has assessed the detailed design proposed for the development on the North Site. It excludes any proposed development to the South Site and includes the Proposed Amending Stage 1 SSDA South Building in the Assessment.

The design incorporates a gradually increasing sloped façade on the Southern side of the building, starting at the top of a 31m high podium to the top of the building.

#### 3.3.2. Model Geometry

##### **Model 1 Existing Building**

Model 1 is shown in the figure below represents City Model as of 2014 with the inclusion of the 50 Martin Place. The buildings shown in Green represent the current MP Metro site buildings. It is noted that the North building No1. Castlereagh Street has been demolished but has been included in this study.



**Figure 4: Existing City of Sydney Model as at 2014 (courtesy of Grimshaw)**

#### **Model 2 Proposed Amending Stage 1 SSDA Envelope**

The PA model represents the proposed MP Metro Planning Proposal North Building and South Site as depicted in the figure below. The Planning Proposal envelope aims to clarify development standards based on the design for the SSD with the inclusion of a site-specific provision in the Sydney LEP 2012. This includes a boundary setback reduction to 8m and the height limit is in accordance with the Hyde Park North Sun Access Plane.



**Figure 6: Proposed Amending Stage 1 Envelope (courtesy of Grimshaw)**



**Model 3 Architectural North Site Detailed Design**

The detailed design model represents the proposed MP Metro North Building design as depicted in the figure below. The entire site has been assessed with the detailed proposed North Building and the Proposed Amending Stage 1 SSDA South site.



**Figure 7: Architectural Detailed North Site Envelope with PA South Site**

**3.4. Key Study Points for Comparative Assessment**

This study is a comparative assessment that has considered points of interest around the North MP Metro project as shown in Figure 9 below. These locations represent the areas where the extent of Sky Views may be influenced by the proposed North MP Metro development as they have a clear line of site to the North building sites. These points were agreed upon with Savills and are consistent with testing done to date. Each key location, excluding points 1 to 5, 13 and 14, have been assessed for each of the different models outlined in Section 3.4. Points 1 to 5, 13 and 14 Sky View Factor is deemed to be influenced by the South Site and are excluded from this comparative assessment.



**Figure 9: Key location study points**

The address of each locations chosen point and the building site assumed to influence the SVF is listed in Table 2 below. For the Stage 2 Architectural North Detailed Design Assessment the points located around the South site will have limited to no Sky View Factor change from the architectural

detailed design on the North Tower and has been removed from this assessment. These points are highlighted in grey in Table 2.

**Table 2: Point Location**

Point	Location	Site Sky View Factor Influence by Proposed development	Hemispherical Angle the Architectural North Detailed Design Model 3 influences	
1	36 Martin Place	South	Points 1-5 are deemed to be influenced by the South Site and are excluded from this assessment	
2	Cnr of Martin Place and Castlereagh St	North & South		
3	37 Martin Place	North & South		
4	Cnr of Martin Place and Elizabeth St	North & South		
5	63 Martin Place	South		
6	Richard Johnson Square	North	90° - 180°	SE
7	Chifley Square	North	180° - 270°	SW
8	20 Elizabeth St	North & South	270° - 360°	NW
9	7 Elizabeth St	North & South	225° - 315°	W
10	55 Hunter St	North	90° - 180°	SE
11	4 Castlereagh St	North & South	0° - 180°	N - S
12	9/17 Castlereagh St	North & South	0° - 180°	N - S
13	30 Castlereagh St	North & South	Points 13-14 are deemed to be influenced by the South Site and are excluded from this assessment	
14	80-85 Elizabeth St	North & South		



## 4. Sky View Assessment

### 4.1. Sky View Factor

Sky View measures the extent of hemispherical sky (or sky vault) with views to the sky viewed from a single point. It is the extent of sky (as a percentage) at a given location or point, where a SFV of 0% represents a fully obstructed sky, whereas 100% represent no obstruction (e.g. in a grass field).

This study has assessed the Sky View Factor taking into consideration all the surrounding buildings obstructing views of the sky, for buildings at a distance of at least 50m from any of the 7 points on the ground. No trees, traffic lights and permeable structures were included in the models as they were not considered to have a significant impact on the results and the effects of these elements would be the same in all models.

### 4.2. City of Sydney SVF

The City of Sydney (CoS) Street Frontage Height and Setback report allocate the Sky View Factor into bands with a Low SFV, Typical SVF, High SVF and Highest SFV as shown in the table below as well as Appendix C.

The CoS report dated 2016 notes the majority of street environments within the Centre Sydney are typical SVF (15-25%).

**Table 3: Sky View Factor Key**

SVF Colour Code			Category	Comments
0% - 5%	5% - 10%	10% - 15%	Low SVF	Small Streets or Laneways
15% - 20%	20% - 25%		Typical SVF	Has long and straight streets
25% - 30%	30% - 35%		High SVF	Short, wide streets with limited tall developments or at an intersection
35% - 40%	40%-45%	>45%	Highest SVF	Streets located at the edge of Sydney

### 4.3. Domestic and International Assessments

In Auckland specified public areas are required to have sunshine during times of the day when they are in high use, whereas in Melbourne the public space is required to offer sunlight at all times of the year when the intensity of pedestrian activity is highest. Sydney Hyde park has height regulations for new developments so that they do not shade the public park.

New York, Auckland and Melbourne employ similar methods of assessment. It has been shown that a setback from the street reduce developments impact on sky views into the street.

### 4.4. Comparative Analysis and Impact Assessment

To provide a comparative analysis of the impact of the different development models Stereographic SVF diagrams have been developed with the extent of SVF calculated as a percentage. The percentage represents the extent of Sky View provided to the viewer at that point, for example 0.1 is equivalent to 10% of the sky being visible.

The benchmark for this comparative study has been taken as the Development Control Plan model however the Existing Site conditions have also been assessed to establish what is considered an appropriate impact. Any change in SVF between the Existing City Model (Model 1) to the DCP Model (Model 2) is to be considered for this study as an acceptable level of SVF change.

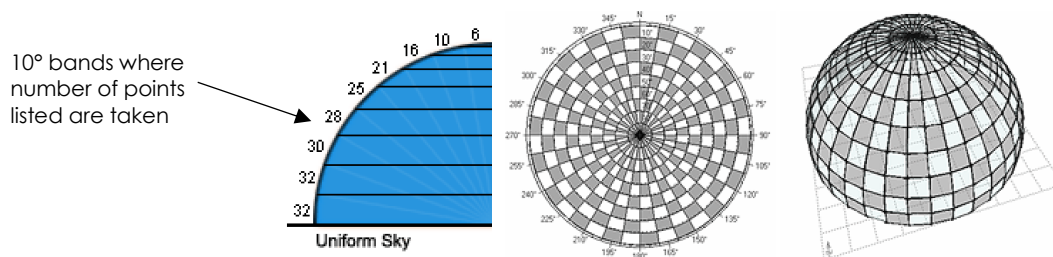
The base case DCP Model 2 was compared with both the SSDA Model 3 and the PA Model 2 in MP Metro Skyview Assessment Stage 1 to assess if the SVF meets the City of Sydney Council requirements of an SVF that is equivalent or improved.

The assessment compares the Architectural North Detailed Design with the SSD and PA models to assess if the SVF reduces below the banding set by the City of Sydney. Refer to Appendix B for more details on the City of Sydney Banding.

#### 4.5. Ecotect Analysis and Stereographic Diagrams

The software used to analyse the Sky View Factor was Autodesk Ecotect Analysis. Ecotect is an environmental analysis tool that allows designers to simulate building performance based off the geometry of the proposed development and the surrounding buildings. It provides a platform to assess the Sky View Factor at a given location.

The stereograph is a projection of the entire sky dome presented onto a flat image. The Sky View Factor assessment takes a stereograph of the sky with 200 points distributed pseudo randomly based on figure 7 number of points per 10° altitude angle. The randomise surface points leads to slightly different results between two calculations however is more accurate as it samples the surface and the surrounding geometry differently on each iteration, making it able to accommodate even highly detailed site geometry.



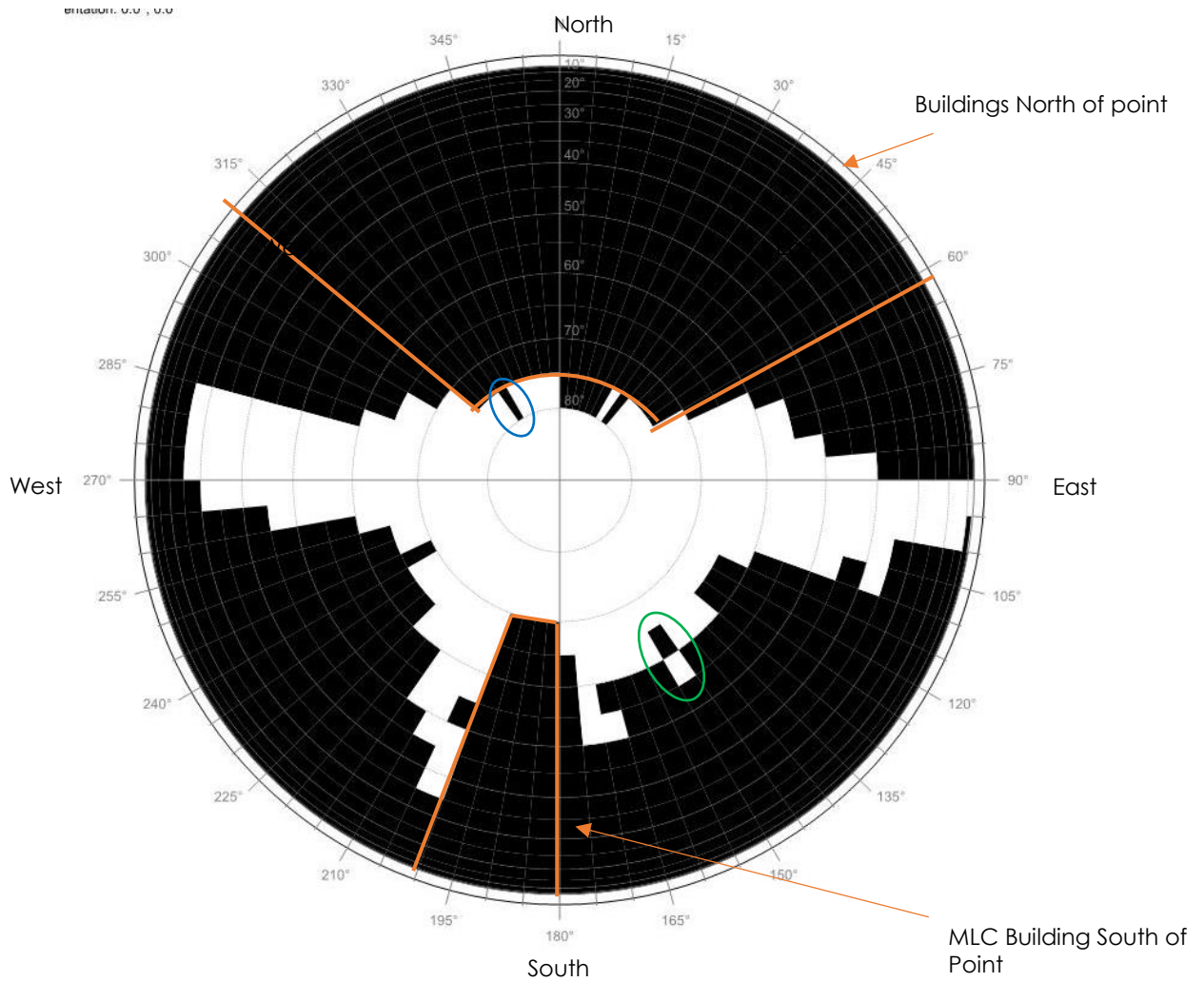
**Figure 10: Points taken in Stereograph Study (From Ecotect)**

Below are the Sky View Assessments results. The stereograph represents a viewer's potential view of the sky, 180 degrees from the horizon and a 360 view (North, East, South West). In this graph the buildings North of the SVF below blocks out sky views from North-West to North-East. The MLC building in the South blocks the sky view for a smaller proportion of the South sky.

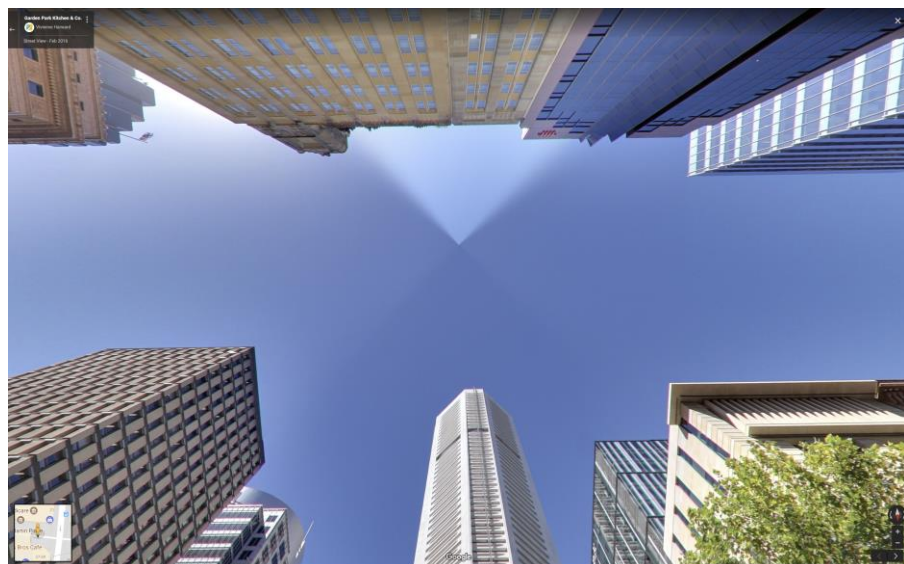
The image below the stereograph shows the existing buildings used in the model, as well as potential for a sky view as limited by the camera lens.

In the stereograph, as shown by the blue circle, the building is shown as a small slit in the area between 75° to 80°. This is because the building is partially in this section so the software models the shading in the tested 5° band.

The green circle shows another case where the point measures no building or obstruction, however the point above it measures a building. This is due to the building residing partially in both sectors, with the lower point measuring the non-shaded section and the upper point measuring the shaded section.



**Figure 11: Stereographic Sky View**



**Figure 12: Site image at Martin Place (Google images)**

#### 4.6. Disclaimer

This Sky View Factor assessment provides an estimate of the views obstructed by the different buildings. This estimate is based on a necessarily simplified and idealised version of the surrounding buildings located in the Sydney Central Business District. The assessment is a simulation and cannot fully represent all of the intricacies of the Sydney Central District and the perspective of viewers.

As a result, simulation results only represent an interpretation of the potential Sky View Factor effected by the building.

#### 4.7. Model Geometry

The building models for this study have been provided by Grimshaw Architects and Tzanee, as such any planning assessments on allowable building setbacks has been completed by Grimshaw Architects or Tzanee. Three (3) have been provided that include:

- Model 1: Existing City of Sydney building model as at December 2014
- Model 2: Proposed Amending Stage 1 SSDA Envelope
- Model 3: Architectural North Site Detailed Design Envelope

The city model was imported into Autodesk Ecotect Analysis and used to assess the Sky View Factor (SVF) at 7 points, as shown in Section 3.5. key study points for comparison assessment. The points were chosen by Savills and Ethos Urban to assess the SVF at ground level and in the centre of the street.

#### 4.8. Assessed Points

All points were taken from the centre of the street to provide a holistic view. The figure below shows the potential sky view factor at three points along a road. The three coloured stars represent different points that could be taken across a street. The blue star shows that is a point if taken next to a smaller building then a SFV is reduced compared with the yellow or green points SVF. The Yellow star shows that is the point is taken next to a large building then the SFV is increased. The middle point is used as this is the average view of the three points.

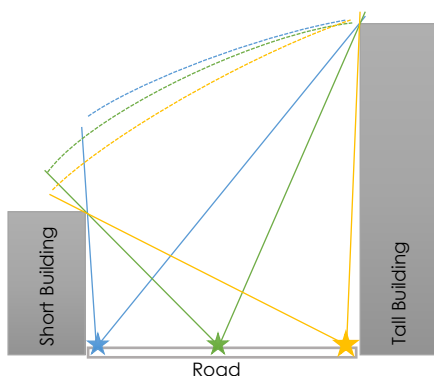


Figure 13: Section View of Assessment Point across a road for SVF

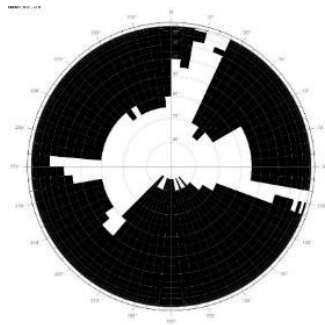
#### 4.9. Existing Sky Views

The images below show actual image and stereograph for the various levels described in City of Sydney Street Frontage Height and Setbacks document. The extent of existing sky views for the viewer varies between a low SVF to a typical SVF.

Limited SVF is achieved at point 9/17 Castlereagh street with a SVF of 8.5% as it is a narrow streets with tall buildings on both sides of the street.



Chifley Square (Google Images)

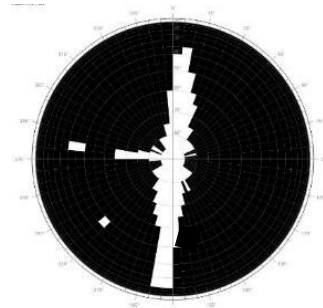


Point 7

Lower limits of a Typical Sky View Factor



9/17 Castlereagh Street (Google Images)



Point 12

Low Sky View Factor

The above existing typical sky view factors are deemed to be acceptable levels of Sky Views within the City Central Business District and have been referred to in the discussion of the results of this study.

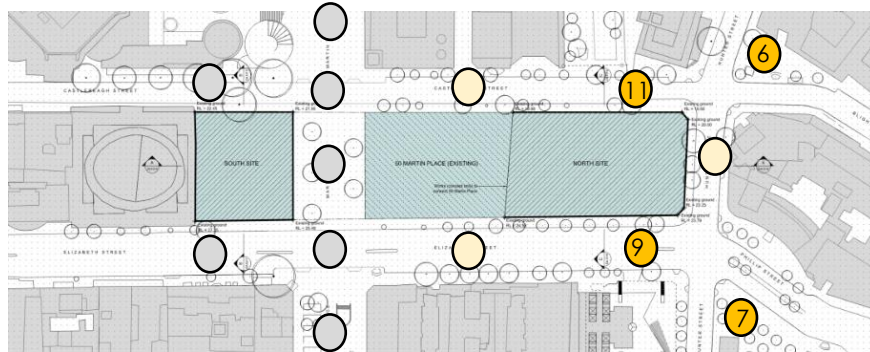


## 5. Sky View Factor Results

The following section details the Sky View Factor results for only four (4) of the seven (7) points listed below as they have the most notable change in Sky View Factor from the Architectural North Detailed Design. The remaining three (3) points have been included in a summary table in Section 6.2 and Appendix A.

The four points include:

- Point 6: Richard Johnson Square
- Point 7: Chifley Square
- Point 9: 7 Elizabeth Street
- Point 11: 4 Castlereagh Street

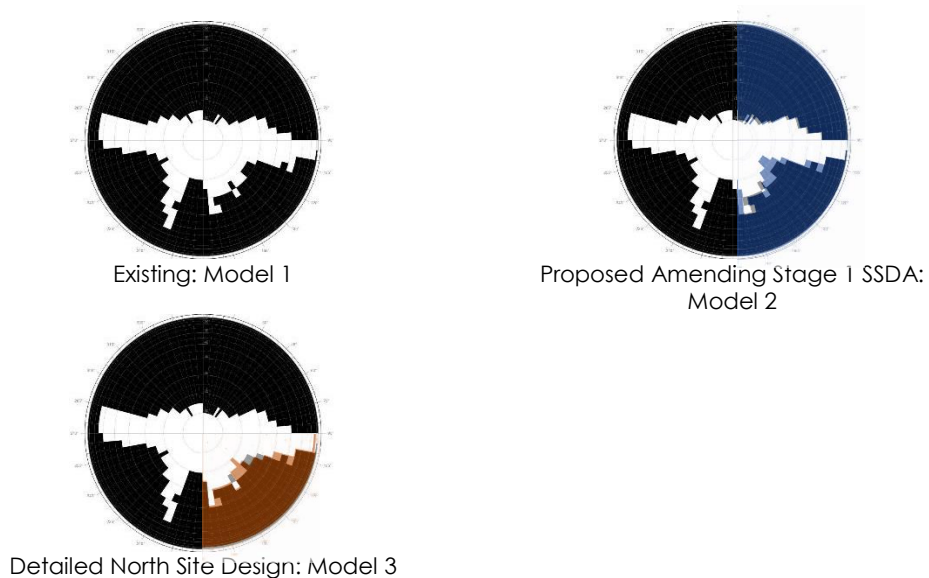


**Figure 14: Key locations**

The results for all seven (7) points of this study are included in Section 6.1 and Appendix A.

### 5.1. Discussion of Results

To illustrate the change in Sky View Factor at each key location overlays of the SVF model results have been provided. The first stereograph, as shown in the example below, is the sky view experienced by the viewers on the points around the existing buildings at the proposed site. The second stereograph shows the Sky View Factor of the existing model 1 (in black/grey), along with an overlay of the PA Model 2 coloured in blue. The third diagram shows the existing model 1 (in black/grey) with the Architectural Detailed North Site Design Model 3 overlaid in orange. Only the side of the graph the proposed site is located on is shown.

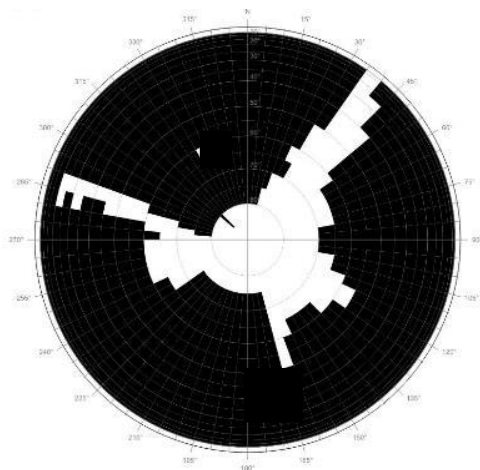


## 5.2. Stereograph Results

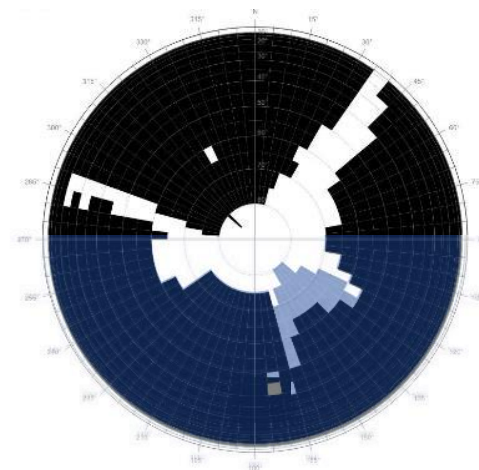
### 5.2.1. Richard Johnson Square

When assessing point six (6), Richard Johnson Square Model 3 experiences a decreased sky view factor on the South-Eastern quadrant of the stereograph when compared with the Existing City, Model 1 due to an increase in height and width from the North Tower.

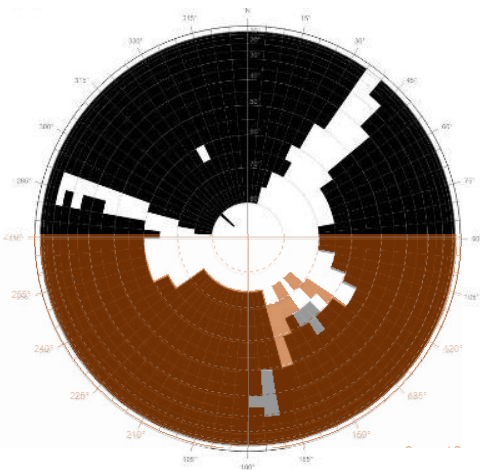
For reference, Model 2 (PA) have been compared with the Existing City, Model 1 and do not have a notable change in sky views.



**Model 1: Existing Model Sky View Factor: 14%**



**Model 2: PA Sky View Factor: 12.5% (Blue) above Model 1: Existing City (Black/Grey)**



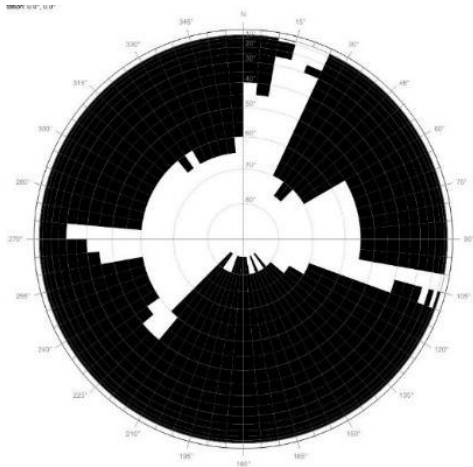
**Model 3: Architectural Detailed Design North site with PA South Site: 12.5% (Orange) above Model 1: Existing City (Black/Grey)**



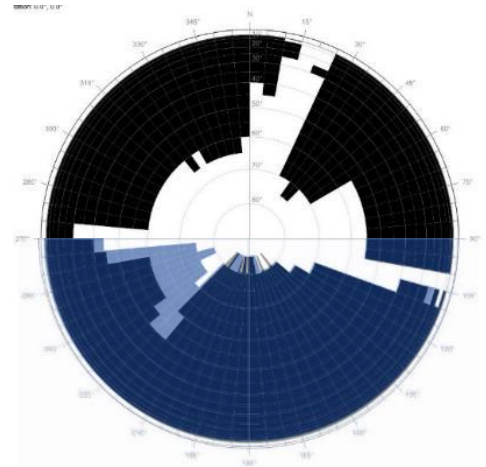
### 5.2.2. Chifley Square

When assessing point seven (7), Chifley Square Model 3 experiences a decreased sky view factor on the South-Western quadrant when compared with the Existing City, Model 1 due to an increase in width from the North Tower.

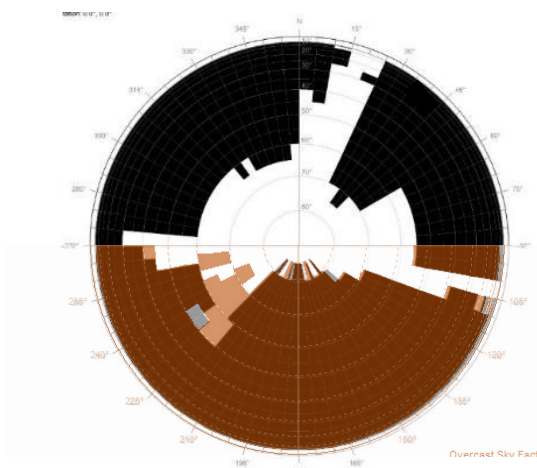
For reference, Model 2 (PA) have been compared with the Existing City, Model 1 and do not have a notable change in sky views.



**Model 1: Existing Model Sky View Factor: 18.5%**



**Model 2: PA Sky View Factor: 16.0% (Blue) above Model 1: Existing City (Black/Grey)**

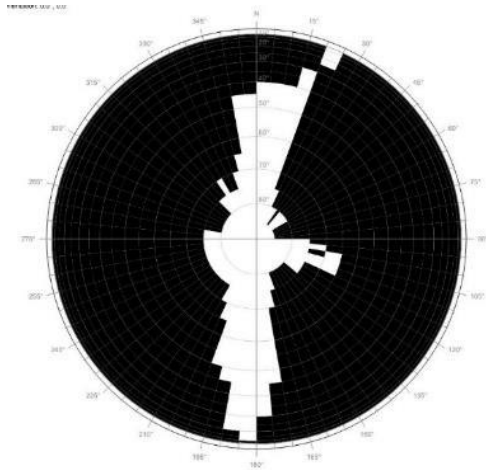


**Model 3: Architectural Detailed Design North site with PA South Site: 16.0% (Orange) above Model 1: Existing City (Black/Grey)**

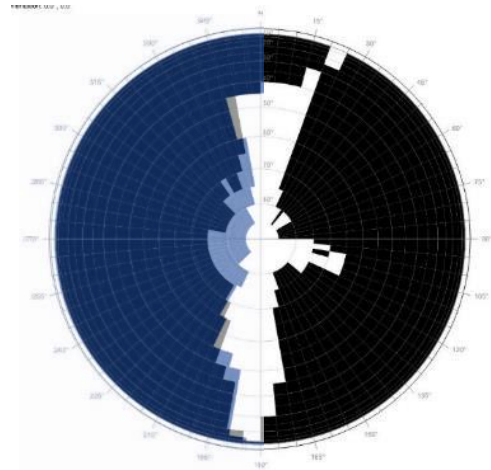
### 5.2.3. 7 Elizabeth Street

When assessing point nine (9), 7 Elizabeth Street Model 3 experiences a decreased sky view factor to the North-Western quadrant when compared with the Existing City, Model 1 due to an increase in height from the North Tower.

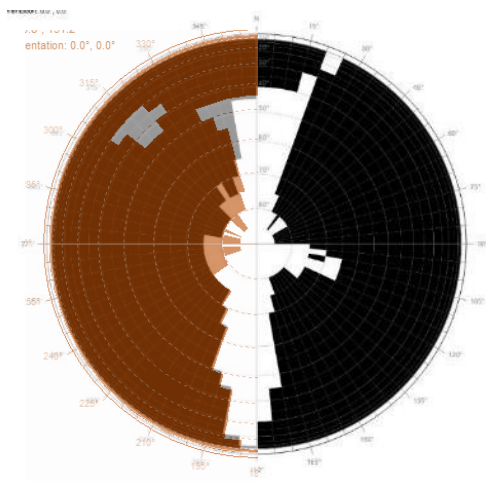
For reference, Model 2 (PA) have been compared with the Existing City, Model 1 and do not have a notable change in sky views.



**Model 1: Existing Model Sky View Factor: 12.5%**



**Model 2: PA Sky View Factor: 9.5% (Blue) above Model 1: Existing City (Black/Grey)**

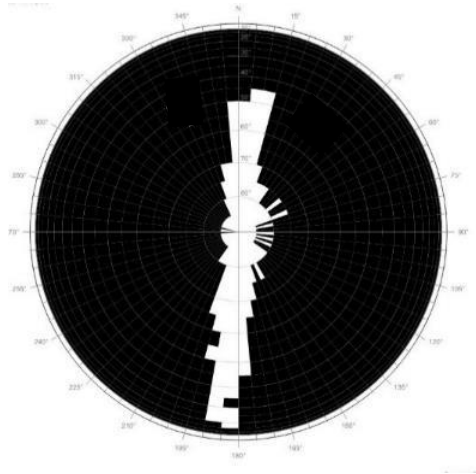


**Model 3: Architectural Detailed Design North site with PA South Site: 11.0% (Orange) above Model 1: Existing City (Black/Grey)**

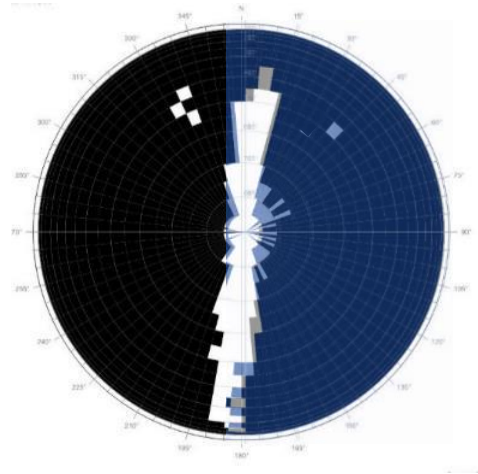
#### 5.2.4. 4 Castlereagh Street

When assessing point eleven (11) 4 Castlereagh Street Model 3 experiences a decreased sky view factor on the North-Eastern quadrant when compared with the Existing City, Model 1 due to an increase in height from the North Tower.

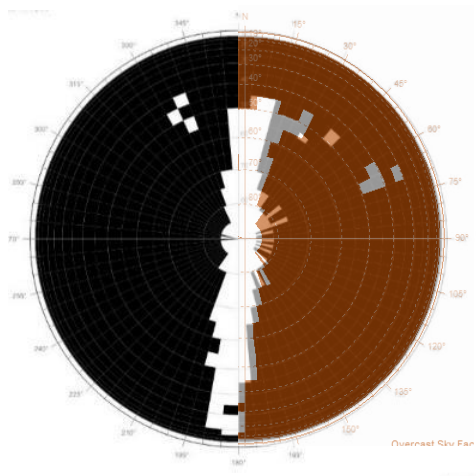
For reference, Model 3 (SSD) and Model 2 (PA) have been compared to the DCP envelope, Model 2 and do not have a notable change in sky views.



**Model 1: Existing Model Sky View Factor: 6.5%**



**Model 2: PA Sky View Factor: 4.5% (Blue) above Model 1: Existing City (Black/Grey)**



**Model 3: Architectural Detailed Design North site: 5.5% (Orange) above Model 1: Existing City (Black/Grey)**

## 6. Results and Discussion

### 6.1. Sky View Factor Model 1, Model 2 and Model 3

The Sky View Factor was assessed for three models Existing City Model 1, Proposed Amending Stage 1 SSDA (PA) and Architectural Detailed Design North Site Stage 2, at 7 points surrounding the proposed North site, excluding points 1-5, 13 and 14, due to the influence the South site has at these points.

Model 1, the Existing City Model achieves Low Sky View Factors (SVF) at six (6) points around the North site. These points experience less than 15% SVF (a low SVF) because they are located on streets that have tall commercial buildings on both sides of the relatively narrow street. Point Seven, Chifley Square, experience Typical Sky views.

Model 3 SVF remains within the Low or Typical SVF, with no points ranging out of the 5% colour band, refer to Section 4.2 for the SVF colour code. Seven points, 1 – 5, 13 and 14, were not assessed as they were deemed to not be affected by the North Site development.

Table 5 lists the sky view factor at each point for each model.

**Table 5: Summary Sky View Factor Results**

Location			Model 1: Existing	Model 2: PA Envelope	Model 3: Detailed Design, North Site*
1 - 5	Points 1-5 are deemed to be influenced by the South Site and are excluded from this assessment				
6	Richard Johnson Square	Low SVF	14.00%	12.50%	12.50%
7	Chifley Square	Typical SVF	18.50%	16.00%	16.00%
8	20 Elizabeth St	Low SVF	11.00%	9.50%	10.00%
9	7 Elizabeth St	Low SVF	12.50%	10.00%	10.50%
10	55 Hunter St	Low SVF	10.50%	10.00%	10.50%
11	4 Castlereagh St	Low SVF	7.50%	4.50%	5.50%
12	9/17 Castlereagh St	Low SVF	8.50%	6.50%	6.50%
13 - 14	Points 13-14 are deemed to be influenced by the South Site and are excluded from this assessment				

\*Model 3 includes the proposed architectural detail design North Site and the proposed amending Stage 1 SSDA South Site

All 7 points stay within the Sky View Factor band used by the City of Sydney.

One (1) point experience a decrease in sky view factor by 2.5%. These points are located at Chifley Square.

Three (3) points experience a decrease sky view factor between 1.5% to 2.0%. These are located at 7 Elizabeth Street, 4 Castlereagh Street and 9/17 Castlereagh Street.

Two (2) points experience a decrease sky view factor between 0% to 1.5%. These points are located at Richard Johnson Square and 20 Elizabeth Street.

The other one (1) points experience 0% sky view factor change. This point is located at 55 Hunter Street.

The sky view for the Architectural South Detailed Design with the Proposed Amending Stage 1 North Site does not result in a change in the banding category of the Sky View Factor.

## 6.2. Sky Views reduction between Model 2 and Model 3

The Sky View Factor (SVF) reduction in Section 6.1 and 6.2 consider the level of influence over the entire view/hemisphere, as shown in Section 4.5.

The sky view reduction considers the difference in sky views to the available sky views only. When assessing the difference in available sky views between Model 1 and Model 3 the reduction increases up to 26.7%.

**Table 6: Summary Sky View Factor Results**

Location		SVF Category	Model 1: Existing	Model 3: Detailed Design, North Site	Sky View Reduction
1 - 5	Points 1-5 are deemed to be influenced by the South Site and are excluded from this assessment				
6	Richard Johnson Square	Low	28/200	25/200	10.7%
7	Chifley Square	Typical	37/200	32/200	13.5%
8	20 Elizabeth St	Low	22/200	20/200	9.1%
9	7 Elizabeth St	Low	25/200	21/200	16.7%
10	55 Hunter St	Low	21/200	21/200	0.0%
11	4 Castlereagh St	Low	15/200	11/200	26.7%
12	9/17 Castlereagh St	Low	17/200	13/200	23.5%
13-14	Points 13-14 are deemed to be influenced by the South Site and are excluded from this assessment				

## 7. Conclusion

By adopting the Development Control Plan, a 3% reduction in Sky View Factor (SVF) is deemed as permitted.

The comparative assessment indicated the following:

- All 7 viewpoints maintained the sky view classification of a Low to Typical Sky View Factor
- Equivalent sky views are experienced at one (1) points. This point is located at 55 Hunter Street
- Two (2) points experience a decreased SVF up to 1.5%. These points are located at Richard Johnson Square and 20 Elizabeth Street
- Three (3) points experience a decreased SVF between 1.5% to 2.0%. These points are located at 7 Elizabeth Street, 4 Castlereagh Street and 9/17 Castlereagh Street
- One (1) point experience a decrease in sky view factor by 2.5%. This point is located at Chifley Square

These results demonstrate the Architectural Detailed Design Model 3 have a negligible reduction of sky visibility in reference to the Existing City Model 1 and the Proposed Amending Stage 1 SSDA Model 2.

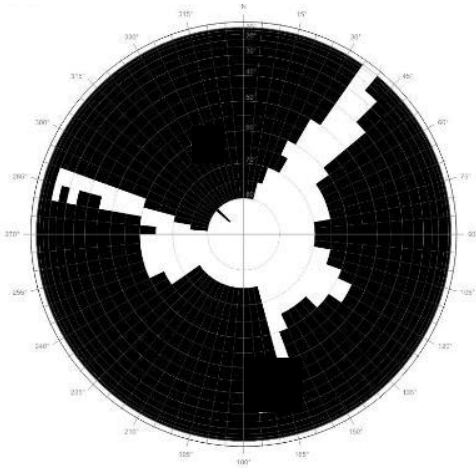
# Appendix A

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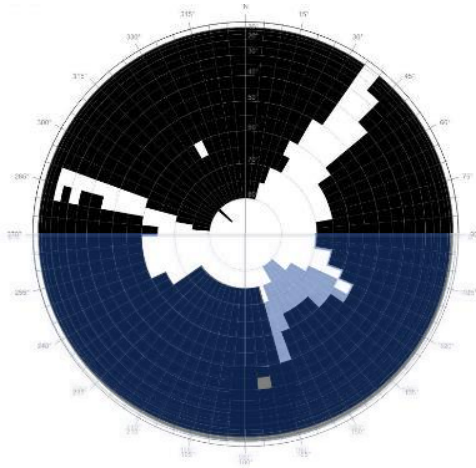
## Stereographs



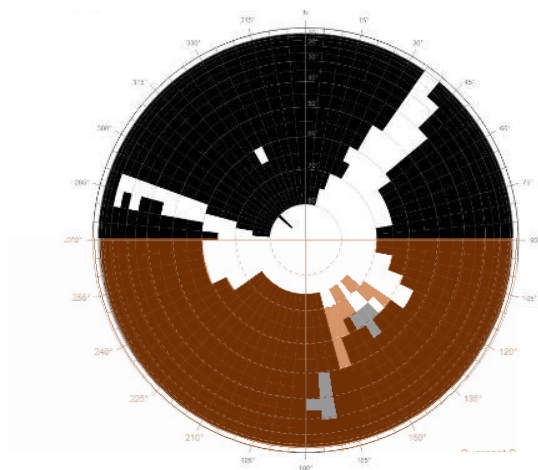
## Richard Johnson Square



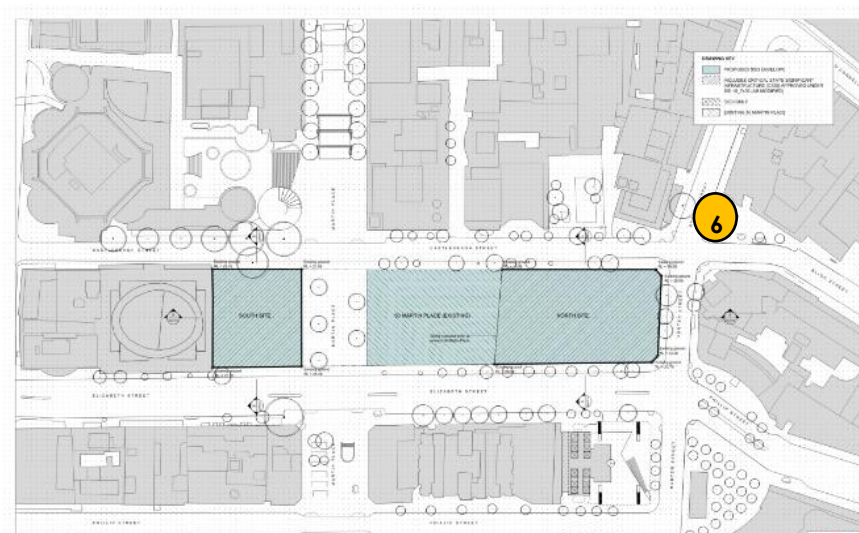
**Model 1: Existing Model Sky View Factor: 14.0%**



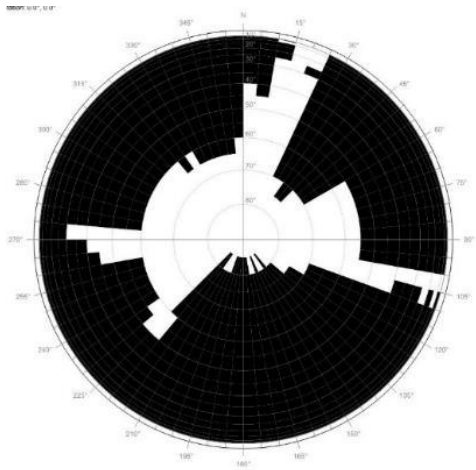
**Model 2: PA Sky View Factor: 12.5% (Blue) above Model 1: Existing City (Black/Grey)**



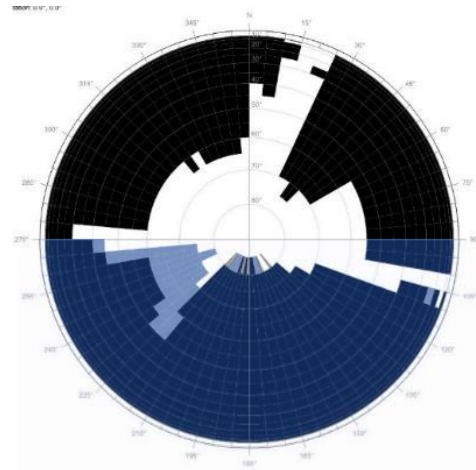
**Model 3: Architectural Detailed Design North site with PA South Site: 12.5% (Orange) above Model 1: Existing City (Black/Grey)**



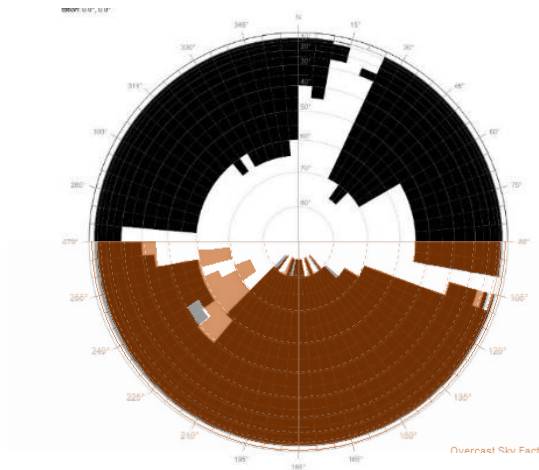
## Chifley Square



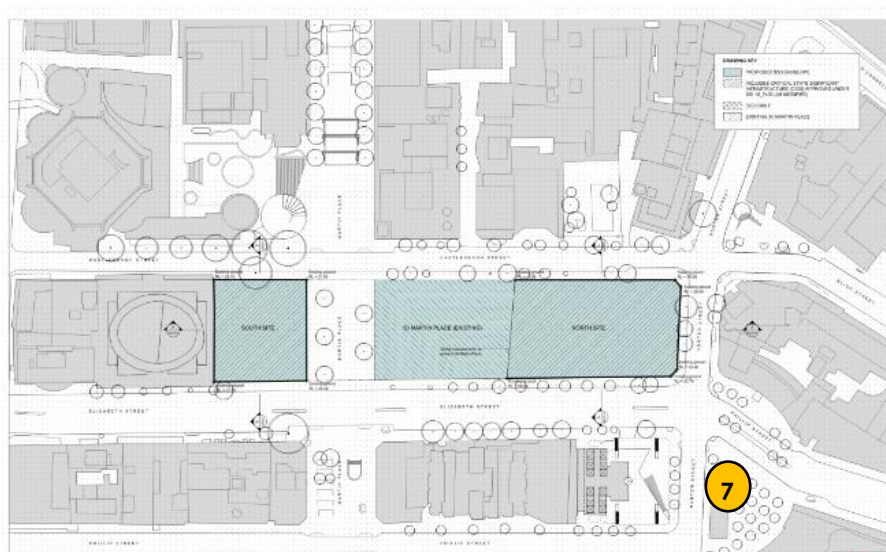
**Model 1: Existing Model Sky View Factor: 18.5%**



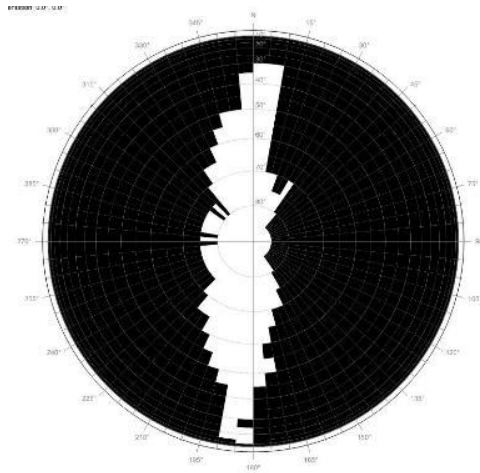
**Model 2: PA Sky View Factor: 16.0% (Blue) above Model 1: Existing City (Black/Grey)**



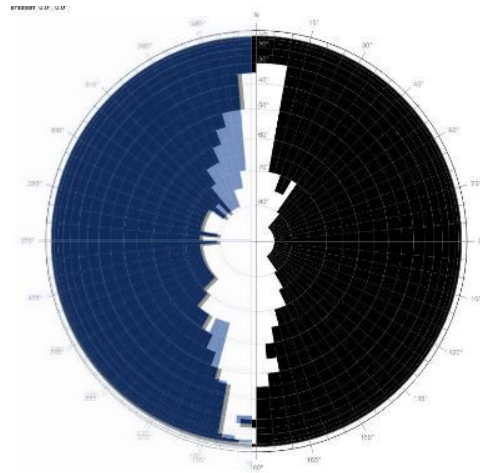
**Model 3: Architectural Detailed Design North site with PA South Site: 16.0% (Orange) above Model 1: Existing City (Black/Grey)**



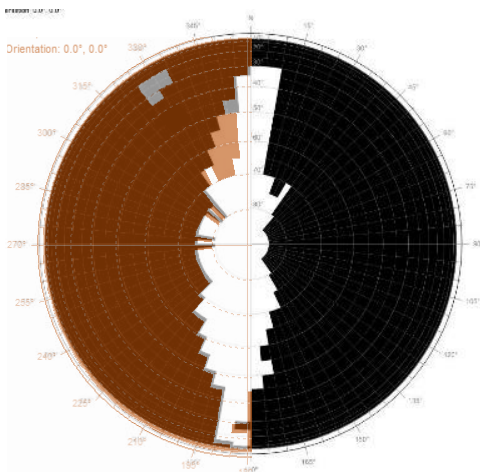
## 20 Elizabeth Street



**Model 1: Existing Model Sky View Factor:**  
11.0%



**Model 2: PA Sky View Factor: 9.5% (Blue) above**  
**Model 1: Existing City (Black/Grey)**

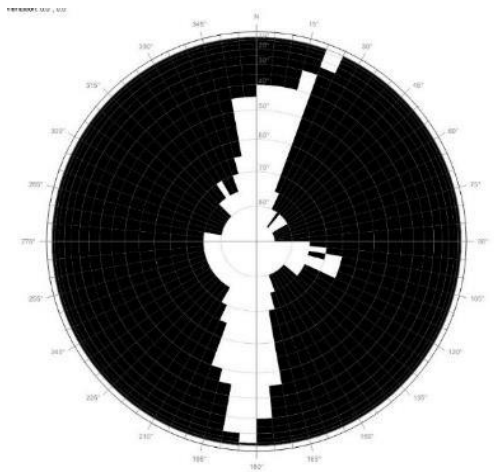


**Model 3: Architectural Detailed Design North**  
**site with PA South Site: 10.5% (Orange)**  
**above Model 1: Existing City (Black/Grey)**

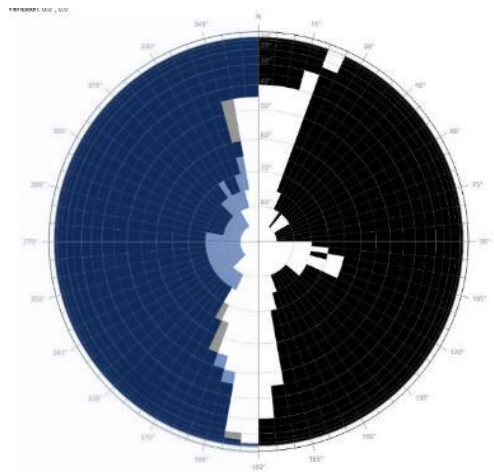




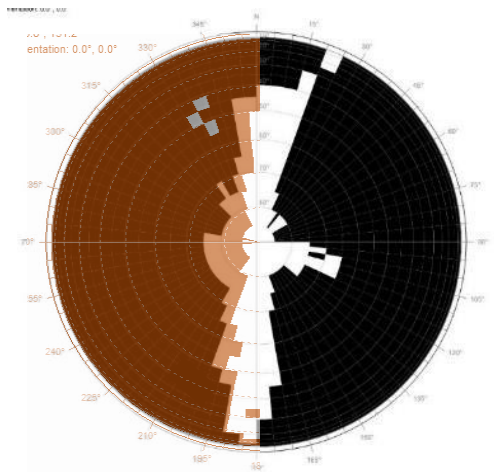
## 7 Elizabeth Street



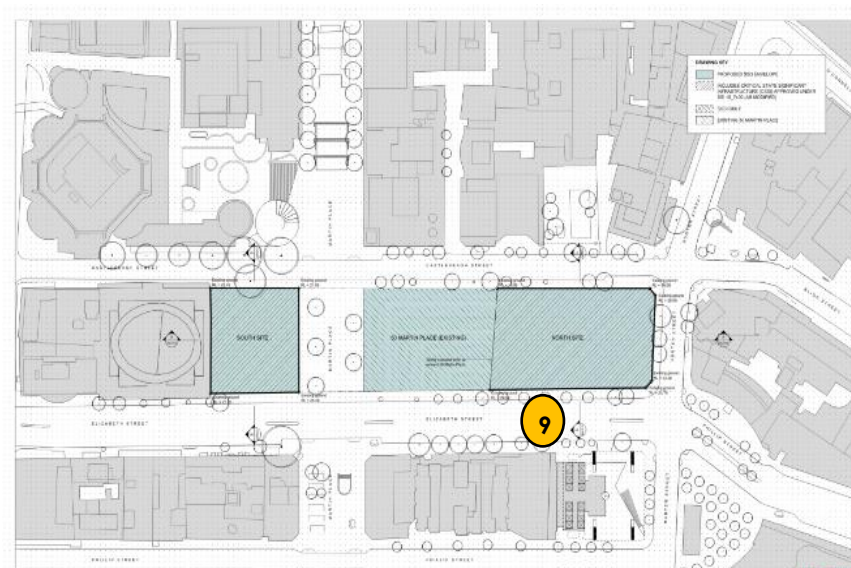
**Model 1: Existing Model Sky View Factor:  
12.5%**



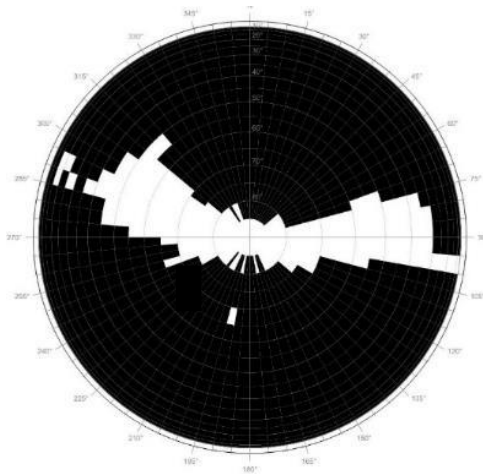
**Model 2: PA Sky View Factor: 9.5% (Blue) above  
Model 1: Existing City (Black/Grey)**



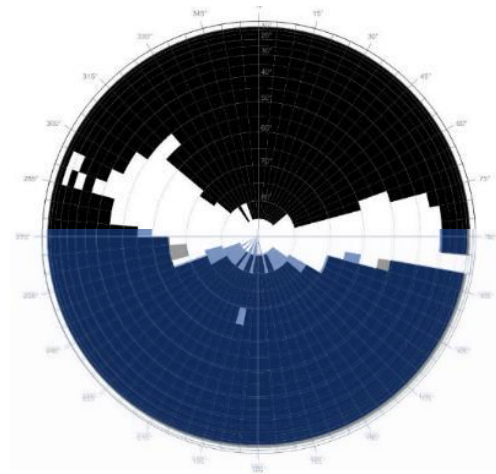
**Model 3: Architectural Detailed Design North  
site with PA South Site: 11.0% (Orange) above  
Model 1: Existing City (Black/Grey)**



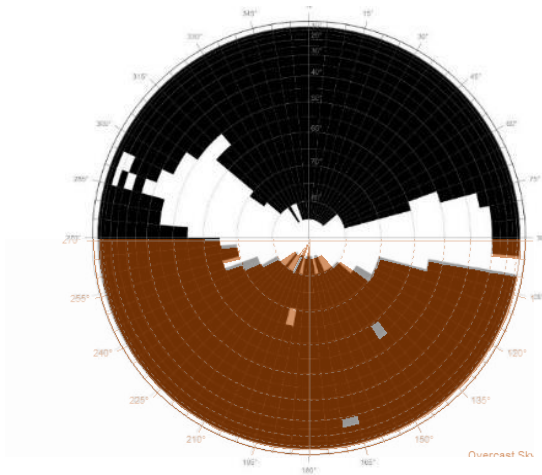
## 55 Hunter Street



**Model 1: Existing Model Sky View Factor: 10.5%**



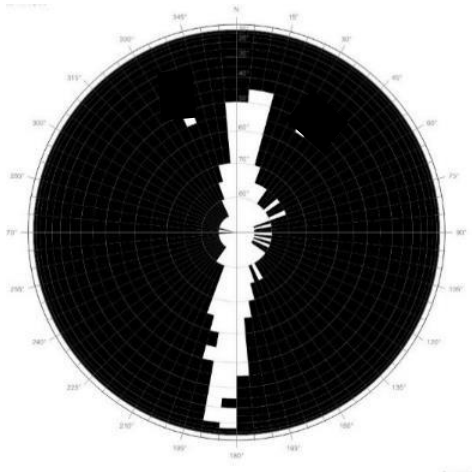
**Model 2: PA Sky View Factor: 10.0% (Blue) above Model 1: Existing City (Black/Grey)**



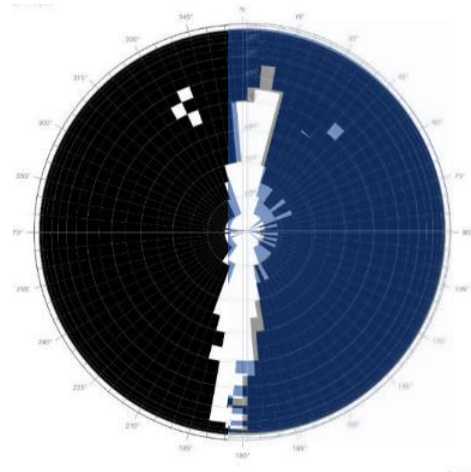
**Model 3: Architectural Detailed Design North site with PA South Site: 10.5% (Orange) above Model 1: Existing City (Black/Grey)**



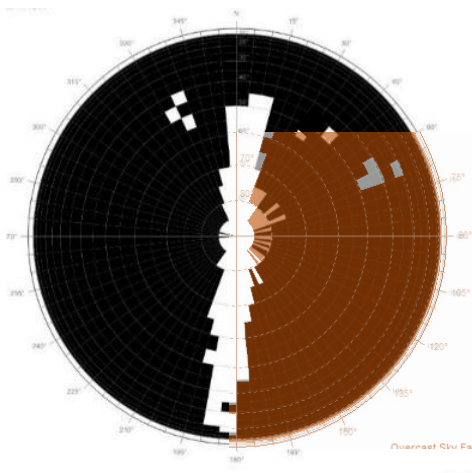
#### 4 Castlereagh Street



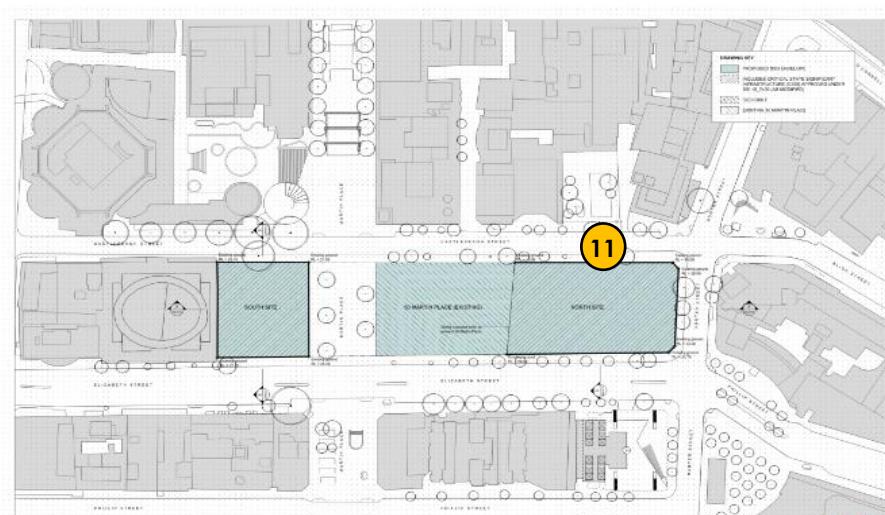
**Model 1: Existing Model Sky View Factor: 7.5%**



**Model 2: PA Sky View Factor: 4.5% (Blue) above Model 1: Existing City (Black/Grey)**

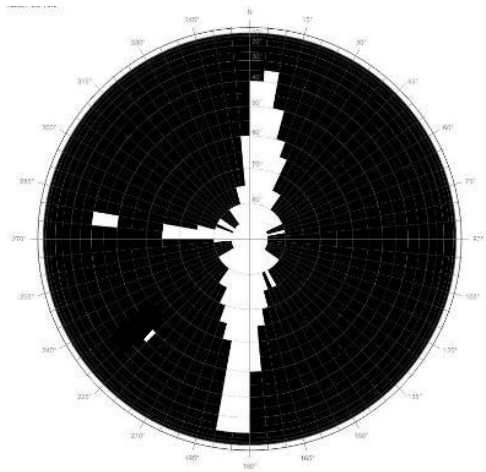


**Model 3: Architectural Detailed Design North site with PA South Site: 5.5% (Orange) above Model 1: Existing City (Black/Grey)**

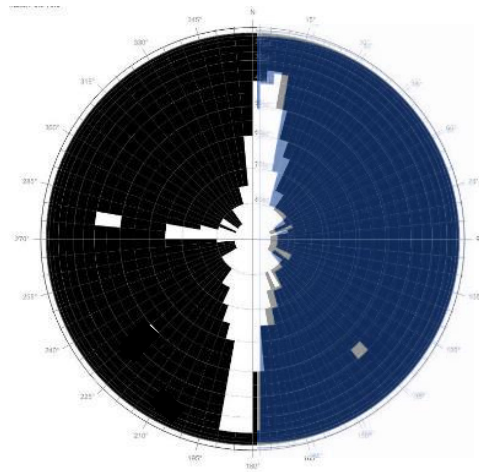




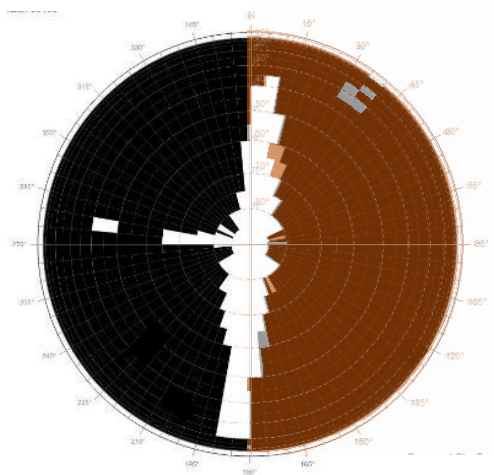
**9/17 Castlereagh Street**



**Model 1: Existing Model Sky View Factor: 8.5%**



**Model 2: PA Sky View Factor: 6.5% (Blue) above  
Model 1: Existing City (Black/Grey)**



**Model 3: Architectural Detailed Design North site with PA South Site: 6.5% (Orange) above Model 1: Existing City (Black/Grey)**



## Appendix B

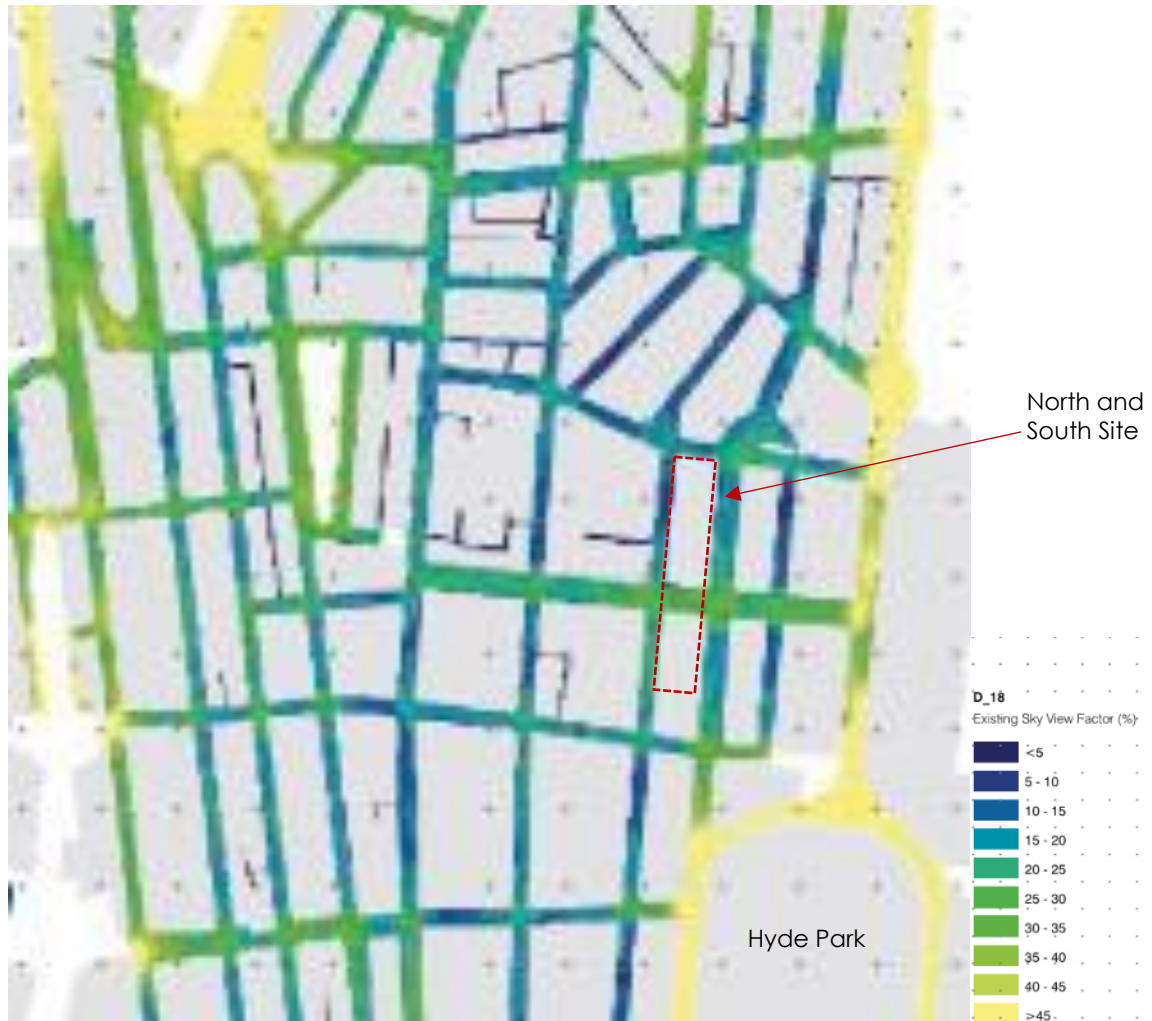
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### City of Sydney Report

### Extracts from the City of Sydney and Discussion

The City of Sydney Street Frontage Height and Setback Study investigates the existing street frontage height and setback controls applying to the city for both the existing condition of the city and the likely development outcomes. They used a 3D digital city model in GIS software to assess the Sky View Factor. They confirm that the sky view is affected by the proximity of built element to the location where the measurement is calculated and the overall composition of built elements.

This assessment has compared the Sky View Factors from the City of Sydney Street Frontage Height and Setback Study Sky View Factor, where they grouped the existing Sky View Factors in 5% ranges, as shown below.



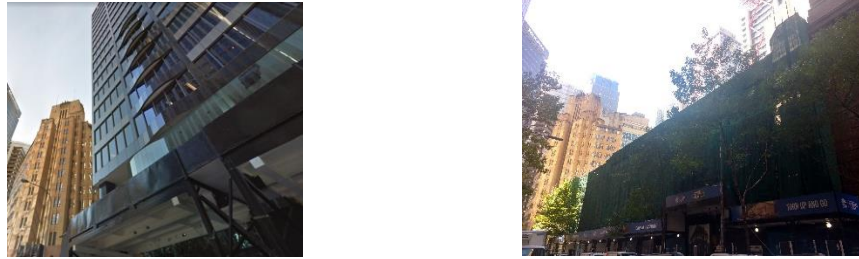
**Figure 1: City of Sydney Frontage Height and Setback Study Sky View Factor Results**

The Skyview factor in this study was classified into the same ranges described in the City of Sydney Street Frontage Height and Setback Study page 24 to 31:




















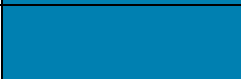








- <15% low Sky View Factor
- 15-25% typical Sky View Factor
- 25-35% higher Sky View Factor
- 35-45% highest Sky View Factor

The table below shows the SVF range the City of Sydney found in their assessment, compared with the SVF that was studied in this report for the existing model. The SVF ranges within a street approximately match the results of the existing 2014 city model. However, at 20 Elizabeth Street the SFV was assessed to notably reduced when compared to the CoS study. This may be due to the fact the existing model used in this report was a city modelled based on the 2014 city, whereas the Cos

Assessment model may have taken into account the deconstruction of the buildings where the new North site is proposed to be built.



**Figure 12: Image taken by Google on July 2017 vs image taken on May 2018**

Location		City of Sydney SVF	Surface Design SVF	Within COS Calculated Range
1	36 Martin Place	 15-25%		Y
2	Cnr of Martin Place and Castlereagh St	 20-30%		Y
3	37 Martin Place	 20-30%		Y
4	Cnr of Martin Place and Elizabeth St	 20-30%		Y
5	63 Martin Place	 15-25%		Y
6	Richard Johnson Square	 10-20%		Y
7	Chifley Square	 15-25%		Y
8	20 Elizabeth St	 10-20%		Y
9	7 Elizabeth St	 10-20%		Y
10	9/17 Castlereagh St	 10-20%		Y
11	4 Castlereagh St	 5-10%		Y
12	55 Hunter St	 5-15%		Y
13	30 Castlereagh St	 15-25%		Y
14	80-85 Elizabeth St	 15-20%		Y