Attachment A17

Skyview Factor Report

Sky View Factor Report

Stockland Piccadilly Complex

09/07/2025

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1 Introduction

This Sky View Factor (SVF) Report has been prepared by BIM Consulting on behalf of Stockland. This report provides analysis of the extent of sky visible above various points in proximity to the site as a proportion of the total possible sky hemisphere above the point. SVF is calculated as the proportion of sky visible when viewed from the ground up. SVF is provided as value that ranges from 0 to 1 (0 to 100%), where SVF of 0 (0%) denotes no sky visible and SVF of 1 (100%) denotes that the sky is completely visible to the horizon in all directions.

A total of 5500 test points were analysed within a 50-metre vicinity of the site boundary. The analysis finds the proposed amended planning envelope would increase the sky visibility compared to the base case envelope when averaged across all test points.

The base case envelope provides a SVF value of **10.991138**% and the proposed amended planning envelope 6F and 6G provides a SVF value of **11.448052**% and **11.418312**% respectively, resulting in an overall increase in sky visibility of SVF value of **+0.456914**% and **+0.427174**% respectively.

1.1 Purpose of assessment

The purpose of the SVF analysis is to demonstrate compliance with *Sydney Development Control Plan 2012* regarding variation to side and rear setbacks, and to varying tapering provisions. This analysis has been prepared in accordance with specific reference to *'Procedure B'* noted in *Section 12.2* of *Schedule 12* of the *DCP*. To avoid repetition, these shall be referred to as 'the related requirements' throughout the report.

This SVF Analysis report accompanies a planning proposal seeking to amend the Sydney Local Environmental Plan 2012 (the LEP) relevant to the land known as 'Stockland Piccadilly Complex' located at 133-145 Castlereagh Street, Sydney (the site) and legally described as Lot 10 in DP828419.

The planning proposal seeks to prescribe site specific LEP provisions, including amending the floor space ratio development standard, as well as concurrently preparing a site-specific Development Control Plan (DCP) to guide the future development. The DCP will establish building envelopes for the site, as well as other key assessment criteria including the establishment of a through-site link and parking and vehicular access.

The intended outcome of the proposed amendments to the LEP and DCP is to facilitate the redevelopment of the site for either an all-commercial development or a mixed-use development, together with an activated ground plane, basement car parking and associated facilities. The proposal will retain the structure of much of the existing commercial tower as well as the basement structure. The proposal facilitates additional commercial floor space capacity in Central Sydney while also delivering improved public domain outcomes. Such outcomes will include a rectified Solar Access Plane breach to Hyde Park, a northerly aligned direct through-site link between Pitt and Castlereagh Street and enhanced pedestrian amenity and activation at the ground plane.

1.2 The site

This report relates to the site at Piccadilly in the Sydney CBD. The site is bordered by Pitt Street and Castlereagh Street, with Market Street one block further north. Proposed developments to the north have been considered in the preparation of the site modelling and context for obstruction.

Two skybridges crossing Pitt Street and Castlereagh Street are proposed for removal to the north of the site.

Since previous testing was undertaken, two new envelopes have been provided by the architect for comparative against the DCP envelope used in the previous round of analysis.

Figure 1.2a Subject site, Piccadilly.

2 Planning Context

This section outlines the planning context that has informed the methodology used to undertake this SVF analysis.

2.1 Planning context

(ii) Sky View Factor (SVF) is the extent of sky observed above a point as a proportion of the total possible sky hemisphere above the point.

SVF is calculated as the proportion of sky visible when viewed from the ground (as an abstract horizontal surface) up. SVF is a dimensionless value that ranges from 0 to 1. A SVF of 1 denotes that the sky is completely visible to the horizon in all directions; for example, in a flat terrain. When a location has topography or buildings blocking view to any part of the sky, it will cause the SVF to decrease proportionally.

Because SVF measures the whole sky hemisphere and only a small fraction of the sky will be subject to change as part of a development the SVF must be resolved at a high resolution to detect the change. This is an inherent feature of the SVF measure. This means that the sky must be subdivided into more than 5000 equal areas for final SVF calculations but also that the difference in SVF may appear small particularly when averaged over a large area.

Figure 12.1.10
Sky View Factor means the extent of sky observed above a point as a proportion of the total possible sky hemisphere above the point

(5) Equivalence reporting

All data that is relied on for equivalence testing must form part of the report including individual data points as tables and model geometries for the base case and alternative building envelopes. These must be described with sufficient dimensions to allow for the equivalent model to be created by a third party for checking.

(a) For wind: the 5% exceedance comfort wind speed values in metres per second must be averaged and compared. The comfort categories are not relevant in demonstrating equivalence.

Note that the proposed alternative building envelopes must both demonstrate equivalence and also not cause wind speeds that exceed comfort or safety standards or cause worsening of existing exceedances.

Note: if the equivalence testing shows new or worsened exceedances of the comfort or safety standards, additional wind tunnel testing will be required to show how these exceedances can be mitigated. This testing may include modelling of awnings consistent with DCP requirements.

(b) For daylight (or SVF): the factors are averaged and the single resultant values compared.

In this document “equivalent” wind speed and daylight/SVF is to be understood as very slightly “better than” at a high level of accuracy. For example a SVF of 0.10001 is equivalent to a SVF of 0.10000 by being very slightly better than it.

Authors of equivalence reports must note that while daylight and wind equivalence is essential, any proposal must still be supported by a detailed urban design and options analysis to demonstrate that a high quality urban design outcome will be achieved, and the proposed massing is compatible with the context.

Figure 2.1a Related requirements as noted in Schedule 12, Sydney Development Control Plan 2012.

2.2 Building Envelope

The *Attachment D6 - Development Control Plan - Central Sydney* provides built form controls relating to: Minimum Street Setbacks (5.1.1.1); Side and Rear Setbacks and Building Form Separations (5.1.1.3); and Built form massing, tapering and maximum dimensions (5.1.1.4).

The base case envelope has been developed and agreed to prior and includes a portion of the existing building on site which penetrates the solar access plane over the site related to Hyde Park. There are two connecting skybridges above street level to the east and west of the site. The proposed envelope includes the removal of the sky bridges, whilst squaring the chamfered envelope form at corners and adjusting the general boundary/podium frontage heights.

Refer to the base case envelope in **Figure 2/3**, and the proposed amended planning envelope in **Figure 4**.

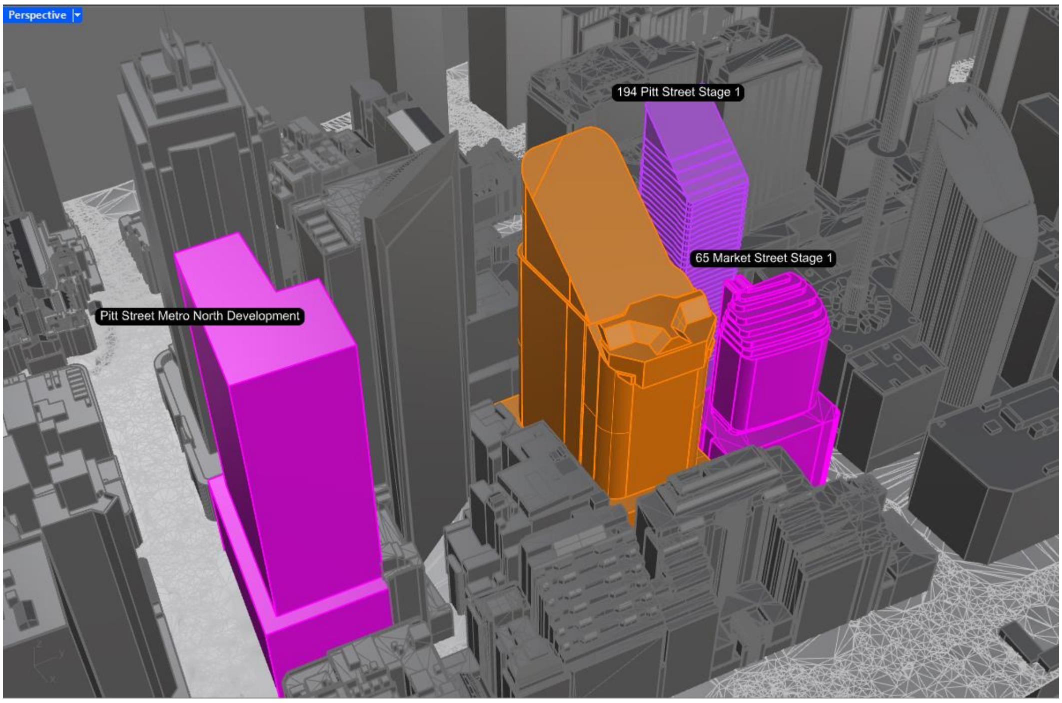

Figure 2.2a Base case envelope

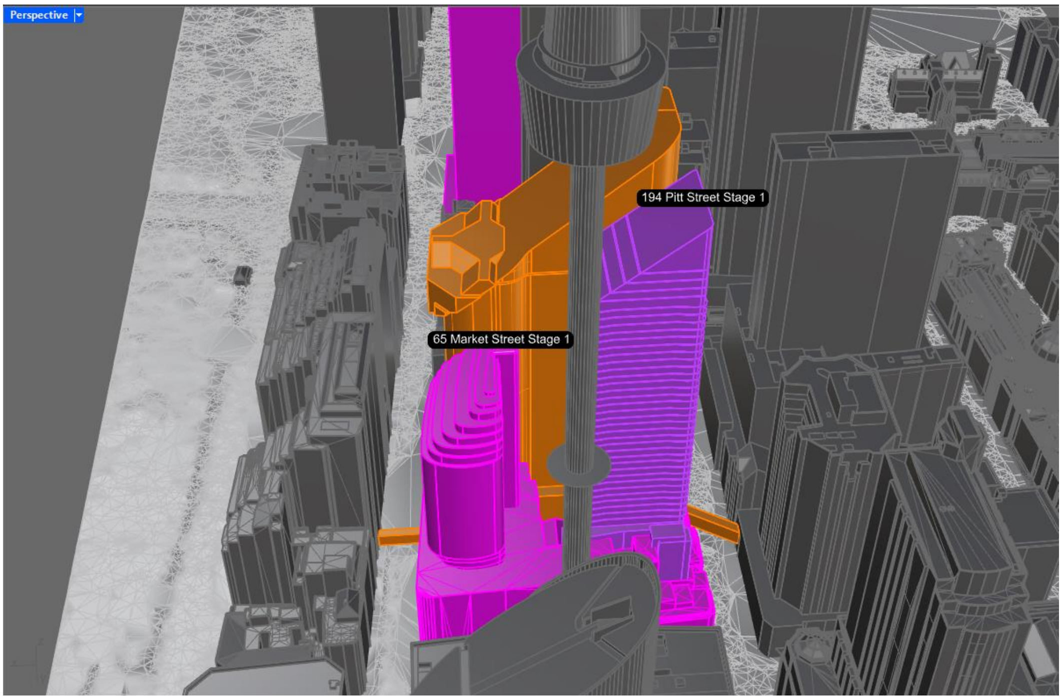

Figure 2.2b Western (left image) and Eastern (right image) skybridges, proposed for removal.

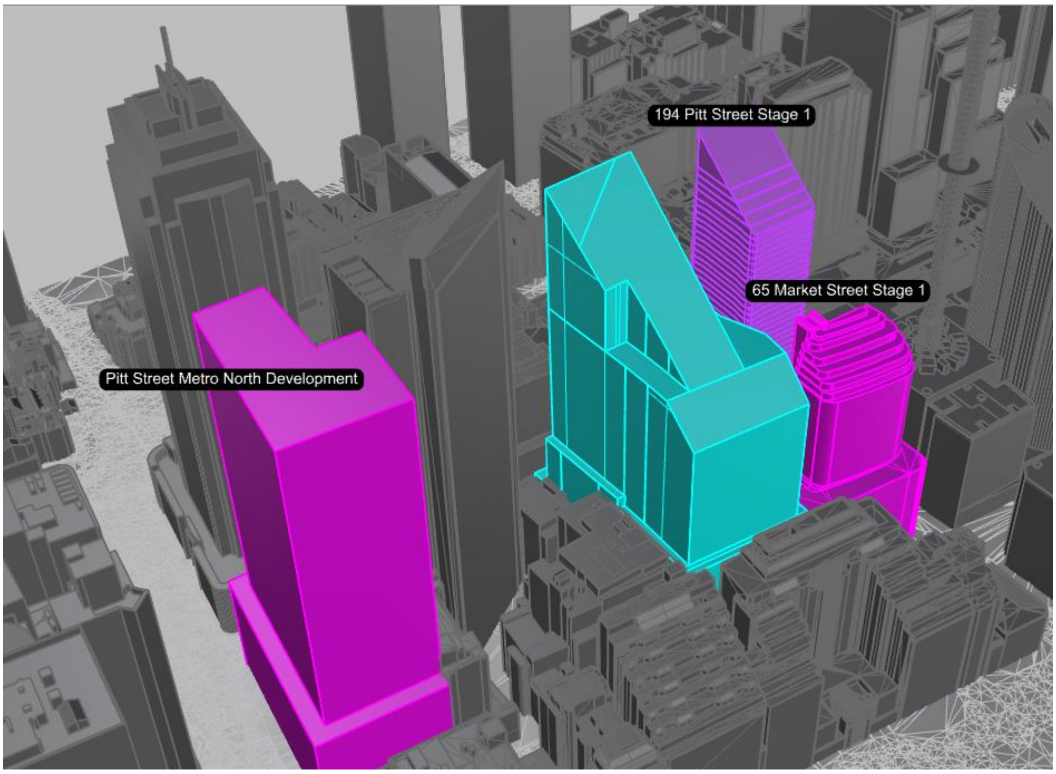

Figure 2.2c Proposed amended planning envelope 6F.

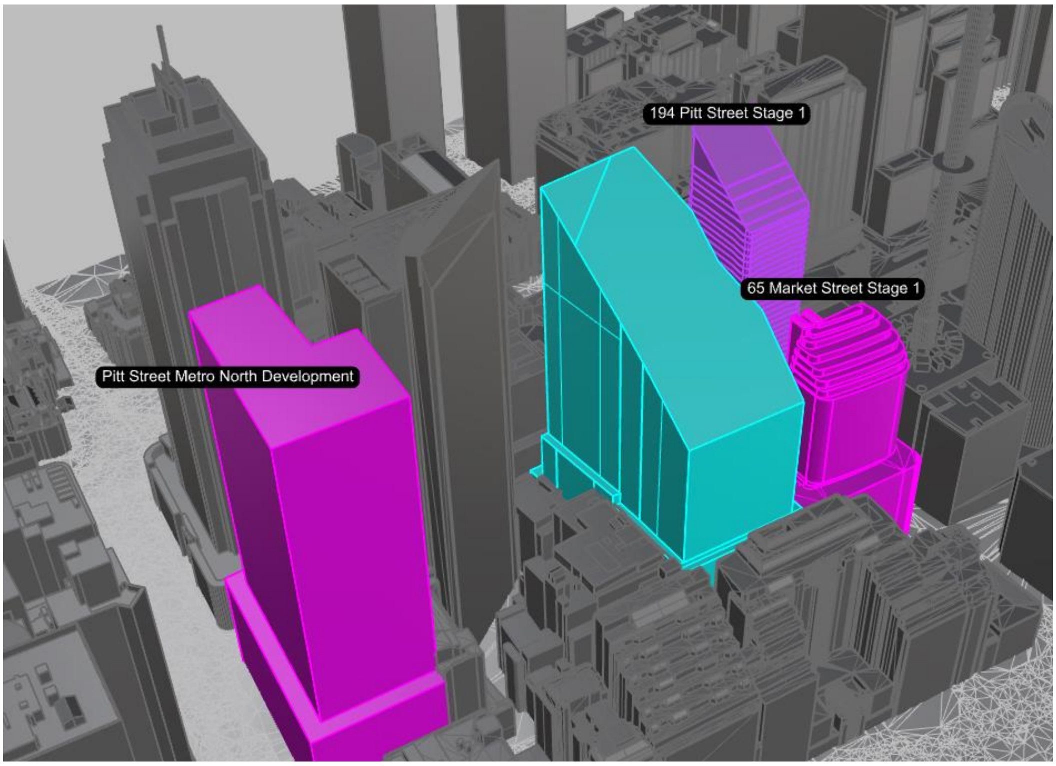

Figure 2.2d Proposed amended planning envelope 6G.

3 Methodology

This section outlines the methodology applied to undertake this SVF analysis.

3.1 Testing Methodology

SVF analysis was undertaken using a proprietary script developed by BIM Consulting inhouse for Grasshopper' which adds-in to Rhinoceros 3D, available from Robert McNeel and Associates. The script divides a hemisphere above each sample point provided into sampled sky patches, then obstructions to each patch from that point are measured and ratioed against total possible patches, yielding the percentage of sky visible (SVF). These results can be converted to a graphical shading mask at one point, or a heatmap across the testable area.

Figures 4 & 5 below indicate the methodology used to prepare this report.

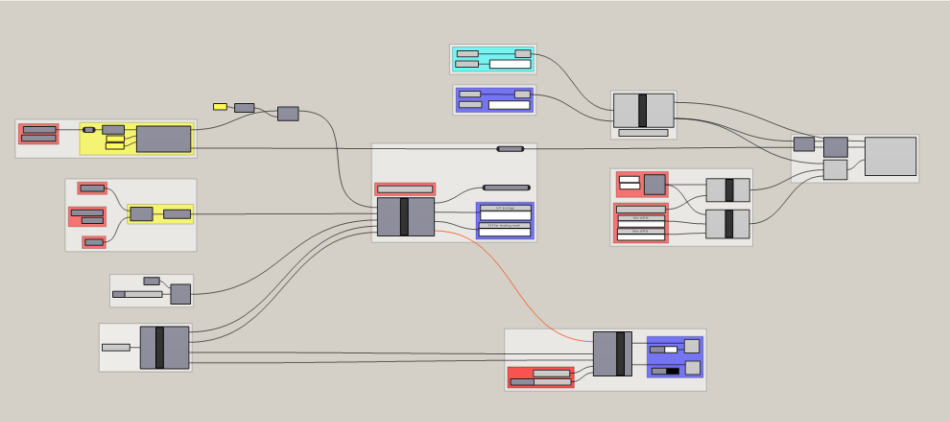

Figure 3.1a Parametric script.

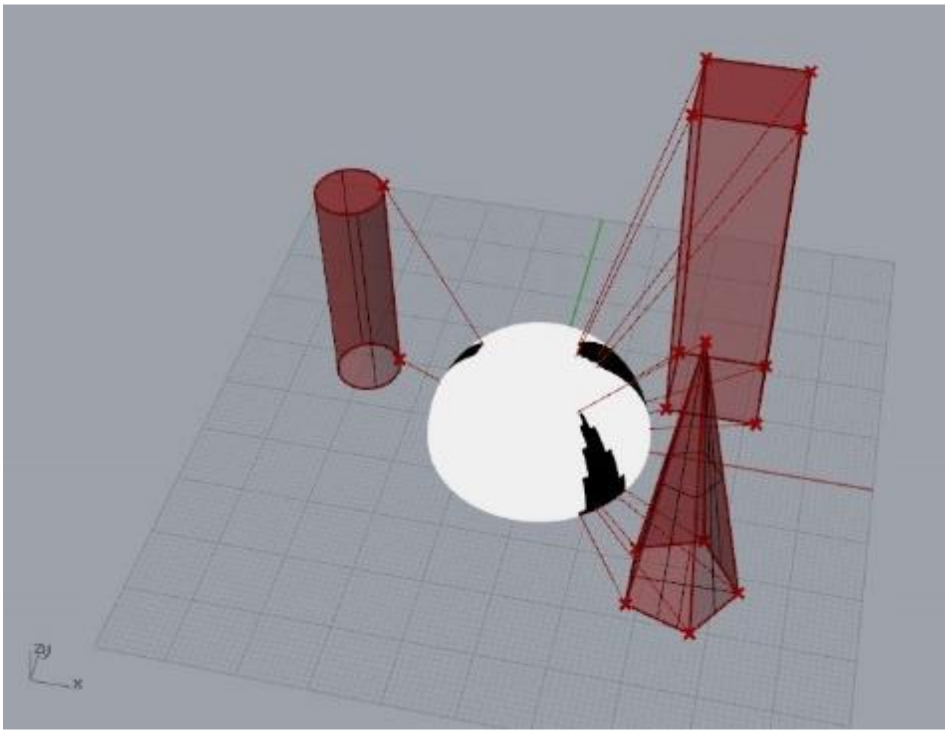

Figure 3.1b Diagram showing the computational methodology applied.

3.2 Context model

The proposed model envelope and compliant model envelope were created using Rhinoceros 3D.

City of Sydney context models were brought into Rhinoceros 3D from a LiDAR scan, then future envelopes were modelled and introduced based on DA material provided as reference. The envelope for the North-Eastern development was updated to suit changes to the related envelope since testing was last undertaken on the site.

Figure 3.2a Sydney context model with site envelope zone in red, North-Eastern development in Green and North-Western development in Blue.

A comparative analysis was run with test zone extending 50 meters from the site. Grid spacing of the test zone, and sky density criteria are not specified in the related requirements.

Grid spacing of every test point was set to 1 meter. Computational time is greatly increased with smaller grid sizes with negligible improvement in the margin of error. Sky density (the resolution of the imagery generated by the analysis) was set to approximately 5500 hemispherical patches (vectors) per test point. Our nominated grid spacing, and sky density testing criteria ensures highly accurate results and is therefore considered adequate to satisfy the related requirements.

Figure 3.2b Extent of analysis undertaken in plan (North facing up the page).

4 Sky View Factor Analysis

This section provides a description of the results of this SVF analysis.

4.1 Results

The analysis finds the proposed schemes would increase sky visibility compared to the complying scheme when averaged across all test points for envelopes 6F and 6G. The breakdown of compliance in the scheme is described in the below table. Examples of these results are graphically demonstrated in the images below.

Proposed Case	SVF %	Tested against	SVF % before	Difference %
Base case envelope (sky bridges included)	**10.991138%**	N/A	N/A	N/A
Proposed amended envelope 6F	**11.448052%**	Base case envelope (sky bridges included)	**10.991138%**	**+ 0.456914%**
Proposed amended envelope 6G	**11.418312%**	Base case envelope (sky bridges included)	**10.991138%**	**+ 0.427174%**

4.2 Heatmap visualisations

The results summarized previously can also be viewed as a heatmap to better understand the zones of most impact and change between base case and proposed envelopes for the tested areas. Note that in all diagrams, the sky bridge has been hidden for clarity whenever it would be visible otherwise above the street level.

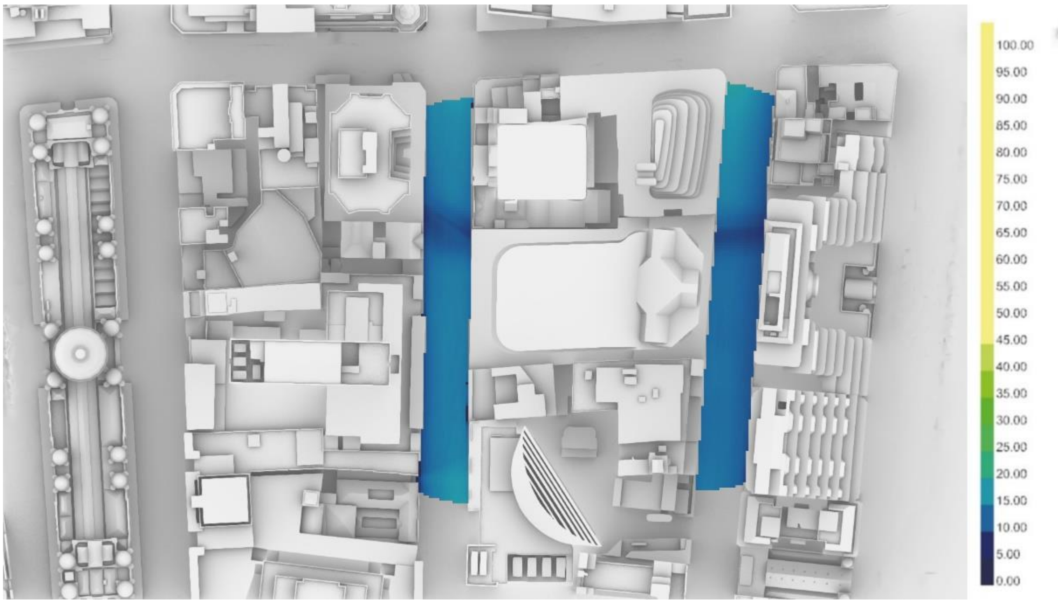

Figure 4.2a Sky View Factor for base case envelope.

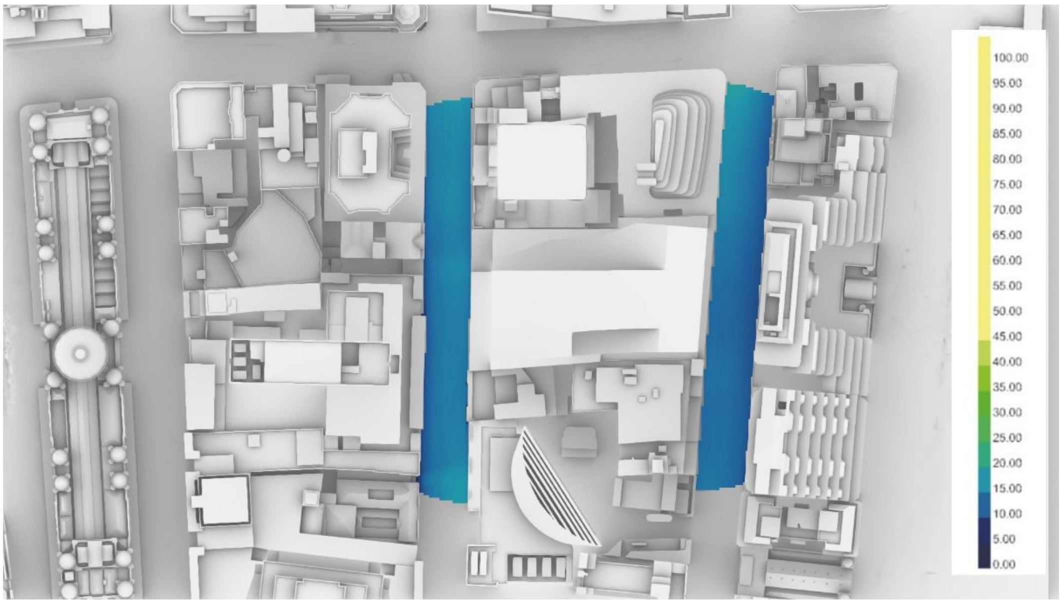

Figure 4.2b Sky View Factor for proposed envelope 6F.

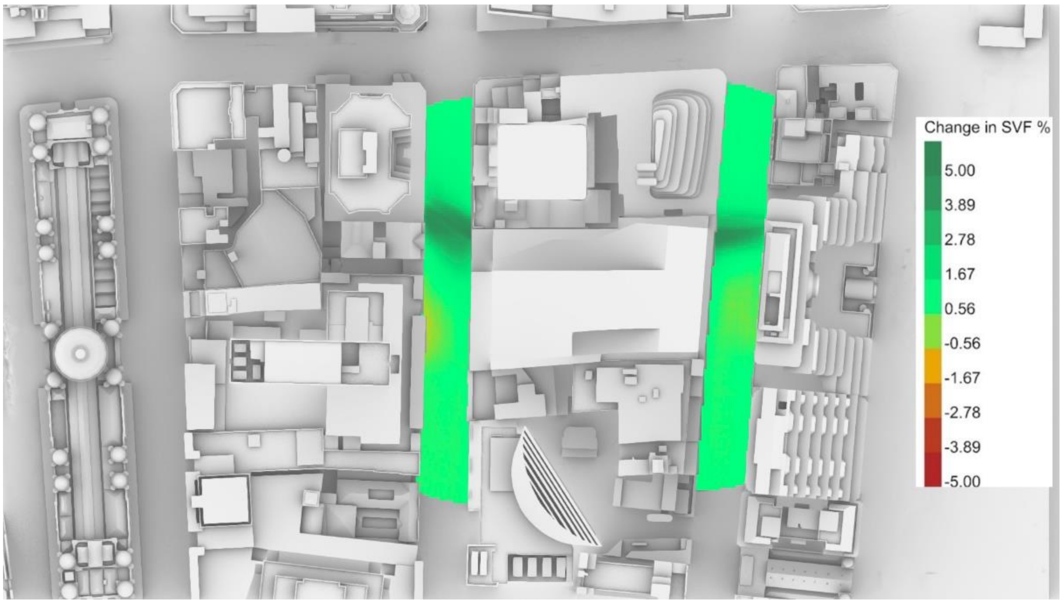

Figure 4.2c Sky View Factor for proposed envelope 6F compared against base case (with skybridges).

The heatmap indicates whilst there is significant improvement in SVF under the sky bridges post-removal, there is some reduction in SVF either side of the site. Overall, the removal of the sky bridges is enough to compensate for the average SVF measured in the tested area.

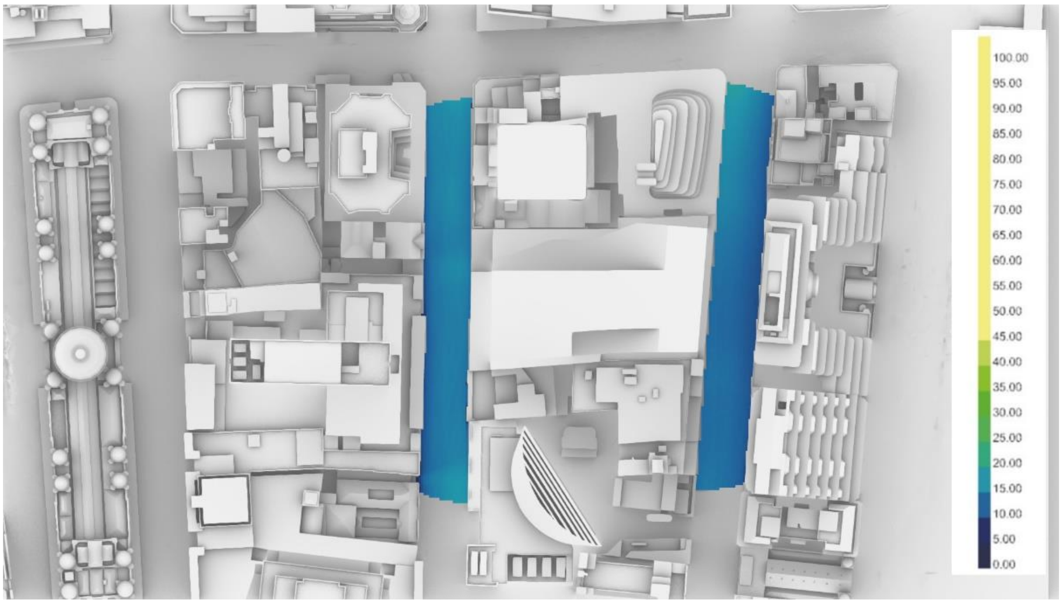

Figure 4.2c Sky View Factor for proposed envelope 6G.

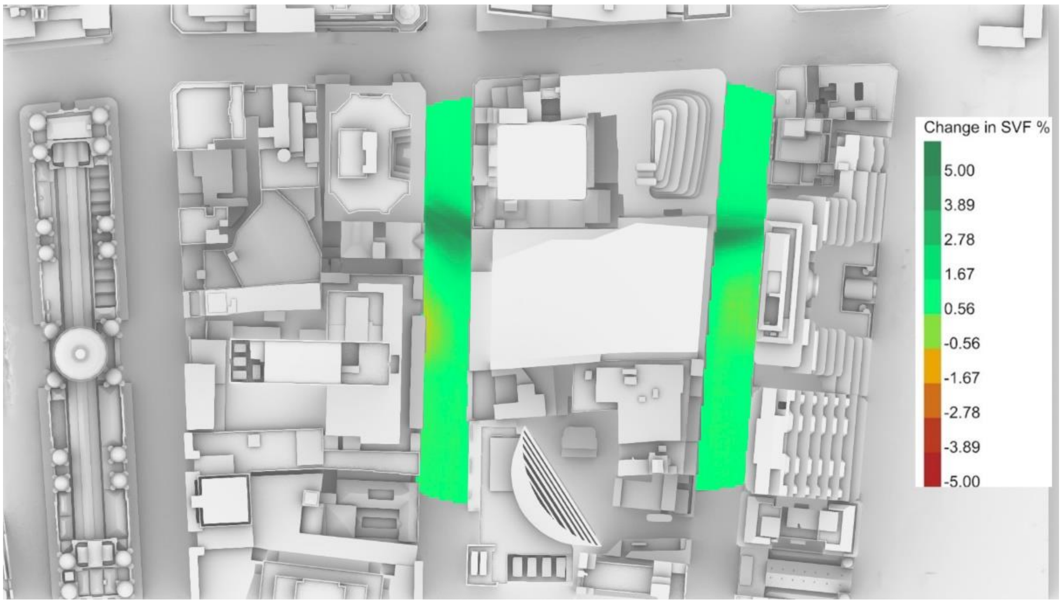

Figure 4.2d Sky View Factor for proposed envelope 6G compared against base case (with skybridges).

The heatmap indicates similar results to 6F, with a marginally better SVF in 6G that is generally not visually perceptible visually on the heatmaps (but to some degree noticeable in the shading masks in the next section).

4.3 Shading masks

Single point studies have been undertaken from the perspective of a viewer looking towards the sky (using what is referred to as a shading mask). As can be seen the skybridges generally have a significant impact versus the building on the potential SVF.

The skybridge has been highlighted in blue, whilst the areas of impact introduced by the proposed envelope have been highlighted in red. Areas where the proposed envelope returns SVF to the viewpoint are shown in green.

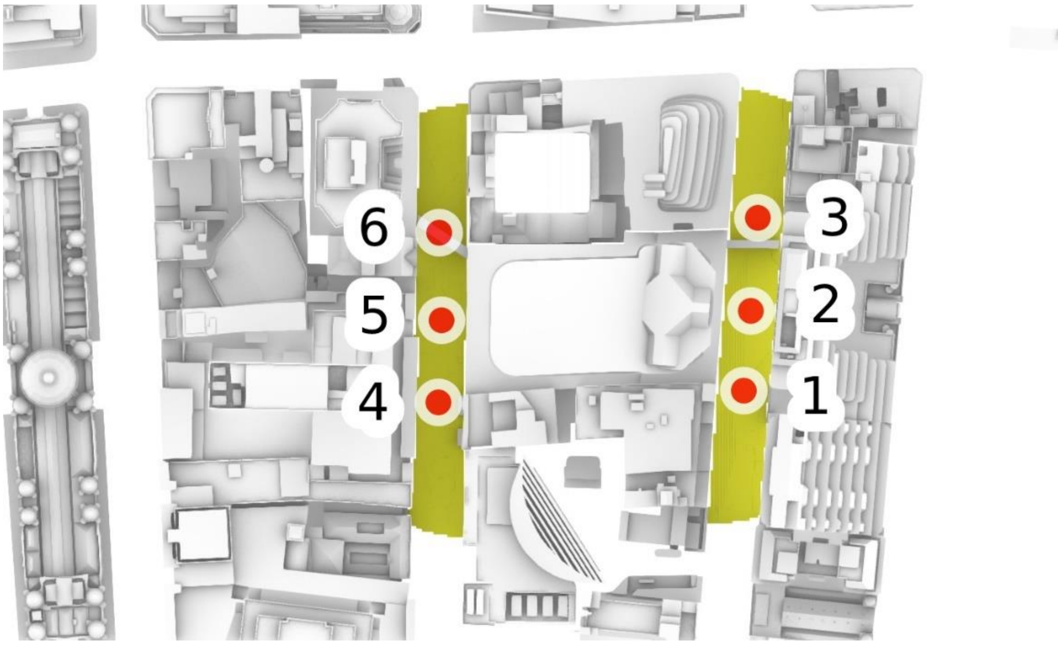

Figure 4.3a Shading mask locations.

Figure 4.3.1a   Shading mask at location 1, compared to 6F.

Figure 4.3.1b   Shading mask at location 1, compared to 6G.

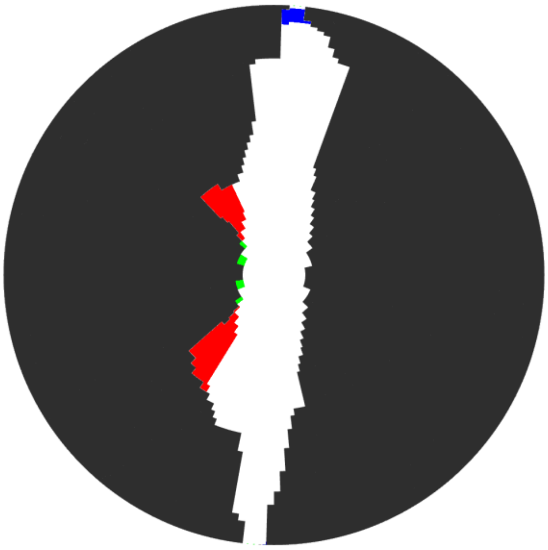

Figure 4.3.2a Shading mask at location 2, compared to 6F.

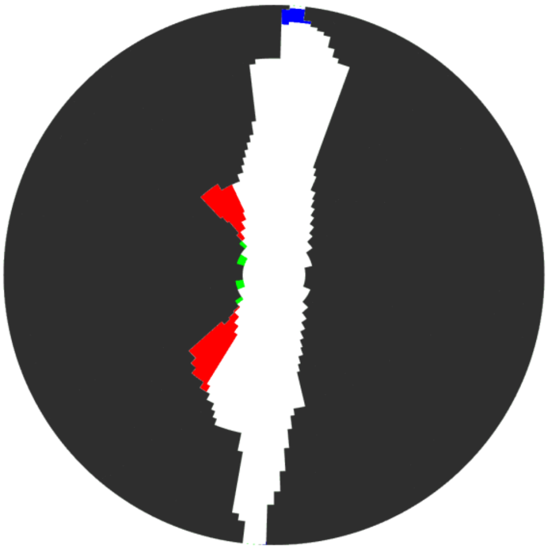

Figure 4.3.2b Shading mask at location 2, compared to 6G.

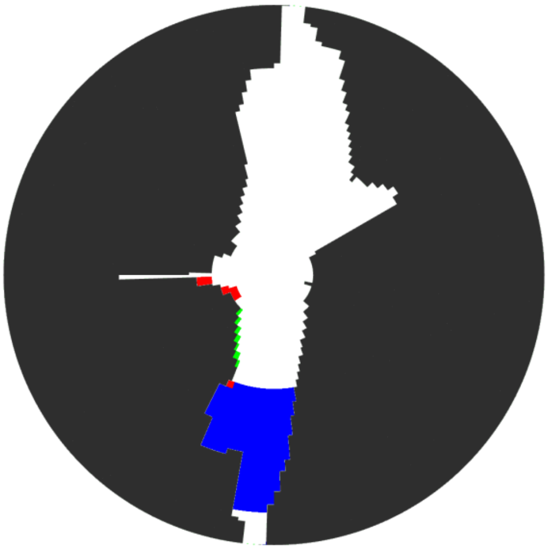

Figure 4.3.3a Shading mask at location 3, compared to 6F.

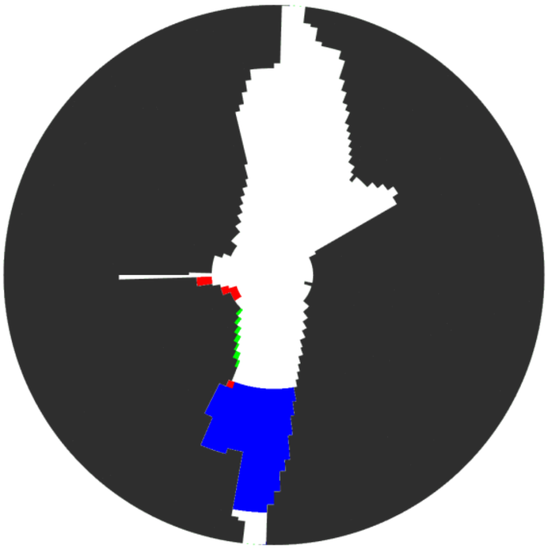

Figure 4.3.3b Shading mask at location 3, compared to 6G.

Figure 4.3.4a Shading mask at location 4, compared to 6F.

Figure 4.3.4b Shading mask at location 4, compared to 6G.

Figure 4.3.5a Shading mask at location 5, compared to 6F.

Figure 4.3.5b Shading mask at location 5, compared to 6G.

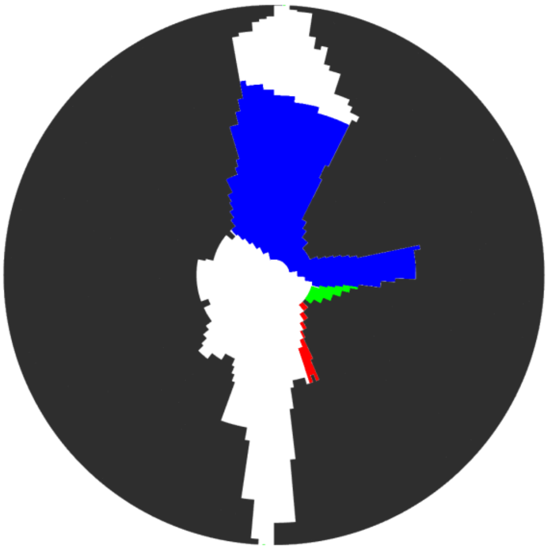

Figure 4.3.6a Shading mask at location 6, compared to 6F.

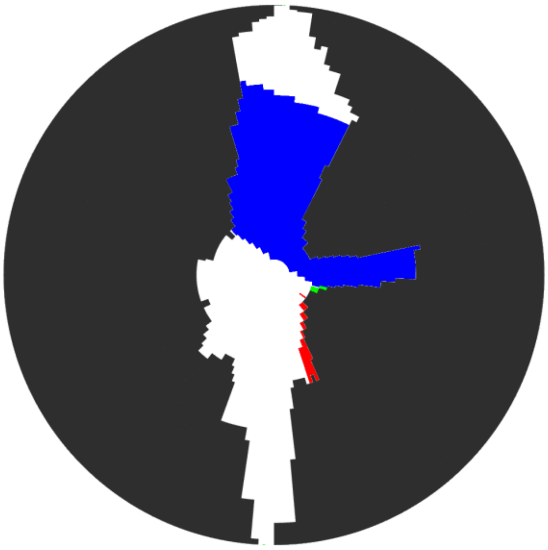

Figure 4.3.6b Shading mask at location 6, compared to 6G.

Whilst the shading masks are typically similar between envelopes 6F and 6G, some improvement in envelope 6F is visible at location 6 that is not offered by 6G, indicating that the closest corner of the envelopes is likely where the marginal difference between the two is most impactful.

5 Conclusion

The SVF analysis demonstrates improvement for average SVF of both proposed envelopes based on testing criteria provided in the related requirements. Envelope 6F performs slightly more favourably than envelope 6G.

It must be noted that the measured SVF improvement is closely related to the removal of the east and west skybridges, so envelopes of a similar shape would likely yield similar results if the bridges were proposed to be removed also. Without the skybridge removal the schemes would reduce the average SVF, so this aspect of the proposal is imperative to ensure a positive change in SVF.

Please contact the undersigned with any queries relating to this report.

Steve Fox