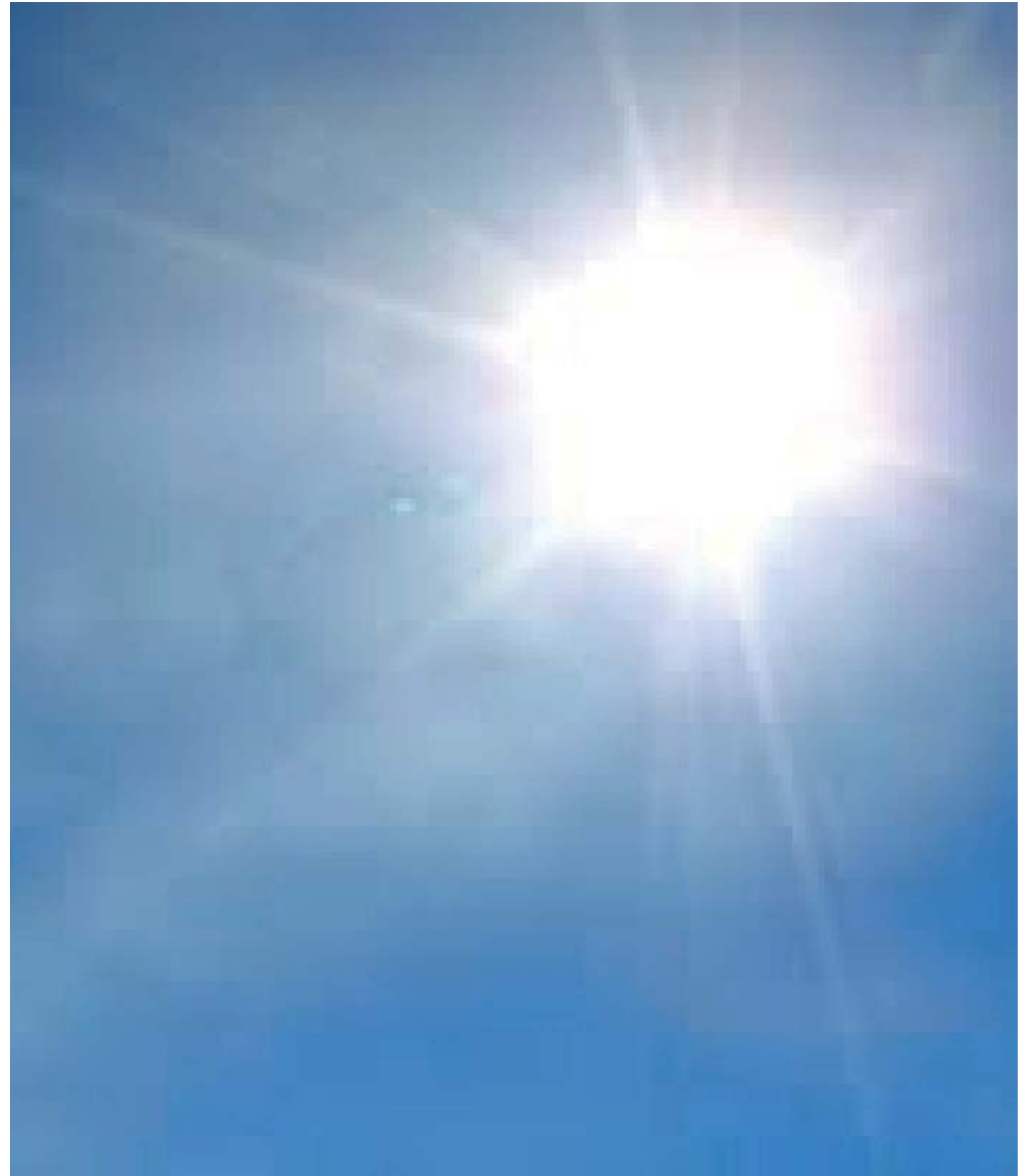


One of the main objectives of the revised proposal for Block 4N is to ensure that the revised scheme does not adversely affect the surrounding buildings and open spaces by further reducing solar access in comparison with the Concept Plan.

A number of solar and shadow studies have been undertaken to test the degree of overshadowing caused by Block 4N on the adjacent public realm and of Block 4N by the surrounding buildings.

The process of testing this impact of the revised design for Block 4N is explained in the following pages of this chapter and the findings explained and analysed.





Shadow studies have been undertaken of the site during 21 December, 22nd March, the Autumn Equinox, 21 June and 21 September at hourly intervals between 07.00h to 17.00h, when the sun's position can cause overshadowing of the common areas of the park. The diagrams on the following pages illustrate the results.

- Shadow line of Concept Plan MOD9
- Additional SUNLIGHT to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application
- Additional SHADOW to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application

21 December Shadow Studies



21 December, 07.00



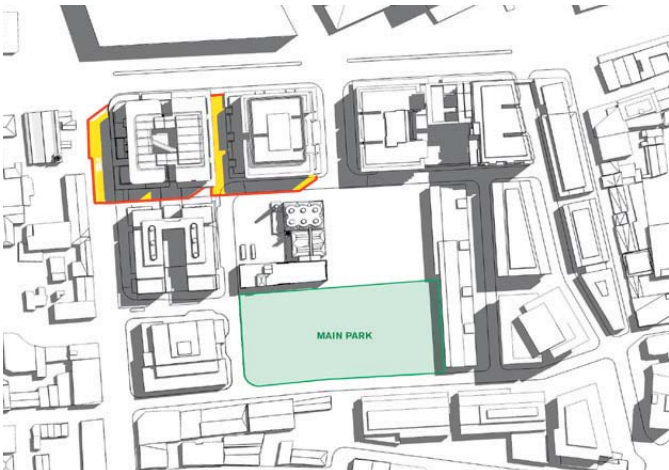
21 December, 08.00



21 December, 09.00



21 December, 10.00



21 December, 11.00



21 December, 12.00



21 December, 13.00



21 December, 14.00



21 December, 15.00



21 December, 16.00



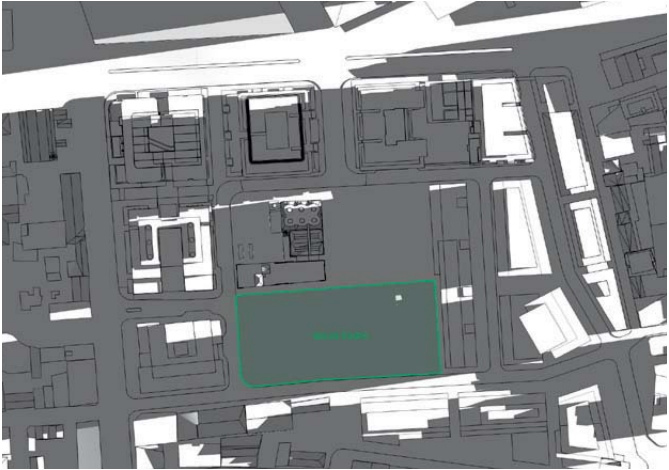
21 December, 17.00



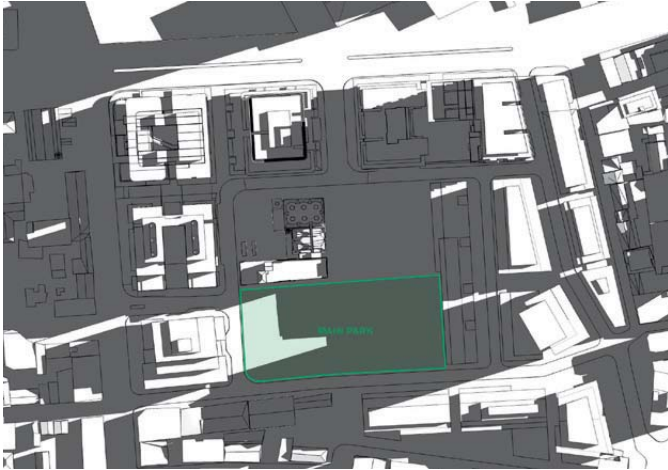


22 March Shadow Studies

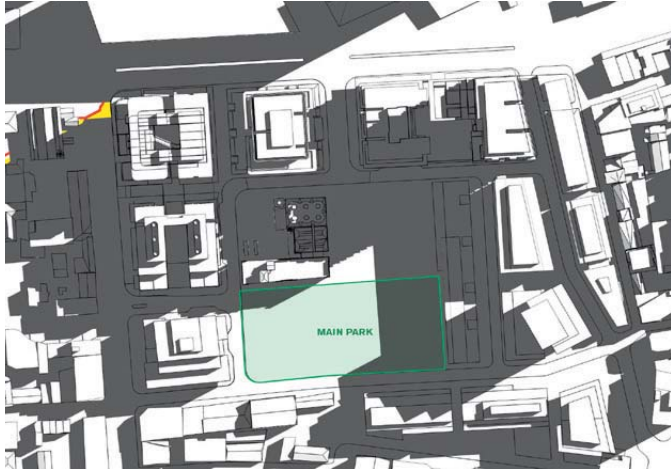
- Shadow line of Concept Plan MOD9
- Additional SUNLIGHT to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application
- Additional SHADOW to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application



22 March, 07.00



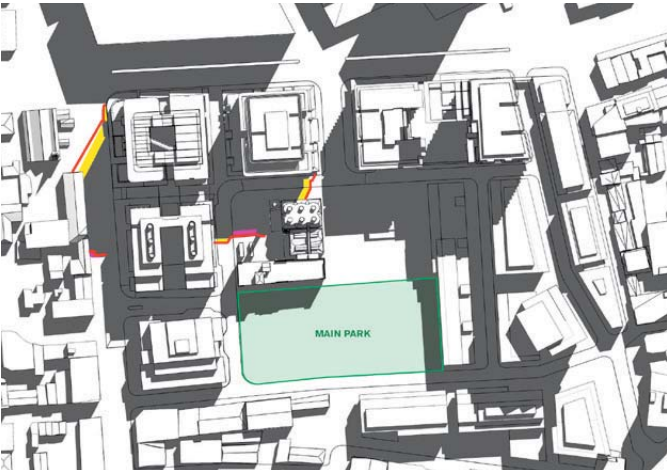
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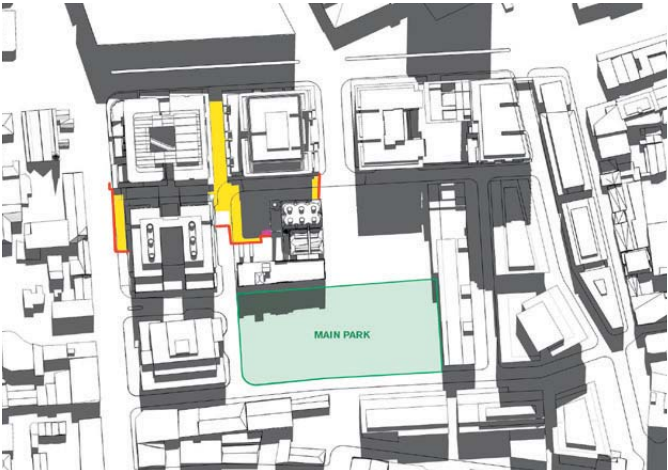
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22 March, 10.00



22 March, 11.00



22 March, 12.00



22 March, 13.00



22 March, 14.00



22 March, 15.00



22 March, 16.00



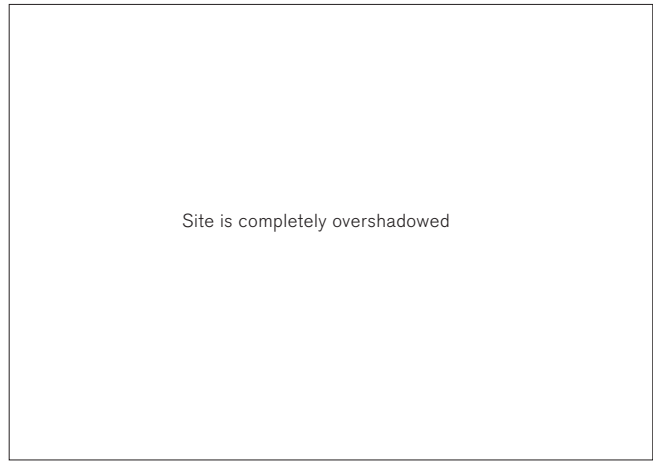
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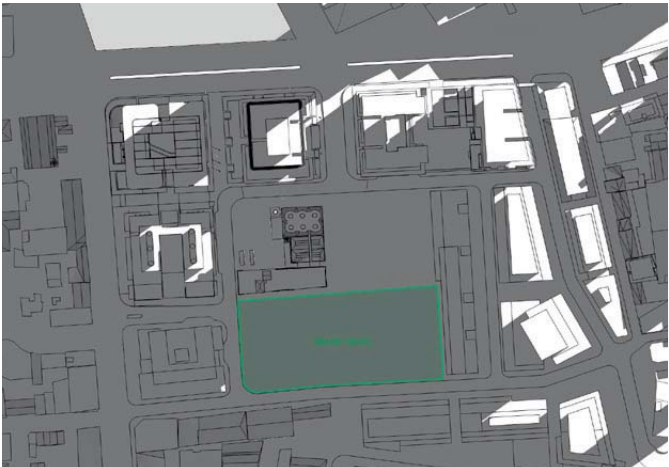


21 June Shadow Studies

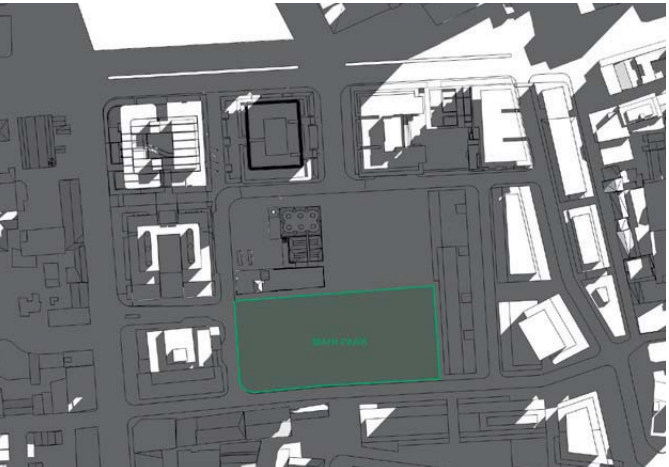
- Shadow line of Concept Plan MOD9
- Additional SUNLIGHT to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application
- Additional SHADOW to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application



21 June, 07.00



21 June, 08.00



21 June, 09.00



21 June, 10.00



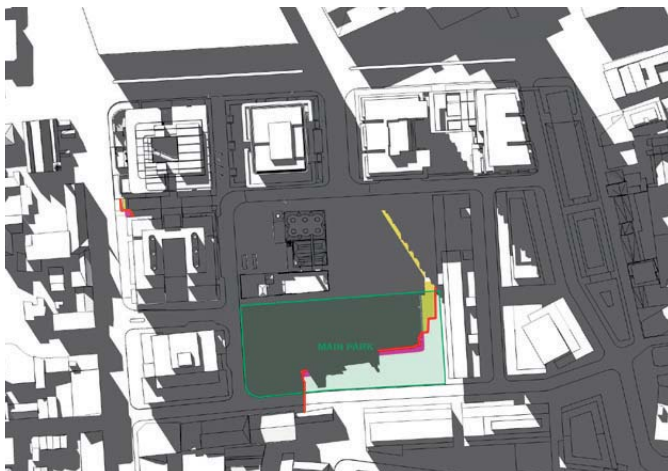
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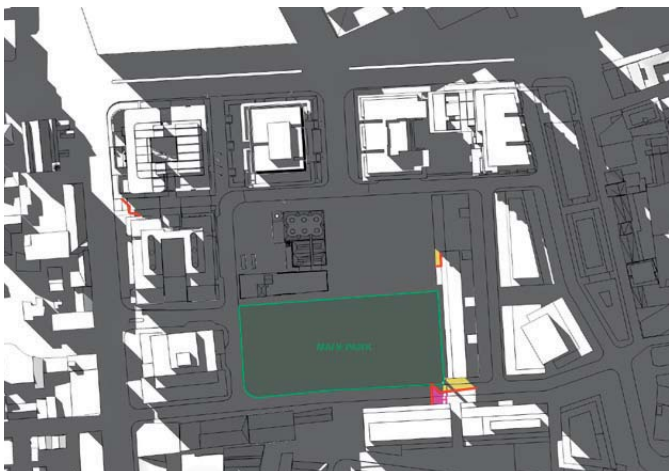
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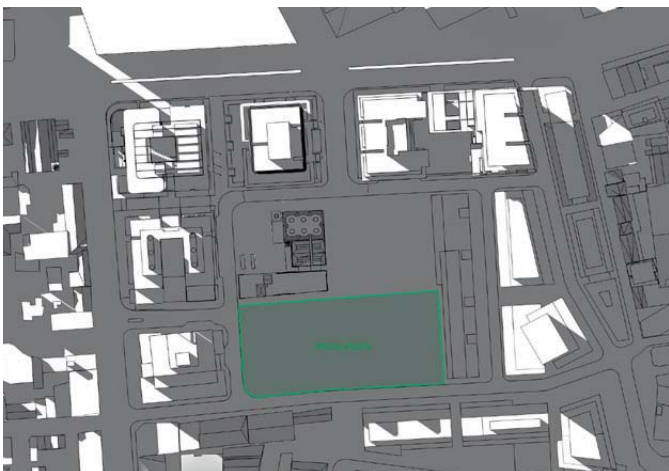
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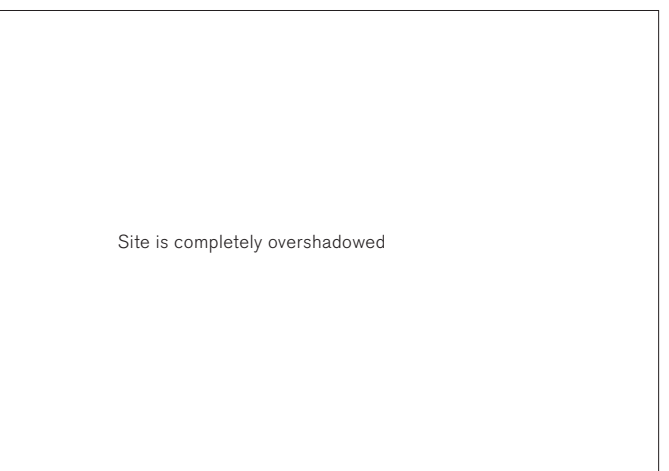
21 June, 14.00



21 June 15.00



21 June, 16.00



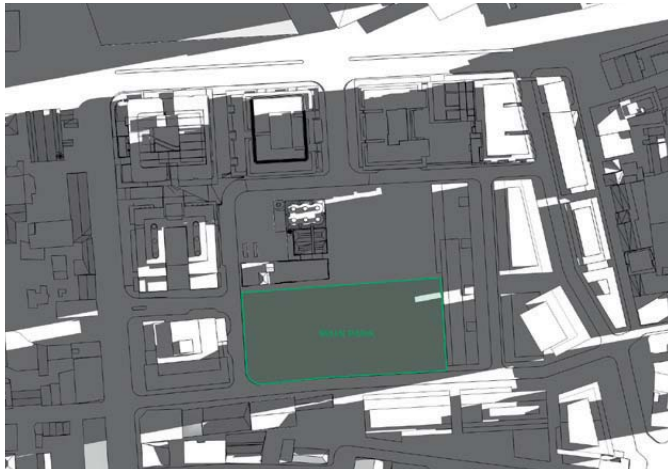
21 June, 17.00





21 September Shadow Studies

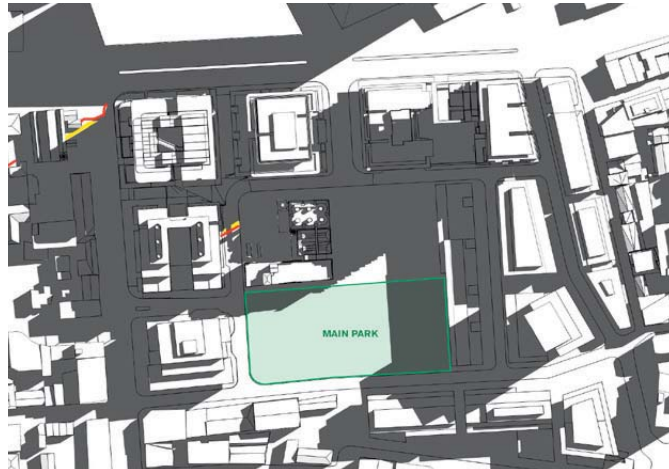
- Shadow line of Concept Plan MOD9
- Additional SUNLIGHT to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application
- Additional SHADOW to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application



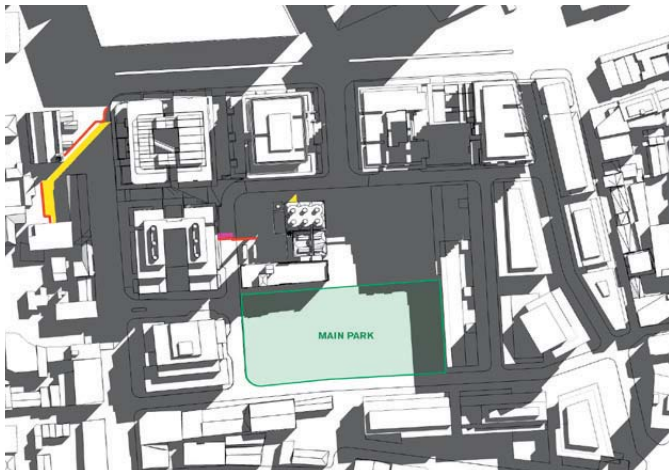
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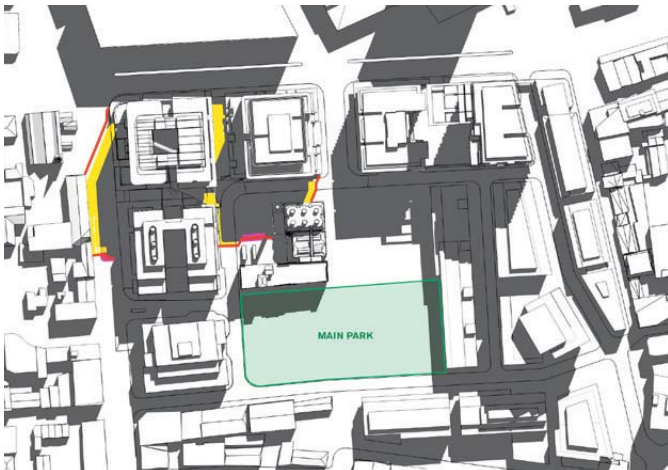
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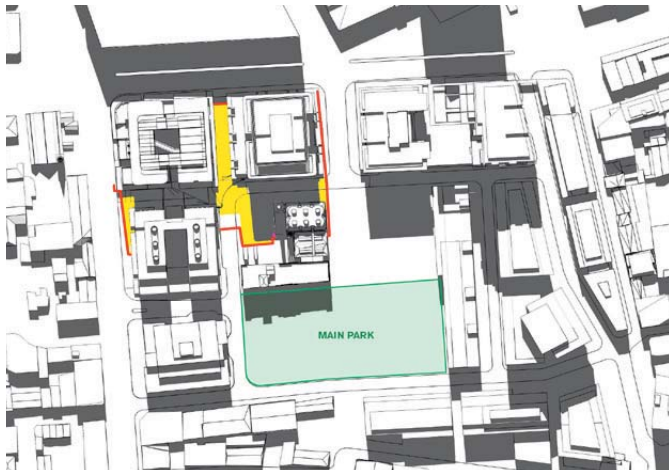
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21 September, 10.00



21 September, 11.00



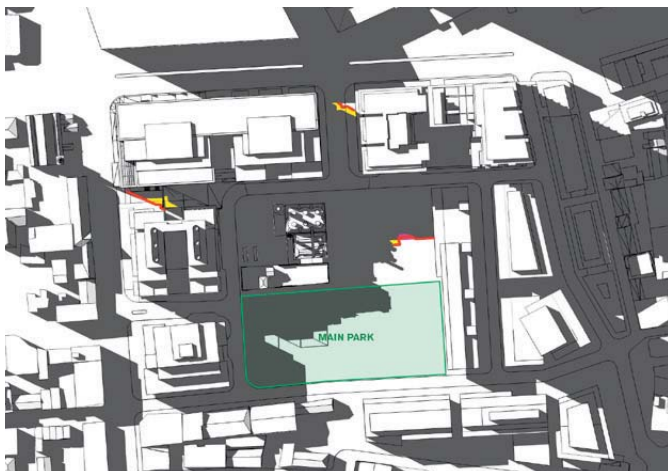
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21 September, 13.00



21 September, 14.00



21 September, 15.00



21 September, 16.00



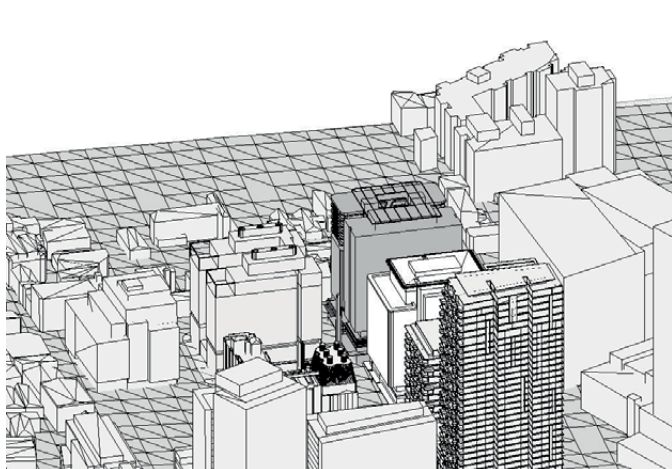
21 September, 17.00



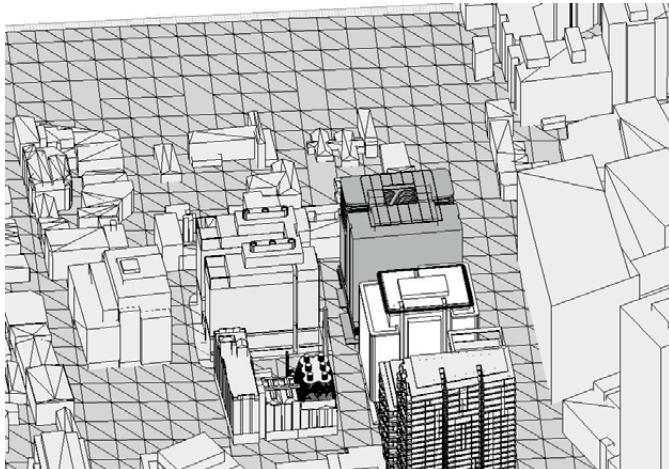
Sun Studies have been undertaken for 21 December, 22 March, 21 June and 21 September to show which parts of the facade and areas on the ground are exposed to direct sunlight from the hours of 07.00h to 17.00h.

This study also shows how neighbouring tall buildings affect the solar access to Block 1.

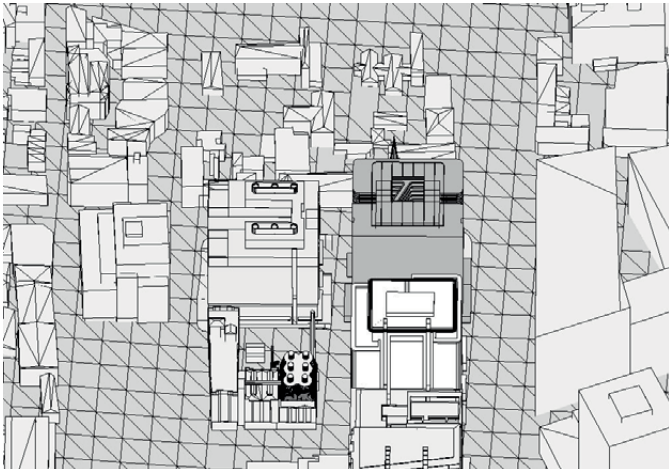
21 December Sun Studies



21 December, 07.00



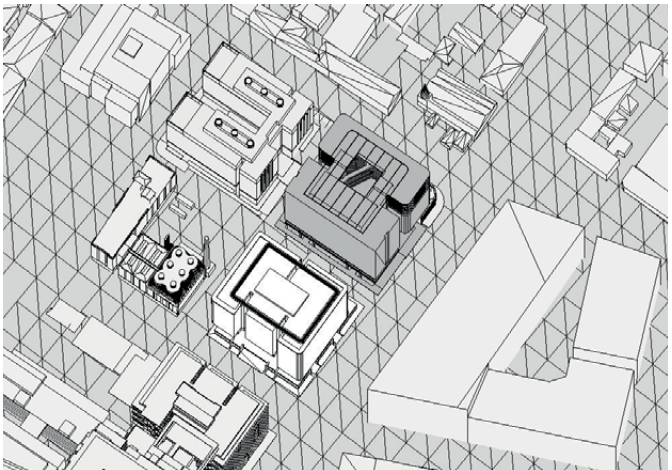
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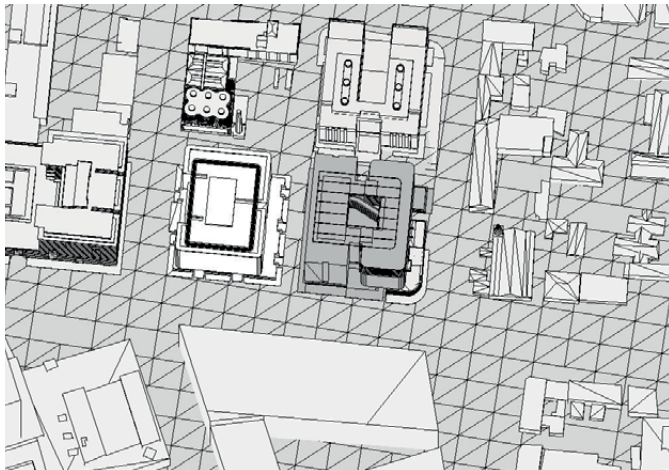
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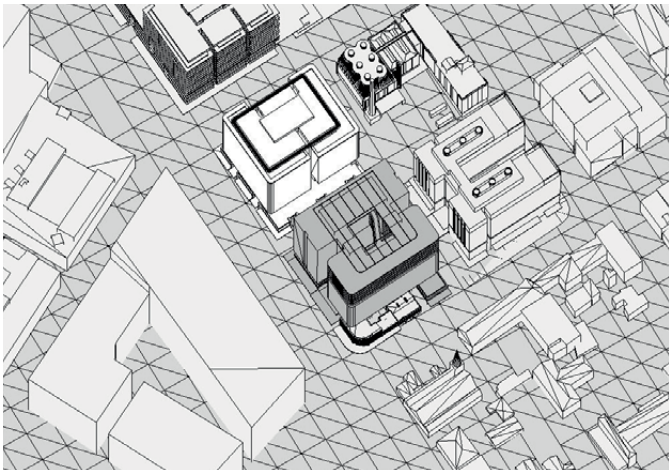
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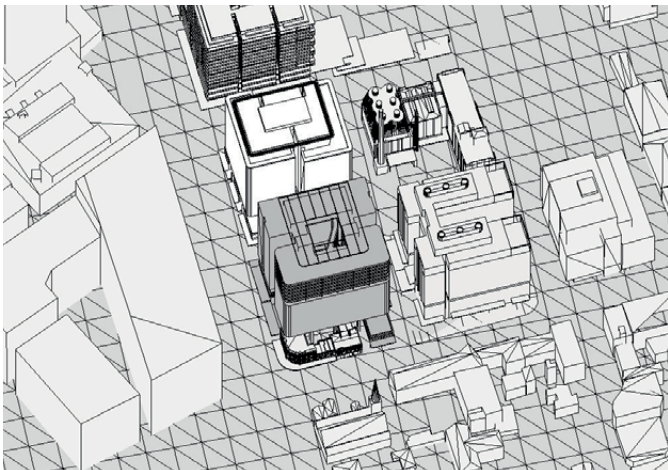
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21 December, 12.00



21 December, 13.00



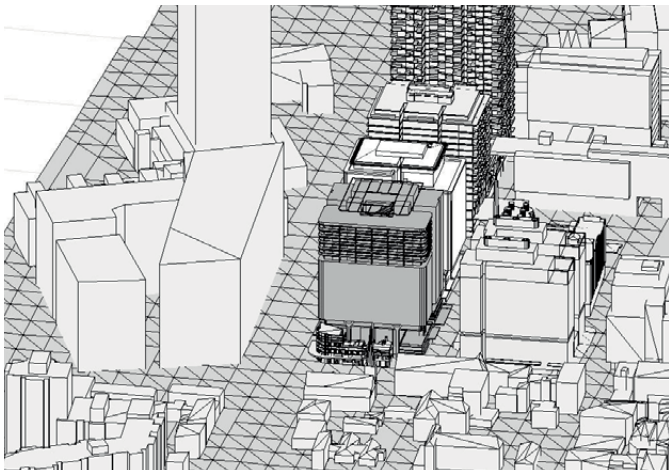
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21 December, 15.00



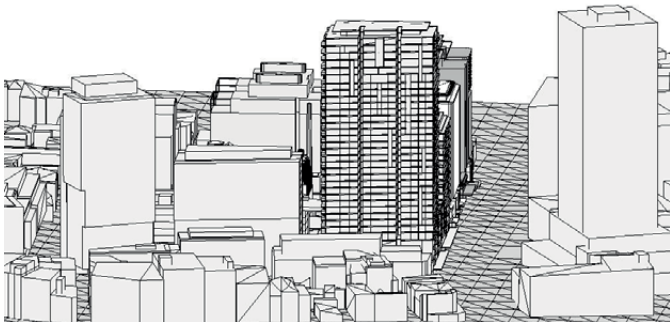
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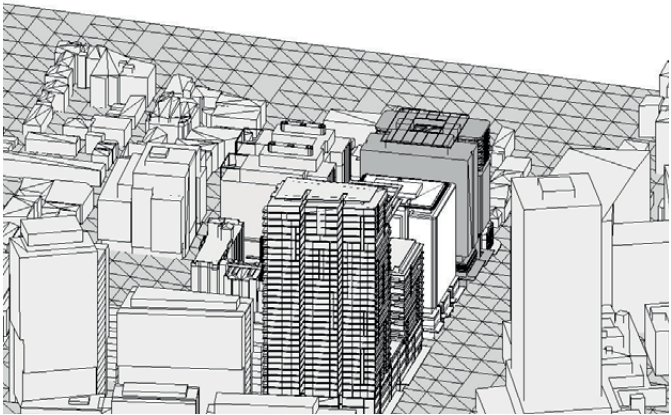
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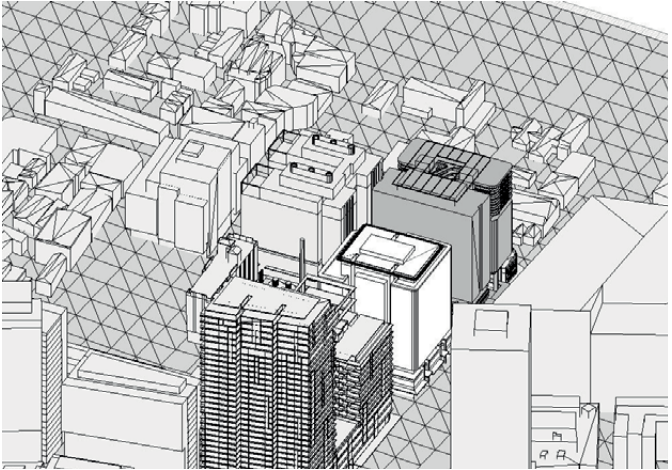
22 March Sun Studies



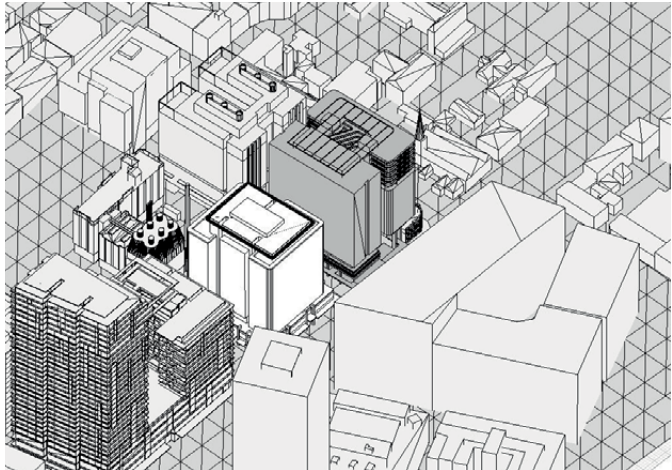
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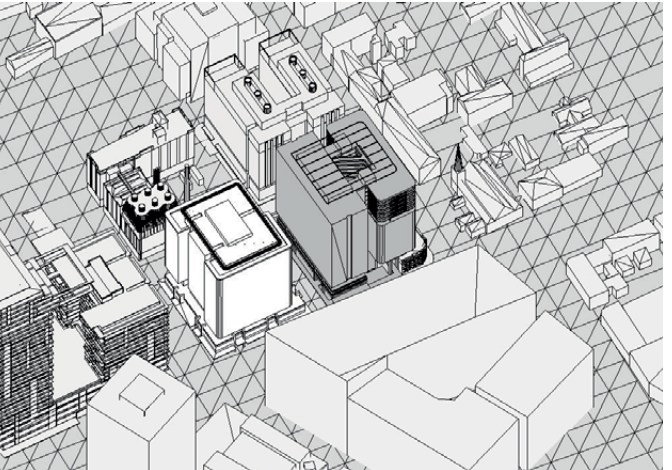
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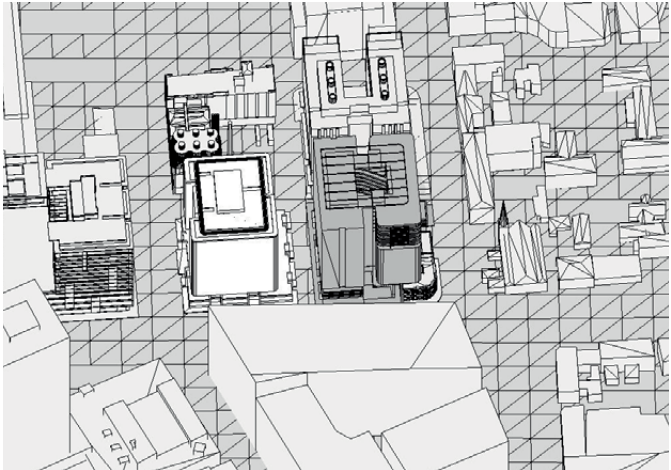
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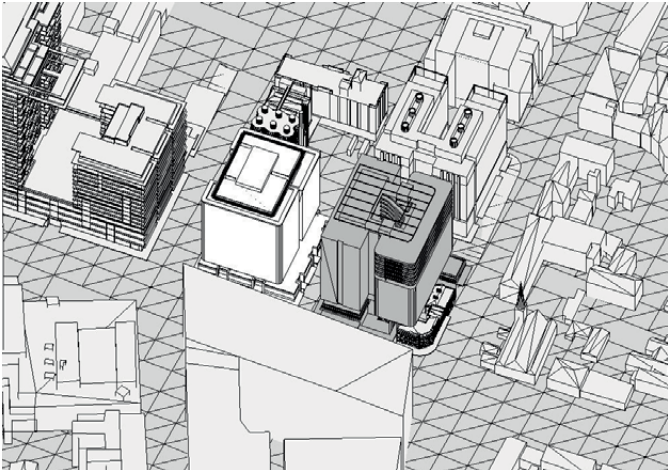
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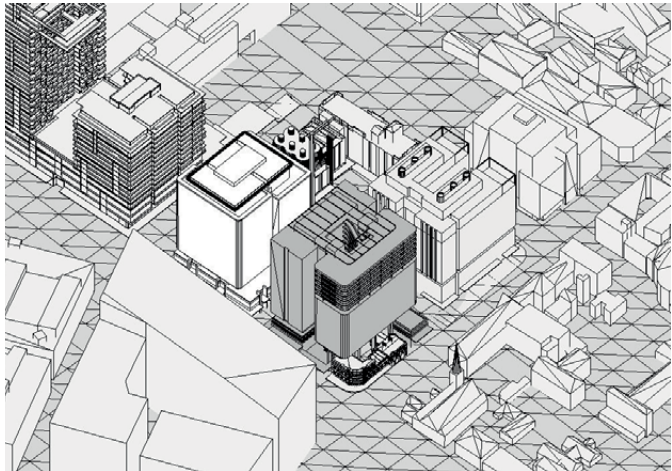
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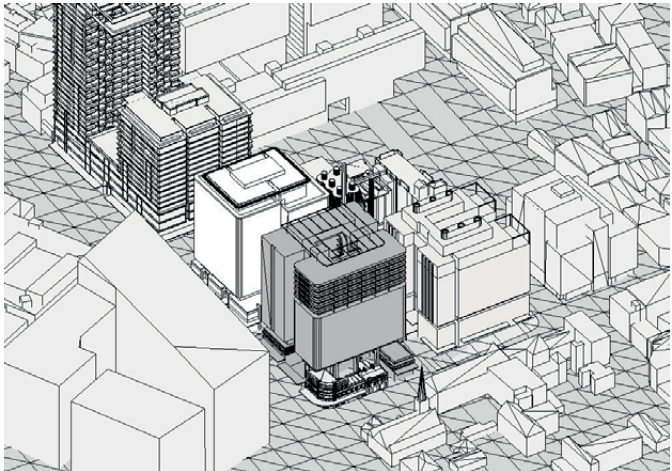
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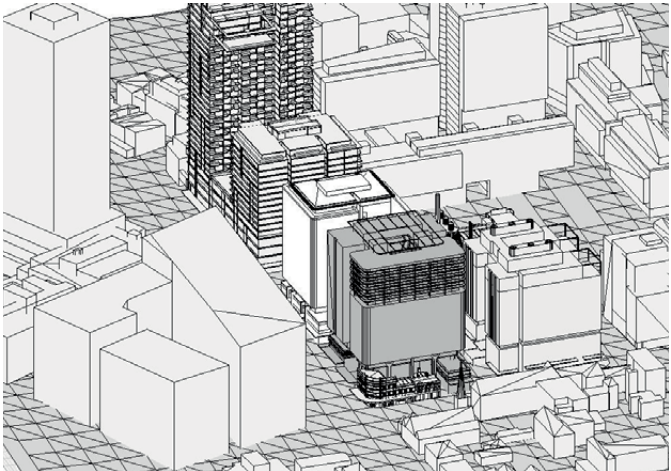
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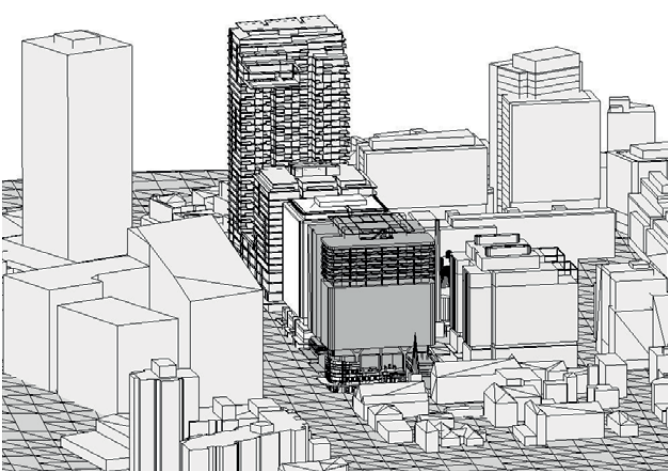
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22 March, 15.00



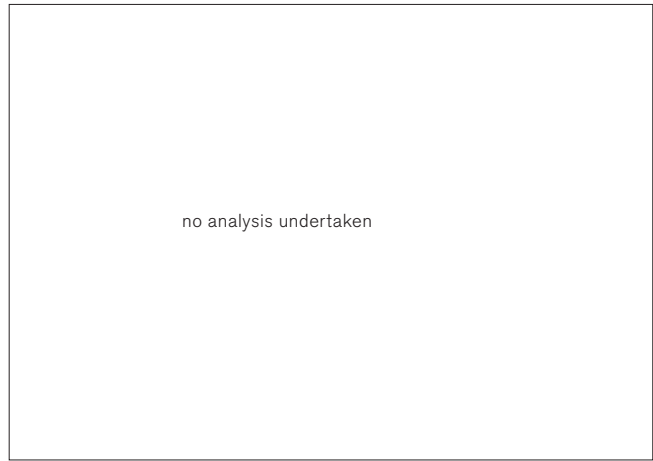
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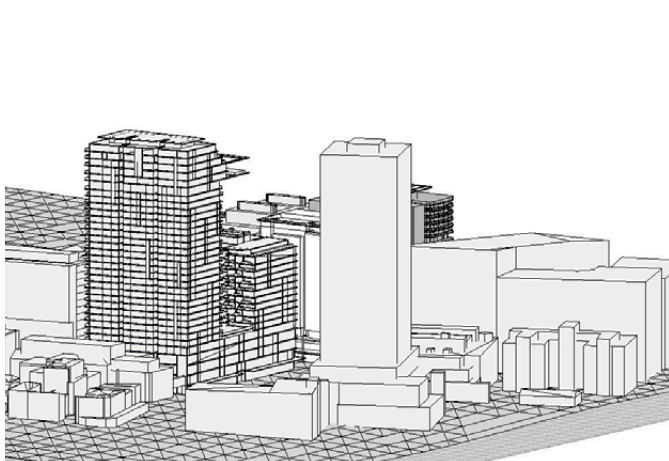
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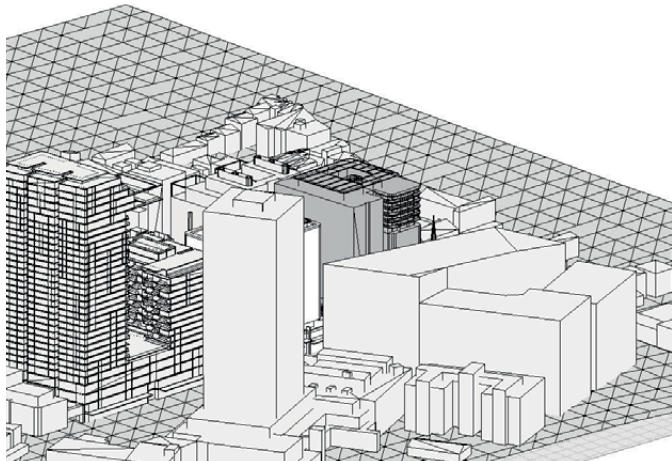
21 June Sun Studies



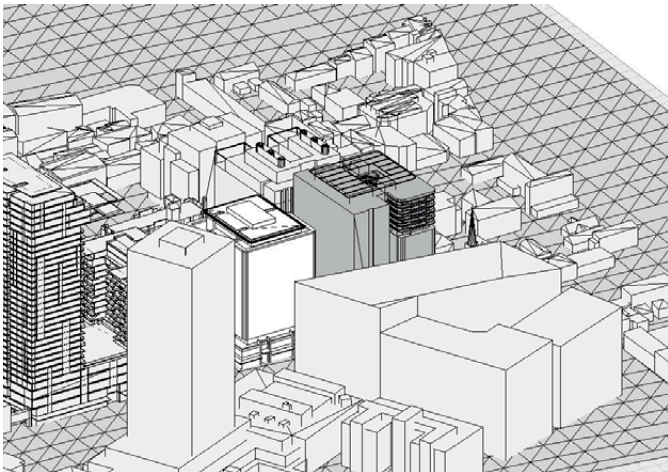
21 June, 07.00



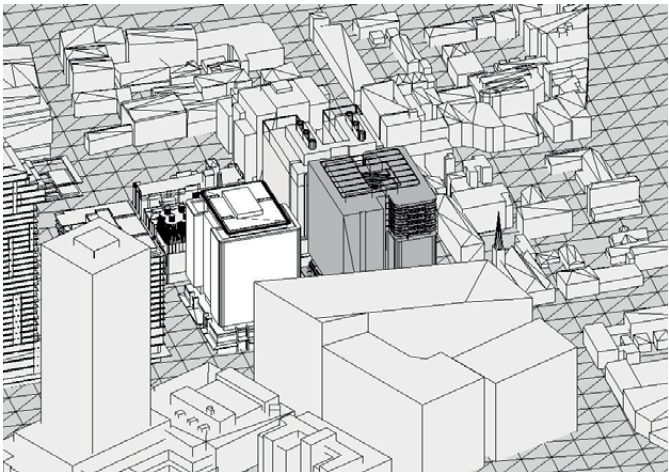
21 June, 08.00



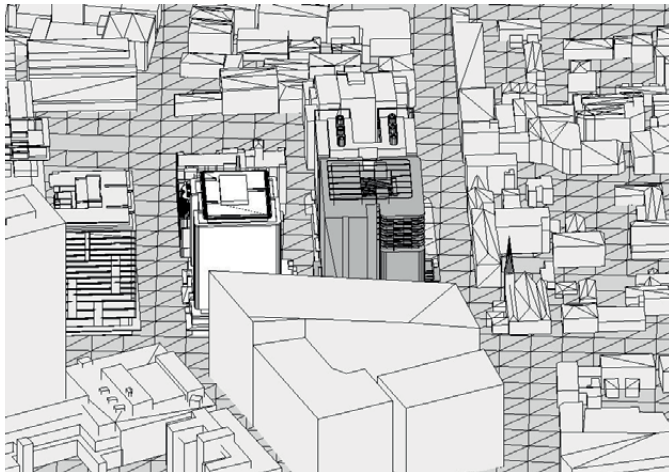
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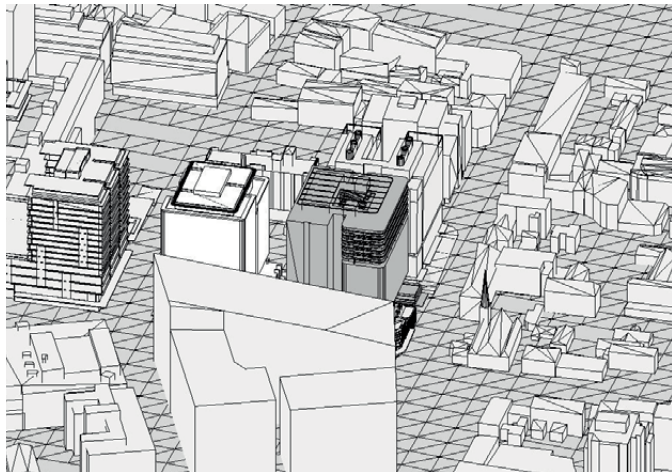
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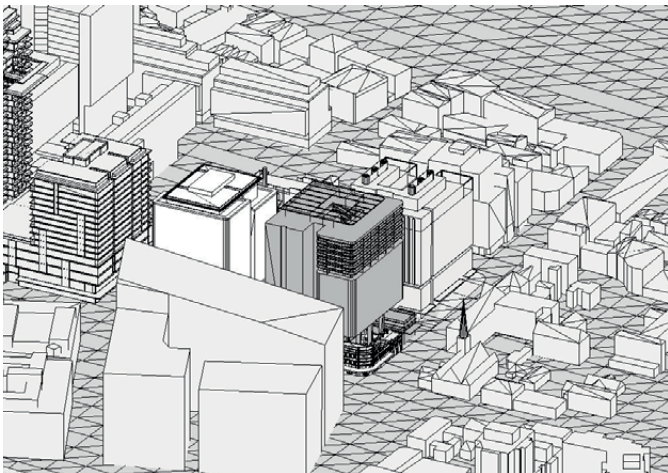
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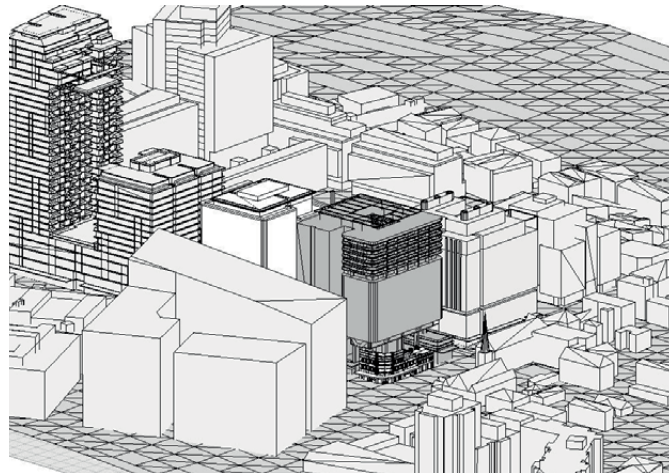
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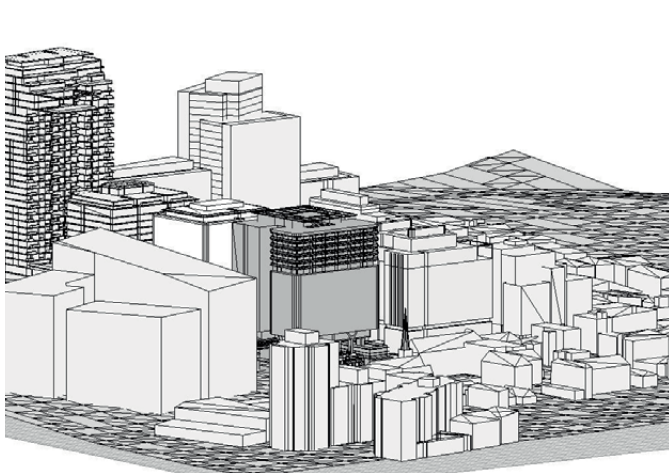
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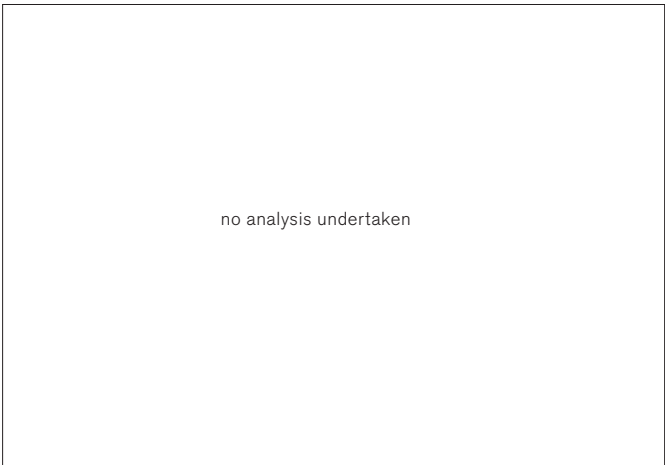
21 June, 14.00



21 June 15.00



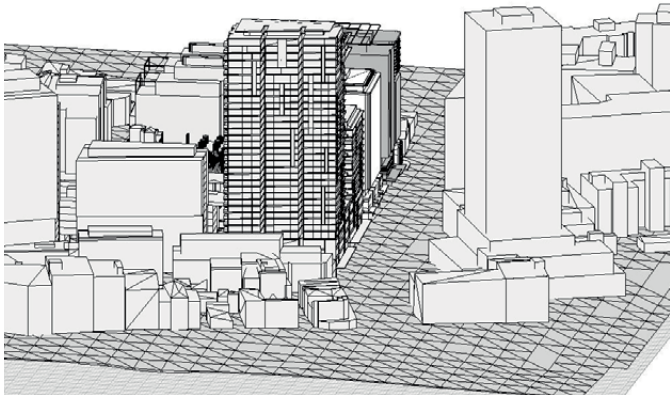
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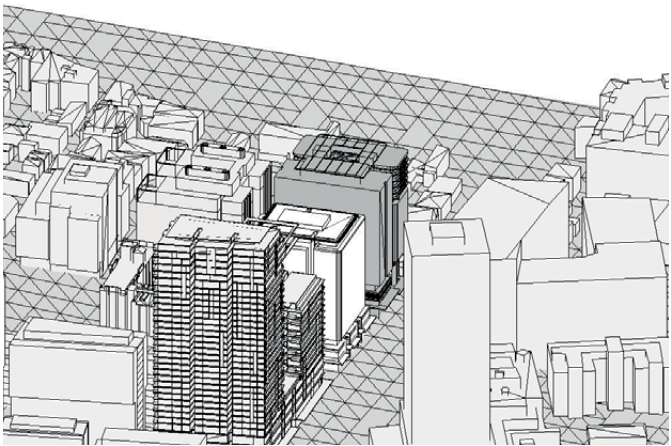
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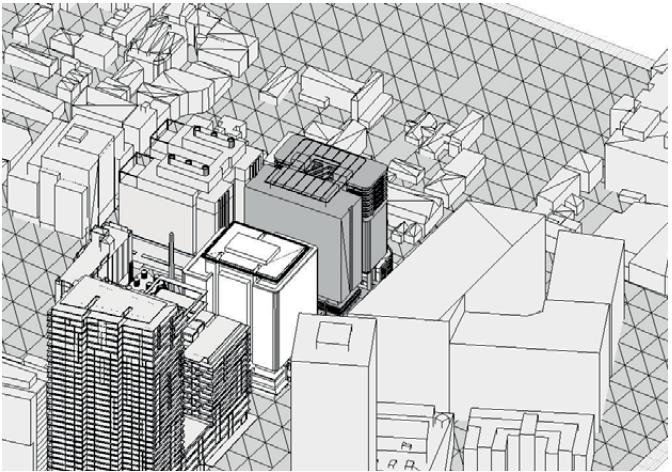
21 September Sun Studies



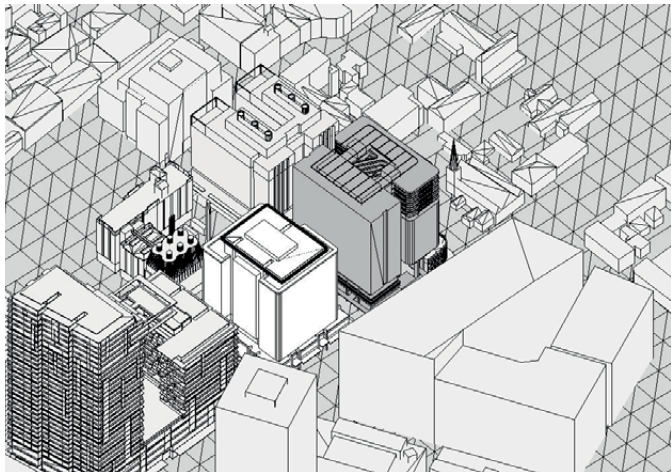
21 September, 07.00



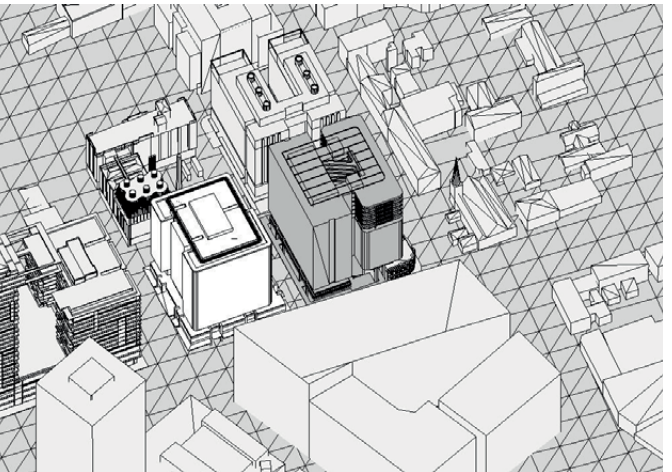
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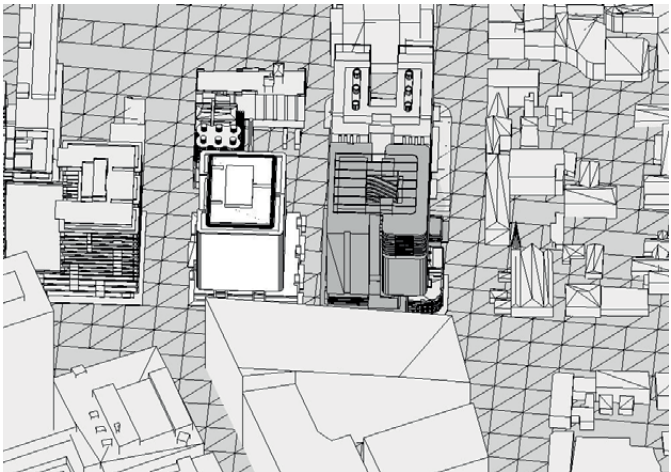
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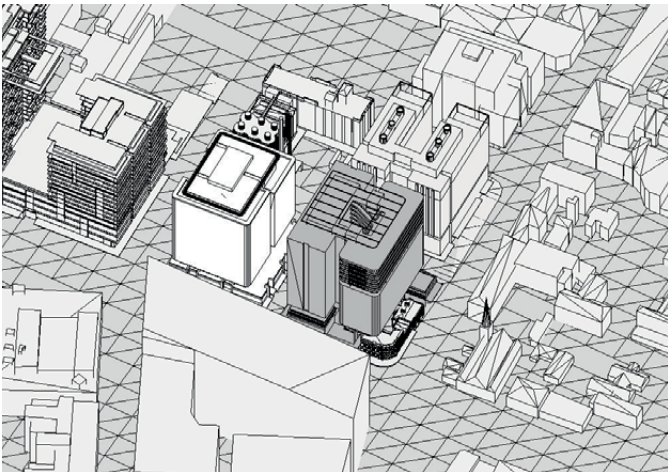
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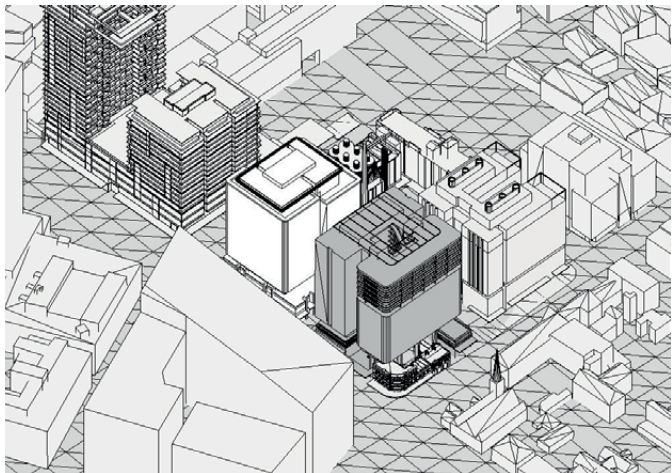
21 September, 11.00



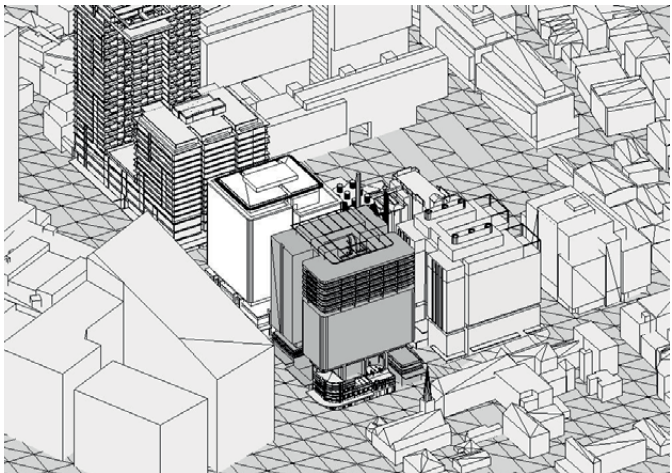
21 September, 12.00



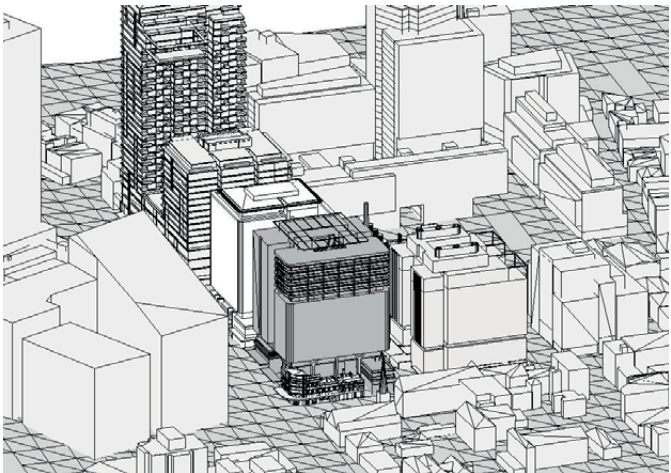
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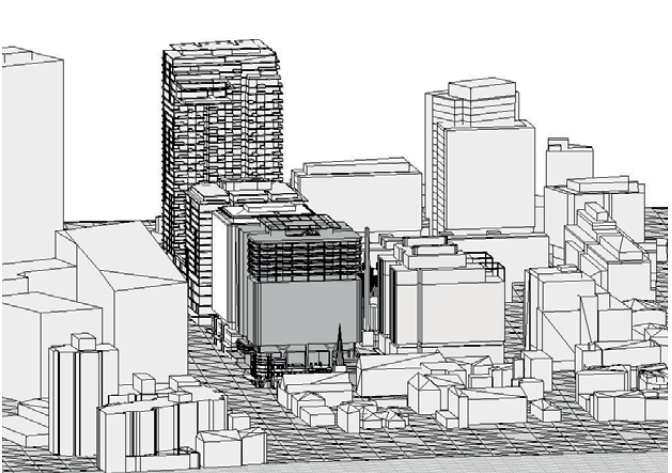
21 September, 14.00



21 September, 15.00



21 September, 16.00



21 March, 17.00



Shadow and Sun study conclusion

Conclusion of results

The shadow and sun studies into the revised massing and design of Block 4N have led to the following conclusions:-

- No detrimental effect to the areas overshadowed by the proposal compared to the previous approved scheme
- Improved mid-day daylight levels into the Brewery Yard Square and the pedestrian link between the hours of 11am and 1pm.
- Improved daylight levels along Eastern facade of Block 4N and Western Facade of Block 1.
- Reduced overshadowing of the pedestrian link during the hours of 11am to 1pm.
- Separate wind modelling undertaken by the environmental engineer also demonstrates no adverse effect to the environment at street level compared to the Approved Scheme. Please refer to the accompanying Environmental Consultants' documentation.
- The sunlight obstruction caused by the new large UTS building North of Block 4N over the road on Broadway was taken into account.

Overall a significant improvement in solar access to the area between Block 1 and 4N, can be observed during midday.



Sun access analysis

Sun access analysis - Residential apartments

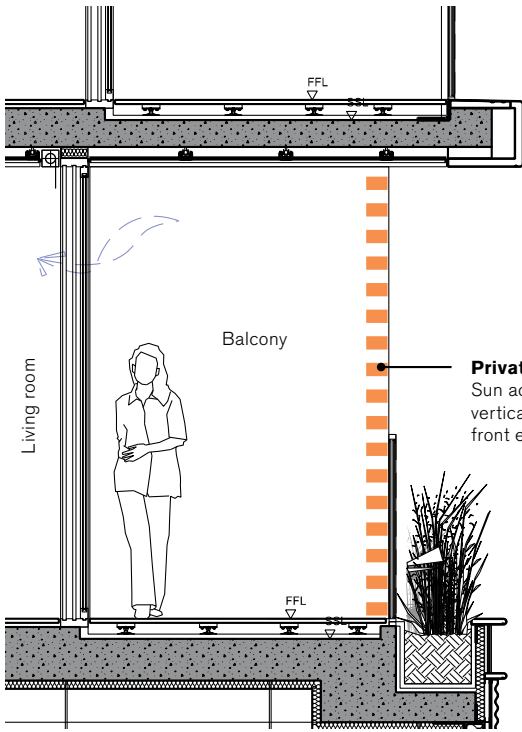
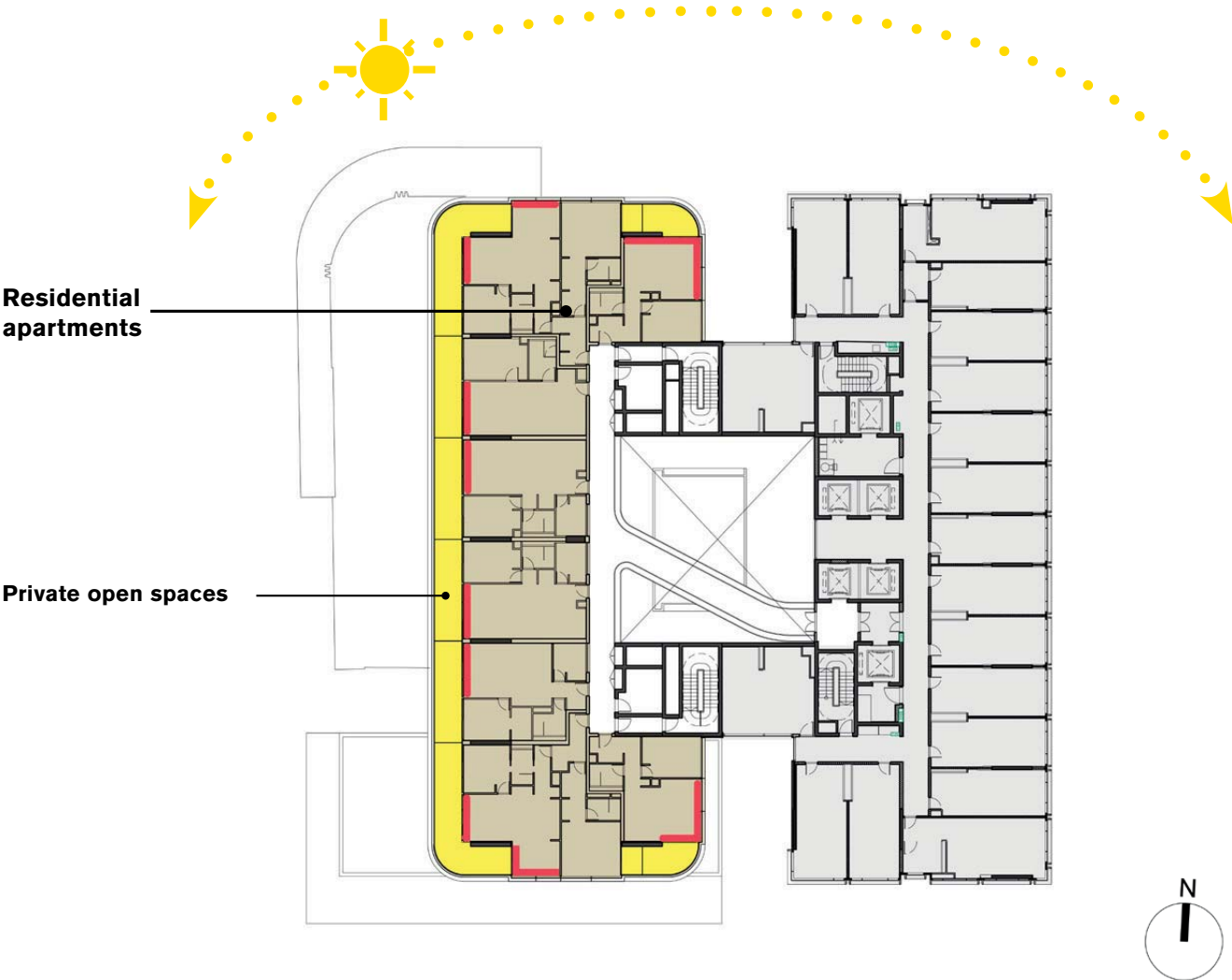
A 3D Model has been analysed to assess the number of apartments that receive solar access.  
Two methods of measurement have been adopted.

- 1) City of Sydney DCP 2012/SEPP6/RFDC
  - 2) Extended hours 07.30 - 16.30
- (The principles from the Approved Concept Plan as Modified (MCP), specifically the Heggies Daylighting Report 2 Oct 2008.)

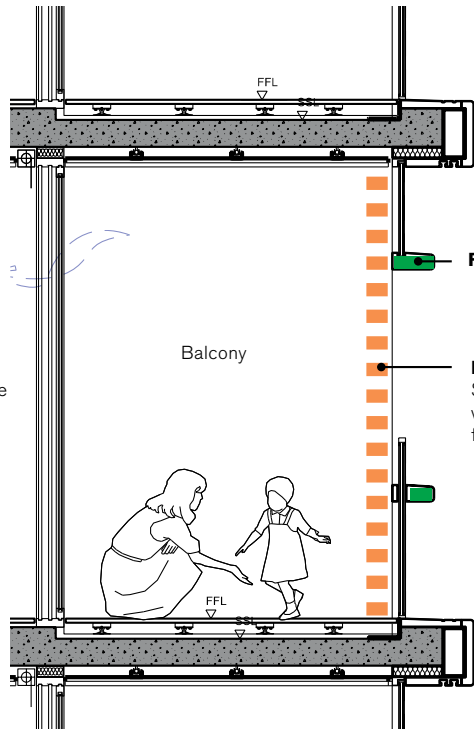
Private open spaces

The table shows a summary of the studies that were conducted along with this result. It shows the percentage of private open spaces that comply with the requirements.  
Minimum 2 hours of direct sunlight onto at least 50% of the required minimum area of private open space.  
The compliance of the private open spaces has been measured on the vertical surface positioned at the external edge of the open space as shown in the picture below.

Private open spaces are placed along the northern, western and southern perimeter of the residential apartments; their position and orientation allow to maximize the amount of solar access they receive during the evening hours. They provide a sufficient large and well proportioned outdoor space, directly adjacent to the living room area, with a minimum depth of 2.0 m clear. The design of the balustrade and the height of the horizontal louvers allow for views out towards north, west and south while providing for safety and visual privacy.



Private open space - Type A, Level 11



Private open space - Type B, Level 12 to 16

Private open spaces (Balconies and terraces)

		2 hours	1.5 hours	1 hour
March 22 <sup>nd</sup>	9.00 - 15.00	25%	25%	77%
	7.30 - 16.30	88%	88%	90%
June 21 <sup>st</sup>	9.00 - 15.00	25%	77%	88%
	7.30 - 16.30	88%	88%	88%

DCP 2012/RFDC

EXTENDED HOURS  
(As set out by HEGGIES report)

March 22<sup>nd</sup> 09.00 - 15.00  
June 21<sup>st</sup> 09.00 - 15.00

March 22<sup>nd</sup> 07.30 - 16.30  
June 21<sup>st</sup> 07.30 - 16.30



