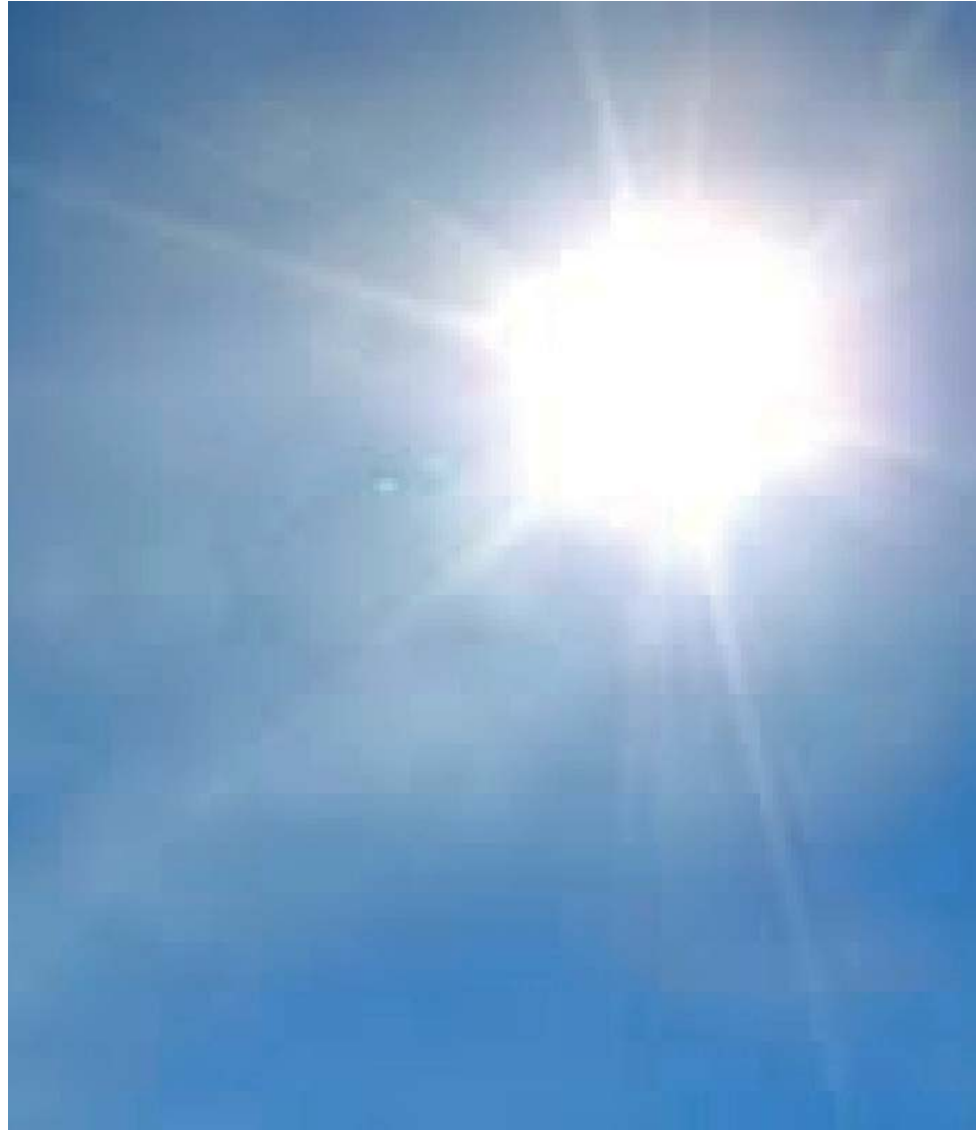


Solar Analysis

One of the main objectives of the revised proposal for Block 1 is to ensure that the scheme does not adversely affect the surrounding buildings and open spaces, by reducing solar access in comparison with the Concept Plan.

A number of solar and shadow studies have been undertaken to establish the extent of overshadowing by Block 1 on the adjacent public realm and of Block 1 by the surrounding buildings.



Solar Analysis

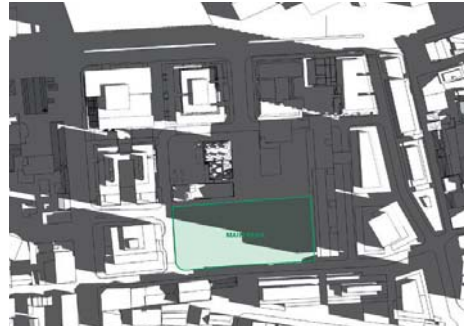
Shadow Studies



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



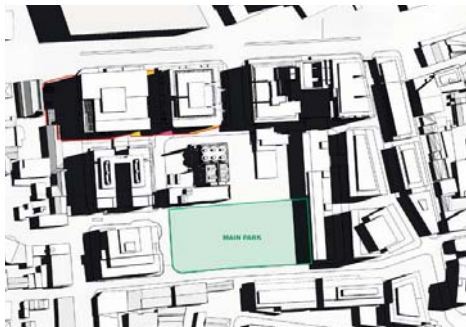
21 December, 07.00



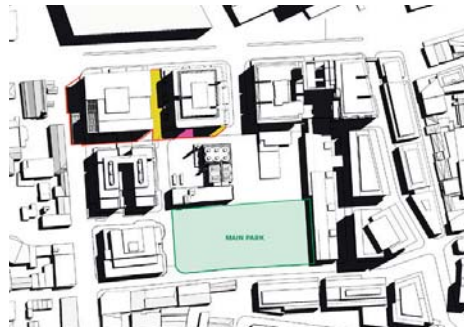
21 December, 08.00



21 December, 09.00



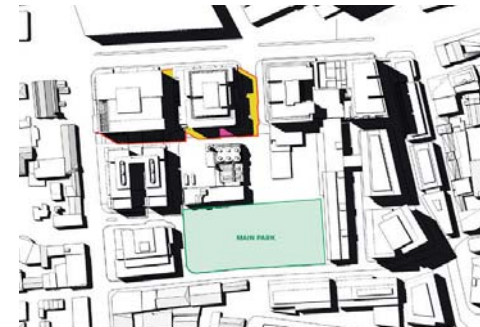
21 December, 10.00



21 December, 11.00



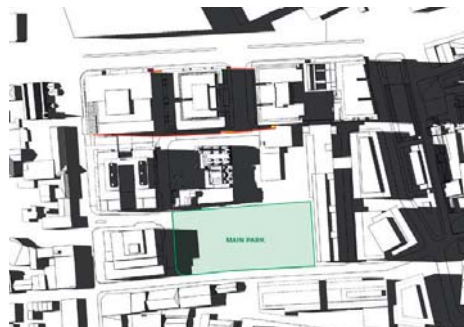
21 December, 12.00



21 December, 13.00



21 December, 14.00



21 December, 15.00



21 December, 16.00



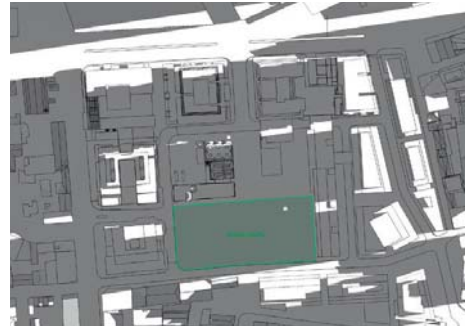
21 December, 17.00

Solar Analysis
Shadow Studies

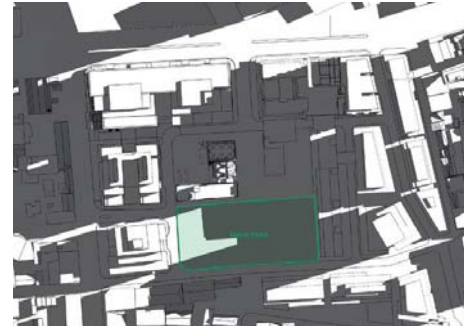


21 March Shadow Studies

- 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



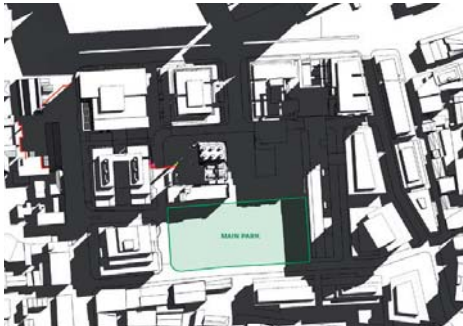
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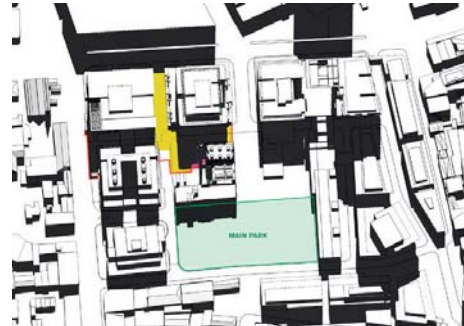
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22 March, 10.00



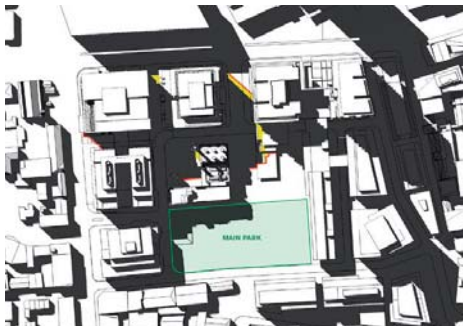
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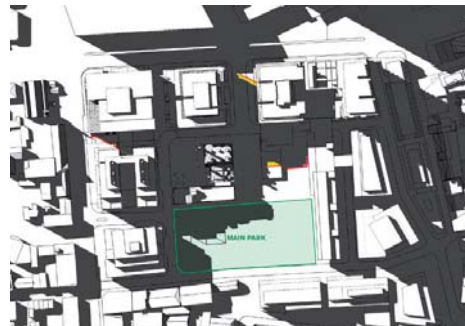
22 March, 12.00



22 March, 13.00



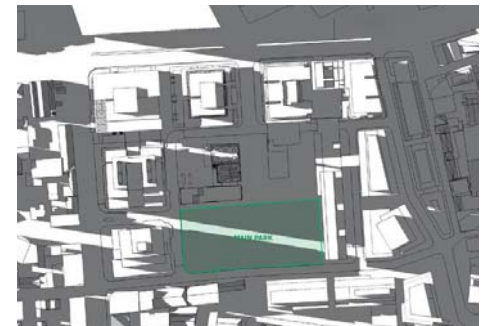
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22 March, 15.00



22 March, 16.00






22 March, 17.00

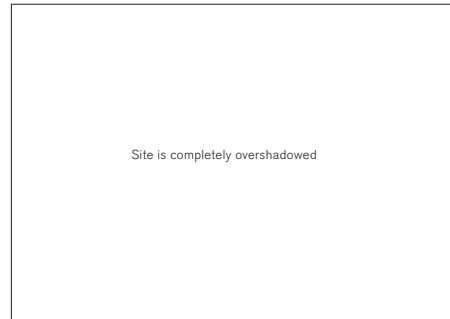
Solar Analysis

Shadow Studies

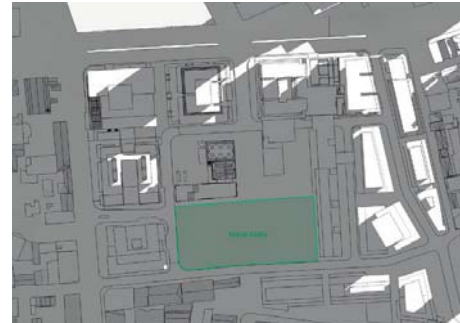


21 June Shadow Studies

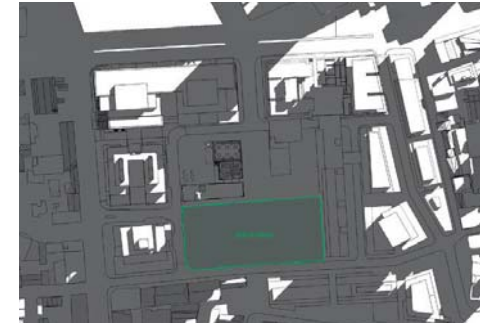
-  Shadow line of Concept Plan MOD9
-  Additional SUNLIGHT to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application
-  Additional SHADOW to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application



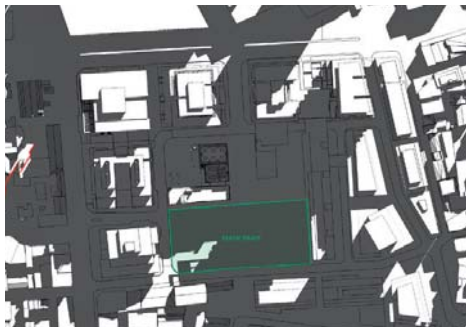
21 June, 07.00



21 June, 08.00



21 June, 09.00



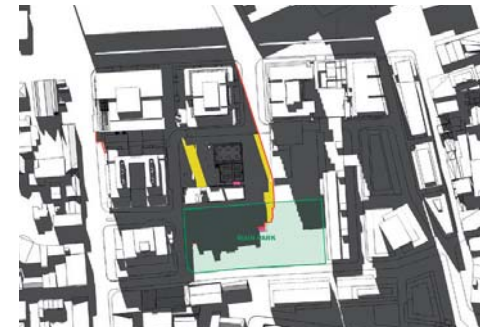
21 June, 10.00



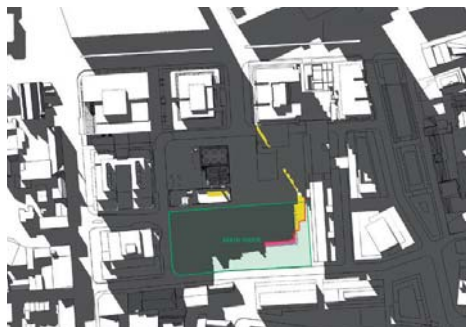
21 June, 11.00



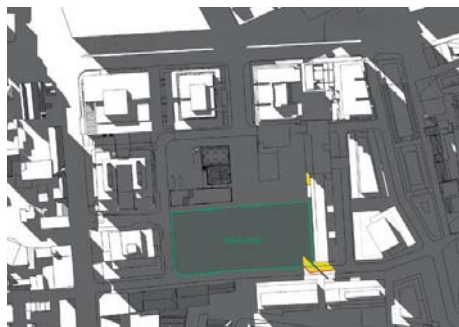
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21 June, 13.00



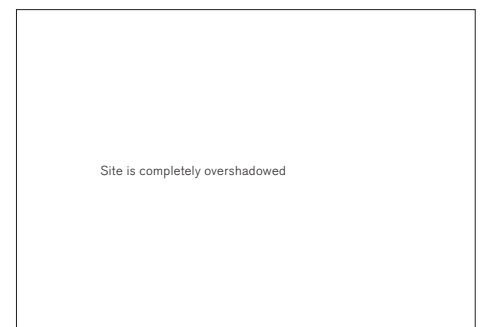
21 June, 14.00



21 June 15.00



21 June, 16.00



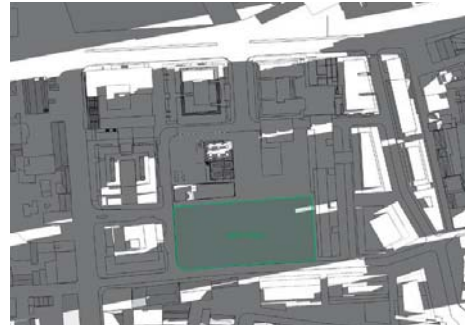
21 June, 17.00

Solar Analysis
Shadow Studies

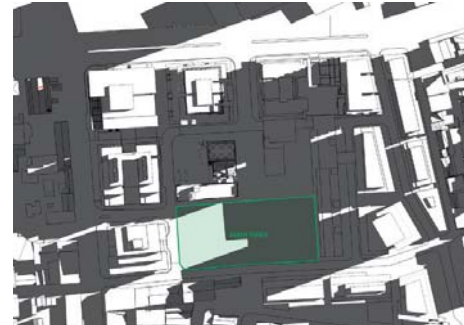


21 September Shadow Studies

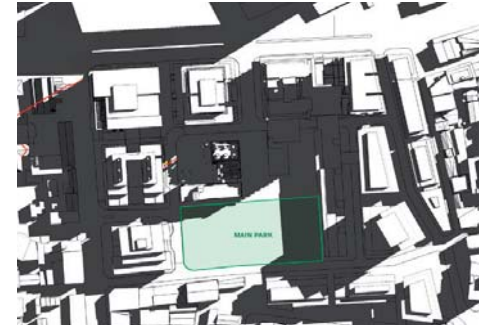
- Shadow line of Concept Plan MOD9
- Additional SUNLIGHT to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application
- Additional SHADOW to Concept Plan in comparison with B4N-1 S75W- MP08 0253 (MOD4) application



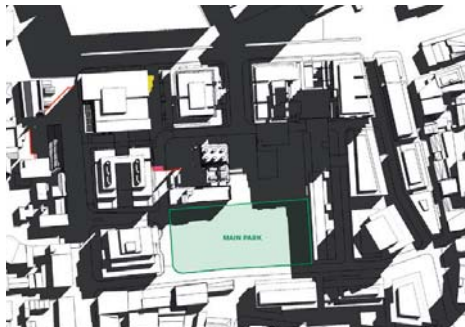
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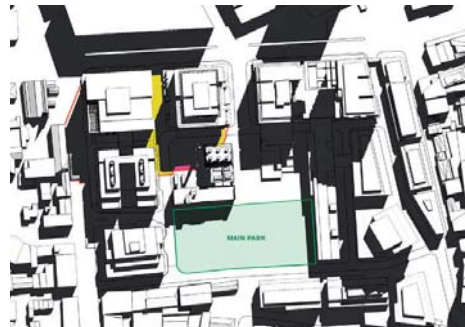
21 September, 08.00



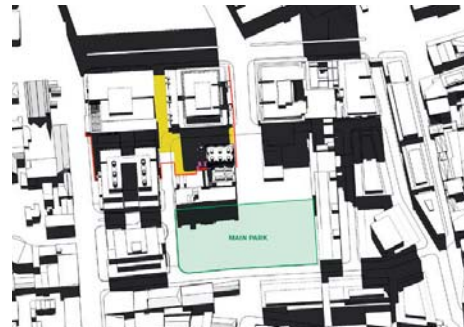
21 September, 09.00



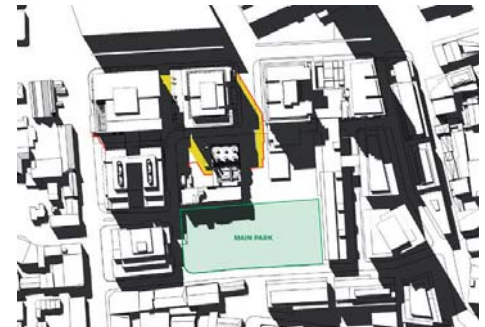
21 September, 10.00



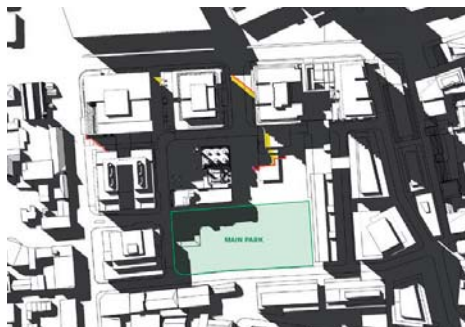
21 September, 11.00



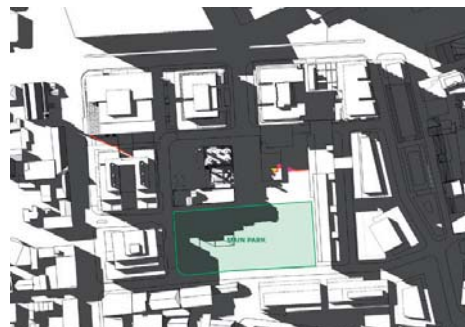
21 September, 12.00



21 September, 13.00



21 September, 14.00



21 September, 15.00



21 September, 16.00



21 March, 17.00

Solar Analysis

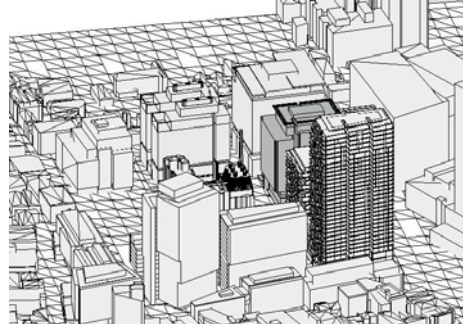
Sun Studies

6.2

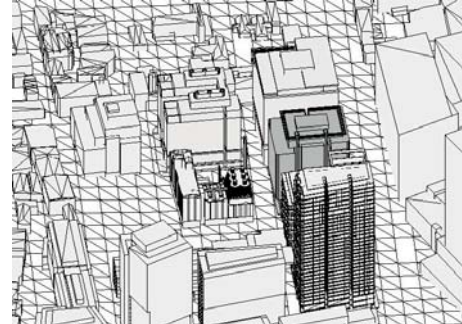
21 December Sun Studies

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.

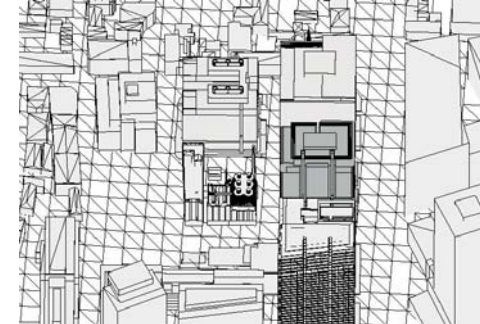
This study also shows how neighbouring tall buildings affect the solar access to Block 1.



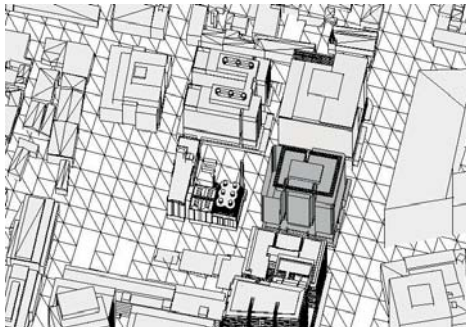
21 December, 07.00



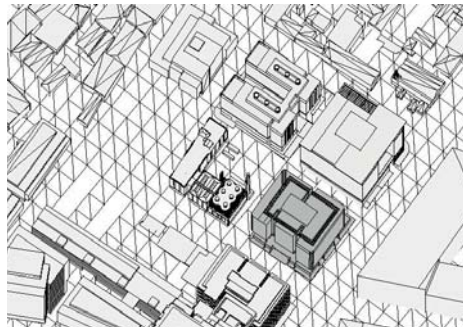
21 December, 08.00



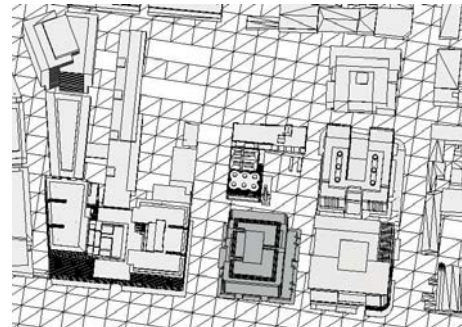
21 December, 09.00



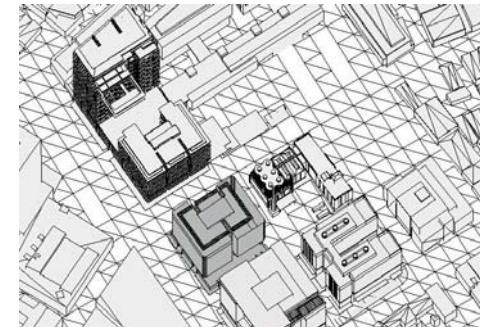
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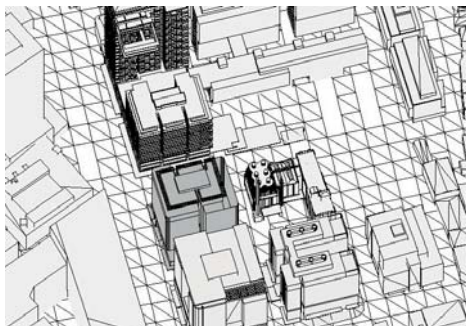
21 December, 11.00



21 December, 12.00



21 December, 13.00



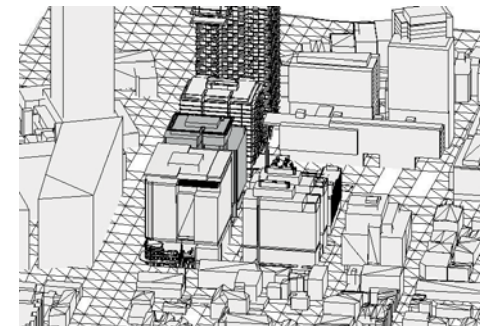
21 December, 14.00



21 December, 15.00



21 December, 16.00

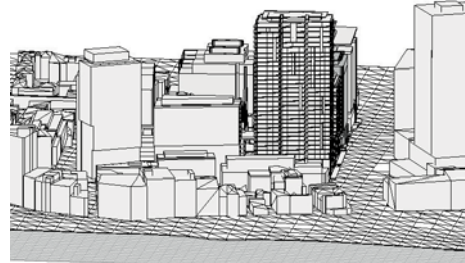


21 December, 17.00

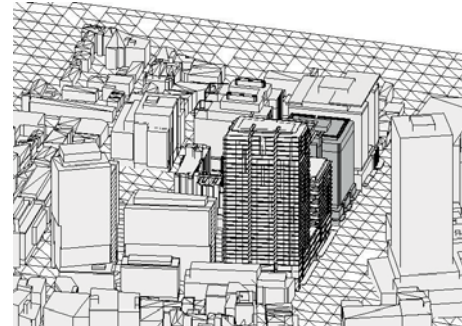
Solar Analysis

Sun studies

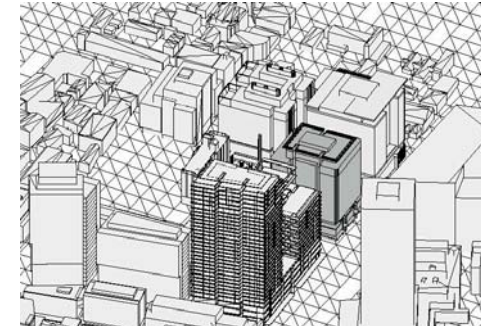
22 March Sun Studies



22 March, 07.00



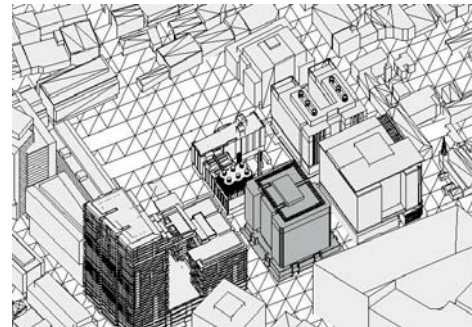
22 March, 08.00



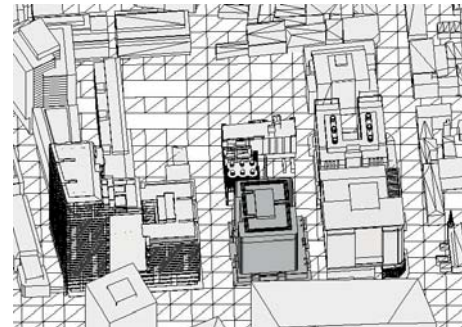
22 March, 09.00



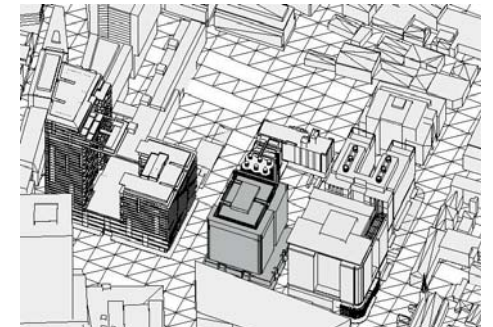
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22 March, 11.00



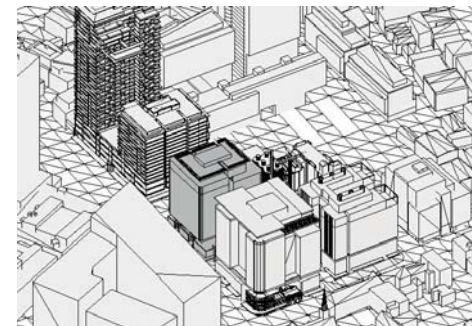
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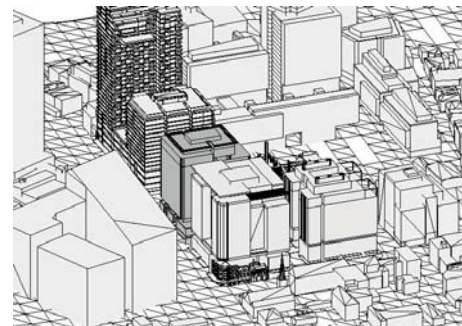
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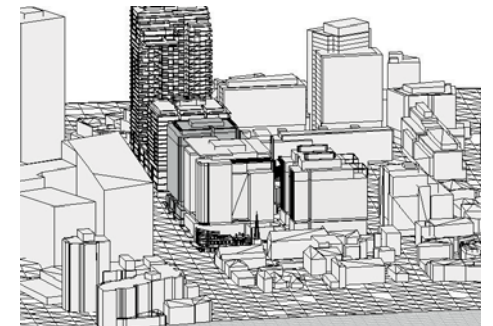
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22 March, 15.00



22 March, 16.00

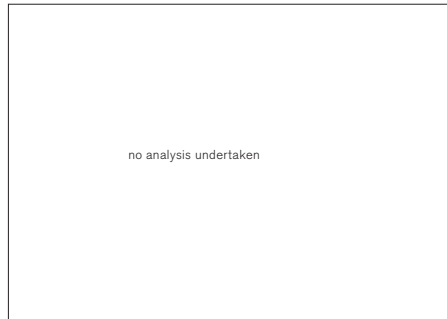


22 March, 17.00

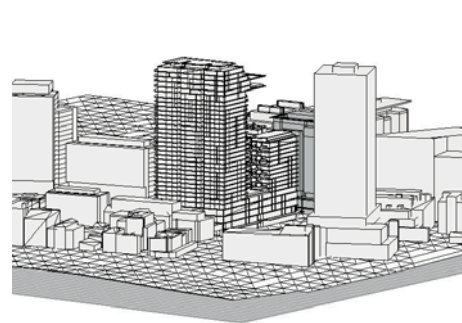
Solar Analysis

Sun Studies

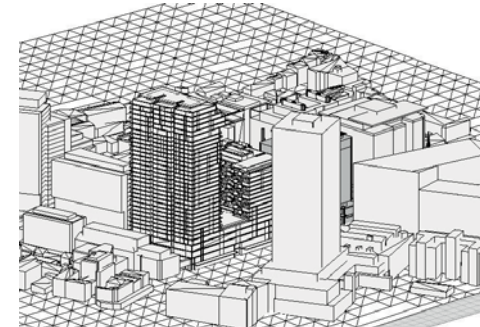
21 June Sun Studies



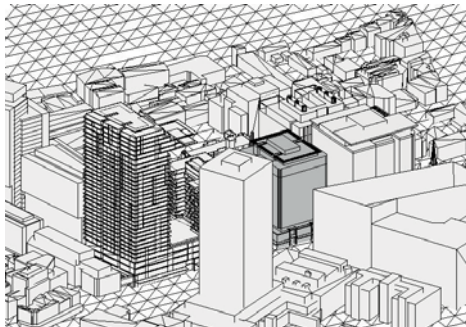
21 June, 07.00



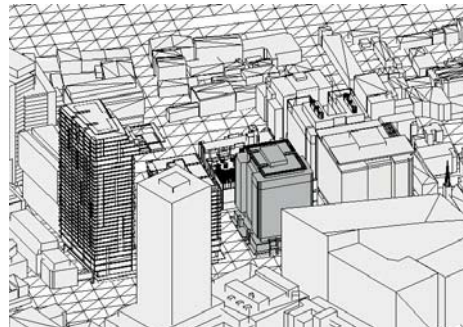
21 June, 08.00



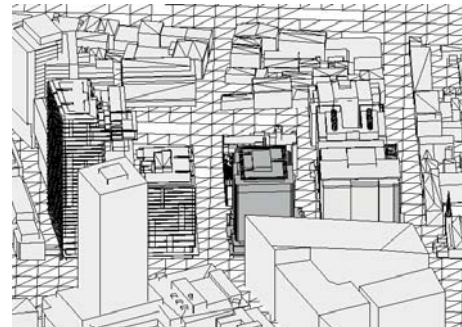
21 June, 09.00



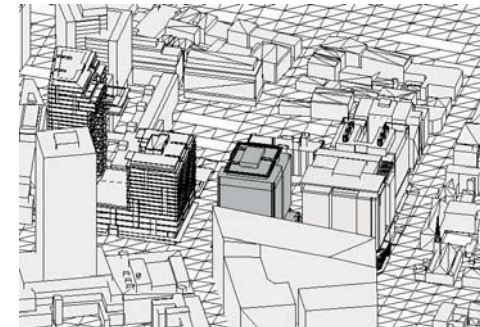
21 June, 10.00



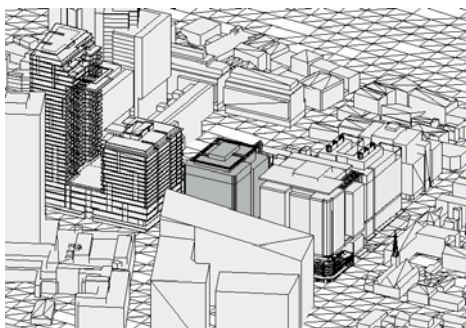
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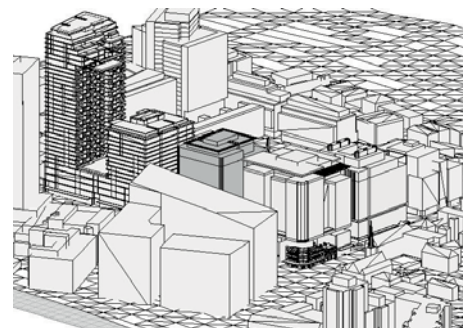
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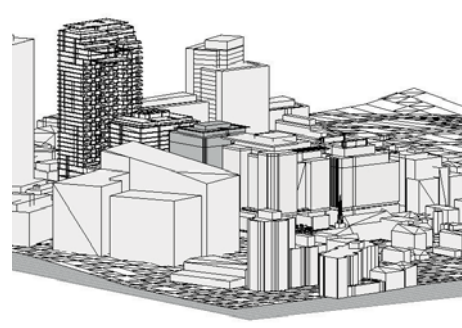
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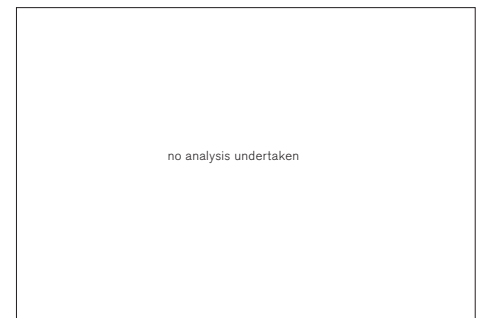
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21 June 15.00



21 June, 16.00

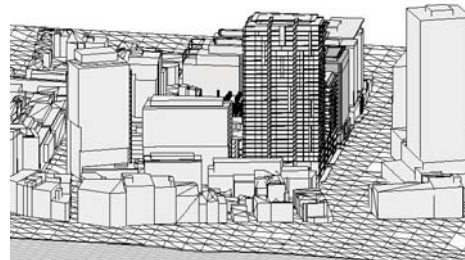


21 June, 17.00

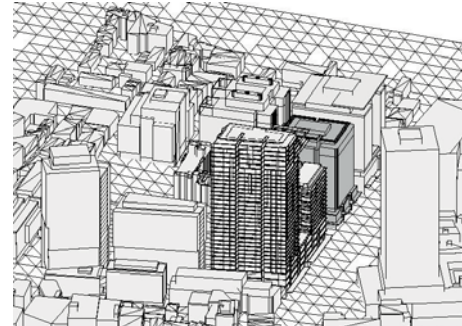
Solar Analysis

Sun studies

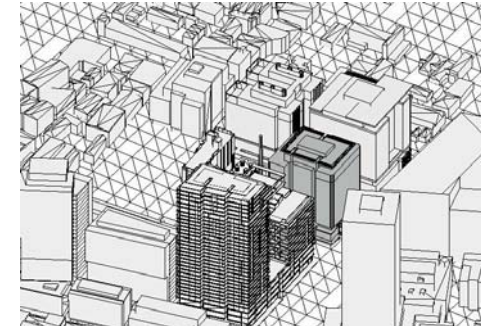
21 September Sun Studies



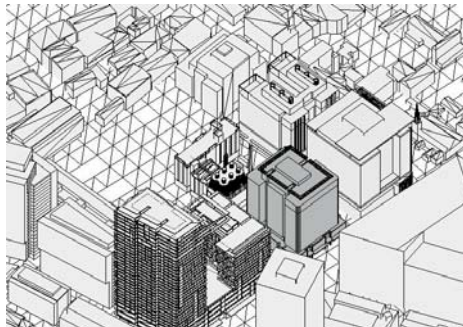
21 September, 07.00



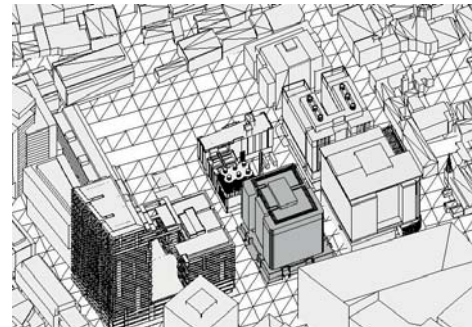
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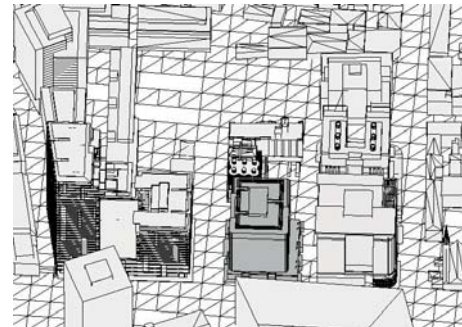
21 September, 09.00



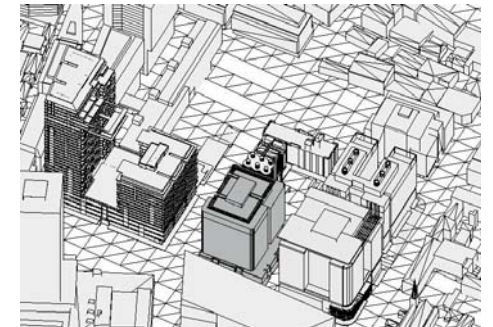
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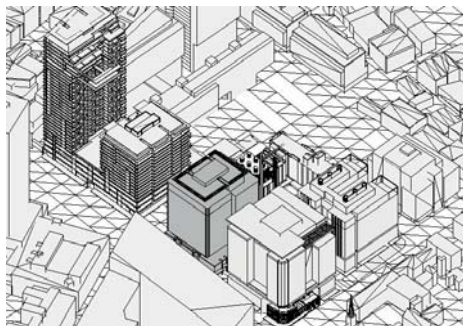
21 September, 11.00



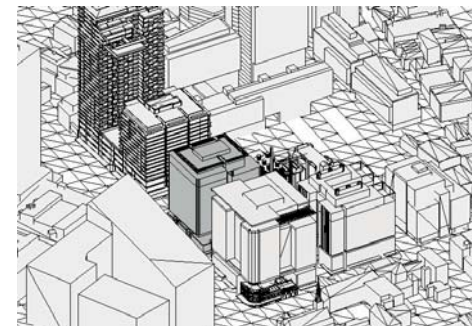
21 September, 12.00



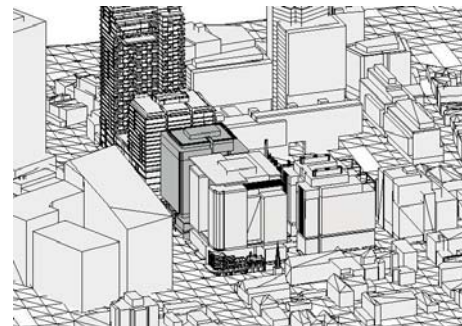
21 September, 13.00



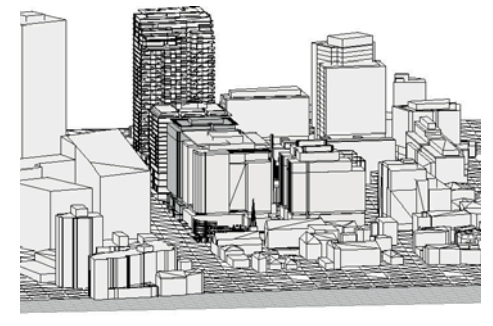
21 September, 14.00



21 September, 15.00



21 September, 16.00



21 March, 17.00

Solar Analysis

Shadow and Sun study conclusion

Conclusion of results

The shadow and sun studies into the revised massing and design of Block 1 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 1 over the road on Broadway was taken into account.

Overall a significant improvement to the area between block 1 and 4N and the Brewery Courtyard behind can be observed during midday.

Solar Analysis

Solar Access - Private open spaces

Summary of Solar access modelling results for living room windows and private open spaces.

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
 - 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.)

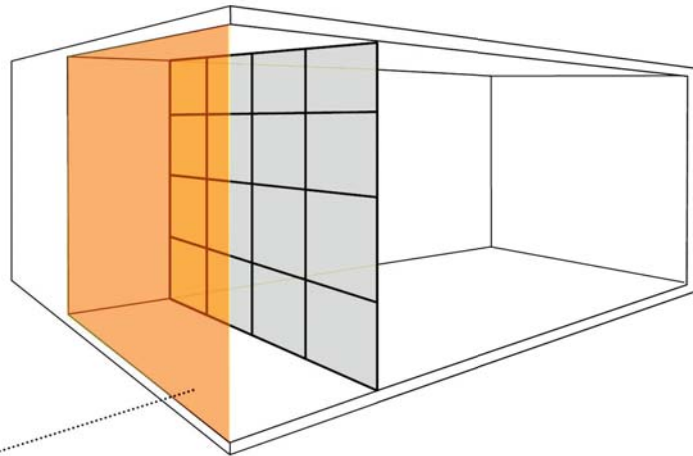
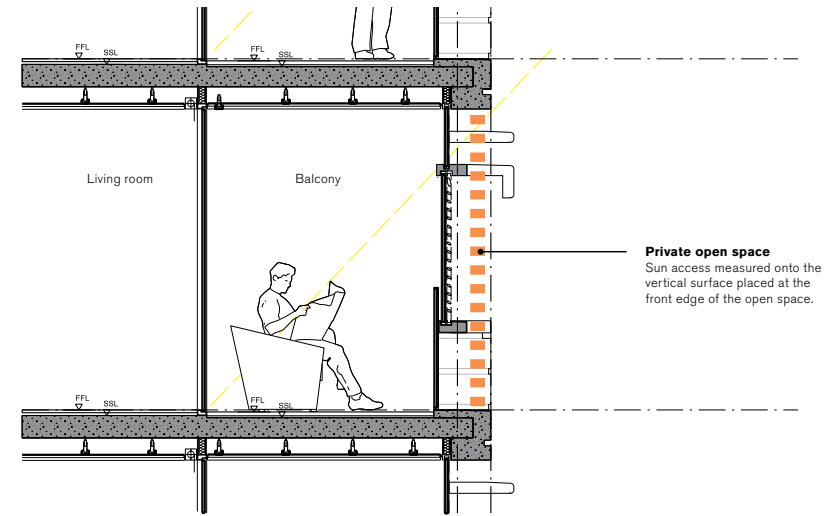
Private open spaces

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.

Because most of the private open spaces are failing the minimum area requirement, the compliance was restricted to surfaces that pass for the 100% of the area.

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.



Vertical surface for open space compliance study

Private open spaces (Balconies and terraces)

		2 hours	1.5 hours	1 hour
March 22 nd	9.00 - 15.00	52%	60%	69%
	7.30 - 16.30	53%	60%	69%
June 21 st	9.00 - 15.00	27%	43%	49%
	7.30 - 16.30	32%	43%	50%

DCP 2012
 EXTENDED HOURS
 (As set out by HEGGIES report)

March 22nd 09.00 - 15.00 March 22nd 07.30 - 16.30
 June 21st 09.00 - 15.00 June 21st 07.30 - 16.30

Solar Analysis

Solar Access - Living room and loggia windows

Summary of Solar access modelling results for living room windows and private open spaces.

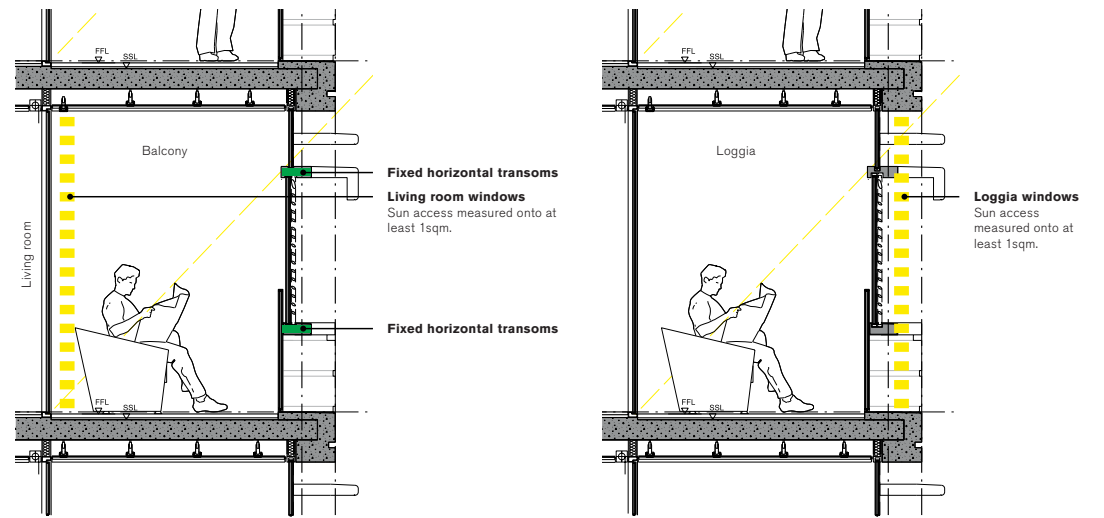
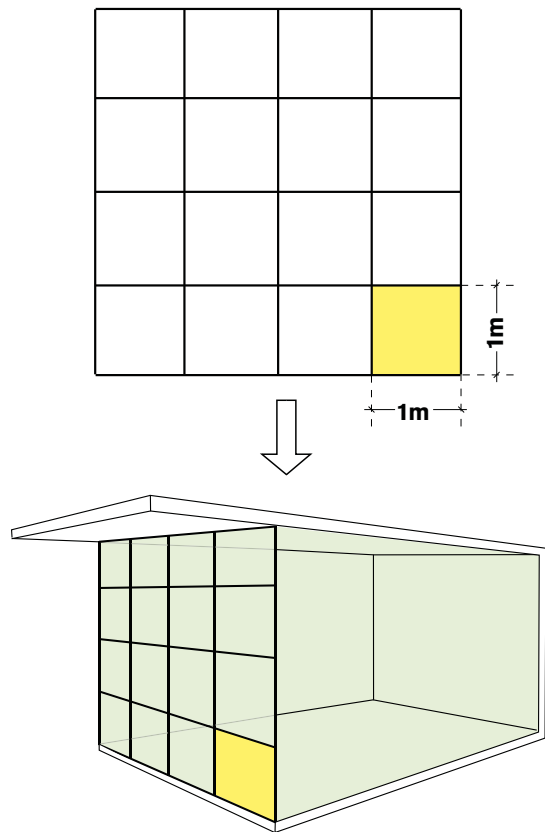
A 3D Model has been analysed to assess the number of apartments that receive solar access. Two methods of measurement have been adopted.

- 1) City of Sydney DCP 2012
 - 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)

Living room and loggia windows

The table shows a summary of the studies that were conducted along with this result. It shows the percentage of living room windows and loggias that comply with the requirements.

When at least 1 sqm of living room windows get 2 hours of direct sunlight or more, then the room complies to the DCP standards.



Living room and loggia windows

		With transoms			Without transoms		
		2 hours	1.5 hours	1 hour	2 hours	1.5 hours	1 hour
March 22 nd	9.00 - 15.00	24%	27%	29%	26%	27%	33%
	7.30 - 16.30	26%	27%	34%	26%	29%	36%
June 21 st	9.00 - 15.00	23%	19%	35%	24%	22%	39%
	7.30 - 16.30	25%	23%	46%	26%	26%	48%

DCP 2012
 EXTENDED HOURS
 (As set out by HEGGIES report)

March 22nd 09.00 - 15.00
 June 21st 09.00 - 15.00

March 22nd 07.30 - 16.30
 June 21st 07.30 - 16.30

Solar Analysis

Solar Access - Apartments

Summary of Solar access modelling results for living room windows and private open spaces.

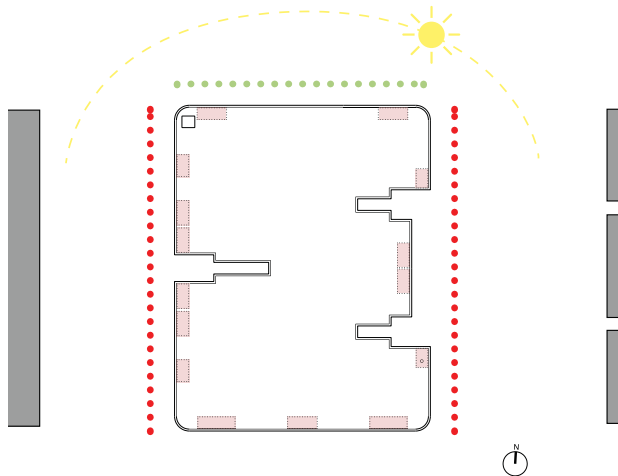
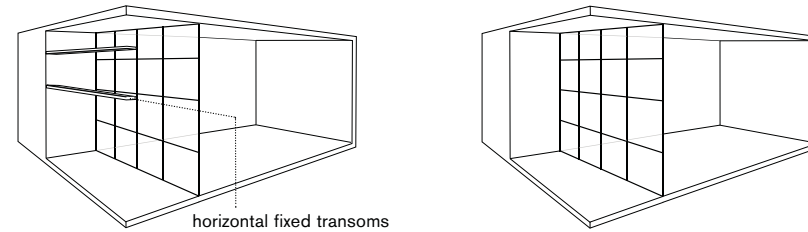
A 3D Model has been analysed to assess the number of apartments that receive solar access. Two methods of measurement have been adopted.

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

Apartments that comply with both private open spaces and living room windows

The table shows a summary of the studies that were conducted along with this result. It shows the percentage of flats that comply to the requirements.

The study indicates low overall performance in terms of solar availability. This is due to a combination of layout, geometry and context.



■ East and West Facades suffer from :

close context, combined with low solar angle
recessed facades / balconies

■ North Facade on the other hand benefits from:

wide street
facade windows
high solar angle (recessed windows though won't get any solar access on the northern facade)

Apartments that comply with both living room windows and private open spaces.

		With transoms			Without transoms		
		2 hours	1.5 hours	1 hour	2 hours	1.5 hours	1 hour
March 22 nd	9.00 - 15.00	24%	27%	29%	26%	27%	33%
	7.30 - 16.30	26%	27%	35%	26%	29%	40%
June 21 st	9.00 - 15.00	18%	19%	30%	19%	22%	33%
	7.30 - 16.30	19%	23%	41%	20%	26%	43%

DCP 2012

EXTENDED HOURS
(As set out by HEGGIES report)

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June 21st 07.30 - 16.30

