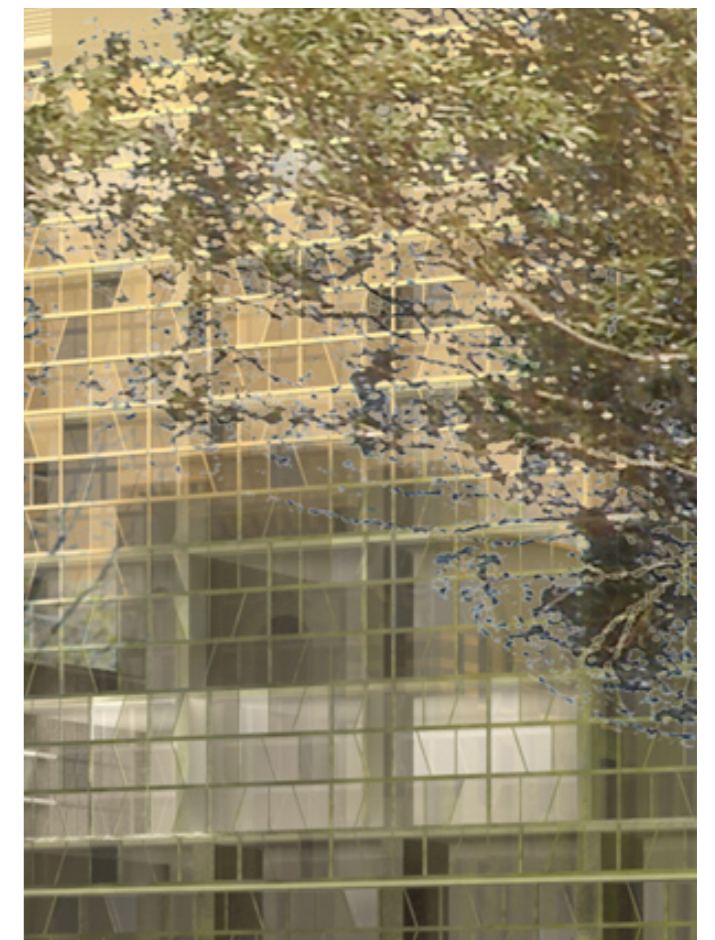


FRASER'S BROADWAY Block 2,5 & 9

Daylight Access Report

July 2009



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Level 10 Plaza Building Australia Square
95 Pitt Street Sydney NSW 2000 Australia

ARCHITECTURE
URBAN DESIGN
LANDSCAPE
EXHIBITIONS
INTERIORS

Introduction

This report demonstrates the current status of units achieving 2 hours daylight access for blocks 2, 5 and 9 and is intended to support the SEPP 65 Design Verification Statements accompanying the Block 2 & 5 Project applications.

Background

The target for daylight access is defined in the Approved Concept plan for the Frasers Broadway site. It is expected, that 70% of units across the site is to achieve 2 hours direct daylight access using the "Cox Tzannes method". Individual blocks may achieve less or more than 70%, but all blocks are expected to achieve a minimum 60%. Block 5 & 9 are to be assessed however as a single block for this purpose.

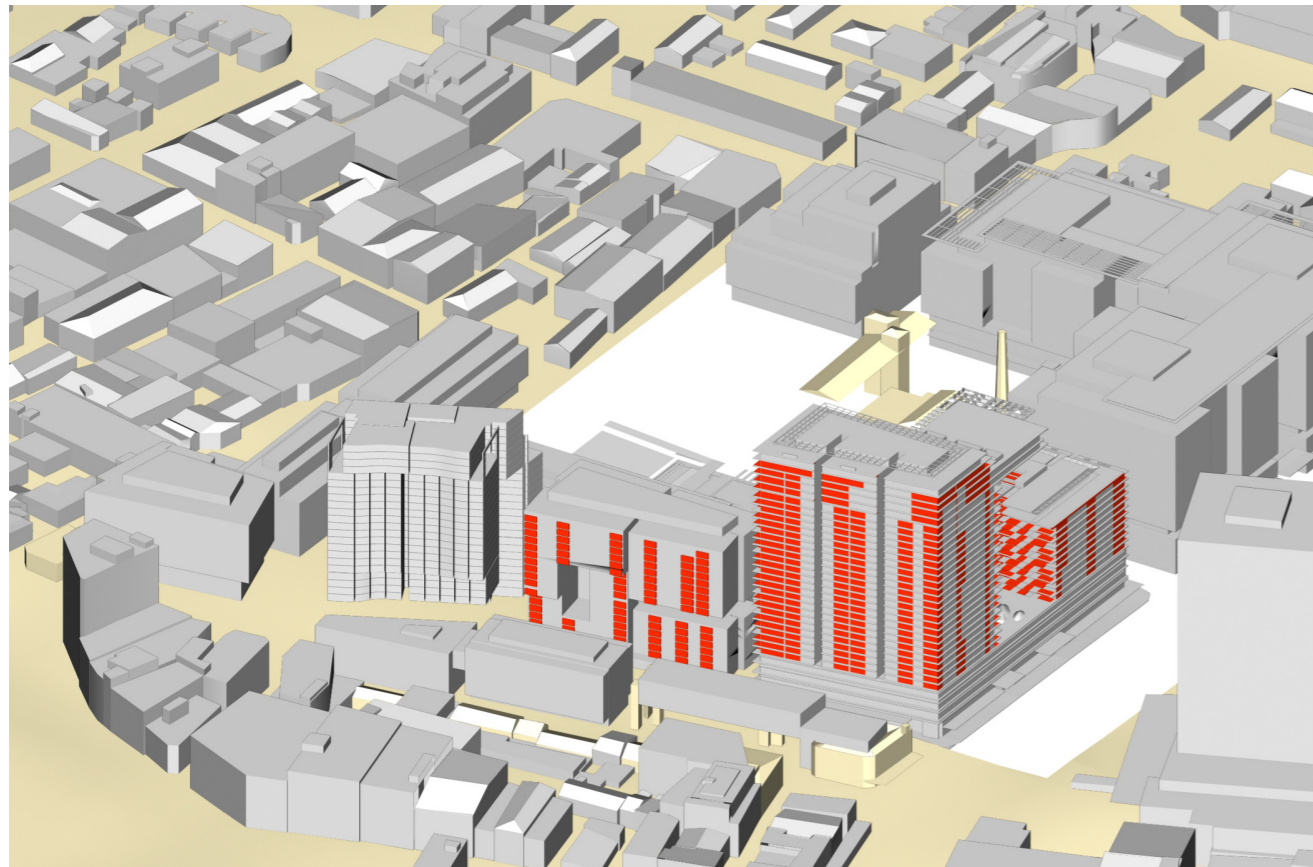
Compliance with this commitment was demonstrated in detail in the report "Frasers Broadway Site Daylighting Report - Rev 4" dated 2/10/08 prepared by Heggies. This report investigates the compliance of the PA proposals for Block 2 & 5 in relation to the percentages reported in the Heggies report.

A Detailed Concept design for Block 9 has been prepared by JPW. While Block 9 is not subject to the block 2 or 5 PAs, the Block 9 Detailed Concept design has been shown in this report for the purpose of demonstrating the combined aggregate of Block 5 & 9 can exceed the minimum 60% required in the Approved Concept Plan.

Methodology

To enable clear comparison between the PA designs for Block 2 & 5 and the Heggies report, this report also uses the Cox/Tzannes method, which looks at "effective sunlight" between 7:30am and 4:30pm, rather than sunlight limited only to the 9am and 3pm range as suggested by the SEPP 65 Residential Flat Design Code. Effective sunlight is described as having a horizontal angle of incidence greater than 22deg to the living room window or balcony edge and altitude greater than 5deg (which roughly corresponds to a sun later than 7:30 am and earlier than 4:30pm on June 21).

The Concept Plan and the Heggies report only considered daylight access for June 21 to enable comparison with the Residential Flat Design Code guidelines. This report also presents the results for March 21, to enable comparison to the City of Sydney standard, which looks at daylight access in March.

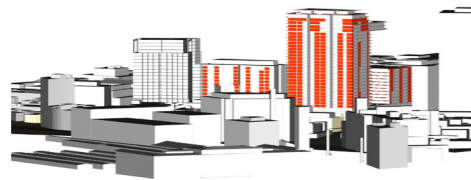


Assumptions

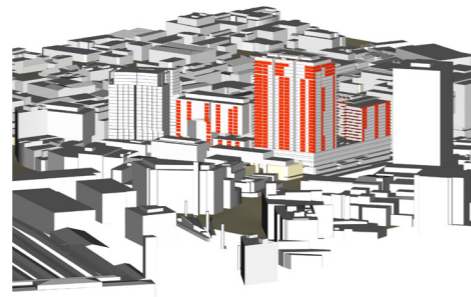
- Block 2 Heliostat and the Block 1&4 roof features will be detailed in later design stages to allow sufficient direct daylight access through to not affect compliance of the units in its 'shadow'
- Daylight savings is assumed for March 21 results
- Analysis is based on the following 3D models:
 - Block 2 PA model provided by AJN 26/7/09.
 - Block 1&4 PA model is provided by F+P 21/7/09
 - Block 5 PA models by JPW
 - Block 9 Detailed Concept Design Model by JPW
 - All other blocks within Frasers Site are of the Concept Plan envelopes as provided by F+P October 2008
 - All surrounding context and ground plane models provided by F+P October 2008

Sun's Eye Perspective March 21 10:30 am

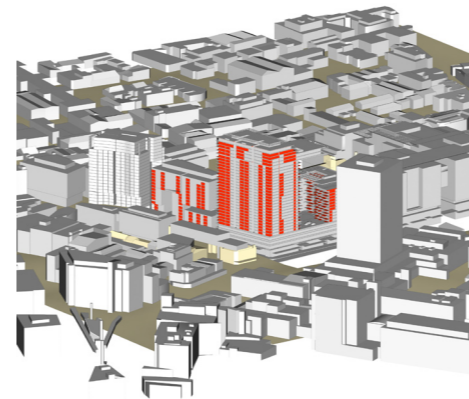
June 21
"Sun's Eye View"
Perspectives



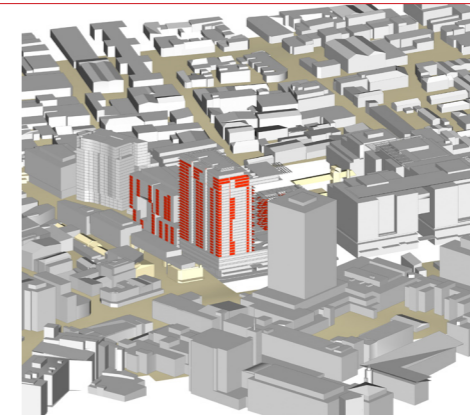
June 21 07:30



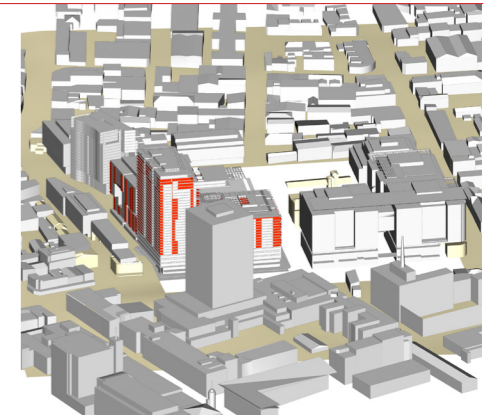
June 21 08:30



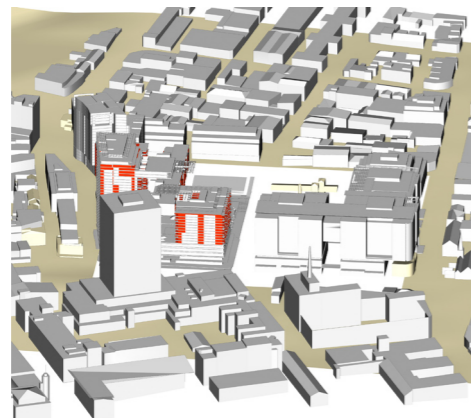
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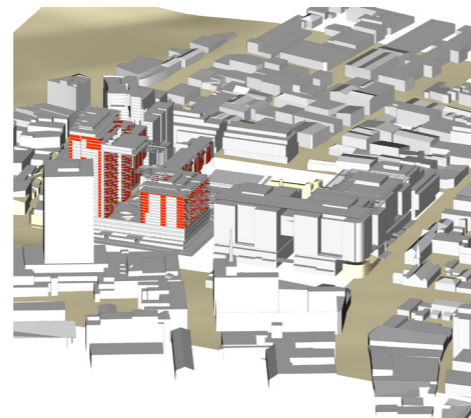
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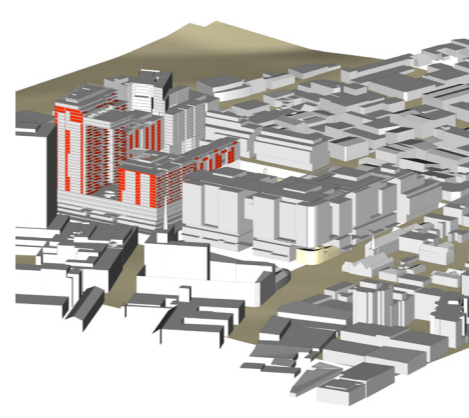
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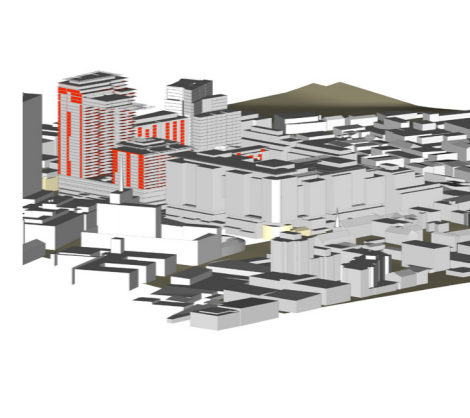
June 21 12:30



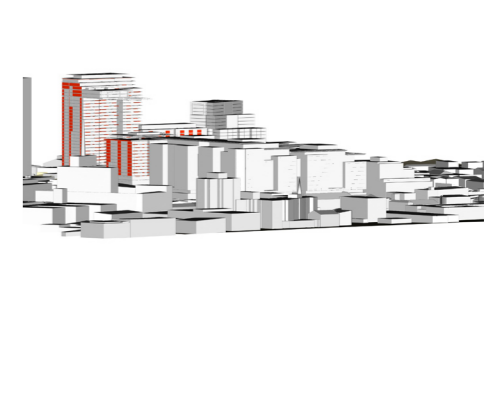
June 21 13:30



June 21 14:30

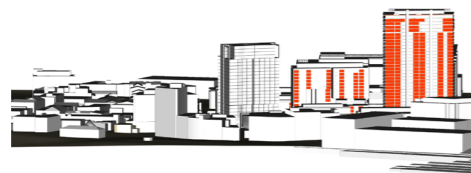


June 21 15:30

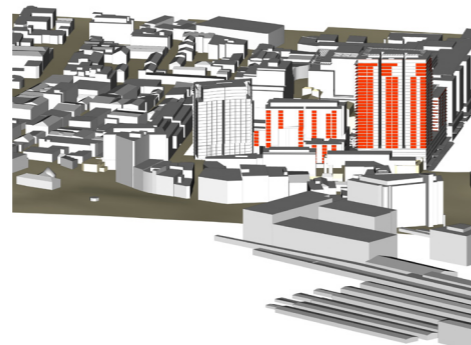


June 21 16:30

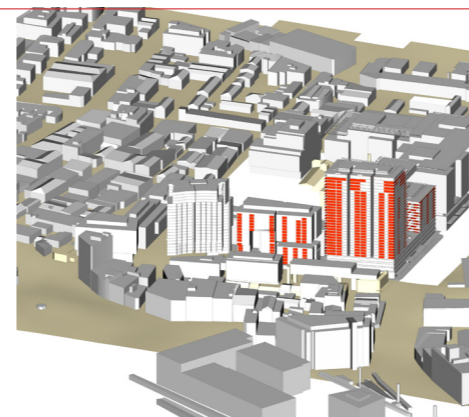
March 21
"Sun's Eye View"
Perspectives



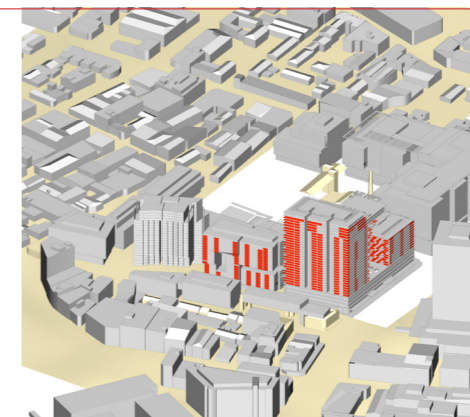
March 21 07:30



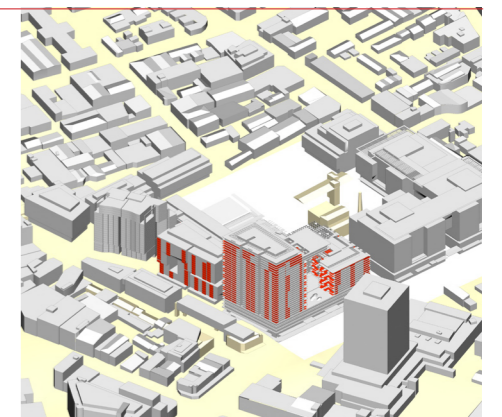
March 21 08:30



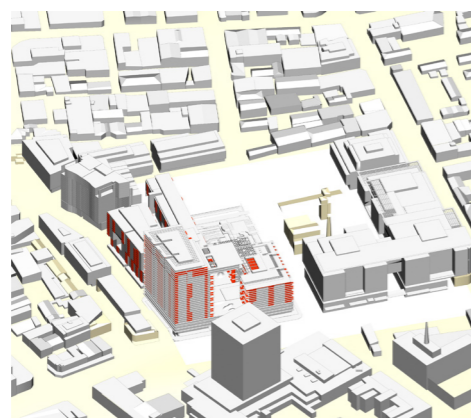
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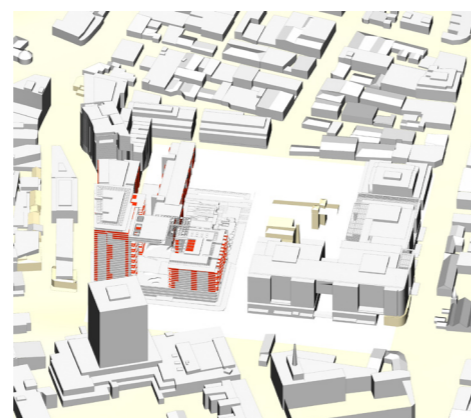
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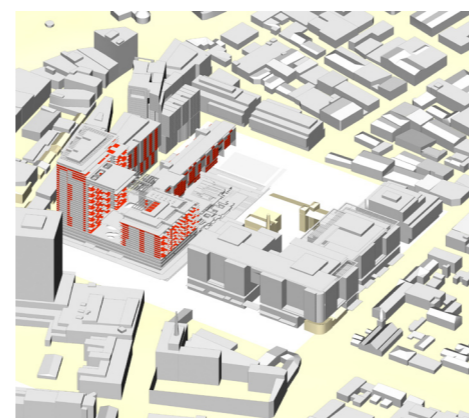
March 21 11:30



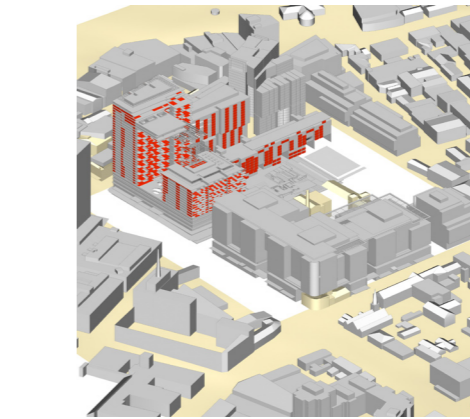
March 21 12:30



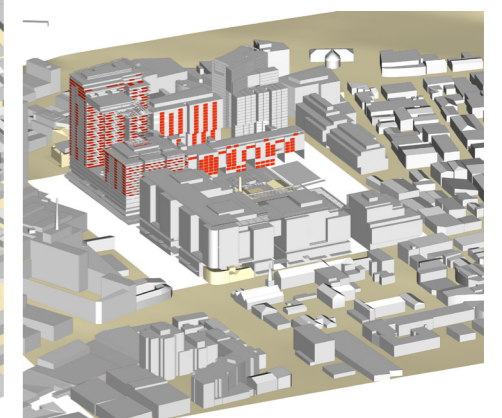
March 21 13:30



March 21 14:30



March 21 15:30



March 21 16:30

Block 2

East Tower			
Level	No Units	Complying in March	Complying in June
33			
32	8	8	8
31	6	9	6
30	9	9	9
29	9	9	8
28	14	10	9
27	14	10	9
26	14	9	9
25	14	10	9
24	14	10	10
23	14	10	13
22	14	10	13
21	14	10	13
20	14	10	13
19	14	10	13
18	14	10	13
17	14	11	13
16	14	11	13
15	14	11	13
14	14	11	11
13	14	11	11
12	14	13	11
11	14	13	11
10	14	13	11
9	14	12	11
8	14	9	11
7	14	9	11
6	14	9	11
5	14	9	11
Total	368	286	304
		78%	83%

Block 2 Summary		
	March	June
No Units	406	412
Complying	68%	69%

West Tower			
Level	No Units	Complying	
		March	June
16	5	5	5
15	20	14	14
14	20	14	14
13	20	14	11
12	20	14	8
11	20	14	8
10	20	10	8
9	20	7	8
8	20	7	8
7	20	7	8
6	20	7	8
5	20	7	8
Total	225	120	108
		53%	48%



Typical Plan West Tower



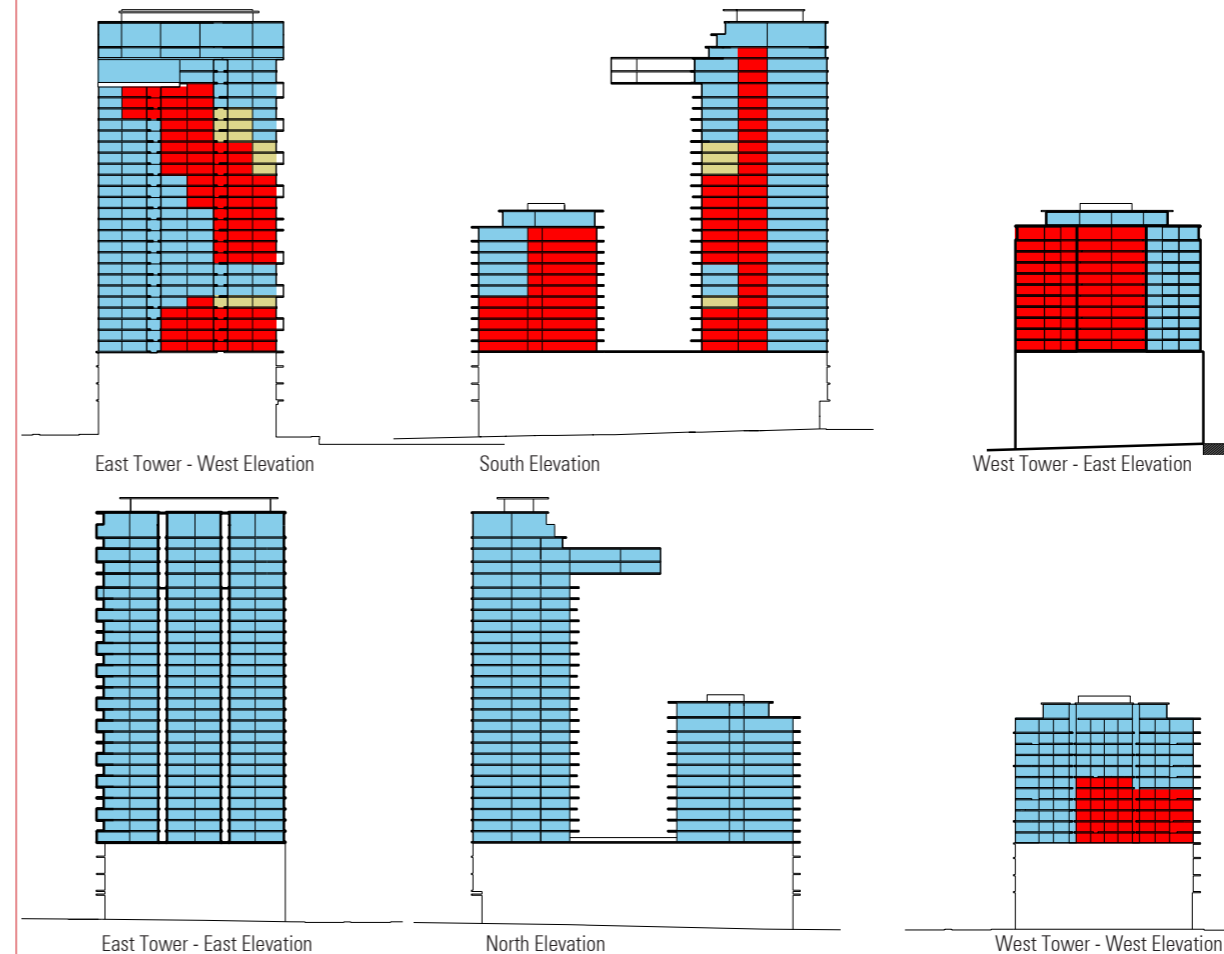
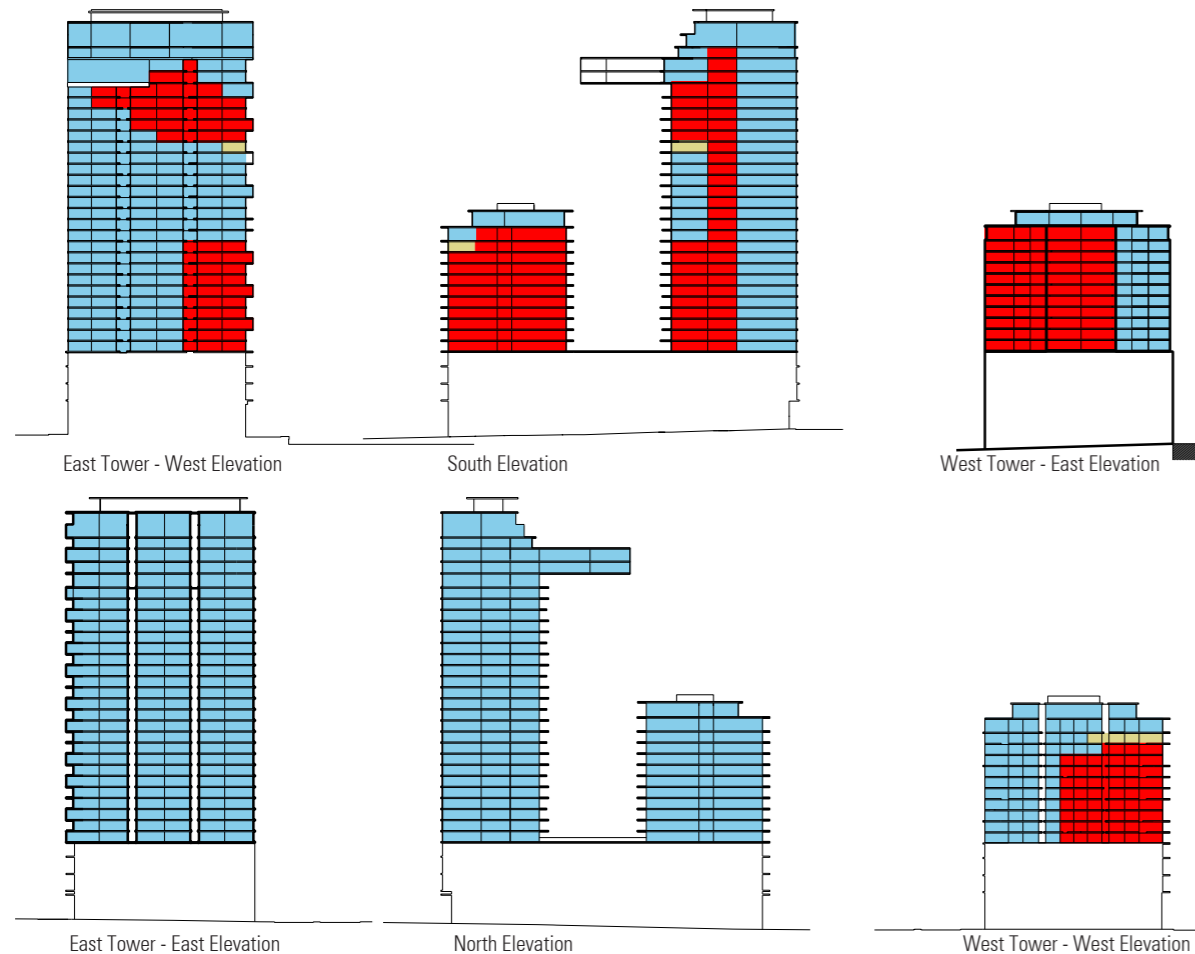
Typical Plan East Tower

On June 21, Block 2 achieves 83% for the East tower and 48% for the West tower. Overall, Block 2 achieves 69%.

In March the results are slightly lower as the higher sun altitude causes a larger shadow under the cantilever.

Summary of Complying Units
June 21

Summary of Complying Units
March 21



- Units achieving less than 2 hours sun using Cox/Tzannes method
- Units achieving at least 2 hours sun using Cox/Tzannes method
- Units relying on Block 1 & 4 roof feature to be transparent

Block 5

Block 5B			
Level	No Units	Complying	
		March	June
18	9	9	8
17	11	10	10
16	12	11	10
15	12	11	9
14	13	12	10
13	12	11	9
12	12	11	8
11	12	11	7
10	12	11	6
9	6	3	3
8	6	3	3
7	11	9	6
6	11	9	6
5	11	9	5
4	12	10	1
3	12	12	0
2	12	8	0
1	0	0	0
0	0	0	0
	186	160	101
		86%	54%

Block 5A			
Level	No Units	Complying	
		March	June
8	5	5	5
7	20	13	6
6	20	13	4
5	20	13	4
4	20	13	3
3	20	12	1
2	8	4	0
1	6	6	0
0	14	10	0
	133	89	23
		67%	17%

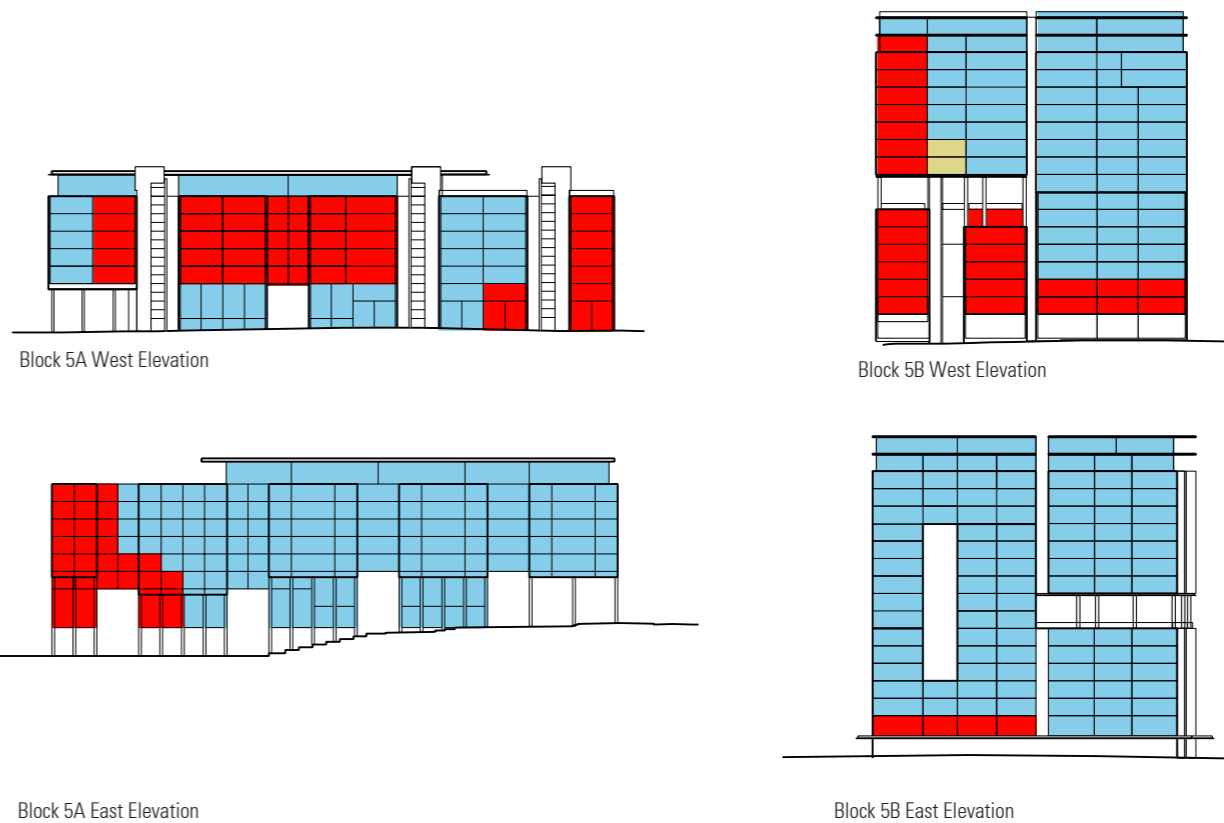
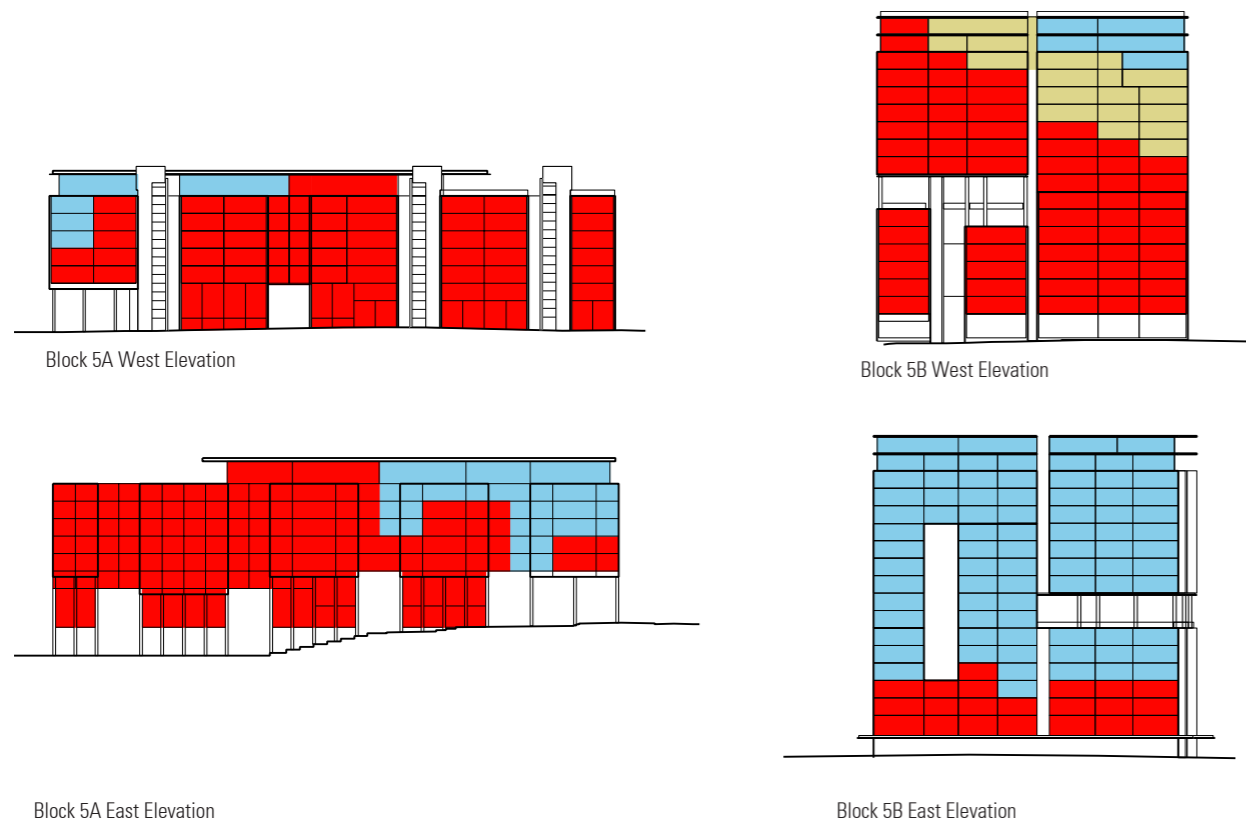
Block 5 Summary	March	June
	319	124
	78%	39%

Block 5 achieves relatively low percentages in June, as the lower Block 5A building is overshadowed by the taller Block 2 and Block 1&4 buildings. This is consistent with expectations in the Heggies report.

In March however, these units will gain substantially longer periods of sun due to the high altitude of the sun. They will enjoy sunny outlook over the park throughout the year.

Summary of Complying Units
June 21

Summary of Complying Units
March 21



- Units achieving less than 2hours sun using Cox/Tzannes method
- Units achieving at least 2hours sun using Cox/Tzannes method
- Units relying on Block 1 & 4 roof feature to be transparent

Block 9

Level	No Units	Complying	
		March	June
27	4	3	4
26	4	3	4
25	4	3	4
24	4	3	4
23	12	11	11
22	12	11	11
21	12	11	11
20	12	11	11
19	19	17	17
18	19	17	17
17	19	17	17
16	19	17	17
15	19	17	17
14	19	17	17
13	19	17	17
12	19	17	17
11	19	17	17
10	19	17	17
09	19	17	17
08	18	16	16
07	18	16	16
06	18	16	16
05	18	16	16
04	10	7	0
03	10	0	0
02	5	0	0
01	5	0	0
	375	314	311
		84%	83%



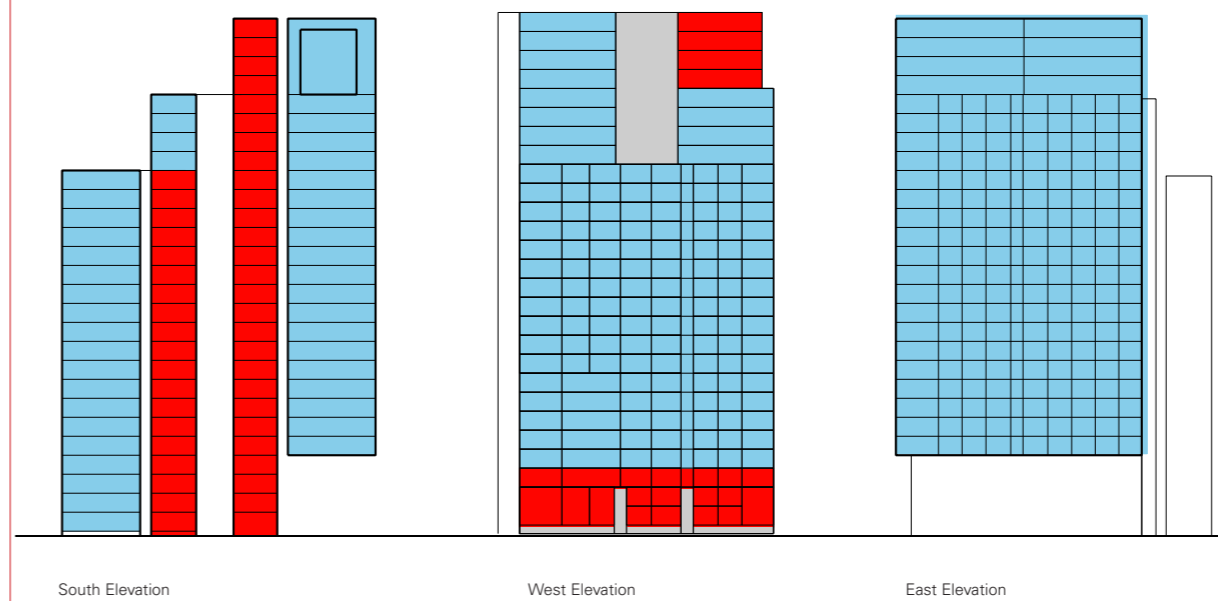
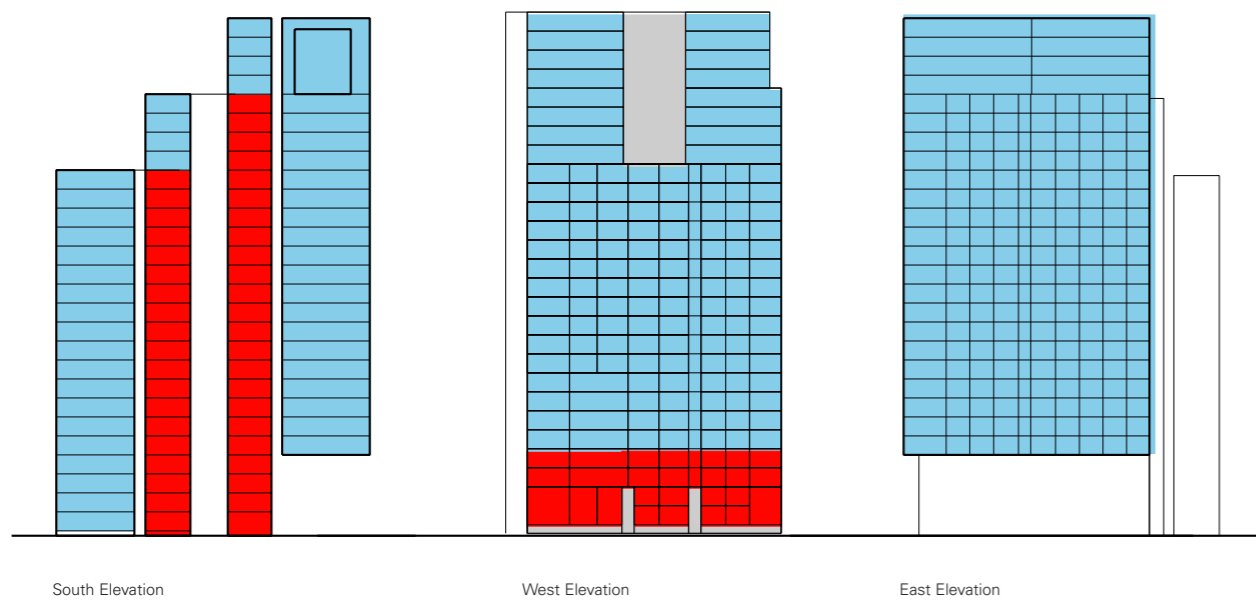
Typical Floor Plan

The adjacent results are for the Block 9 detailed concept design prepared by JPW. Block 9 is not subject to either Block 2 or 5 PA and the design may change in future. The concept design is shown here to demonstrate that in June, Block 5 & 9 can exceed 60% the results of each are combined.

	No Units	Complying (June)	%
Block 5	319	124	39%
Block 9	375	311	83%
Aggregate	694	435	63%

Summary of Complying Units
June 21

Summary of Complying Units
March 21



- Units achieving less than 2 hours sun using Cox/Tzannes method
- Units achieving at least 2 hours sun using Cox/Tzannes method
- Units relying on Block 1 & 4 roof feature to be transparent

Conclusions

Generally the PA designs for Block 2 & 5 are achieving daylight access consistent with the expectations of the Heggies Report and the Approved Concept Plan.

The Block 2 east tower exceeds the results expected in the Heggies report. The west tower is partially overshadowed by the taller east tower and the adjacent Block 1&4. The west tower (previously commercial use) was not considered in the Heggies report, so no comparison with the concept plan is possible. The inclusion of the west tower as residential use pulls down the overall performance of Block 2 to 69%. While this is short of the 81% anticipated in the Heggies report, it none-the-less complies with the 60% minimum required in Concept Plan for individual blocks.

Block 5 achieves slightly less than the results anticipated by the Heggies report. The simplified massing modelled in the Heggies report did not capture the detail of roof elements and plants rooms on Block 1 & 4. This analysis takes into account a more detailed understanding of the Block 1 & 4 proposal which reveals slightly less late afternoon sun on the lower Block 5A building than was expected by Heggies. Combined with a potential design for Block 9 however, Block 5 does meet minimum 60% required for each Block under the Concept Plan. Analysis of the daylight access in March, reveals that units in Block 5 will in fact enjoy considerably longer periods of direct daylight throughout the year in comparison to the mid Winter results.

The Block 2 and 5 PA designs comply with the Concept Plan daylight access provisions

	Concept Plan	PA Design		
		No Units	Complying	Percent
Block 2 East	81.4%	368	304	83%
Block 2 West	NA	225	108	48%
Block 2 Overall	NA	593	412	69%
Block 5A	36.1%	133	23	17%
Block 5B	57.6%	186	101	54%
Block 5 Overall		319	124	39%
Block 9	84.2%	375	311	83%
Block 5 & 9 Aggregate		694	435	63%