

DIRECT SOLAR ACCESS REPORT V BY CROWN, PARRAMATTA

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DOCUMENT CONTROL

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EXECUTIVE SUMMARY

This report is in relation to the proposed development known as V by Crown, located at 45 Macquarie Street, Parramatta and presents a detailed assessment of the amount of direct solar access available to the living areas and associated private open spaces for each residential apartment of the proposed development. The analysis of the solar access relating to the proposed development was carried out in the context of the subject site location, building morphology and land topography.

The analysis undertaken has been carried out utilising a 3D computer model of the subject development based on the architectural drawings which have been prepared by the project architect Allen Jack + Cottier, received 11th June, 2014. The study takes into account any overshadowing effects caused as a result of neighbouring buildings, eaves, overhead protruding balcony slabs, blade walls and any other feature which may affect the direct solar access to the development.

The times of the day when direct solar access is available onto the glass-line of the window(s) of the living area, and onto the floor plan of the associated private open space, of each residential unit of the subject development has been calculated. The results have then been compared against the criteria for direct solar access described in the State Environmental Planning Policy No. 65 (SEPP 65) and Parramatta DCP. The results presented in this report are based between the hours of 9am and 3pm on the Winter Solstice (June 21), as detailed within these requirements.

Requirements stipulate that for a multi-dwelling residential development located in a dense urban area, at least 70% of the residential apartments achieve at least 2 hours of direct solar access between 9am and 3pm on June 21 (winter solstice). Note also that SEPP 65 requires that the number of south-facing single-aspect units within a development be less than 10% of the total number of residential dwellings.

The results of the analysis are summarised as follows.

- 70% of the residential apartments (411 out of 590) achieve at least 2 hours of direct solar access to the window(s) of the Living Area.
- 78% of the residential apartments (407 out of 520) achieve at least 2 hours of direct solar access to the floor slab of the Private Open Space.
- 11% (66 out of 590) of the residential apartments have the living room window(s) facing towards the south.

Hence the results of the analysis indicate that the development will comply with solar access requirements stipulated in SEPP 65 and the Parramatta DCP of more than 70% of the residential apartments achieving direct solar access for more than 2 hours.

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1 DESCRIPTION OF THE PROPOSED REDEVELOPMENT AND SURROUNDS

The proposed development site consists of a 30 level residential development. 590 residential dwellings are proposed, spanning across 28 levels of the building. Ground floor consists of retail spaces and facilities associated with the archaeological site. Six basement levels dedicated to car-parking are also proposed. Openings to the residential apartments are proposed on all aspects of the subject development.

The subject site is located at 45 Macquarie Street, Parramatta and is bounded by Macquarie Street to the north, Marsden Street to the east and Hunter Street to the south. On the adjacent site to the west is a 12 storey office building, while to the north-west is the Jessie Street Centre. East of the subject site are a number of commercial buildings with heights up to six storeys above ground. To the south-east of the site is the St John's Cathedral, with Westfield Parramatta further beyond this.

There is a general rise towards the south-west in the local land topography around the subject site. An aerial image of the site is shown in the Figure 2a and 2b below.



Figure 2a: Aerial Image of the Site Location



**Figure 2b: Aerial Perspective of the Existing Site
(view from the west, facing east)**

2 CRITERIA FOR DIRECT SOLAR ACCESS

The number of hours of direct solar access that each residential apartment of the proposed development achieves is compared to criteria from the State Environmental Planning Policy No. 65 (SEPP 65) and the Parramatta City Council Development Control Plan (DCP) requirements. The criteria stipulated under each criterion are detailed in the sections below.

2.1 State Environmental Planning Policy No. 65 (SEPP65)

The State Environmental Planning Policy No. 65 (SEPP65) for the design of quality residential flat development requires that a residential development should be designed in such a way as to optimise the amount of available solar access.

The Residential Flat Design Code has the following guidelines, listed as "Rules of Thumb":

- Living rooms and private open spaces for at least 70 percent of apartments in a development should receive a minimum of three hours direct sunlight between 9am and 3pm in mid-winter. In dense urban areas a minimum of two hours may be acceptable.
- Limit the number of single-aspect apartments with a southerly aspect (SW-SE) to a maximum of 10 percent of the total units proposed. Developments which seek to vary from the minimum standards must demonstrate how site constraints and orientation prohibit the achievement of these standards and how energy efficiency is addressed."

2.2 Parramatta City Council DCP 2011, Part 3.3.5

The development is located in the Parramatta Town Centre precinct located within the Parramatta City Council. The planning regulations pertaining to this site are bound by the Parramatta City Council Development Control Plan 2011, Part 3.3.5, which states the following:

- Dwellings within the development site and adjoining properties are to receive a minimum of 3 hours sunlight in habitable rooms and in at least 50% of the private open space between 9am and 3am on 21 June.

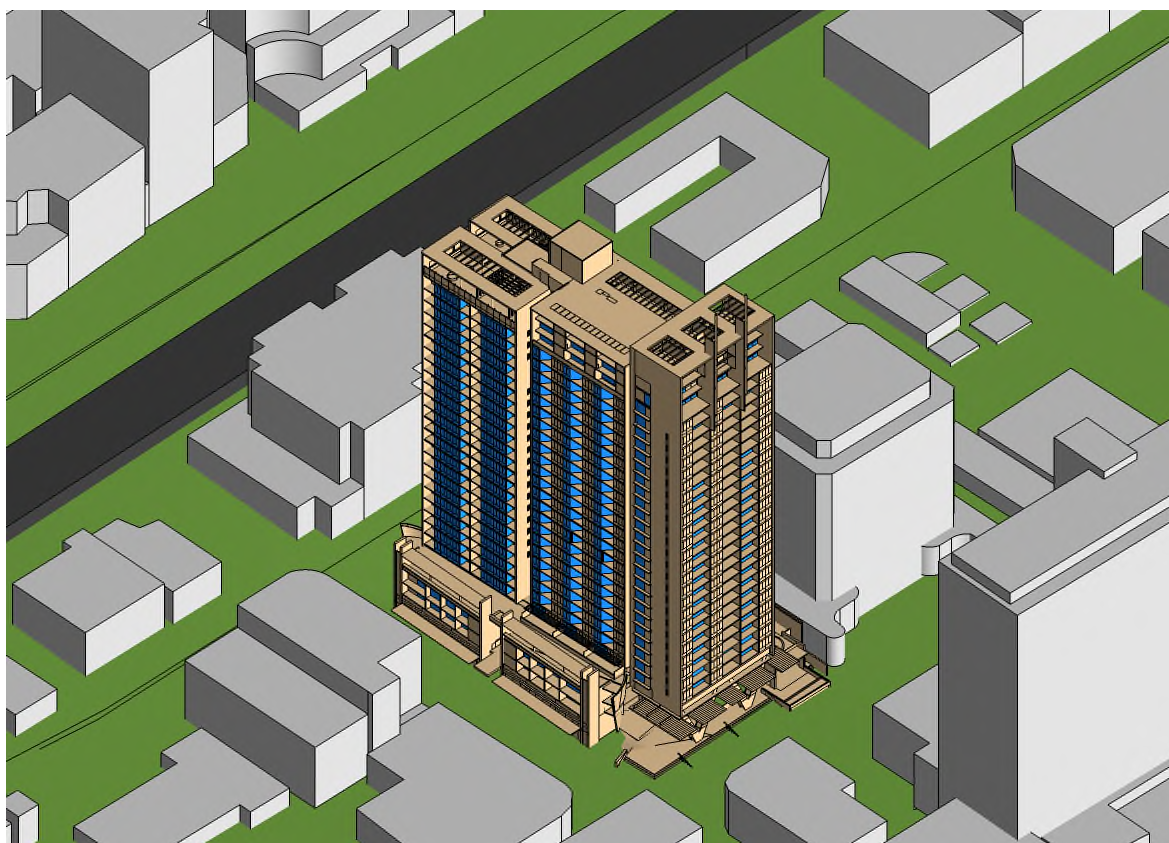
As the proposed development is located in a high density urban area, the requirement for two hours of solar access between the 9am and 3pm on the Winter Solstice for SEPP65 is applicable.

3 METHODOLOGY

The analysis of direct solar access is carried out based on a shadow diagram analysis of the proposed development and its adjacent surroundings in a 3D CAD environment. Effects of land topographical have also been included in the model. The 3D computer model has been constructed based on architectural drawings prepared by the project architect, Allen Jack + Cottier, received 28th February, 2014. The study has taken into account any overshadowing effects caused by neighbouring buildings, eaves, overhead protruding balcony slabs, blade walls, and any other façade features that may affect direct solar access. Figures 2a to 2c illustrates perspective images of the 3D CAD model used for the analysis.

Shadows are cast over the model which is based on the path of the sun on the winter solstice (June 21) respective of the site location. From this simulation, the times of the day when direct solar access is available onto the glass-line of the window(s) of the living area, and onto the floor plan of the associated private open space, of each residential unit of the subject development can be calculated. The results of this study are accurate to within 5 minutes.

Images of the direct solar access available on the elevations of the proposed development are attached in the Appendix B of this report.



**Figure 2a: Perspective Image of the 3D Computer Model
(view from the north-east, facing south-west)**



**Figure 2b: Perspective Image of the 3D Computer Model
(view from the south-east, facing north-west)**



**Figure 2c: Perspective Image of the 3D Computer Model
(view from the south-west, facing north-east)**

4 RESULTS OF ANALYSIS

The direct solar access analysis for the subject development has been undertaken, taking into account the effects of the subject site location, building morphology and land topography. Note that the proposed future developments to the north-west of the site will not have a direct impact upon the solar access performance of the subject development due to its distance away from the site.

4.1 Results from the Analysis

The results for the direct solar access analysis for the various residential apartments within the proposed development are presented in the following table. The indicated apartment number utilised in the below table corresponds to the apartment numbering scheme indicated in the latest set of architectural drawings provided. Solar access to the glazing of the living space area and the associated private outdoor areas of each apartment has been assessed. Note skylights have been assumed to be included above the living areas of the penthouse apartments 28.01, 28.02 and 28.03.

Table 1: Direct Solar Access for Each Residential Apartment

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
1.01	0.7	9:00 - 9:40	1.8	9:00 - 10:50
1.02	0.0	No Solar Access	1.8	9:00 - 10:50
1.03	0.0	No Solar Access	1.8	9:00 - 10:50
1.04	0.0	No Solar Access	1.8	9:00 - 10:50
1.05	0.2	9:00 - 9:10	1.8	9:00 - 10:50
1.06	0.5	9:00 - 9:30	1.8	9:00 - 10:50
1.07	0.7	9:00 - 9:40	1.8	9:00 - 10:50
1.08	0.2	9:00 - 9:10	1.8	9:00 - 10:50
2.01	0.5	9:00 - 9:30	1.8	9:00 - 10:50
2.02	0.0	No Solar Access	1.8	9:00 - 10:50
2.03	0.0	No Solar Access	1.8	9:00 - 10:50
2.04	0.0	No Solar Access	1.8	9:00 - 10:50
2.05	0.2	9:00 - 9:10	1.8	9:00 - 10:50
2.06	0.5	9:00 - 9:30	1.8	9:00 - 10:50
2.07	0.7	9:00 - 9:40	1.8	9:00 - 10:50
2.08	0.2	9:00 - 9:10	1.8	9:00 - 10:50
2.09	0.0	No Solar Access	1.5	11:30 - 13:00
2.10	1.3	11:40 - 13:00	-	-
S2.01	0.0	No Solar Access	-	-
S2.02	0.0	No Solar Access	0.0	No Solar Access
S2.03	0.0	No Solar Access	0.0	No Solar Access

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
S2.04	0.0	No Solar Access	0.0	No Solar Access
S2.05	0.0	No Solar Access		-
S2.06	1.3	10:00 - 11:20 and 15:00 - 15:00	1.0	9:50 - 10:10, 10:40 - 11:20 and 15:00 - 15:00
S2.07	1.5	10:30 - 12:00 and 15:00 - 15:00	1.0	10:40 - 11:40 and 15:00 - 15:00
S2.08	1.7	10:50 - 12:30 and 15:00 - 15:00	1.5	10:40 - 12:10 and 15:00 - 15:00
S2.09	1.7	11:20 - 13:00	1.3	11:20 - 12:40
3.01	0.0	No Solar Access	1.2	12:00 - 12:20 and 12:50 - 13:40
3.02	1.7	12:50 - 14:30	0.2	14:10 - 14:20
3.03	0.7	14:20 - 15:00	0.7	14:20 - 15:00
3.04	0.5	14:30 - 15:00	0.5	14:30 - 15:00
3.05	2.0	9:00 - 11:00	2.0	9:00 - 11:00 and 15:00 - 15:00
3.06	2.2	9:00 - 11:10	2.2	9:00 - 11:10 and 15:00 - 15:00
3.07	2.7	9:00 - 11:40	2.7	9:00 - 11:40 and 15:00 - 15:00
3.08	2.0	9:00 - 11:00	2.3	9:00 - 11:20
3.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
3.10	2.0	9:00 - 11:00	2.0	9:00 - 11:00
3.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
3.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
3.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
3.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
3.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
3.16	0.0	No Solar Access	1.7	11:30 - 13:10
3.17	1.3	11:40 - 13:00		-
S3.01	0.0	No Solar Access		-
S3.02	0.0	No Solar Access	0.0	No Solar Access
S3.03	0.0	No Solar Access	0.0	No Solar Access
S3.04	0.0	No Solar Access	0.0	No Solar Access
S3.05	0.0	No Solar Access		-
S3.06	1.3	10:00 - 11:20 and 15:00 - 15:00	1.3	9:50 - 11:10 and 15:00 - 15:00
S3.07	1.5	10:30 - 12:00 and 15:00 - 15:00	1.3	10:20 - 11:40 and 15:00 - 15:00
S3.08	1.8	10:50 - 12:40 and 15:00 - 15:00	1.5	10:40 - 12:10 and 15:00 - 15:00
S3.09	1.8	11:20 - 13:10	1.5	11:20 - 12:50
4.01	0.0	No Solar Access	1.3	11:50 - 12:20 and 12:50 - 13:40

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
4.02	2.0	11:50 - 12:20 and 12:40 - 14:10	1.5	12:50 - 14:20
4.03	0.7	14:20 - 15:00	0.7	14:20 - 15:00
4.04	0.5	14:30 - 15:00	0.5	14:30 - 15:00
4.05	2.0	9:00 - 11:00 and 15:00 - 15:00	2.0	9:00 - 11:00 and 15:00 - 15:00
4.06	2.2	9:00 - 11:10	2.2	9:00 - 11:10 and 15:00 - 15:00
4.07	2.7	9:00 - 11:40 and 15:00 - 15:00	2.7	9:00 - 11:40 and 15:00 - 15:00
4.08	2.0	9:00 - 11:00	2.2	9:00 - 11:10
4.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
4.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
4.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
4.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
4.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
4.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
4.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
4.16	0.2	13:10 - 13:20	1.7	11:30 - 13:10
4.17	1.7	11:40 - 13:20		-
S4.01	0.0	No Solar Access		-
S4.02	0.0	No Solar Access	0.0	No Solar Access
S4.03	0.0	No Solar Access	0.0	No Solar Access
S4.04	0.0	No Solar Access	0.0	No Solar Access
S4.05	0.0	No Solar Access		-
S4.06	1.5	10:00 - 11:30 and 15:00 - 15:00	1.3	9:50 - 11:10 and 15:00 - 15:00
S4.07	2.0	10:20 - 12:20 and 15:00 - 15:00	1.5	10:20 - 11:50 and 15:00 - 15:00
S4.08	2.0	10:50 - 12:50 and 15:00 - 15:00	1.7	10:40 - 12:20 and 15:00 - 15:00
S4.09	2.0	11:20 - 13:20	1.7	11:20 - 13:00
5.01	0.0	No Solar Access	1.3	11:50 - 12:20 and 12:50 - 13:40
5.02	2.0	11:50 - 12:20 and 12:50 - 14:20	2.0	11:50 - 12:20 and 12:50 - 14:20
5.03	0.7	14:20 - 15:00	0.7	14:20 - 15:00
5.04	0.5	14:30 - 15:00	0.5	14:30 - 15:00
5.05	2.0	9:00 - 11:00 and 15:00 - 15:00	2.0	9:00 - 11:00 and 15:00 - 15:00
5.06	2.2	9:00 - 11:10	2.2	9:00 - 11:10 and 15:00 - 15:00
5.07	2.7	9:00 - 11:40 and 15:00 - 15:00	2.7	9:00 - 11:40 and 15:00 - 15:00
5.08	2.0	9:00 - 11:00	2.2	9:00 - 11:10

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
5.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
5.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
5.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
5.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
5.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
5.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
5.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
5.16	0.5	13:00 - 13:30	2.0	11:30 - 13:30
5.17	2.0	11:30 - 13:30		-
S5.01	0.0	No Solar Access		-
S5.02	0.0	No Solar Access	0.0	No Solar Access
S5.03	0.0	No Solar Access	0.0	No Solar Access
S5.04	0.0	No Solar Access	0.0	No Solar Access
S5.05	0.0	No Solar Access		-
S5.06	1.7	10:00 - 11:40 and 15:00 - 15:00	1.3	9:50 - 11:10 and 15:00 - 15:00
S5.07	2.0	10:30 - 12:30 and 15:00 - 15:00	1.7	10:20 - 12:00 and 15:00 - 15:00
S5.08	2.2	10:50 - 13:00 and 15:00 - 15:00	1.9	10:35 - 12:30 and 15:00 - 15:00
S5.09	2.2	11:20 - 13:30	2.0	11:10 - 13:10
6.01	0.0	No Solar Access	2.0	11:50 - 13:50
6.02	2.5	11:50 - 14:20	2.0	11:50 - 12:20 and 12:50 - 14:20
6.03	1.2	13:50 - 15:00	2.0	13:00 - 15:00
6.04	0.5	14:30 - 15:00	0.5	14:30 - 15:00
6.05	2.0	9:00 - 11:00 and 15:00 - 15:00	2.0	9:00 - 11:00 and 15:00 - 15:00
6.06	2.2	9:00 - 11:10	2.2	9:00 - 11:10 and 15:00 - 15:00
6.07	2.7	9:00 - 11:40 and 15:00 - 15:00	2.7	9:00 - 11:40 and 15:00 - 15:00
6.08	2.0	9:00 - 11:00	2.2	9:00 - 11:10
6.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
6.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
6.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
6.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
6.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
6.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
6.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
6.16	0.7	13:10 - 13:50	2.2	11:30 - 13:40
6.17	2.0	11:40 - 13:40		-
S6.01	0.0	No Solar Access		-

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
S6.02	0.0	No Solar Access	0.0	No Solar Access
S6.03	0.0	No Solar Access	0.0	No Solar Access
S6.04	0.0	No Solar Access	0.0	No Solar Access
S6.05	0.0	No Solar Access		-
S6.06	1.7	10:00 - 11:40	1.4	9:50 - 11:15
S6.07	2.2	10:30 - 12:40	1.7	10:20 - 12:00 and 15:00 - 15:00
S6.08	2.3	10:50 - 13:10	2.2	10:40 - 12:50 and 15:00 - 15:00
S6.09	2.5	11:20 - 13:50	2.0	11:20 - 13:20
7.01	0.5	13:40 - 14:10	2.3	11:50 - 14:10
7.02	2.5	11:50 - 14:20	2.3	12:00 - 14:20
7.03	1.3	13:40 - 15:00	2.0	13:00 - 15:00
7.04	0.5	14:30 - 15:00	0.5	14:30 - 15:00
7.05	2.0	9:00 - 11:00 and 15:00 - 15:00	2.0	9:00 - 11:00 and 15:00 - 15:00
7.06	2.2	9:00 - 11:10	2.2	9:00 - 11:10 and 15:00 - 15:00
7.07	2.7	9:00 - 11:40 and 15:00 - 15:00	2.7	9:00 - 11:40 and 15:00 - 15:00
7.08	2.0	9:00 - 11:00	2.2	9:00 - 11:10
7.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
7.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
7.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
7.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
7.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
7.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
7.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
7.16	1.0	13:00 - 14:00	2.5	11:30 - 14:00
7.17	2.3	11:40 - 14:00		-
S7.01	0.0	No Solar Access		-
S7.02	0.0	No Solar Access	0.0	No Solar Access
S7.03	0.0	No Solar Access	0.0	No Solar Access
S7.04	0.0	No Solar Access	0.0	No Solar Access
S7.05	0.0	No Solar Access		-
S7.06	5.0	10:00 - 15:00	2.2	9:50 - 11:30 and 14:30 - 15:00
S7.07	3.7	10:30 - 14:10 and 15:00 - 15:00	2.0	10:20 - 12:20 and 15:00 - 15:00
S7.08	3.2	10:50 - 14:00 and 15:00 - 15:00	2.3	10:40 - 13:00 and 15:00 - 15:00
S7.09	3.7	11:20 - 15:00	2.3	11:20 - 13:40
8.01	0.7	13:40 - 14:20	2.3	11:50 - 14:10

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
8.02	2.8	11:50 - 14:40	2.5	12:00 - 14:30
8.03	1.3	13:40 - 15:00	2.0	13:00 - 15:00
8.04	2.0	12:10 - 12:20 and 13:10 - 15:00	2.0	13:00 - 15:00
8.05	2.0	9:00 - 11:00 and 15:00 - 15:00	2.0	9:00 - 11:00 and 15:00 - 15:00
8.06	2.2	9:00 - 11:10	2.2	9:00 - 11:10 and 15:00 - 15:00
8.07	2.7	9:00 - 11:40 and 15:00 - 15:00	2.7	9:00 - 11:40 and 15:00 - 15:00
8.08	2.0	9:00 - 11:00	2.2	9:00 - 11:10
8.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
8.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
8.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
8.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
8.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
8.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
8.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
8.16	2.0	12:50 - 14:50	2.8	11:30 - 14:20
8.17	2.8	11:40 - 14:30		-
S8.01	0.0	No Solar Access		-
S8.02	0.0	No Solar Access	0.0	No Solar Access
S8.03	0.0	No Solar Access	0.0	No Solar Access
S8.04	0.0	No Solar Access	0.0	No Solar Access
S8.05	0.0	No Solar Access		-
S8.06	5.0	10:00 - 15:00	5.2	9:50 - 15:00
S8.07	4.5	10:30 - 15:00	4.7	10:20 - 15:00
S8.08	4.2	10:50 - 15:00	4.3	10:40 - 15:00 and 15:00 - 15:00
S8.09	3.7	11:20 - 15:00	2.7	11:20 - 14:00
9.01	1.2	13:40 - 14:50	2.8	11:50 - 14:40
9.02	3.0	11:50 - 14:50	3.0	12:00 - 15:00
9.03	1.3	13:40 - 15:00	2.0	13:00 - 15:00
9.04	2.5	11:50 - 12:30 and 13:10 - 15:00	2.3	11:50 - 12:20 and 13:10 - 15:00
9.05	2.7	9:00 - 11:00, 12:50 - 13:00 and 13:40 - 14:10	2.0	9:00 - 11:00 and 15:00 - 15:00
9.06	2.7	9:00 - 11:10, 12:50 - 13:10 and 14:00 - 14:10	2.2	9:00 - 11:10 and 15:00 - 15:00
9.07	3.2	9:00 - 11:40 and 13:00 - 13:30	2.7	9:00 - 11:40 and 15:00 - 15:00
9.08	2.0	9:00 - 11:00	2.2	9:00 - 11:10

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
9.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
9.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
9.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
9.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
9.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
9.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
9.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
9.16	2.2	12:50 - 15:00	3.5	11:30 - 15:00
9.17	3.3	11:40 - 15:00		-
S9.01	0.0	No Solar Access		-
S9.02	0.0	No Solar Access	0.0	No Solar Access
S9.03	0.0	No Solar Access	0.0	No Solar Access
S9.04	0.0	No Solar Access	0.0	No Solar Access
S9.05	0.0	No Solar Access		-
S9.06	5.0	10:00 - 15:00	5.2	9:50 - 15:00
S9.07	4.5	10:30 - 15:00	4.7	10:20 - 15:00
S9.08	4.2	10:50 - 15:00	4.3	10:40 - 15:00
S9.09	3.7	11:20 - 15:00	2.7	11:20 - 14:00
10.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
10.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
10.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
10.04	3.0	11:20 - 12:30 and 13:10 - 15:00	3.0	11:20 - 12:30 and 13:10 - 15:00
10.05	4.8	9:00 - 11:00, 11:40 - 13:10 and 13:40 - 15:00	2.0	9:00 - 11:00 and 15:00 - 15:00
10.06	4.5	9:00 - 11:10, 11:50 - 13:10 and 14:00 - 15:00	2.2	9:00 - 11:10 and 15:00 - 15:00
10.07	5.3	9:00 - 13:40 and 14:20 - 15:00	2.7	9:00 - 11:40 and 15:00 - 15:00
10.08	2.0	9:00 - 11:00	2.2	9:00 - 11:10
10.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
10.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
10.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
10.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
10.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
10.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
10.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
10.16	2.2	12:50 - 15:00	3.5	11:30 - 15:00
10.17	3.3	11:40 - 15:00		-
S10.01	0.0	No Solar Access		-
S10.02	0.0	No Solar Access	0.0	No Solar Access

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
S10.03	0.0	No Solar Access	0.0	No Solar Access
S10.04	0.0	No Solar Access	0.0	No Solar Access
S10.05	0.0	No Solar Access		-
S10.06	5.0	10:00 - 15:00	5.2	9:50 - 15:00
S10.07	4.5	10:30 - 15:00	4.7	10:20 - 15:00
S10.08	4.2	10:50 - 15:00	4.3	10:40 - 15:00
S10.09	3.7	11:20 - 15:00	2.7	11:20 - 14:00
11.01	1.3	13:40 - 15:00	3.3	11:40 - 15:00
11.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
11.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
11.04	3.7	11:20 - 15:00	3.8	11:10 - 15:00
11.05	4.5	9:00 - 11:00, 11:40 - 13:00 and 13:50 - 15:00	4.0	9:00 - 11:00, 12:10 - 13:00 and 13:50 - 15:00
11.06	4.7	9:00 - 11:10, 11:40 - 13:10 and 14:00 - 15:00	4.2	9:00 - 11:20, 12:10 - 13:10 and 14:00 - 14:50
11.07	5.3	9:00 - 13:40 and 14:20 - 15:00	4.2	9:00 - 11:50 and 12:20 - 13:40
11.08	2.0	9:00 - 11:00	2.2	9:00 - 11:10
11.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
11.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
11.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
11.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
11.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
11.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
11.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
11.16	2.0	13:00 - 15:00	3.5	11:30 - 15:00
11.17	3.3	11:40 - 15:00		-
S11.01	0.0	No Solar Access		-
S11.02	0.0	No Solar Access	0.0	No Solar Access
S11.03	0.0	No Solar Access	0.0	No Solar Access
S11.04	0.0	No Solar Access	0.0	No Solar Access
S11.05	0.0	No Solar Access		-
S11.06	5.0	10:00 - 15:00	5.2	9:50 - 15:00
S11.07	4.5	10:30 - 15:00	4.7	10:20 - 15:00
S11.08	4.2	10:50 - 15:00	4.3	10:40 - 15:00
S11.09	3.7	11:20 - 15:00	2.7	11:20 - 14:00
12.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
12.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
12.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
12.04	3.7	11:20 - 15:00	3.8	11:10 - 15:00

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
12.05	5.5	9:00 - 13:10 and 13:40 - 15:00	5.2	9:00 - 11:00, 11:20 - 13:10 and 13:40 - 15:00
12.06	5.3	9:00 - 13:20 and 14:00 - 15:00	5.3	9:00 - 13:20 and 14:00 - 15:00
12.07	5.5	9:00 - 13:50 and 14:20 - 15:00	5.3	9:00 - 13:40 and 14:20 - 15:00
12.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
12.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
12.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
12.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
12.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
12.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
12.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
12.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
12.16	3.5	11:30 - 15:00		-
12.17	3.3	11:40 - 15:00		-
S12.01	0.0	No Solar Access		-
S12.02	0.0	No Solar Access	0.0	No Solar Access
S12.03	0.0	No Solar Access	0.0	No Solar Access
S12.04	0.0	No Solar Access	0.0	No Solar Access
S12.05	0.0	No Solar Access		-
S12.06	5.0	10:00 - 15:00	5.2	9:50 - 15:00
S12.07	4.5	10:30 - 15:00	4.7	10:20 - 15:00
S12.08	4.2	10:50 - 15:00	4.3	10:40 - 15:00
S12.09	3.7	11:20 - 15:00	2.7	11:20 - 14:00
S12.10	3.3	11:40 - 15:00	0.0	No Solar Access
13.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
13.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
13.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
13.04	3.7	11:20 - 15:00	3.8	11:10 - 15:00
13.05	6.0	9:00 - 15:00	5.7	9:00 - 13:20 and 13:40 - 15:00
13.06	6.0	9:00 - 15:00	5.5	9:00 - 13:30 and 14:00 - 15:00
13.07	5.7	9:00 - 14:00 and 14:20 - 15:00	5.5	9:00 - 13:50 and 14:20 - 15:00
13.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
13.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
13.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
13.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
13.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
13.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
13.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
13.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
13.16	3.5	11:30 - 15:00		-
13.17	3.3	11:40 - 15:00		-
S13.01	0.0	No Solar Access		-
S13.02	0.0	No Solar Access	0.0	No Solar Access
S13.03	0.0	No Solar Access	0.0	No Solar Access
S13.04	0.0	No Solar Access	0.0	No Solar Access
S13.05	0.0	No Solar Access		-
S13.06	5.0	10:00 - 15:00	5.2	9:50 - 15:00
S13.07	4.5	10:30 - 15:00	4.7	10:20 - 15:00
S13.08	4.2	10:50 - 15:00	4.3	10:40 - 15:00
S13.09	3.7	11:20 - 15:00	2.7	11:20 - 14:00
S13.10	3.3	11:40 - 15:00	0.0	No Solar Access
14.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
14.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
14.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
14.04	3.7	11:20 - 15:00	3.8	11:10 - 15:00
14.05	6.0	9:00 - 15:00	6.0	9:00 - 15:00
14.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00
14.07	6.0	9:00 - 15:00	6.0	9:00 - 15:00
14.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
14.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
14.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
14.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
14.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
14.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
14.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
14.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
14.16	3.5	11:30 - 15:00		-
14.17	3.3	11:40 - 15:00		-
S14.01	0.0	No Solar Access		-
S14.02	0.0	No Solar Access	0.0	No Solar Access
S14.03	0.0	No Solar Access	0.0	No Solar Access
S14.04	0.0	No Solar Access	0.0	No Solar Access
S14.05	0.0	No Solar Access		-
S14.06	5.0	10:00 - 15:00	5.2	9:50 - 15:00
S14.07	4.5	10:30 - 15:00	4.7	10:20 - 15:00
S14.08	4.2	10:50 - 15:00	4.3	10:40 - 15:00
S14.09	3.7	11:20 - 15:00	2.7	11:20 - 14:00

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
S14.10	3.3	11:40 - 15:00	0.0	No Solar Access
15.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
15.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
15.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
15.04	3.7	11:20 - 15:00	3.8	11:10 - 15:00
15.05	6.0	9:00 - 15:00	6.0	9:00 - 15:00
15.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00
15.07	6.0	9:00 - 15:00	6.0	9:00 - 15:00
15.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
15.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
15.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
15.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
15.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
15.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
15.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
15.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
15.16	3.5	11:30 - 15:00		-
15.17	3.3	11:40 - 15:00		-
S15.01	0.0	No Solar Access		-
S15.02	0.0	No Solar Access	0.0	No Solar Access
S15.03	0.0	No Solar Access	0.0	No Solar Access
S15.04	0.0	No Solar Access	0.0	No Solar Access
S15.05	0.0	No Solar Access		-
S15.06	5.0	10:00 - 15:00	5.2	9:50 - 15:00
S15.07	4.5	10:30 - 15:00	4.7	10:20 - 15:00
S15.08	4.2	10:50 - 15:00	4.3	10:40 - 15:00
S15.09	3.7	11:20 - 15:00	2.7	11:20 - 14:00
S15.10	3.3	11:40 - 15:00	0.0	No Solar Access
16.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
16.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
16.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
16.04	3.7	11:20 - 15:00	3.8	11:10 - 15:00
16.05	6.0	9:00 - 15:00	6.0	9:00 - 15:00
16.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00
16.07	6.0	9:00 - 15:00	6.0	9:00 - 15:00
16.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
16.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
16.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
16.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
16.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
16.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
16.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
16.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
16.16	3.5	11:30 - 15:00		-
16.17	3.3	11:40 - 15:00		-
S16.01	0.0	No Solar Access		-
S16.02	0.0	No Solar Access	0.0	No Solar Access
S16.03	0.0	No Solar Access	0.0	No Solar Access
S16.04	0.0	No Solar Access	0.0	No Solar Access
S16.05	0.0	No Solar Access		-
S16.06	5.0	10:00 - 15:00	5.2	9:50 - 15:00
S16.07	4.5	10:30 - 15:00	4.7	10:20 - 15:00
S16.08	4.2	10:50 - 15:00	4.3	10:40 - 15:00
S16.09	3.7	11:20 - 15:00	2.7	11:20 - 14:00
S16.10	3.3	11:40 - 15:00	0.0	No Solar Access
17.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
17.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
17.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
17.04	3.7	11:20 - 15:00	3.8	11:10 - 15:00
17.05	6.0	9:00 - 15:00	6.0	9:00 - 15:00
17.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00
17.07	6.0	9:00 - 15:00	6.0	9:00 - 15:00
17.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
17.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
17.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
17.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
17.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
17.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
17.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
17.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
17.16	3.5	11:30 - 15:00		-
17.17	3.3	11:40 - 15:00		-
S17.01	0.0	No Solar Access	0.0	No Solar Access
S17.02	0.0	No Solar Access	0.0	No Solar Access
S17.03	0.0	No Solar Access	0.0	No Solar Access
S17.04	0.0	No Solar Access	0.0	No Solar Access
S17.05	5.0	10:00 - 15:00	5.2	9:50 - 15:00
S17.06	4.5	10:30 - 15:00	4.7	10:20 - 15:00
S17.07	4.2	10:50 - 15:00	4.3	10:40 - 15:00
S17.08	3.7	11:20 - 15:00	2.7	11:20 - 14:00

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
S17.09	3.3	11:40 - 15:00		-
18.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
18.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
18.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
18.04	3.7	11:20 - 15:00	3.8	11:10 - 15:00
18.05	6.0	9:00 - 15:00	6.0	9:00 - 15:00
18.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00
18.07	6.0	9:00 - 15:00	6.0	9:00 - 15:00
18.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
18.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
18.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
18.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
18.12	3.5	11:30 - 15:00		-
18.13	3.3	11:40 - 15:00		-
S18.01	0.0	No Solar Access	0.0	No Solar Access
S18.02	0.0	No Solar Access	0.0	No Solar Access
S18.03	0.0	No Solar Access	0.0	No Solar Access
S18.04	0.0	No Solar Access	0.0	No Solar Access
S18.05	5.0	10:00 - 15:00	5.2	9:50 - 15:00
S18.06	4.5	10:30 - 15:00	4.7	10:20 - 15:00
S18.07	4.2	10:50 - 15:00	4.3	10:40 - 15:00
S18.08	3.7	11:20 - 15:00		11:20 - 14:00
S18.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
S18.10	2.0	9:00 - 11:00	2.0	9:00 - 11:00
19.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
19.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
19.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
19.04	3.7	11:20 - 15:00	3.8	11:10 - 15:00
19.05	6.0	9:00 - 15:00	6.0	9:00 - 15:00
19.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00
19.07	6.0	9:00 - 15:00	6.0	9:00 - 15:00
19.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
19.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
19.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
19.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
19.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
19.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
19.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
19.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
19.16	2.2	12:50 - 15:00	3.5	11:30 - 15:00

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
19.17	3.5	11:30 - 15:00		-
19.18	3.3	11:40 - 15:00		-
20.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
20.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
20.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
20.04	3.7	11:20 - 15:00	3.8	11:10 - 15:00
20.05	6.0	9:00 - 15:00	6.0	9:00 - 15:00
20.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00
20.07	6.0	9:00 - 15:00	6.0	9:00 - 15:00
20.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
20.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
20.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
20.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
20.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
20.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
20.14	2.0	9:00 - 11:00	2.0	9:00 - 11:00
20.15	2.0	9:00 - 11:00	2.0	9:00 - 11:00
20.16	2.2	12:50 - 15:00	3.3	11:40 - 15:00
20.17	3.5	11:30 - 15:00		-
20.18	3.3	11:40 - 15:00		-
21.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
21.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
21.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
21.04	6.0	9:00 - 15:00	6.0	9:00 - 15:00
21.05	6.0	9:00 - 15:00	6.0	9:00 - 15:00
21.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00
21.07	2.0	9:00 - 11:00	2.0	9:00 - 11:00
21.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
21.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
21.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
21.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
21.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
21.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
21.14	3.5	11:30 - 15:00	3.5	11:30 - 15:00
21.15	3.5	11:30 - 15:00	3.5	11:30 - 15:00
21.16	3.5	11:30 - 15:00		-
21.17	3.3	11:40 - 15:00		-
22.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
22.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
22.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
22.04	6.0	9:00 - 15:00	6.0	9:00 - 15:00
22.05	6.0	9:00 - 15:00	6.0	9:00 - 15:00
22.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00
22.07	2.0	9:00 - 11:00	2.0	9:00 - 11:00
22.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
22.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
22.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
22.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
22.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
22.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
22.14	3.5	11:30 - 15:00	3.5	11:30 - 15:00
22.15	3.5	11:30 - 15:00	3.5	11:30 - 15:00
22.16	3.5	11:30 - 15:00		-
22.17	3.3	11:40 - 15:00		-
23.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
23.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
23.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
23.04	6.0	9:00 - 15:00	6.0	9:00 - 15:00
23.05	6.0	9:00 - 15:00	6.0	9:00 - 15:00
23.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00
23.07	2.0	9:00 - 11:00	2.0	9:00 - 11:00
23.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
23.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
23.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
23.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
23.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
23.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
23.14	3.5	11:30 - 15:00	3.5	11:30 - 15:00
23.15	3.5	11:30 - 15:00	3.5	11:30 - 15:00
23.16	3.5	11:30 - 15:00		-
23.17	3.3	11:40 - 15:00		-
24.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
24.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
24.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
24.04	6.0	9:00 - 15:00	6.0	9:00 - 15:00
24.05	5.2	9:00 - 14:10	6.0	9:00 - 15:00
24.06	5.8	9:00 - 14:50	6.0	9:00 - 15:00
24.07	2.0	9:00 - 11:00	2.0	9:00 - 11:00
24.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
24.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
24.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
24.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
24.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
24.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
24.14	3.5	11:30 - 15:00	3.5	11:30 - 15:00
24.15	3.5	11:30 - 15:00	3.5	11:30 - 15:00
24.16	3.5	11:30 - 15:00		-
24.17	3.3	11:40 - 15:00		-
25.01	1.3	13:40 - 15:00	3.2	11:50 - 15:00
25.02	3.2	11:50 - 15:00	3.0	12:00 - 15:00
25.03	1.3	13:40 - 15:00	2.2	12:50 - 15:00
25.04	5.8	9:00 - 14:50	6.0	9:00 - 15:00
25.05	4.7	9:00 - 13:40	6.0	9:00 - 15:00
25.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00
25.07	2.0	9:00 - 11:00	2.0	9:00 - 11:00
25.08	2.0	9:00 - 11:00	2.0	9:00 - 11:00
25.09	2.0	9:00 - 11:00	2.0	9:00 - 11:00
25.1	2.0	9:00 - 11:00	2.0	9:00 - 11:00
25.11	2.0	9:00 - 11:00	2.0	9:00 - 11:00
25.12	2.0	9:00 - 11:00	2.0	9:00 - 11:00
25.13	2.0	9:00 - 11:00	2.0	9:00 - 11:00
25.14	3.5	11:30 - 15:00	3.5	11:30 - 15:00
25.15	3.5	11:30 - 15:00	3.5	11:30 - 15:00
25.16	3.5	11:30 - 15:00		-
25.17	3.3	11:40 - 15:00		-
26.01	2.5	12:30 - 15:00	3.0	11:40 - 14:40
26.02	2.5	12:30 - 15:00	2.7	12:00 - 14:40
26.03	1.3	13:40 - 15:00	2.3	12:20 - 14:40
26.04	5.8	9:00 - 14:50	6.0	9:00 - 15:00
26.05	4.7	9:00 - 13:40	6.0	9:00 - 15:00
26.06	5.3	9:00 - 14:20	6.0	9:00 - 15:00
26.07	1.0	9:00 - 10:00	2.0	9:00 - 11:00
26.08	1.0	9:00 - 10:00	2.0	9:00 - 11:00
26.09	1.0	9:00 - 10:00	2.0	9:00 - 11:00
27.01	2.7	12:20 - 15:00	3.3	11:40 - 15:00
27.02	2.7	12:20 - 15:00	3.0	12:00 - 15:00
27.03	1.3	13:40 - 15:00	2.3	12:40 - 15:00
27.04	6.0	9:00 - 15:00	6.0	9:00 - 15:00
27.05	5.0	9:00 - 14:00	6.0	9:00 - 15:00
27.06	6.0	9:00 - 15:00	6.0	9:00 - 15:00

Apartment Number	Living Areas		Private Open Spaces	
	Number of Hours	Times of Occurrence	Number of Hours	Times of Occurrence
27.07	1.0	9:00 - 10:00	1.7	9:00 - 10:40
27.08	1.0	9:00 - 10:00	1.7	9:00 - 10:40
27.09	1.0	9:00 - 10:00	1.7	9:00 - 10:40
28.01	6.0	9:00 - 15:00	1.2	9:00 - 10:10
28.02	6.0	9:00 - 15:00	1.2	9:00 - 10:10
28.03	6.0	9:00 - 15:00	1.2	9:00 - 10:10
28.04	6.0	9:00 - 15:00	6.0	9:00 - 15:00
28.05	5.0	9:00 - 14:00	6.0	9:00 - 15:00
28.06	5.0	9:00 - 14:00	6.0	9:00 - 15:00

4.2 Summary of the Results

- 70% of the residential apartments (411 out of 590) achieve at least 2 hours of direct solar access to the window(s) of the Living Area.
- 78% of the residential apartments (407 out of 520) achieve at least 2 hours of direct solar access to the floor slab of the Private Open Space.
- 11% (66 out of 590) of the residential apartments have the living room window(s) facing towards the south.

Hence the results of the analysis indicate that the development will comply with solar access requirements stipulated in SEPP 65 and the Parramatta DCP of more than 70% of the residential apartments achieving direct solar access for more than 2 hours.

5 CONCLUSION

An analysis of the direct solar access has been undertaken for the proposed development known as V by Crown, located at 45 Macquarie Street, Parramatta and presents a detailed assessment of the amount of direct solar access available to the living areas and associated private open spaces for each residential apartment of the proposed development. The analysis of the solar access relating to the proposed development was carried out in the context of the subject site location, building morphology and land topography.

The analysis undertaken has been carried out utilising a 3D computer model of the subject development based on the architectural drawings which have been prepared by the project architect Allen Jack + Cottier, received 11th June, 2014. The study takes into account any overshadowing effects caused as a result of neighbouring buildings, eaves, overhead protruding balcony slabs, blade walls and any other feature which may affect the direct solar access to the development.

- 70% of the residential apartments (411 out of 590) achieve at least 2 hours of direct solar access to the window(s) of the Living Area.
- 78% of the residential apartments (407 out of 520) achieve at least 2 hours of direct solar access to the floor slab of the Private Open Space.
- 11% (66 out of 590) of the residential apartments have the living room window(s) facing towards the south.

Hence the results of the analysis indicate that the development will comply with solar access requirements stipulated in SEPP 65 and the Parramatta DCP of more than 70% of the residential apartments achieving direct solar access for more than 2 hours.

6 REFERENCES

R.O. Phillips, Sunshine and Shade in Australia 6th Edition, CSIRO Technical Report 92/2.

Department of Infrastructure , Planning and Natural Resources, Residential Flat Design Code, Part 3: Building Design, 2002.

Parramatta City Council, Parramatta Development Control Plan 2011, Part 3.3.5 Solar Access and Cross Ventilation.

APPENDIX A - SOLAR CHART FOR THE SYDNEY REGION

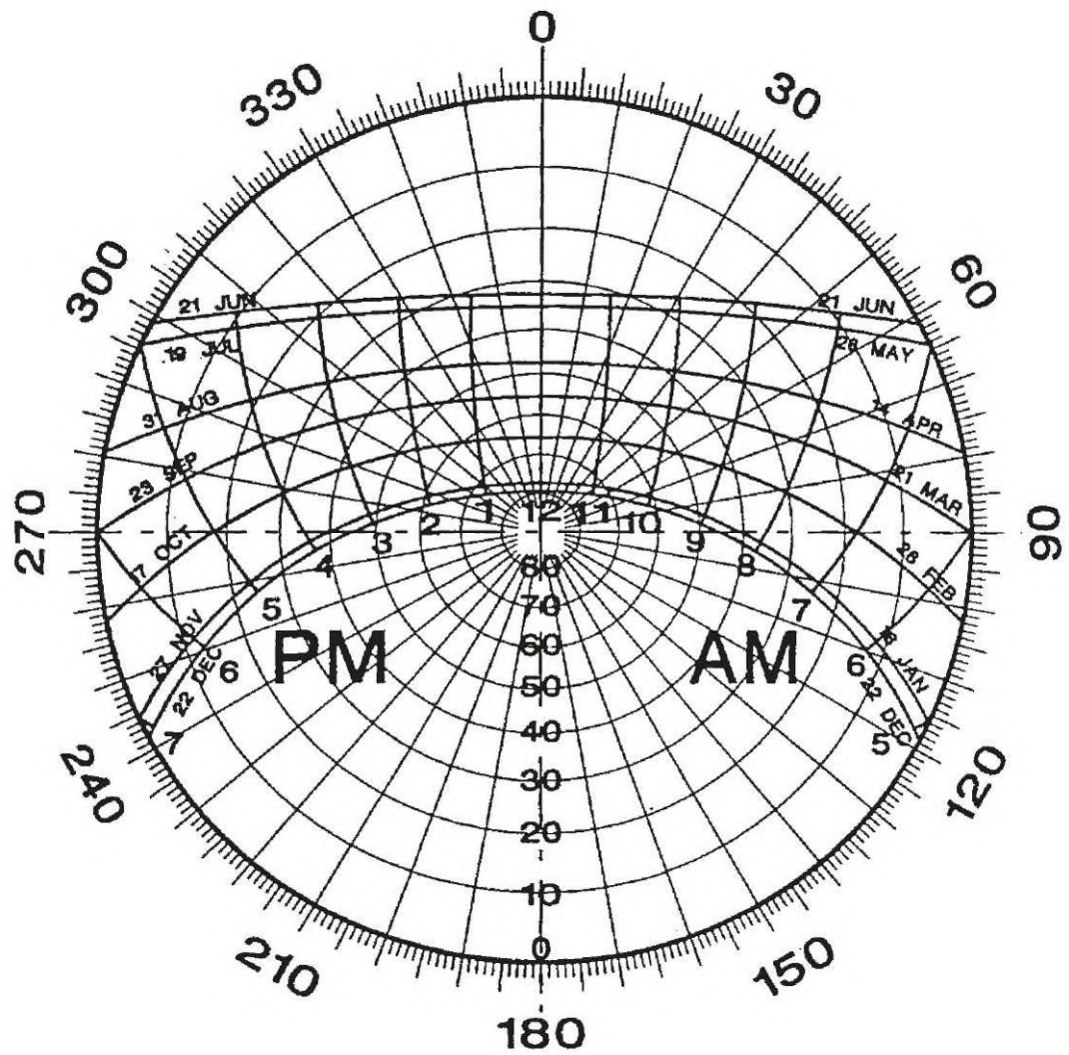


Figure A1: Solar Chart for the Sydney Region

APPENDIX B - IMAGES FROM 3D MODEL



Figure B1: Eastern Aspect (9:00am)



Figure B2: Eastern Aspect (10:00am)



Figure B3: Eastern Aspect (11:00am)



Figure B4: Eastern Aspect (12:00pm)



Figure B5: Eastern Aspect (1:00pm)



Figure B6: Eastern Aspect (2:00pm)



Figure B7: Eastern Aspect (3:00pm)

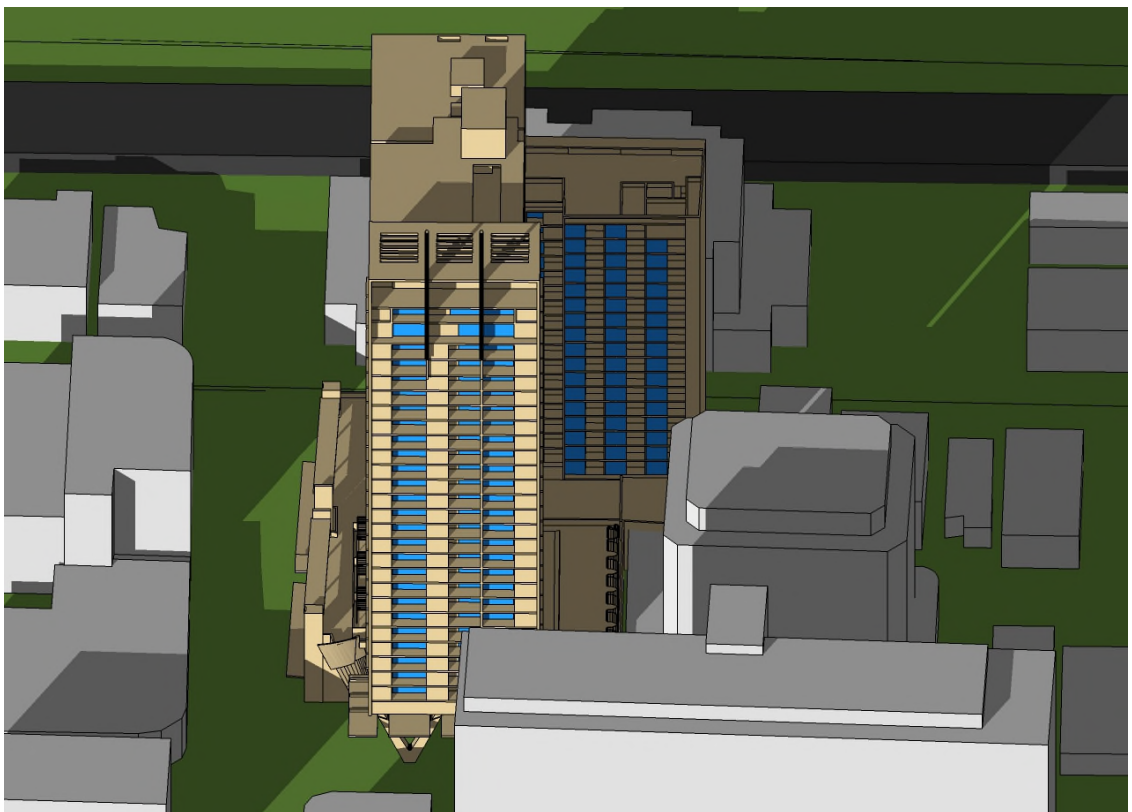


Figure B8: Northern Aspect (9:00am)

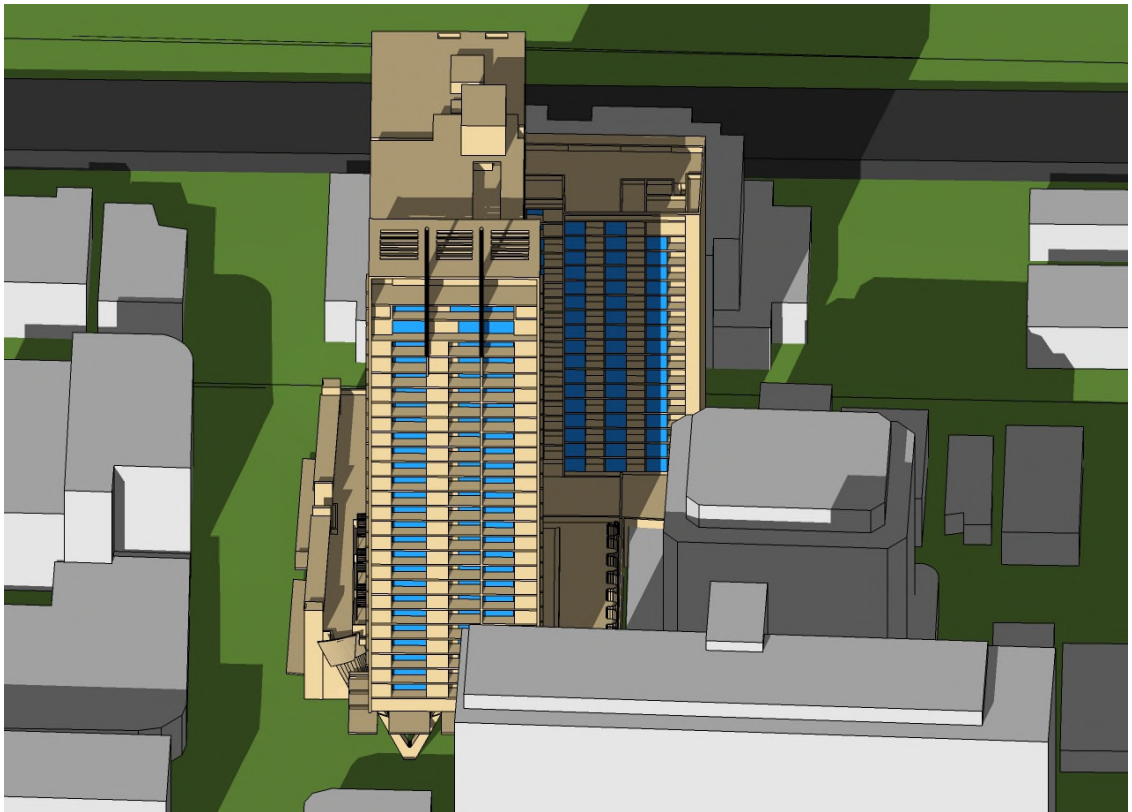


Figure B9: Northern Aspect (10:00am)



Figure B10: Northern Aspect (11:00am)



Figure B11: Northern Aspect (12:00pm)



Figure B12: Northern Aspect (1:00pm)



Figure B13: Northern Aspect (2:00pm)



Figure B14: Northern Aspect (3:00pm)



Figure B15: Western Aspect (9:00am)

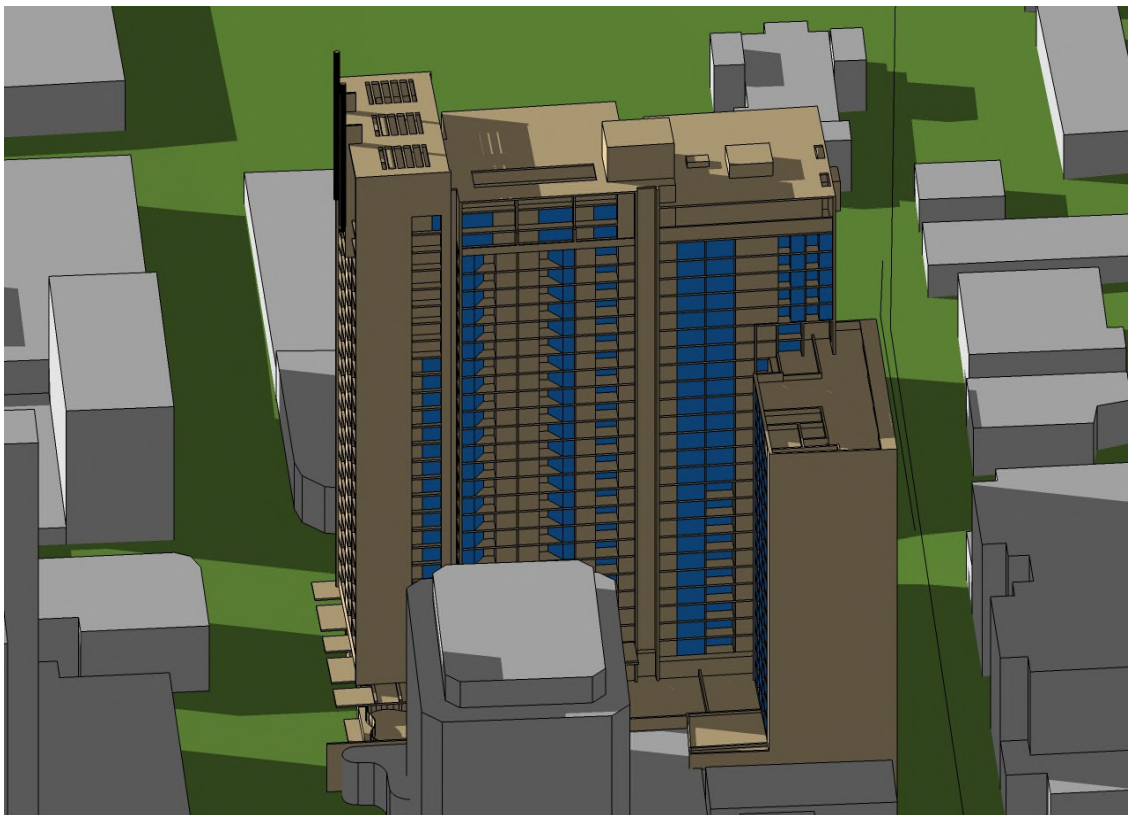


Figure B16: Western Aspect (10:00am)

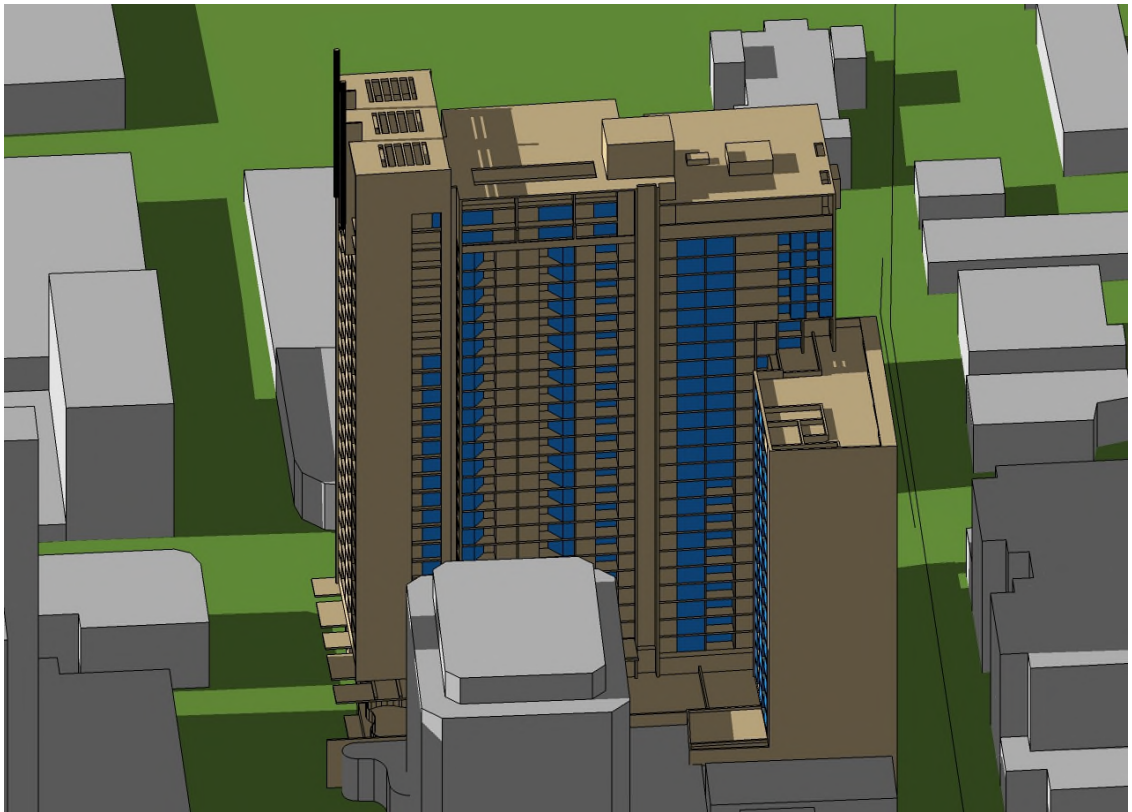


Figure B17: Western Aspect (11:00am)

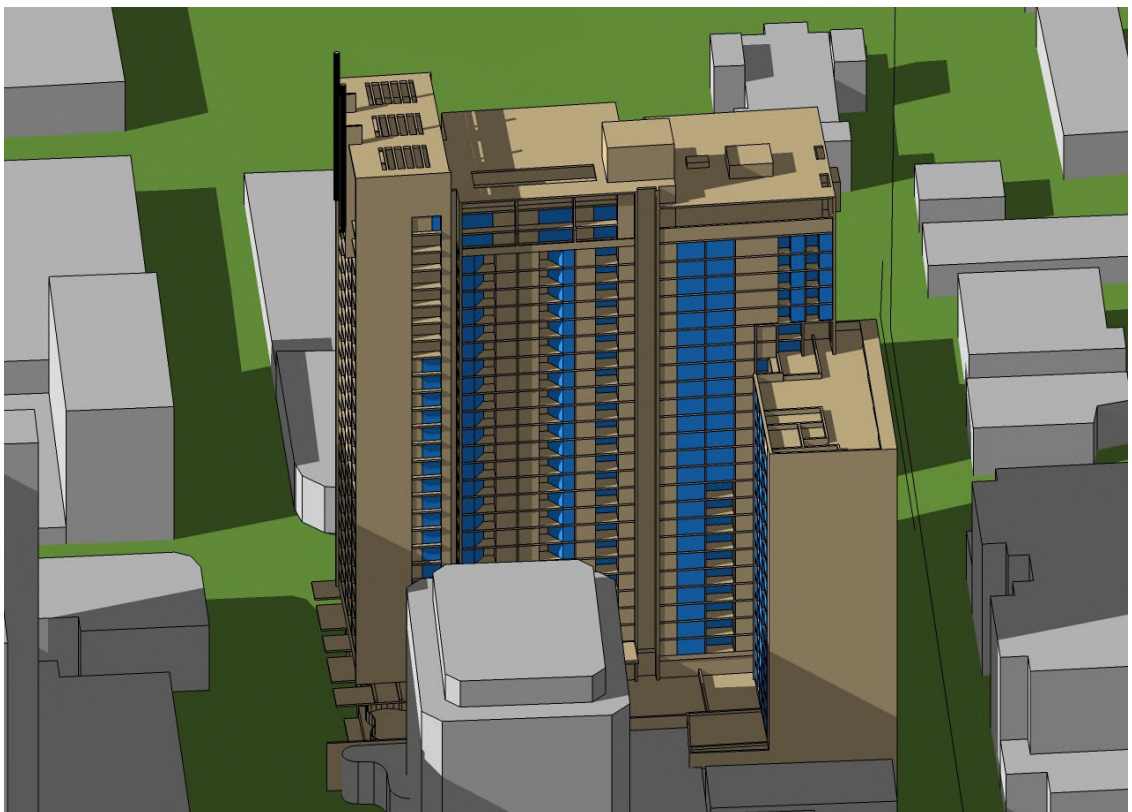


Figure B18: Western Aspect (12:00pm)

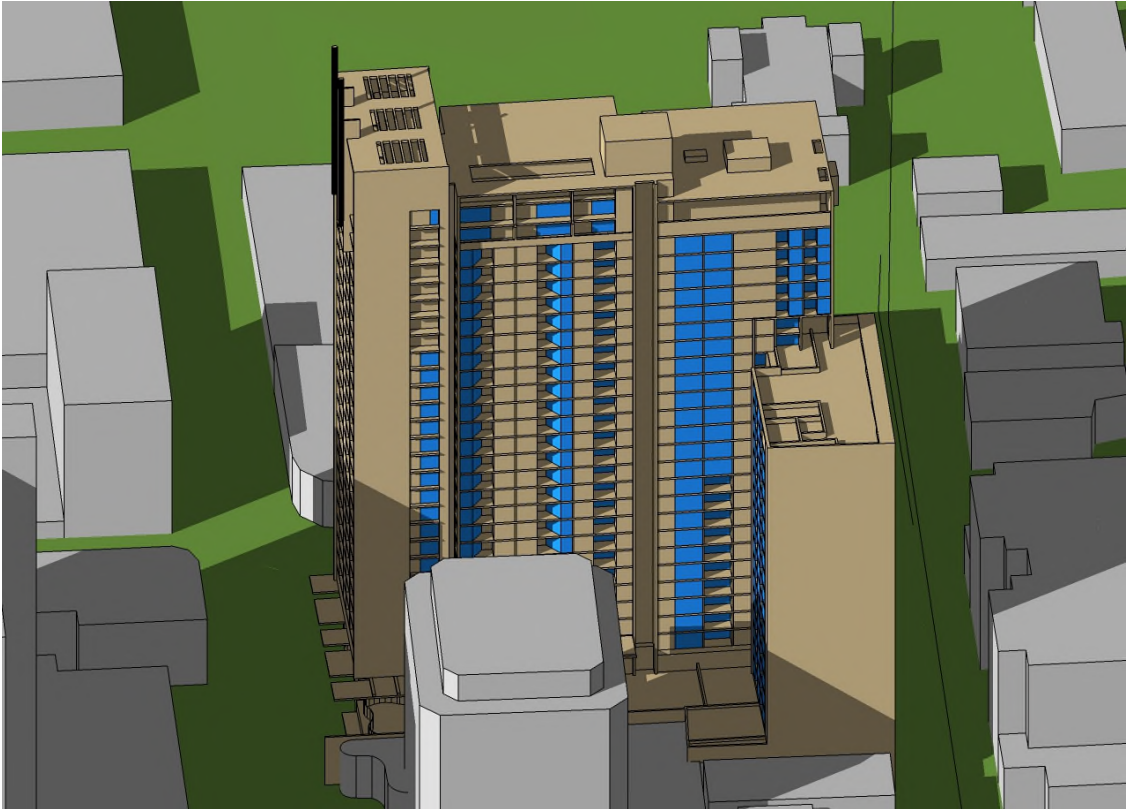


Figure B19: Western Aspect (1:00pm)



Figure B20: Western Aspect (2:00pm)



Figure B21: Western Aspect (3:00pm)