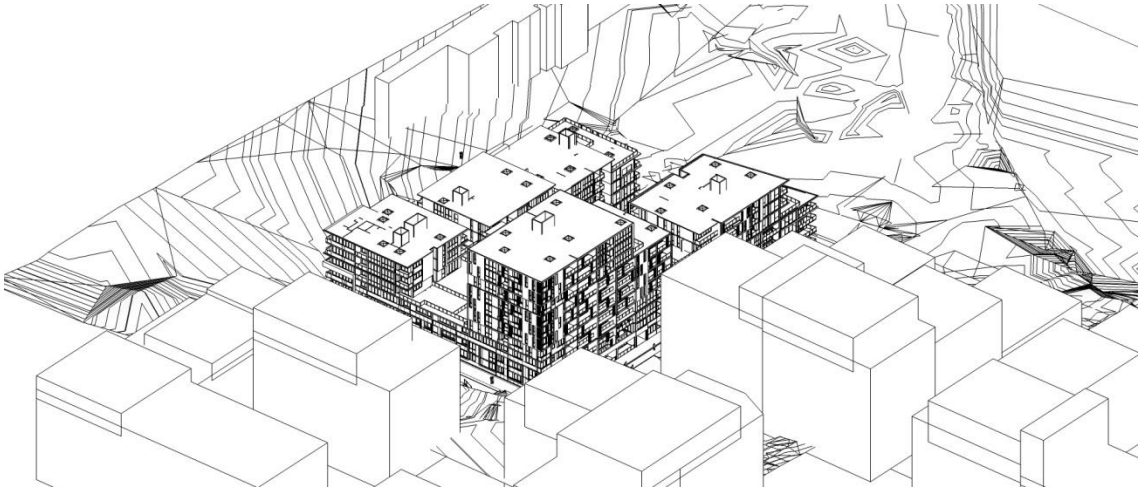
Analysis Report

SEPP65 ISSUES OF AMENITY

SOLAR ACCESS AND NATURAL VENTILATION



s75W Application

STAGE 1 PROJECT

SHEPHERDS BAY URBAN RENEWAL

Residential Development

at the former

Meadowbank Employment Area

29 October 2013

Signed,

STEVE KING

CONSULTANT ARCHITECT

11 Clovelly Road Randwick NSW 2031 Australia

PHONE 0414385485

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0.0 EXECUTIVE SUMMARY AND CONCLUSIONS

0.1 New report

This report is a new analysis in which I address issues of **solar access** and **natural ventilation** relating to the design of a Residential Development at the former **Meadowbank Employment Area, Stage 1**comparing:

- **Proposed s75W Application Scheme** *and*
- **Approved DA Scheme**

0.2 Concept Plan

I take as given the general layout and massing of the overall Concept Plan for the site.

The site for Stage 1 is steeply sloping towards the south with a dominant view over the harbour in the same direction. The urban design of the concept plan imposed a strong planning constraint which encourages the preservation and reinforcement of the existing street grid and view corridors to the harbour. Building forms that can achieve appropriate densities within this master plan layout and given height limits have a severely constrained potential to achieve midwinter solar access.

I note that the Stage 1 Project Application has been approved by the Consent Authority with a further variation of height controls. As a consequence, the Approved DA Scheme differs from the Project Application Scheme primarily by the loss of some upper storeys. The overall effect of that change was that a disproportionate number of the apartments lost were those most easily complying for both solar access and natural ventilation.

In now reconfiguring the apartment mix *within the approved building envelope*, the architects have taken the opportunity to reinstate the number of apartments for which approval was originally sought, but importantly to also increase the number of apartments complying with the solar access controls in particular.

0.3 Stage 1 project: Solar access

In the first instance, by redistributing units on the north-east and north-west facades, the s.75W Application Scheme increases the *actual number of dwellings* with available sun *to Living areas* greater than 2 hours between 9am and 3pm on June 21.

The actual level of compliance of the Approved DA Scheme was never analyzed or quantified. For that reason, to establish the appropriate comparison with the Proposed s75W Application Scheme, I have carried out a full 3D model analysis of the solar access for both designs.

For clarity, I report for both schemes the number and proportion of units complying with the SEPP 65 Residential Flat Design Code *Rule of Thumb,* which requires a minimum of three hours of direct sun to glazing of living areas and to private open space between 9am and 3pm on June 21, where that may be reduced to a minimum of two hours in dense urban environments.

Table 1 summarises the baseline compliance achieved in both schemes.

Table 1: Solar access compliance

	Approved		s.75W	
Units with sun to Living >3 hours between 9am & 3pm	54	26.1%	55	22.4%
Units with sun to Living >2 hours between 9am & 3pm	13	6.3%	32	13.0%
Total for Living areas	**67**	**32.4%**	**87**	**35.4%**

I note that the current application for s.75W amendment increases the absolute number of complying units by twenty (20), and notwithstanding that the percentage is calculated on a higher total number of units, also increases the proportion of fully complying units by 3%.

I believe has been well understood by the determining authority that this compliance level is relatively low, as an anticipated outcome of the combined master plan constraints. I note however that the actual number and proportion of dwellings with usable winter sun access is considerably higher. Were one to take account of solar access to bedrooms in the s75W Scheme at 129 (52.4%),.

The present proposal for 246 units improves on the original application for the same number of dwellings and significantly improves on the Approved DA Scheme. In my considered opinion, given the nature of the siting constraints the proportion of complying apartments achieved here is a very reasonable standard, and should not be an impediment to approval of the s75W application.

0.4 Stage 1 project: Natural ventilation

The number of simply cross ventilated apartments in the Proposed s75W Application Scheme is increased to 119 (48.4%) from the 99 (47.8%) in the Approved DA Scheme.

A further number of single sided apartments in each scheme, because of their wind exposure and design may be safely classified as having satisfactory ventilation patterns comparable to cross ventilation, and therefore may be deemed as complying for natural ventilation. I base this opinion on quantitative analysis of single sided ventilation, undertaken in other projects for comparably designed apartments, under near identical wind exposure conditions. *Because in any development of this scale, there is a highly likely reliance on effective ventilation of at least some single aspect apartments, I provide a longer account of my reasoning at 5.3 Enhanced single sided natural ventilation.*

However, I note that with the removal of several upper storey floor plates, the relative proportion of such apartments was dramatically reduced in the Approved DA Scheme, from that projected for the Project Application Scheme. I therefore apply to the present s75W Application Scheme an expert opinion that characterises a much reduced number of single sided apartments being likely to perform similarly to some cross ventilated apartments.

A relatively conservative characterisation allows approximately 60-61% of apartments in the s75W Application Scheme Stage 1 project to be described as complying with the performance objectives for natural ventilation. In my considered opinion, on that basis the development may be considered fully compliant for natural ventilation under the Residential Flat Design Code.

1.0 PRELIMINARIES

1.1 My qualifications and experience are summarized in **2.0 Credentials**.

1.2 The documents utilised to support the opinions contained in this report are detailed in **3.0 Documents and Information**. I have visited the site.

2.0 CREDENTIALS

2.1 I have been teaching architectural design, thermal comfort and building services at the Universities of Sydney, Canberra and New South Wales since 1971. From 1992, I was a Research Project Leader in SOLARCH, the National Solar Architecture Research Unit at the University of NSW. Until November 2006, I was the Associate Director, Centre for Sustainable Built Environments (SOLARCH), UNSW. My teaching, research and practice specialization is in the assessment of comfort and energy performance of buildings, in particular solar access and other environmental control parameters such as natural ventilation.

My research and consultancy includes work in solar access, energy simulation and assessment for houses and multi-dwelling developments, building assessments under the NSW SEDA Energy Smart Buildings program, appropriate design and alternative technologies for museums and other cultural institutions, and 'asthma and domestic building design'. SOLARCH/UNISEARCH under contract to SEDA NSW set up and administered the House Energy Rating Management Body (HMB), to accredit assessors under the Nationwide House Energy Rating Scheme, NSW. I was until early 2004 the technical supervisor of the HMB, with a broad overview of the dwelling thermal performance assessments carried out by assessors in NSW over the initial four and a half years. I carried out the Independent Expert Review of the comparison of NatHERS and DIY methods of compliance for Thermal Comfort under BASIX, for the NSW Department of Planning. I have delivered professional development courses on topics relating to energy efficient design both in Australia and internationally.

I am the principal author of SITE PLANNING IN AUSTRALIA: Strategies for energy efficient residential planning, funded by the then Department of Primary Industry and Energy, and published by AGPS, and of the RAIA Environment Design Guides on the same topic. Through UNSWGlobal and NEERG Seminars, I conduct training in solar access and overshadowing assessment for Local Councils.

Also of relevance, I teach the wind and ventilation components of environmental control in the course in architecture at UNSW, and am the author of refereed papers and internationally referenced, web accessed coursework materials on the subject.

I am a registered Architect and maintain a specialist architectural consultancy practice in Sydney and Canberra.

2.2 I regularly assist the Land and Environment Court as an expert witness in similar matters.

3.0 DOCUMENTS AND INFORMATION

3.1 I base my report on

- Preliminary s75W Application architectural drawings, by Robertson and Marks Architects issued 24.9.2013:
  - A000/D
  - A001/K
  - A002 to 3/I,
  - A004 to 13/H
  - A014/F
  - A015/E

- Approved Development Application architectural drawings, by Robertson and Marks Architects.

Sheet List	
Sheet # / Revision	Sheet Name
A 100-3	COVER SHEET
A 101/12	BASEMENT PLAN
A 102/11	UPPER BASEMENT PLAN
A 103/11	LOWER GROUND FLOOR PLAN
A 104/10	GROUND FLOOR PLAN
A 105/9	LEVEL 1 FLOORPLAN
A 106/10	LEVEL 2 FLOORPLAN
A 107/11	LEVEL 3 FLOORPLAN
A 108/9	LEVEL 4 FLOORPLAN
A 109/6	LEVEL 5 FLOORPLAN
A 110/5	LEVEL 6 FLOORPLAN
A 111/6	LEVEL 7 FLOORPLAN
A 112/5	LEVEL 8 PLAN
A 113/5	LEVEL 9 PLAN
A 114/5	LEVEL 10 PLAN
A 115/5	LEVEL 11 PLAN
A 117/5	ROOF PLAN
A 118/10	ROTHESAY AVENUE ELEVATION
A 119/9	BELMORE STREET ELEVATION
A 120/8	HAMILTON CRESCENT ELEVATION
A 121/9	NEW FORESHORE LINK ELEVATION

- Digital 3D models of each scheme prepared by the architects in Revit software and exported to .3ds files.

4.0 STAGE 1 PROJECT: SOLAR ACCESS

4.1 Predicted solar access: methodology

I undertook exhaustive detailed analysis by computer generated projections. The digital model of the revised design was provided to me by the applicant from the Revit software used to prepare the design and application documents. I imported the model into *Trimble SketchUp* software for analysis. I independently checked the original model for sufficient accuracy, and verified the direction of True North by examining the cadastral grid north. I am satisfied that the current models are consistent with previous versions, and therefore sufficient for the purpose of the solar analysis.

For the analysis, I rely primarily on projections known as *'View from the Sun'*, taken at half hourly intervals. A view from the sun shows all sunlit surfaces at a given time and date. It therefore allows a very precise count of sunlight hours on any glazing or horizontal surface, with little or no requirement for secondary calculations or interpolation. Figure 1 illustrates the technique. *Note that a 'view from the sun' by definition does not show any shadows.*

For the purpose of calculating the compliance with the control, I have examined sun patches on the relevant glazing line of each apartment. Given the design, the balconies will in most cases enjoy a more favourable sun exposure with an additional hour or more of complying solar access. The limiting conditions for solar access to the glazing where it is not overshadowed by known or projected neighbouring buildings is generally self-shading by the privacy walls and/or deeply recessed balconies.

Figure 1: View from the sun, 12pm June 21

The following additional considerations are relevant to fully interpreting whether an apartment achieves compliance with the amenity objectives of the Residential Flat Design Code:

- All effective sun that is demonstrably available to a point of interest, including sun earlier than 9am, or later than 3pm.
- Extended periods of sun available to bedrooms, as contributing significantly to the amenity of any apartment that has an otherwise unfavourably oriented living area.

Both these characterisations are consistent with the interpretation of the *'BenSoc Principle' (and its predecessor 'Parsonage Principle')* as previously accepted by the Land and Environment Court, and by various Councils. In my detailed tables of direct sun available to individual apartments, I include sun from 8 AM to 4 PM, and separately annotate sun available to bedrooms.

4.2 Predicted solar access: Proposed s75W Application Scheme

I tabulate available effective sun in detail. Table 2 summarizes the projected solar access for the residential dwelling units in the s75W Application scheme. Table 5 in Appendix A shows sun for all apartments, rounded to 30 minutes. The times are generally for an acceptable area of sunlit glazing to Living rooms, in which case I do not note any additional time that may be available to Bedrooms. Where appropriate as previously described, I record complying periods of effective sun to Bedrooms, and I note those by a distinguishing code and cell tone in the table.

	Number	%
Units with sun to Living >3 hours between 9am and 3pm	**55**	**22.4%**
Units with sun to Living >2 hours between 9am and 3pm	**32**	**13.0%**
Total for Living areas complying with RFDC *Rule of Thumb*	**87**	**35.4%**
Additional solar access which may be taken into consideration:		
Units with sun to Living >2 hours 8am – 4pm	7	2.8%
Units with sun to Living and/or bedrooms >2 hours between 8am and 4pm	35	14.2%
Total to Living and/or Bedrooms	*129*	*52.4%*

Table 2: Summary of solar access for units in s75W Application Scheme

4.3 Predicted solar access: Approved DA Scheme

The comparable data for the Approved DA Scheme is shown in Table 3, with the detailed analysis in Table 6 in Appendix A. Of particular importance in interpreting these numbers is that the DA Approval was for 207 apartments.

	Number	%
Units with sun to Living >3 hours	**54**	**26.1%**
Units with sun to Living >2 hours	**13**	**6.3%**
Total for Living areas complying with RFDC *Rule of Thumb*	**67**	**32.4%**
Additional solar access which may be taken into consideration:		
Units with sun to Living >2 hours 8am – 4pm	1	0.5%
Units with sun to Living and/or bedrooms >2 hours 8am – 4pm	44	21.2%
Total to Living and/or Bedrooms	*112*	*54.1%*

Table 3: Summary of solar access for units Approved DA

The comparison of the two detailed tables makes clear the additional design effort that has taken units in the approved scheme with sun only to bedrooms, to redesign them as sun to the living areas, as well as the disproportionate overall improvement of the units fully complying with the *Rule of Thumb*.

5.0 NATURAL VENTILATION

5.1 Performance Objectives

The Residential Flat Design Code (RFDC) gives a quantified recommendation for interpreting SEPP 65 with respect to natural ventilation:

- Building depths, which support natural ventilation typically range from 10 to 18 metres.
- Sixty percent (60%) of residential units should be naturally cross ventilated.
- Twenty five percent (25%) of kitchens within a development should have access to natural ventilation.
- Developments, which seek to vary from the minimum standards, must demonstrate how natural ventilation can be satisfactorily achieved, particularly in relation to habitable rooms. *(*Rules of Thumb: *Natural Ventilation* p.87)

SEPP65 itself does not refer to prescribed quantitative standards, but may be regarded as a performance based regulatory instrument. Proper reading of the Residential Flat Design Code as it interprets SEPP65 similarly makes clear the performance based approach of the Code.

The control of energy efficiency and energy use for assuring thermal comfort is now vested exclusively in SEPP BASIX. Specific performance measures for buildings designed in compliance with SEPP65 are therefore scrutinized in light of an objective of *natural ventilation for general amenity*.

5.2 Natural ventilation/cross ventilation

I set out here again the considerations relating to natural ventilation compliance.

So-called 'cross-ventilation' is a simplistic expedient for checking the likely contribution of natural ventilation to projected comfort conditions. 'Cross-ventilation' describes where a dwelling has operable openings to two or more distinctly different orientations, thus making likely that in any conditions of breeze, relative pressure differentials will assure some air movement through connected spaces in the dwelling. The *Rules of Thumb* in the Residential Flat Design Code give a quantified recommendation *with respect only to cross ventilation*, relating to the overall proportion of complying dwellings, but not to the expected performance for any one dwelling.

5.2.1 Cross ventilation by openings in adjacent or opposite facades

In the subject development, all such apartments are classified as cross-ventilated without further discussion here – the simple definition of cross ventilation is met by all 'corner' apartments in the complex.

5.2.2 Cross ventilation by roof openings

A number of apartments on the top floors of the building are characterised as cross ventilated by virtue of suitably designed raised monitors, with operable vertical glazed sashes in two or more faces. In a flat roof under all wind directions, such openings may be relied on to be in a region of reduced static pressure, and therefore to act as reliable outlet openings for cross ventilation.

5.3 Enhanced single sided natural ventilation

As a consequence of the double loaded planning, approximately 60% of the apartments in the proposed development are single sided, and don't have the benefit of conventional cross ventilation as described in *6.2.1 and 6.2.2* above.

I have previously demonstrated on a number of other projects that natural ventilation compliance under the RFDC is achievable by suitably designed *single sided apartments with reliable exposure to the prevalent summer cooling breezes* in Sydney. The fundamental attribute for achieving this condition is the degree of 'relief' in the dominant windward façade — by use of protruding elements and recessed balconies, as notably employed in this design.

Where apartments meet this and other design pre-requisites, and are suitably oriented, the ventilation regime of such single sided, multi-room frontage apartments is sufficiently comparable to cross ventilation to satisfy the performance objectives.

See my earlier detailed discussion of enhanced single sided ventilation with respect to the Project Application Scheme, in my *Supplementary Report SEPP65 ISSUES OF AMENITY: SOLAR ACCESS* of 24 April 2012.

5.4 Quantification of ventilation compliance

Table 4 summarises the apartment types with their ventilation status as assessed against the criteria described, and reports the compliance deemed to be achieved, for the s75W Application scheme compared to the Approved DA Scheme.

Apartments identified as having *'enhanced single sided ventilation'* potential are included as deemed complying with the RFDC performance objectives. I apply my opinion only to specific apartments in the proposed design. A characterisation of compliance as *'enhanced single sided ventilation'* is limited to those single sided apartments that have been qualified by the necessary design attributes, and *directly comparable to previous simulation based investigation.* In brief, these are apartments exposed to the north-east and/or south to south-east cooling winds, as they are expected to be channelled by the streets running down to the harbour. I specifically *exclude* apartments which may be otherwise similar, but where I consider the likely level of exposure to prevailing summer cooling breezes to be insufficient. I believe my characterization of compliance is therefore conservative.

	s75W Scheme		Approved DA Scheme	
Cross ventilated	**119**	**48.4%**	**99**	**47.8%**
Complying because of height	12	4.9%	10	4.8%
Enhanced single sided ventilation	19	7.7%	18	8.7%
Total	246		207	
Total deemed complying	**147**	**61.0%**	**127**	**61.4%**

Table 4: Ventilation compliance

Table 5 in Appendix A identifies the basis of classification of natural ventilation performance for individual apartments in the Proposed s.75W Scheme.

6.0 CONCLUSION

6.1 Stage 1 project: Solar access

The s.75W changes proposed result in a greater number of complying apartments for solar access than are provided in the Approved DA.

The present s.75W Application seeks to reinstate the same number of dwellings (246) for which the original DA application was made, while preserving the building envelope approved. Comparison of the Propose s75W Scheme to the Approved DA Scheme shows that the present proposal improves on that scheme by increasing the number of dwellings fully complying with the RFDC *Rules of Thumb* from 67 out of 207 (32.4%) to a projected 87 dwellings out of 246 (35.4%).

In my considered opinion, given the nature of the siting constraints the proportion of complying apartments achieved here is a very reasonable standard, and should not be an impediment to approval of the s75W application.

6.2 Stage 1 project: Natural ventilation

The number of simply cross ventilated apartments in the Proposed s.75W Scheme is increased to 119 (48.4%) from the 99 (47.8%) in the Approved DA Scheme and 113 (45.9%) in the original submission for 246 dwellings.

Because of their wind exposure and design a further number of single sided apartments in each scheme may be safely classified as having satisfactory ventilation patterns comparable to cross ventilation. However, I note that with the removal of several upper storey floor plates, the relative proportion of such apartments was dramatically reduced in the Approved DA Scheme, from that projected for the Project Application Scheme.

A relatively conservative characterisation allows approximately 60-61% of apartments* in both the approved and proposed versions of the Stage 1 project *to be described as complying with the performance objectives for natural ventilation. In my considered opinion, on that basis the development may be considered fully compliant for natural ventilation under the Residential Flat Design Code.

APPENDIX A: SOLAR ACCESS AND NATURAL VENTILATION TABLES

Table 5: Detailed ventilation and solar access for apartments in Proposed s75W Scheme

UNIT	Type	Orientation	8	830	9	930	10	1030	11	1130	12	1230	13	1330	14	1430	15	1530	16	>3 hrs 9am – 3pm	>2hrs 9am – 3pm	>2hrs 8am – 4pm	Cross vent	Vent compliance due to height	Effective single sided ventilation
Basement																									
B-01	2 BED	SW					B	B										Y	Y				YES		
B-01a	3 BED	SE																					YES		
B-02	2 BED	NW																							
B-03	1 BED	SE																							
B-04	3 BED	SW	B					Y															YES		
B-04a	2 BED	NW																					YES		
Upper Basement																									
UB-01	2 BED	SW						Y				Y	Y				Y	Y	Y			YES	YES		
UB-01a	3 BED	SE		Y																			YES		
UB-02	1 BED	SE																							
UB-03	2 BED	NW					B	B																	
UB-04	1 BED	NW																							
UB-05	2 BED	SE																							
UB-06	2 BED	SE																					YES		
UB-07	2 BED	NW																					YES		
UB-08	2 BED	NW											Y												
UB-09	1 BED	SE																							
UB-10	3 BED	SW																					YES		
UB-10a	2 BED	NW								Y	Y												YES		
UB-11	1 BED	SE	Y	Y																					
UB-12	1 BED	SE																							
UB-13	1 BED	SE		Y																					
UB-14	1 BED	NW									Y	Y	Y	Y											
UB-15	1 BED	NW										B	B	B	Y										
UB-16	1 BED	NW					B	B	B																
UB-17	1 BED	NW					B	B	B	B															
UB-18	1 BED	NW							B	B	B														
Lower Ground Floor																									
LG-01	2 BED	SW					B	B		B	Y	Y	Y	Y			Y	Y	Y		YES		YES		
LG-01a	3 BED	SE		Y																			YES		
LG-02	1 BED	SE																							
LG-03	2 BED	NW						B						Y											
LG-04	2 BED	NW						B																	
LG-05	2 BED	SE																							
LG-06	2 BED	SE																					YES		
LG-07	2 BED	SE																					YES		
LG-07a	2 BED	SE																							
LG-08	1 BED	SE																							

UNIT	Type	Orientation	8	830	9	930	10	1030	11	1130	12	1230	13	1330	14	1430	15	1530	16	>3 hrs 9am – 3pm	>2hrs 9am – 3pm	>2hrs 8am – 4pm	Cross vent	Vent compliance due to height	Effective single sided ventilation
LG-09	1 BED	NW						B	B	B	B														
LG-09a	1 BED	NW					B	B	B	B															
LG-10	1 BED	NW								Y	Y	Y	Y	Y							YES				
LG-11	1 BED	SE																							
LG-12	2 BED	SE									B	B	B	B	B	B							YES		
LG-13	2 BED	NW																					YES		
LG-14	2 BED	NW																							
LG-15	2 BED	SE	Y	Y																					
LG-16	1 BED	SE		B	B																				
LG-16a	1 BED	SE	B	B	B																				
LG-17	2 BED	NW					Y	Y																	
LG-18	2 BED	NW																					YES		
LG-19	2 BED	NW																					YES		
LG-20	2 BED	SE																							
LG-21	2 BED	NW					Y	Y					Y	Y											
LG-22	2 BED	NW					B	B	Y	Y	Y	Y									YES		YES		
LG-23	3 BED	SW																					YES		
LG-24	1 BED	NW														Y	Y	Y							
LG-25	1 BED	NW												Y	Y	Y	Y								
Ground Floor																									
GF-01	2 BED	SW					B	B	B	B	B	B	Y	Y	Y	Y	Y	Y	Y		YES		YES		
GF-01a	3 BED	SE		Y																			YES		
GF-02	1 BED	SE																							
GF-03	2 BED	NW				B	B	B	B		Y	Y	Y	Y	Y	Y					YES				
GF-04	2 BED	NW				B	B	B	B																
GF-05	2 BED	SE																							
GF-06	2 BED	SE																					YES		
GF-07	2 BED	SE																					YES		
GF-08	2 BED	SE																							
GF-09	1 BED	NW				B	B	B	B	B	B	B													
GF-09a	1 BED	NW				B	B	B	B	B															
GF-10	2 BED	NW				B	B	B	B	Y	Y	Y	Y	Y	Y						YES				
GF-11a	1 BED	SE																							
GF-11	1 BED	SE																							
GF-12	2 BED	SE									B	B	B	B	B	B	B						YES		
GF-13	1 BED	NW										Y	Y	Y	Y	Y	Y				YES				
GF-14	3 BED	NW				B	B	B	B	B	B			Y	Y	Y	Y	Y				YES	YES		
GF-15	1 BED	NE							B	Y	Y	Y	Y												
GF-16	2 BED	NE									Y	Y	Y	Y								YES			
GF-17	2 BED	SW																							
GF-18	2 BED	NE										Y	Y	Y	Y	Y					YES				
GF-19	2 BED	SW																							
GF-20	1 BED	NE										Y	Y	Y	Y	Y					YES				
GF-21	3 BED	SE	B	B	B							B	B	B	B	B							YES		
GF-22	2 BED	SE																							
GF-23	2 BED	NW																					YES		
GF-24	2 BED	NW						Y	Y	B															

UNIT	Type	Orientation	8	830	9	930	10	1030	11	1130	12	1230	13	1330	14	1430	15	1530	16	>3 hrs 9am – 3pm	>2hrs 9am – 3pm	>2hrs 8am – 4pm	Cross vent	Vent compliance due to height	Effective single sided ventilation
GF-25	2 BED	SE	Y	Y																					
GF-26	2 BED	SE	Y	Y	Y																				
GF-26a	1 BED	SE	B																						
GF-27	2 BED	NW					Y	Y	Y																
GF-28	2 BED	NW																					YES		
GF-29	2 BED	NW													Y	Y							YES		
GF-30	2 BED	NW					Y	Y	Y		Y	Y	Y	Y	B					YES					
GF-31	2 BED	SE																							
GF-32	2 BED	NW				B	B	B	B	Y	Y	Y	Y									YES	YES		
GF-33	3 BED	SW																					YES		
Level 01																									
L01-01	2 BED	SW					B	B	B	B	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
L01-01a	3 BED	SE		Y	Y																		YES	SKYLIGHT	
L01-02	1 BED	SE																							
L01-03	2 BED	NW					B	B	B	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES					
L01-04	2 BED	NW					B	B	B		B	B				B	B	B							
L01-05	2 BED	SE																							
L01-06	2 BED	SE																					YES		
L01-07	2 BED	SE																					YES		
L01-08	1 BED	SE																							
L01-08a	2 BED	SE																							
L01-09	1 BED	NW					B	B	B	B	B														
L01-09a	1 BED	NW					B	B	B	B															
L01-10	2 BED	NW					B	B	B	Y	Y	Y	Y	Y							YES				
L01-11	1 BED	SE																							
L01-12	2 BED	SE									B	B	B	B	B	B	B						YES		
L01-13	1 BED	NW									Y	Y	Y	Y	Y	Y	Y			YES					
L01-14	3 BED	NW				B	B	B	B	B	B	B	Y	Y	Y	Y	Y	Y			YES		YES		
L01-15	1 BED	NE							B	Y	Y	Y	Y						.						
L01-16	1 BED	NE									Y	Y	Y	Y											
L01-17	2 BED	SW																							
L01-18	2 BED	SW									B	B											YES		
L01-19	2 BED	SW										B											YES		
L01-20	1 BED	NE									Y	Y	Y	Y	Y	Y	Y			YES					
L01-21	2 BED	SW																							
L01-22	1 BED	NE									Y	Y	Y	Y	Y	Y					YES				
L01-23	3 BED	SE	B	B	B				B		B	B	B	B	B	B							YES		
L01-24	2 BED	SE																							
L01-25	2 BED	NW																					YES		
L01-26	2 BED	NW						Y	Y	B															
L01-27	2 BED	SE	Y	Y	Y																				
L01-28	2 BED	SE	Y	Y																					
L01-28a	1 BED	SE	B																						
L01-29	2 BED	NW					Y	Y	Y																
L01-30	2 BED	NW														Y	Y						YES		
L01-31	2 BED	NW												Y	Y	Y	Y				YES		YES		
L01-32	2 BED	NW				Y	Y	Y	Y	Y	Y	Y	Y	Y	Y					YES					

UNIT	Type	Orientation	8	830	9	930	10	1030	11	1130	12	1230	13	1330	14	1430	15	1530	16	>3 hrs 9am – 3pm	>2hrs 9am – 3pm	>2hrs 8am – 4pm	Cross vent	Vent compliance due to height	Effective single sided ventilation
L01-33	2 BED	SE																							
L01-34	2 BED	NW				Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				YES			YES	SKYLIGHT	
L01-35	3 BED	SW	B	B	B	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES			YES	SKYLIGHT	
Level 02																									
L02-01	3 BED	SW					Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
L02-02	2 BED	SW	Y	Y																			YES	SKYLIGHT	
L02-04	1 BED	NW											Y				B	Y	Y						YES
L02-05	2 BED	SE		Y																					
L02-06	2 BED	SE																					YES		
L02-07	2 BED	SE																					YES		
L02-08a	2 BED	SE																							YES
L02-08	1 BED	SE																							YES
L02-09	1 BED	NW				B	B	B	B	B	B														YES
L02-09a	1 BED	NW				B	B	B	B	B															YES
L02-10	2 BED	NW				B	B	B	B	Y	Y	Y	Y	Y							YES				YES
L02-11	1 BED	SE																							YES
L02-12	2 BED	SE									B	B	B	B	B	B	B						YES		
L02-13	1 BED	NW									Y	Y	Y	Y	Y	Y	Y			YES					YES
L02-14	3 BED	NW				B	B	B	B	B	B	Y	Y	Y	Y	Y	Y	Y			YES		YES		
L02-15	1 BED	NE							Y	Y	Y	Y	Y	Y	Y	Y	Y			YES					YES
L02-16	1 BED	NE							Y	Y	Y	Y	Y	Y	Y	Y	Y			YES					YES
L02-17	2 BED	SW																							
L02-18	2 BED	SW								B	B	B	B	B									YES		
L02-19	2 BED	SW								B	B	B	B	B									YES		
L02-20	1 BED	NE								Y	Y	Y	Y	Y	Y	Y	Y			YES					YES
L02-21	2 BED	SW																							
L02-22	1 BED	NE								Y	Y	Y	Y	Y	Y	Y	Y			YES					YES
L02-23	3 BED	SE	B	B					B	B	B	B	B	B	B	B							YES		
L02-24	2 BED	SE																					YES		
L02-25	2 BED	SE	Y	Y					B	B	B	Y	Y	Y								YES	YES		
L02-26	1 BED	SE	B	B																					YES
L02-26a	1 BED	SE	B	B																					YES
L02-27	2 BED	NW					Y	Y	Y	Y							B	Y			YES				
L02-28	2 BED	NW											Y		Y	Y	Y	Y				YES	YES		
L02-29	2 BED	NW											Y	Y	Y	Y	Y				YES		YES	SKYLIGHT	
L02-30	2 BED	NW			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES			YES	SKYLIGHT	
L02-31	2 BED	SE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES			YES	SKYLIGHT	
Level 03																									
L03-01	2 BED	SW	Y	Y																			YES		
L03-02	3 BED	SW					Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES		
L03-04	1 BED	NW									Y	Y	Y	Y	Y	B	B	Y	Y		YES				
L03-05	2 BED	SE	Y	Y																					YES
L03-06	2 BED	SE	Y					B	B	B	B	Y	Y	Y	Y	Y	Y				YES		YES		
L03-07a	2 BED	SE																					YES		
L03-07	2 BED	NW								B	Y	B											YES		
L03-08	1 BED	NW					B	B	B	Y	Y	Y	Y	Y							YES				
L03-09	1 BED	SE																							YES

UNIT	Type	Orientation	8	830	9	930	10	1030	11	1130	12	1230	13	1330	14	1430	15	1530	16	>3 hrs 9am – 3pm	>2hrs 9am – 3pm	>2hrs 8am – 4pm	Cross vent	Vent compliance due to height	Effective single sided ventilation
L03-10	2 BED	SE									B	B	B	B	B	B	B						YES		
L03-11	1 BED	NW									Y	Y	Y	Y	Y	Y	Y			YES					YES
L03-12	3 BED	NW				B	B	B	B	B	B	Y	Y	Y	Y	Y	Y	Y			YES			YES		
L03-13	1 BED	NE						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES					YES
L03-14	2 BED	SE						B	B	B	B	B	B	B	B	B							YES		
L03-15	1 BED	NE							Y	Y	Y	Y	Y	Y	Y	Y	Y			YES			YES		
L03-16	1 BED	NE					Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES					YES
L03-17	3 BED	SE	B	B	B		B	B	B	B	B	B	B	B	B	B							YES		
L03-18	2 BED	SE																					YES		
L03-19	2 BED	NW					Y	Y	Y	Y	Y	Y									YES		YES		
L03-20	2 BED	SE	Y	Y				Y	Y	Y	Y	Y	Y	Y						YES			YES	SKYLIGHT	
L03-21	3 BED	SE		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
L03-22	2 BED	NW		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
Level 04																									
L04-01	3 BED	SW			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
L04-02	2 BED	SW	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
L04-04	1 BED	NW					Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
L04-05	2 BED	SE	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
L04-06	2 BED	SE	Y					Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES			YES	SKYLIGHT	
L04-07	2 BED	NW						B	B	B	Y	B											YES		
L04-07a	2 BED	SE		Y																			YES		
L04-08	1 BED	NW								Y	Y	Y	Y	Y							YES				
L04-09	1 BED	SE																						YES	
L04-10	2 BED	SE									B	B	B	B	B	B	B						YES		
L04-11	1 BED	NW									Y	Y	Y	Y	Y	Y	Y	Y		YES				YES	
L04-12	3 BED	NW				B	B	B	B	B	B	Y	Y	Y	Y	Y	Y	Y	B		YES		YES		
L04-13	1 BED	NE					Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES					
L04-14	2 BED	SE						B	B	B	B	B	B	B	B								YES		
L04-15	1 BED	NE				Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES			YES		
L04-16	1 BED	NE				Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES				YES	
L04-17	3 BED	SE	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B						YES		
L04-18	2 BED	SE																					YES		
L04-19	2 BED	NW						Y	Y	Y	Y	Y									YES		YES		
Level 05																									
L05-01	2 BED	NW						B	B	B	Y	Y	Y					Y	Y			YES	YES		
L05-01a	2 BED	SE	Y	Y															B				YES		
L05-02	1 BED	NW								Y	Y	Y	Y	Y							YES			YES	
L05-03	1 BED	SE																						YES	
L05-04	2 BED	SE									B	B	B	B	B	B	B						YES		
L05-05	1 BED	NW									Y	Y	Y	Y	Y	Y	Y	Y		YES				YES	
L05-06	3 BED	NW				B	B	B	B	B	B	Y	Y	Y	Y	Y	Y	Y	B		YES		YES		
L05-07	1 BED	NE				B	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES				YES	
L05-08	2 BED	SE					B	B	B	B	B	B	B	B	B								YES		
L05-09	1 BED	NE		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES			YES	SKYLIGHT	
L05-10	1 BED	NE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES			YES	SKYLIGHT	
L05-11	3 BED	SE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	B			YES			YES	SKYLIGHT	
L05-12	2 BED	SE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				YES			YES	SKYLIGHT	

UNIT	Type	Orientation	8	830	9	930	10	1030	11	1130	12	1230	13	1330	14	1430	15	1530	16	>3 hrs 9am – 3pm	>2hrs 9am – 3pm	>2hrs 8am – 4pm	Cross vent	Vent compliance due to height	Effective single sided ventilation
L05-13	2 BED	SW	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y						YES			YES		
Level 06																									
L06-01	2 BED	NW						B	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	YES			YES		
L06-01a	2 BED	SE	Y	Y									Y	Y	Y	Y	Y		Y		YES		YES	SKYLIGHT	
L06-02	1 BED	NW								Y	Y	Y	Y	Y							YES			YES	
L06-03	1 BED	SE																						YES	
L06-04	2 BED	SE									B	B	B	B	B	B	B						YES		
L06-05	1 BED	NW									Y	Y	Y	Y	Y	Y	Y	Y		YES				YES	
L06-06	3 BED	NW			B	B	B	B	B	B	B	Y	Y	Y	Y	Y	Y	Y	B		YES		YES		
L06-07	1 BED	NE				Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES				YES	
L06-08	2 BED	SE				B	B	B	B	B	B	B	B	B	B								YES		
Level 07																									
L07-01	3 BED	SW	Y	B																			YES		
L07-02	3 BED	NW						Y	Y	Y	Y	Y	Y	Y	Y	Y	B			YES			YES		
L07-03	1 BED	NW									Y	Y	Y	Y	Y	Y	Y	Y	B	YES				YES	
L07-04	3 BED	NW		B	B	B	B	B	B	B	B	Y	Y	Y	Y	Y	Y	Y	Y		YES		YES		
L07-05	1 BED	NE			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES				YES	
L07-06	2 BED	SE		Y	Y	B	B	B	B	B	B	B	B	B	B								YES		
Level 08																									
L08-01	3 BED	SW	Y	B																			YES		
L08-02	3 BED	NW						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES			YES		
L08-03	1 BED	NW									Y	Y	Y	Y	Y	Y	Y	Y	B	YES				YES	
L08-04	3 BED	NW		B	B	B	B	B	B	B	B	Y	Y	Y	Y	Y	Y	Y	Y		YES		YES		
L08-05	1 BED	NE		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			YES				YES	
L08-06	2 BED	SE	Y	Y	Y	B	B	B	B	B	B	B	B	B	B								YES		
Level 09																									
L09-01	3 BED	SW	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
L09-02	3 BED	NW	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		YES			YES	SKYLIGHT	
L09-03	1 BED	NW	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
L09-04	3 BED	NW	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
L09-05	1 BED	NE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES			YES	SKYLIGHT	
L09-06	2 BED	SE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y					YES			YES	SKYLIGHT	
		`												246	units					55	32	7	119	12	19
																				22.4%	13.0%	2.8%	48.4%	4.9%	7.7%
																					35.4%	38.2%			61.0%

Table 6: Detailed ventilation and solar access for apartments Approved DA

Unit	Type	Aspect	8	830	9	930	10	1030	11	1130	12	1230	1	130	2	230	3	330	4	>3 hrs	>2hrs	>2hrs (8-16)	Cross vent	Vent compliance due to height	Enhanced single sided ventilation performance		
Basement																				.	.	.					
B-01	3 BED	NW											B						YES	.	.	.	YES				
B-02	2 BED	NW					B	B												.	.	.					
B-03	2 BED	SE																		.	.	.					
B-04	3 BED	NW	B	B								YES								.	.	.	YES				
Upper Basement																											
UB-01	3 BED	SW										YES	YES						YES	.	.	.	YES				
UB-02	2 BED	SE																		.	.	.					
UB-03	2 BED	NW					B	B												.	.	.					
UB-04	1 BED	NW																		.	.	.					
UB-05	2 BED	SE																		.	.	.					
UB-06	2 BED	SE																		.	.	.	YES				
UB-07	2 BED	NW																		.	.	.	YES				
UB-08	2 BED	NW					B	YES					B							.	.	.					
UB-09	1 BED	SE																		.	.	.					
UB-10	3 BED	SW	B	B							YES	YES								.	.	.	YES				
Lower Ground																											
LG-01	3 BED	SW										B	B	B					YES	.	.	.	YES				
LG-02	2 BED	SE		YES																.	.	.					
LG-03	2 BED	NW					B	B						YES						.	.	.					
LG-04	2 BED	NW					B	B												.	.	.					
LG-05	2 BED	SE																		.	.	.					
LG-06	2 BED	SE																		.	.	.	YES				
LG-07	2 BED	SE																		.	.	.	YES				
LG-08	2 BED	SE																		.	.	.					
LG-09	2 BED	NW					B	B	B	B	B									.	.	.					
LG-10	1 BED	NW									YES	YES	YES							.	.	.					
LG-11	2 BED	SE																		.	.	.					
LG-12	2 BED	SE										B	B	B	B	B				.	.	.	YES				
LG-13	2 BED	NW																		.	.	.	YES				
LG-14	2 BED	NW																		.	.	.					
LG-15	1 BED	SE																		.	.	.					
LG-16	2 BED	SE		YES																.	.	.					
LG-17	2 BED	NW					B	YES	YES											.	.	.					
LG-18	2 BED	NW																		.	.	.	YES				
LG-19	2 BED	NW																		.	.	.	YES				
LG-20	2.BED	SE		B																.	.	.					
LG-21	2.BED	NW					YES	YES				B	B	YES	YES					.	.	.					
LG-22	3.BED	SW		B								YES								.	.	.	YES				
Ground Floor																											

Unit	Type	Aspect	8	830	9	930	10	1030	11	1130	12	1230	1	130	2	230	3	330	4	>3 hrs	>2hrs	>2hrs (8-16)	Cross vent	Vent compliance due to height	Enhanced single sided ventilation performance		
GF-01	3 BED	SW									B	B	B	B	B	B	B	B	YES	.	.	.	YES				
GF-02	2 BED	SE		YES	YES															.	.	.					
GF-03	2 BED	NW				B	B	B	B	YES	YES	YES	YES	YES	YES	YES				YES							
GF-04	2 BED	NW				B	B	YES	YES											.	.	.					
GF-05	2 BED	SE			YES															.	.	.					
GF-06	2 BED	SE																		.	.	.	YES				
GF-07	2 BED	SE																		.	.	.	YES				
GF-08	2 BED	SE																		.	.	.					
GF-09	2 BED	NW				B	B	B	B	YES	B									.	.	.					
GF-10	2 BED	NW				B	B	B	B	YES	YES	YES	YES							.	.	.					
GF-11	2 BED	SE																		.	.	.					
GF-12	2 BED	SE									B	B	B	B	B	B	B			.	.	.	YES				
GF-13	1 BED	NW									YES	YES	YES	YES	YES	YES	YES			YES							
GF-16	2 BED	NE								YES	YES	YES	YES	B			YES			.	YES						
GF-17	2 BED	SW																		.	.	.					
GF-18	2 BED	NE										YES	YES	YES	YES	YES	YES			.	YES						
GF-19	2 BED	NE																		.	.	.					
GF-20	1 BED	SW										YES	YES	B	B	B	B			.	.	.					
GF-21	3 BED	NE	B	B								B	B	B	B	B	B			.	.	.	YES				
GF-22	1 BED	SE																		.	.	.					
GF-23	2 BED	SE	B																	.	.	.	YES				
GF-24	2 BED	NW					B	B	B	B										.	.	.					
GF-25	2 BED	NW	B	B	B															.	.	.					
GF-26	2 BED	SE	B	B	B															.	.	.					
GF-27	2 BED	SE					YES	YES	YES											.	.	.					
GF-28	2 BED	NW																		.	.	.	YES				
GF-29	2 BED	NW													YES	YES				.	.	.	YES				
GF-30	2 BED	NW					YES	YES	YES	B	B	B	B	YES	YES	YES				.	YES						
GF-31	2 BED	NW	B	B	B															.	.	.					
GF-32	3 BED	SE	B	B	B							YES	YES							.	.	.	YES				
Level 01																											
L01-01	3 BED	SW									B	B	B	B	B	B	B	B	YES	.	.	.	YES				
L01-02	2 BED	SE		YES	YES															.	.	.					
L01-03	2 BED	NW				B	B	B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES							
L01-04	2 BED	NW				B	B	YES	YES	YES	B	B				B	B	YES		.	.	.					
L01-05	2 BED	SE			YES															.	.	.					
L01-06	2 BED	SE																		.	.	.	YES				
L01-07	2 BED	SE																		.	.	.	YES				
L01-08	2 BED	SE			B															.	.	.					
L01-09	2 BED	NW				B	B	B	B	YES	B									.	.	.					
L01-10	2 BED	NW				B	B	B	B	YES	YES	YES	YES							.	.	.					

Unit	Type	Aspect	8	830	9	930	10	1030	11	1130	12	1230	1	130	2	230	3	330	4	>3 hrs	>2hrs	>2hrs (8-16)	Cross vent	Vent compliance due to height	Enhanced single sided ventilation performance		
L01-11	2 BED	SE																		.	.	.					
L01-12	2 BED	SE									B	B	B	B	B	B				.	.	.	YES				
L01-13	1 BED	NW									YES	YES	YES	YES	YES	YES	YES			YES							
L01-14	3 BED	NW				B	B	B	B	B	B	YES	YES	YES	YES	YES	YES	YES	B	.	YES		YES				
L01-15	1 BED	NE							YES	YES	YES	YES	B			B				.	.	.					
L01-16	1 BED	NE								B	YES	YES	YES	B		B				.	.	.					
L01-17	1 BED	SW																		.	.	.					
L01-18	2 BED	SW									B	B	B	B						.	.	.	YES				
L01-19	2 BED	NE									B	B	B	B						.	.	.	YES				
L01-20	1 BED	NE									YES	YES	YES	B	B	B	B			.	.	.					
L01-21	2 BED	NE																		.	.	.					
L01-22	1 BED	NE						YES			YES	YES	YES	B	B	B	B			.	.	.					
L01-23	3 BED	SE	B	B				B	B		B	B	B	B	B	B	B			.	.	.	YES				
L01-24	1 BED	SE																		.	.	.					
L01-25	2 BED	NW																		.	.	.	YES				
L01-26	2 BED	SE					B	B	B	B										.	.	.					
L01-27	2 BED	SE	B	B																.	.	.					
L01-28	2 BED	SE	B	B																.	.	.					
L01-29	2 BED	NW					YES	YES	YES											.	.	.					
L01-30	2 BED	NW														YES	YES			.	.	.	YES				
L01-31	2 BED	NW												YES	YES	YES	YES			.	.	.	YES				
L01-32	1 BED	NW					YES	YES	YES		YES	YES	YES	YES	YES					YES							
L01-33	2 BED	NE	B	B																.	.	.					
L01-34	3 BED	SW	B	B								YES	YES	YES	YES				YES	.	.	YES	YES				
Level 02																											
L02-02	1 BED	SW	B	B																.	.	.	YES				
L02-03	2 BED	SW				B	B	B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES				
L02-04	2 BED	NW				B	B	YES	YES	YES	B	YES	YES	YES	B	B	B	YES	YES	.	YES						
L02-05	2 BED	SE	B	YES	YES															.	.	.					
L02-06	2 BED	SE																		.	.	.	YES				
L02-07	2 BED	SE																		.	.	.	YES				
L02-08	2 BED	SE																		.	.	.					
L02-09	2 BED	NW				B	B	B	B	YES	B									.	.	.					
L02-10	2 BED	NW					B	B	B	YES	YES	YES	YES							.	.	.					
L02-11	2 BED	SE																		.	.	.					
L02-12	2 BED	SE									B	B	B	B	B	B				.	.	.	YES				
L02-13	1 BED	NW									YES	YES	YES	YES	YES	YES	YES			YES							
L02-14	3 BED	NW				B	B	B	B	B	B	YES	YES	YES	YES	YES	YES	YES	B	.	YES		YES				
L02-15	1 BED	NW							YES	YES	YES	YES	YES	B	B	B	B			.	YES						
L02-16	1 BED	NW								YES	YES	YES	YES	B	B	B	B			.	.	.					
L02-17	1 BED	SW																		.	.	.					

Unit	Type	Aspect	8	830	9	930	10	1030	11	1130	12	1230	1	130	2	230	3	330	4	>3 hrs	>2hrs	>2hrs (8-16)	Cross vent	Vent compliance due to height	Enhanced single sided ventilation performance		
L02-18	2 BED	SW								B	B	B	B							.	.	.	YES				
L02-19	2 BED	SW								B	B	B	B							.	.	.	YES				
L02-20	1 BED	NW								YES	YES	YES	YES	B	B	B	B			.	.	.					
L02-21	2 BED	SW															YES			.	.	.					
L02-22	1 BED	NW	YES					YES		YES	YES	YES	YES	B	B	B	B			.	YES						
L02-23	3 BED	SE	B	B				B	B	B	B	B	B	B	B	B	B			.	.	.	YES				
L02-24	2 BED	SE																		.	.	.					
L02-25	2 BED	NW	B	B	B				YES	YES	YES	YES								.	.	.	YES				
L02-26	2 BED	SE	B	B																.	.	.			YES		
L02-27	2 BED	NW					YES	YES	YES	YES								B		.	.	.					
L02-28	2 BED	NW	YES															YES	YES	.	.	.	YES				Useless Skylight in terms of solar gain.
L02-30	3 BED	NW					YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES			YES				Skylight
L02-32	2 BED	SW	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES				YES			YES				Skylight
Level 03																											
L03-02	1 BED	SW	B	B	B															.	.	.	YES				
L03-03	2 BED	NW				B	B	B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES				
L03-04	2 BED	NW				B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES	B	YES	YES	YES					YES		
L03-05	2 BED	SE	YES	YES	YES															.	.	.			YES		
L03-06	2 BED	N	YES					B	B	B	B	YES	YES	YES	YES	YES	YES			.	YES		YES				
L03-07	2 BED	SE							B	B	B									.	.	.	YES				
L03-08	2 BED	NW					B	B	B	YES	YES	YES	YES							.	.	.			YES		
L03-09	2 BED	SE																		.	.	.			YES		
L03-10	2 BED	SE									B	B	B	B	B	B				.	.	.	YES				
L03-11	1 BED	NW								YES	YES	YES	YES	YES	YES	YES	YES			YES					YES		
L03-12	3 BED	NW				B	B	B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES	B	YES			YES				
L03-13	1 BED	NE						YES	YES	YES	YES	YES	B	B	B					.	YES				YES		
L03-14	2 BED	SE						B	B	B	B	B	B	B	B	B	B			.	.	.	YES				
L03-15	1 BED	NE					B	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES			YES				
L03-16	1 BED	NE					YES	YES	YES	YES	YES	YES	YES	YES	B	B	B			YES					YES		
L03-17	3 BED	SE	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			.	.	.	YES				
L03-18	2 BED	SE																		.	.	.	YES				
L03-19	1 BED	SW					YES	YES	YES	YES	YES	YES	YES							YES			YES				
L03-20	2 BED	N	B	B					YES	YES	YES	YES	YES	B	B					.	YES		YES				
L03-21	2 BED	SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES				Skylight
L03-22	2 BED	NW		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES	YES	B		YES			YES				Skylight
Level 04																											
L04-02	1 BED	SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES				Skylight
L04-03	2 BED	NW			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES				Skylight
L04-04	2 BED	NW							YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES					YES		
L04-05	2 BED	SE	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES				Skylight

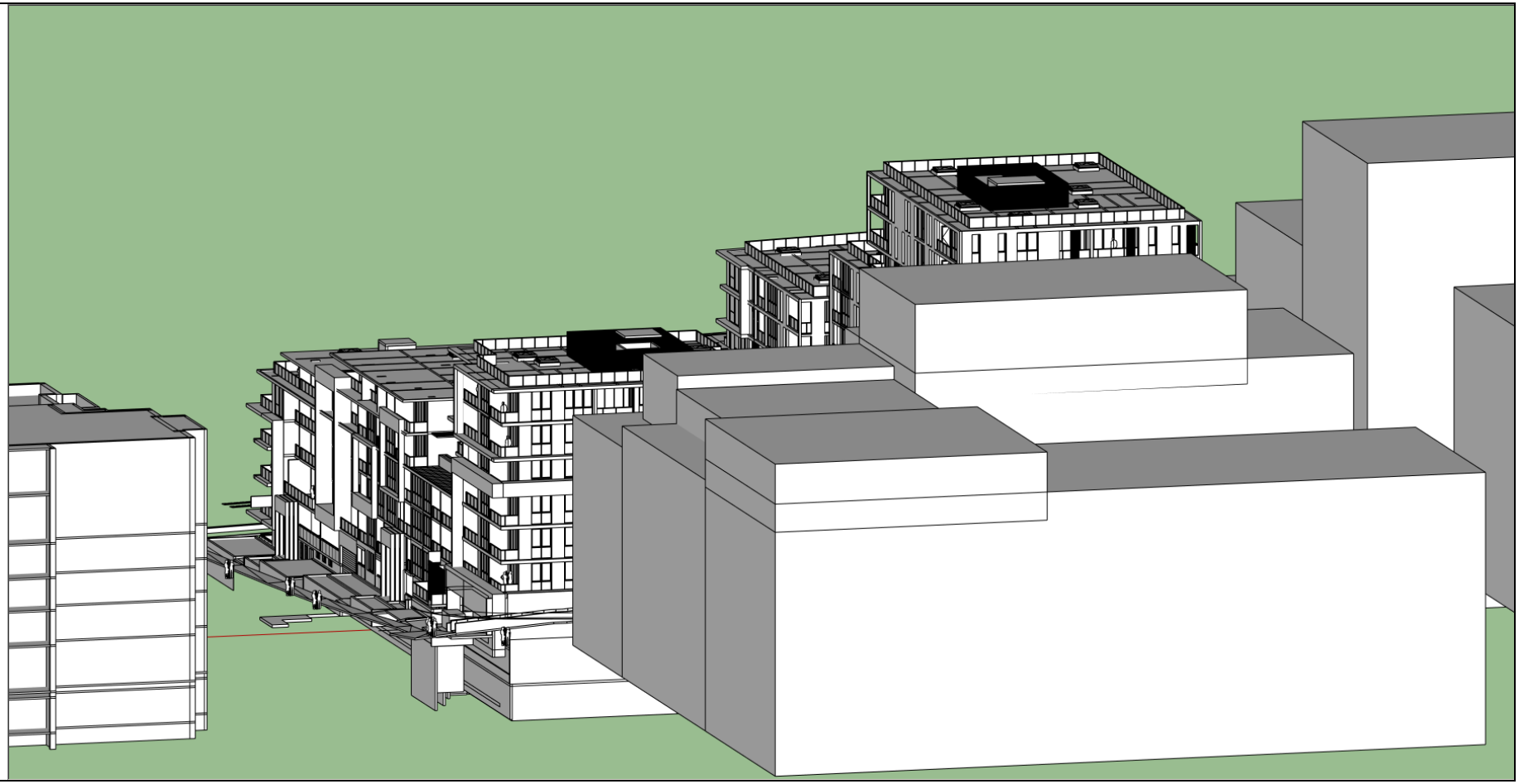
Unit	Type	Aspect	8	830	9	930	10	1030	11	1130	12	1230	1	130	2	230	3	330	4	>3 hrs	>2hrs	>2hrs (8-16)	Cross vent	Vent compliance due to height	Enhanced single sided ventilation performance		
L04-06	2 BED	N							YES	YES	YES	YES	YES	YES	YES	YES	YES			YES			YES				
L04-07	2 BED	SE							B	B	B									.	.	.	YES				
L04-08	2 BED	NW					B	B	B	YES	YES	YES	YES							.	.	.			YES		
L04-09	2 BED	SE																		.	.	.			YES		
L04-10	2 BED	SE									B	B	B	B	B	B				.	.	.	YES				
L04-11	1 BED	NW								YES	YES	YES	YES	YES	YES	YES	YES	YES		YES					YES		
L04-12	3 BED	NW				B	B	B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES	B	YES			YES				
L04-13	1 BED	NE					YES	YES	YES	YES	YES	YES	B	B	B					.	YES				YES		
L04-14	2 BED	SE						B	B	B	B	B	B	B	B	B	B			.	.	.	YES				
L04-15	1 BED	NE				YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES			YES				
L04-16	1 BED	NE		YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	B	B	B			YES					YES		
L04-17	3 BED	SE	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			.	.	.	YES				
L04-18	2 BED	SE																		.	.	.	YES				
L04-19	1 BED	SW					YES	YES	YES	YES	YES	YES	YES							YES			YES				
Level 05																											
L05-01	2 BED	SE							B	B	B	B	B					B		.	.	.	YES				
L05-02	2 BED	NW					B	B	B	YES	YES	YES	YES							.	.	.			YES		
L05-03	2 BED	SE		YES																.	.	.			YES		
L05-04	2 BED	SE									B	B	B	B	B	B				.	.	.	YES				
L05-05	1 BED	NW								YES	YES	YES	YES	YES	YES	YES	YES	YES		YES					YES		
L05-06	3 BED	NW			B	B	B	B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES	B	YES			YES				
L05-07	1 BED	NE				YES	YES	YES	YES	YES	YES	YES	B	B	B					YES					YES		
L05-08	2 BED	SE					B	B	B	B	B	B	B	B	B	B	B			.	.	.	YES				
L05-09	1 BED	NE		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES			YES				Skylight
L05-10	1 BED	NE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES			YES				Skylight
L05-11	3 BED	SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES			YES				Skylight
L05-12	2 BED	SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES				YES			YES				Skylight
L05-13	1 BED	SW	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES						YES			YES				Skylight
Level 06																											
L06-01	2 BED	SE							B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES				Skylight
L06-02	2 BED	NW					B	B	B	YES	YES	YES	YES	YES						.	YES			YES			
L06-03	2 BED	SE		YES																.	.	.		YES			
L06-04	2 BED	SE									B	B	B	B	B	B				.	.		YES				
L06-05	1 BED	NW								YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES				YES			
L06-06	3 BED	NW		B	B	B	B	B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES	B	YES			YES				
L06-07	1 BED	NE			YES	YES	YES	YES	YES	YES	YES	YES	B	B	B					YES				YES			
L06-08	2 BED	SE		B	B	B	B	B	B	B	B	B	B	B	B	B	B			.	.	.	YES				
Level 07																											
L07-01	2 BED	SE	YES	B	B															.	.	.	YES				
L07-02	2 BED	NW					B	B	B	YES	YES	YES	YES	YES	YES	YES				YES			YES				
L07-03	1 BED	NW								YES	YES	YES	YES	YES	YES	YES	YES	YES		YES				YES			

Unit	Type	Aspect	8	830	9	930	10	1030	11	1130	12	1230	1	130	2	230	3	330	4	>3 hrs	>2hrs	>2hrs (8-16)	Cross vent	Vent compliance due to height	Enhanced single sided ventilation performance		
L07-04	3 BED	NW		B	B	B	B	B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES				
L07-05	1 BED	NW			YES	YES	YES	YES	YES	YES	YES	YES	B	B	B					YES				YES			
L07-06	2 BED	SE		YES	YES	B	B	B	B	B	B	B	B	B	B	B	B			.	.	.	YES				
Level 08																											
L08-01	2 BED	SE	YES	B	B															.	.	.	YES				
L08-02	2 BED	NW					B	B	B	YES	YES	YES	YES	YES	YES	YES	YES			YES			YES				
L08-03	1 BED	NW								YES	YES	YES	YES	YES	YES	YES	YES	YES		YES				YES			
L08-04	3 BED	NW		B	B	B	B	B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES				
L08-05	1 BED	NW		YES	YES	YES	YES	YES	YES	YES	YES	YES	B	B	B					YES				YES			
L08-06	2 BED	SE	YES	YES	YES	B	B	B	B	B	B	B	B	B	B	B	B			.	.	.	YES				
Level 09																											
L09-01	2 BED	SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES				Skylight
L09-02	2 BED	NW				B	B	B	B	YES	YES	YES	YES	YES	YES	YES	YES			YES			YES				
L09-03	1 BED	NW								YES	YES	YES	YES	YES	YES	YES	YES	YES	B	YES				YES			
L09-04	3 BED	NW	B	B	B	B	B	B	B	B	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES				
L09-05	1 BED	NW	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	B	B	B					YES				YES			
L09-06	2 BED	SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES				Skylight
207																				**54**	**13**	**1**	**99**	**10**	**18**		
																				26.1%	**6.3%**	**0.5%**	**47.8%**	**4.8%**	**8.7%**		
																					32.4%	**32.9%**			**61.4%**		

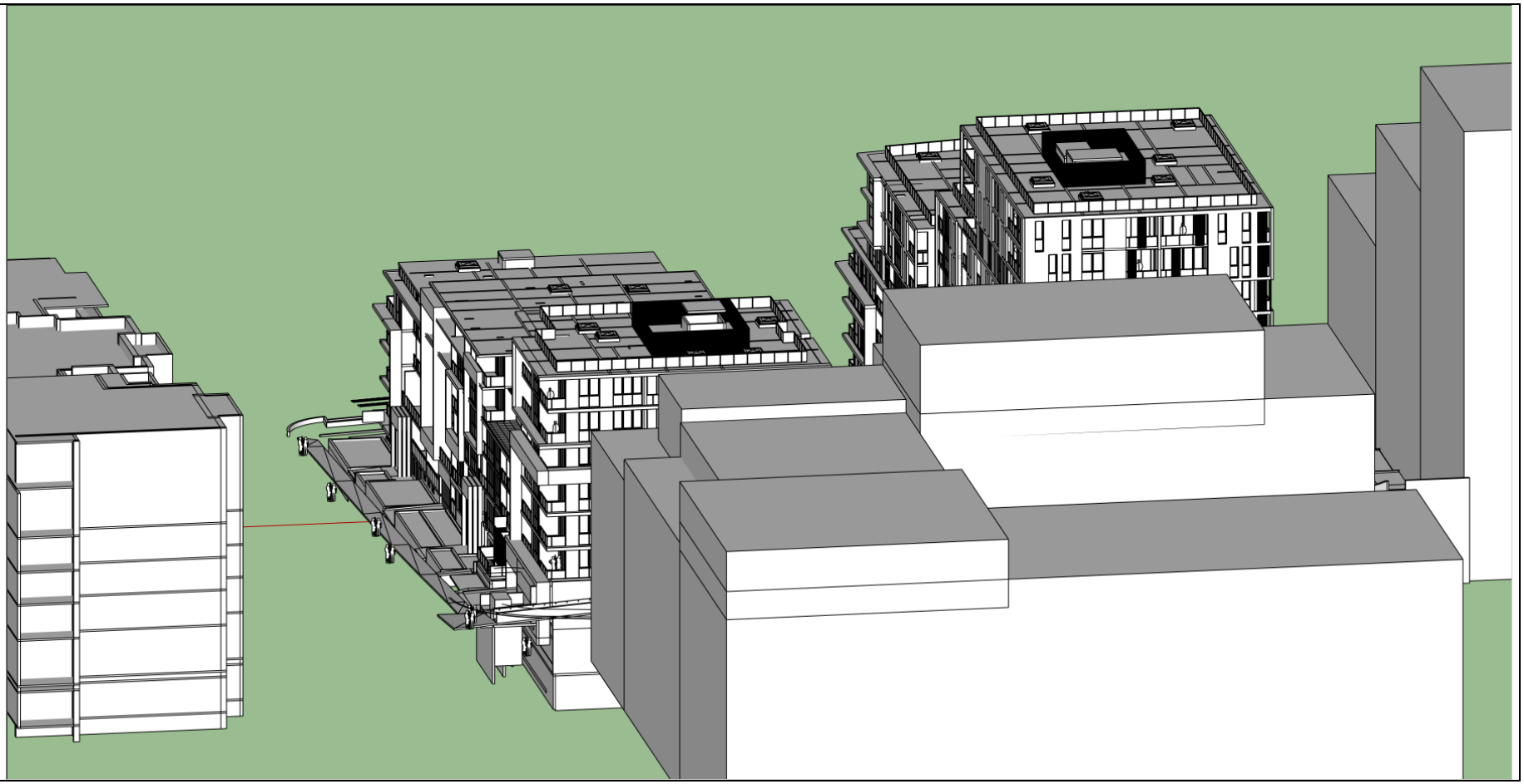
APPENDIX B: VIEWS FROM THE SUN

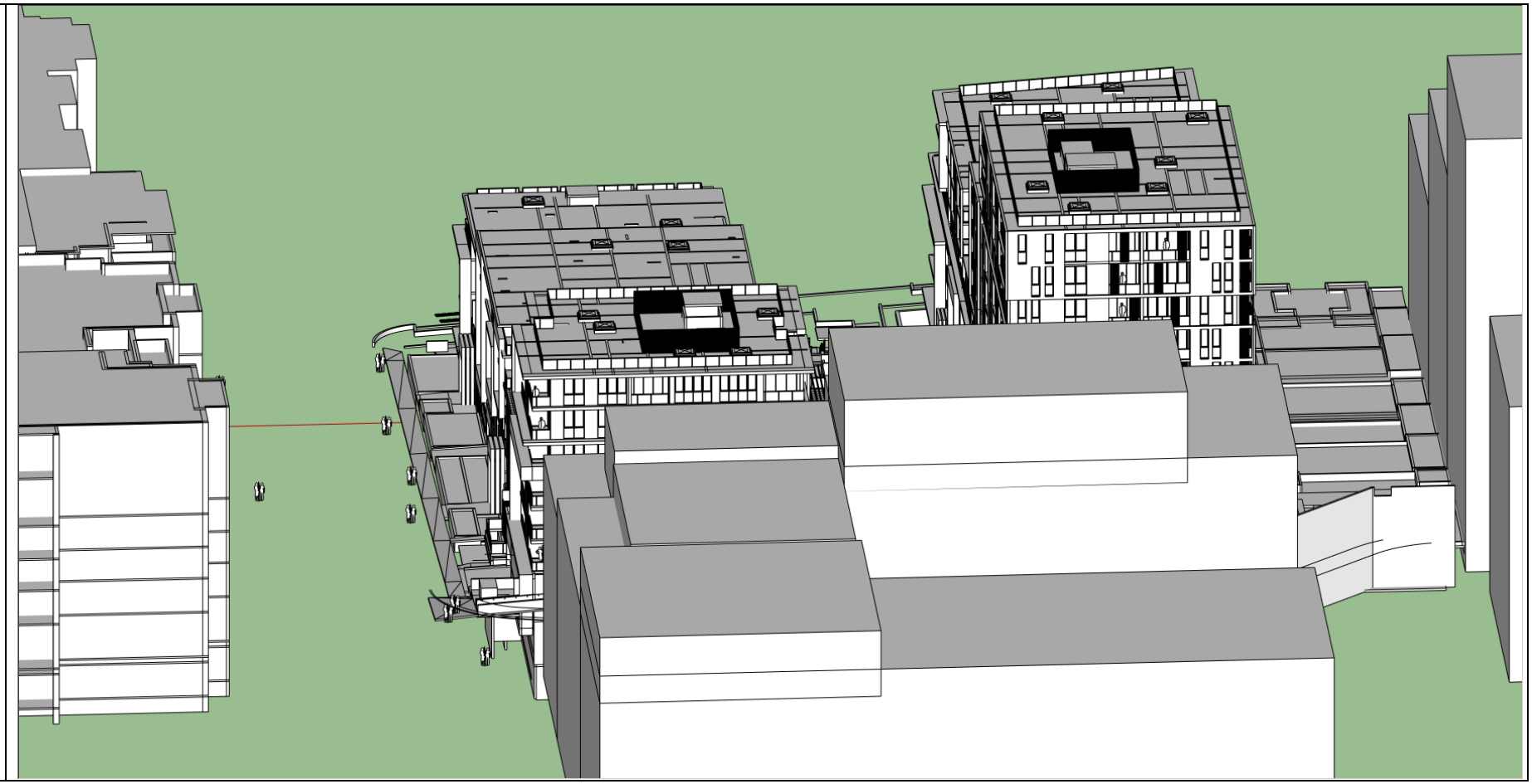
A table of 'views from the sun' is provided for reference.

Table 7: Views from the sun at half hour intervals, June 21: s75W Application

0800	

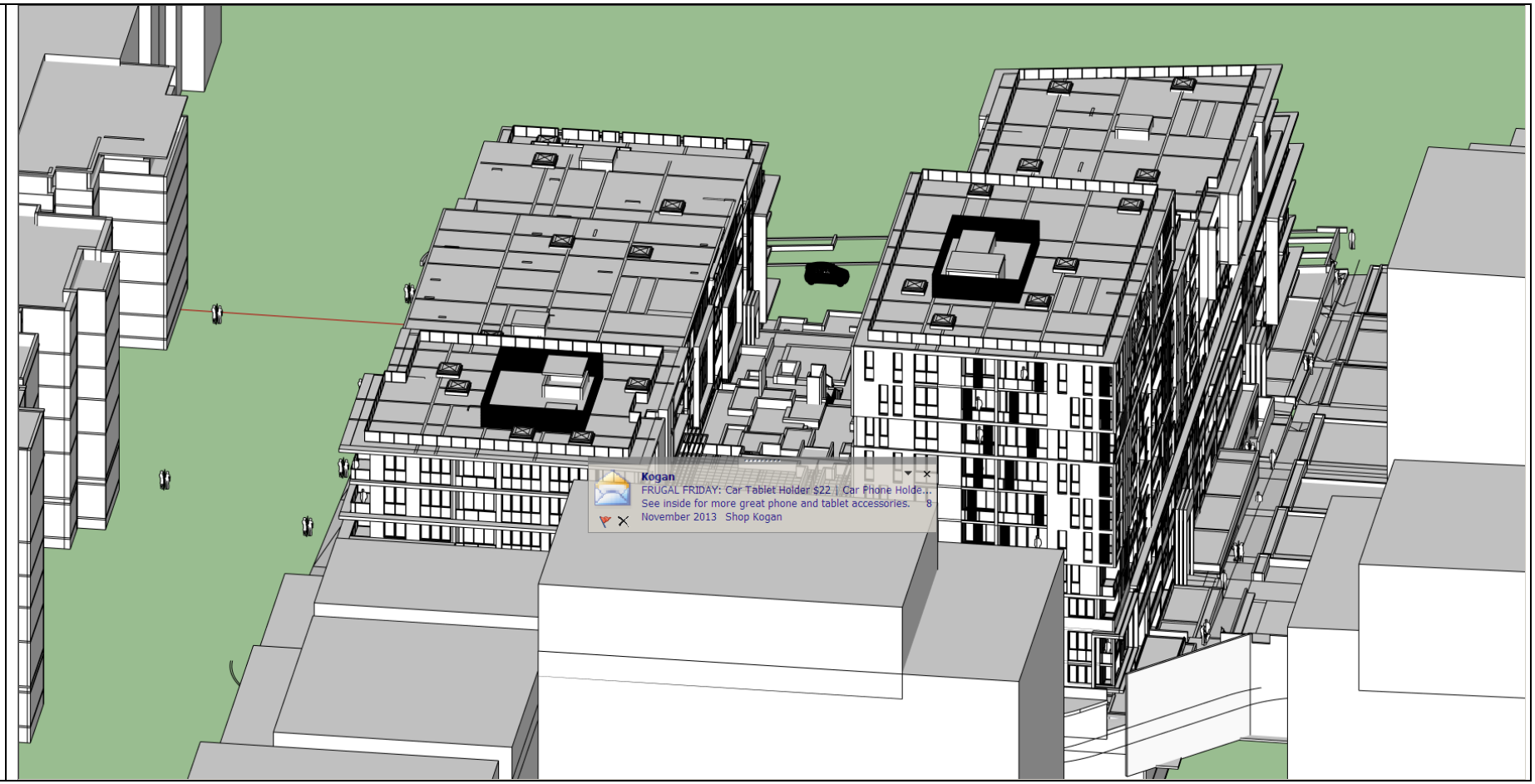
0830



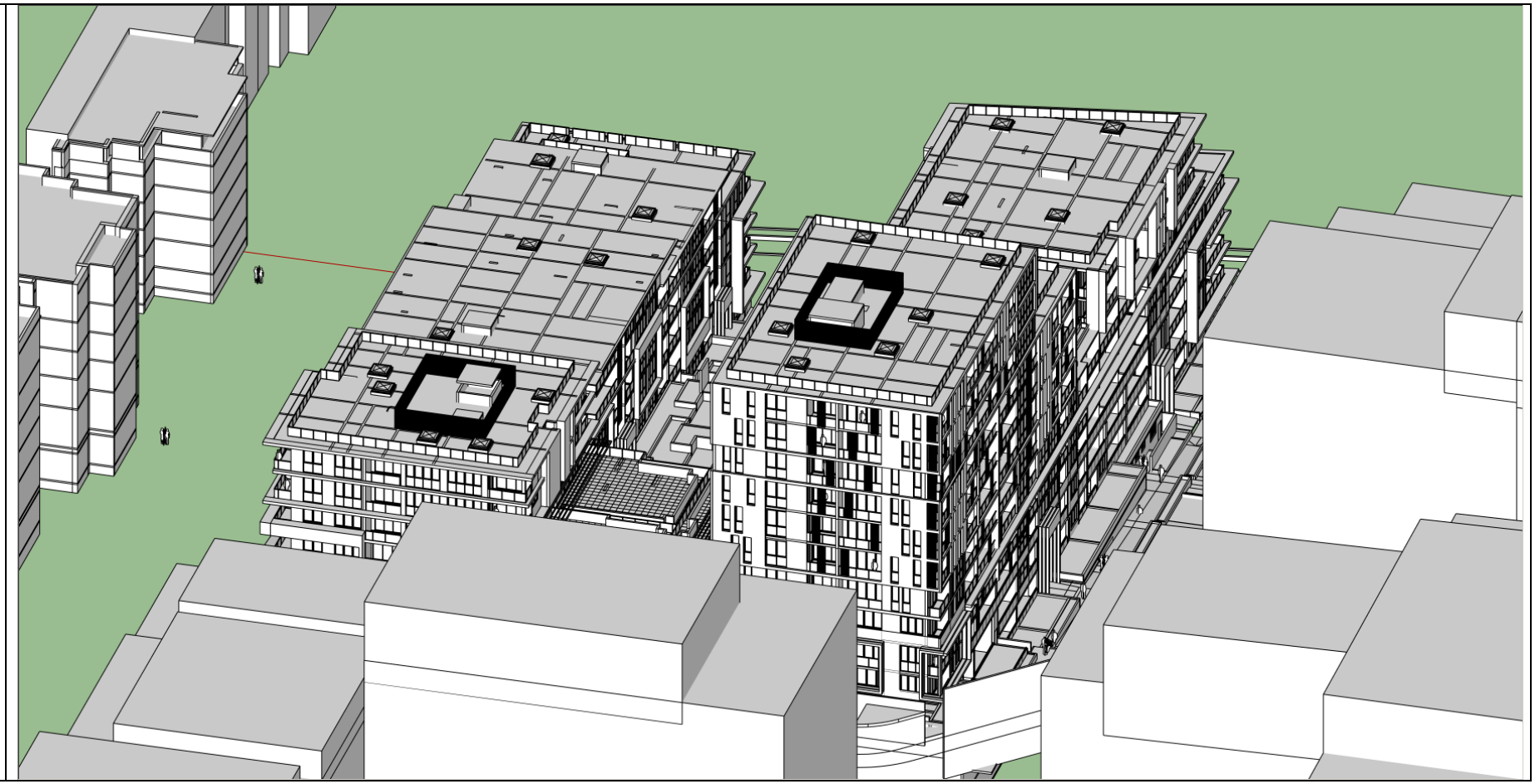
0900	

0930	

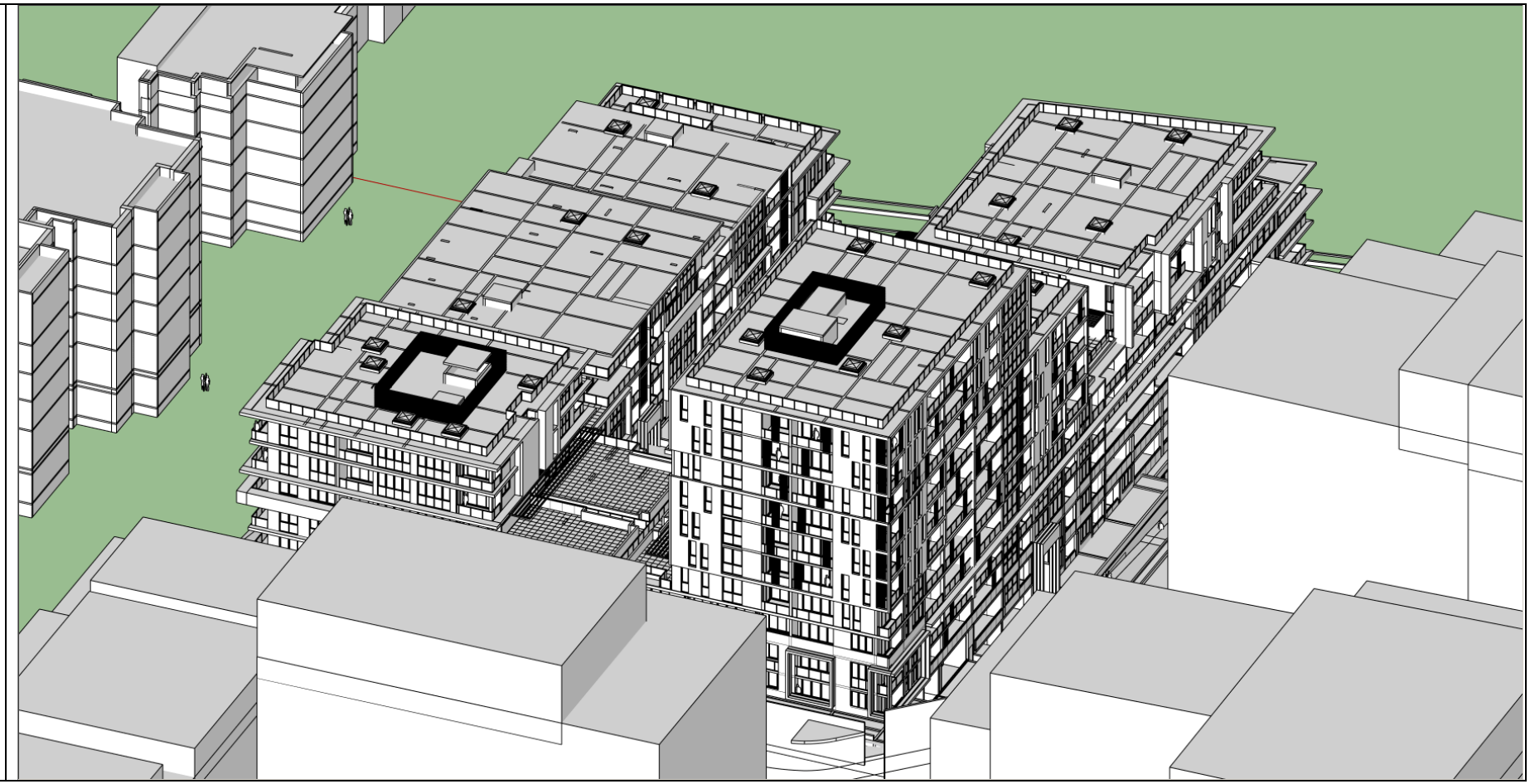
1000

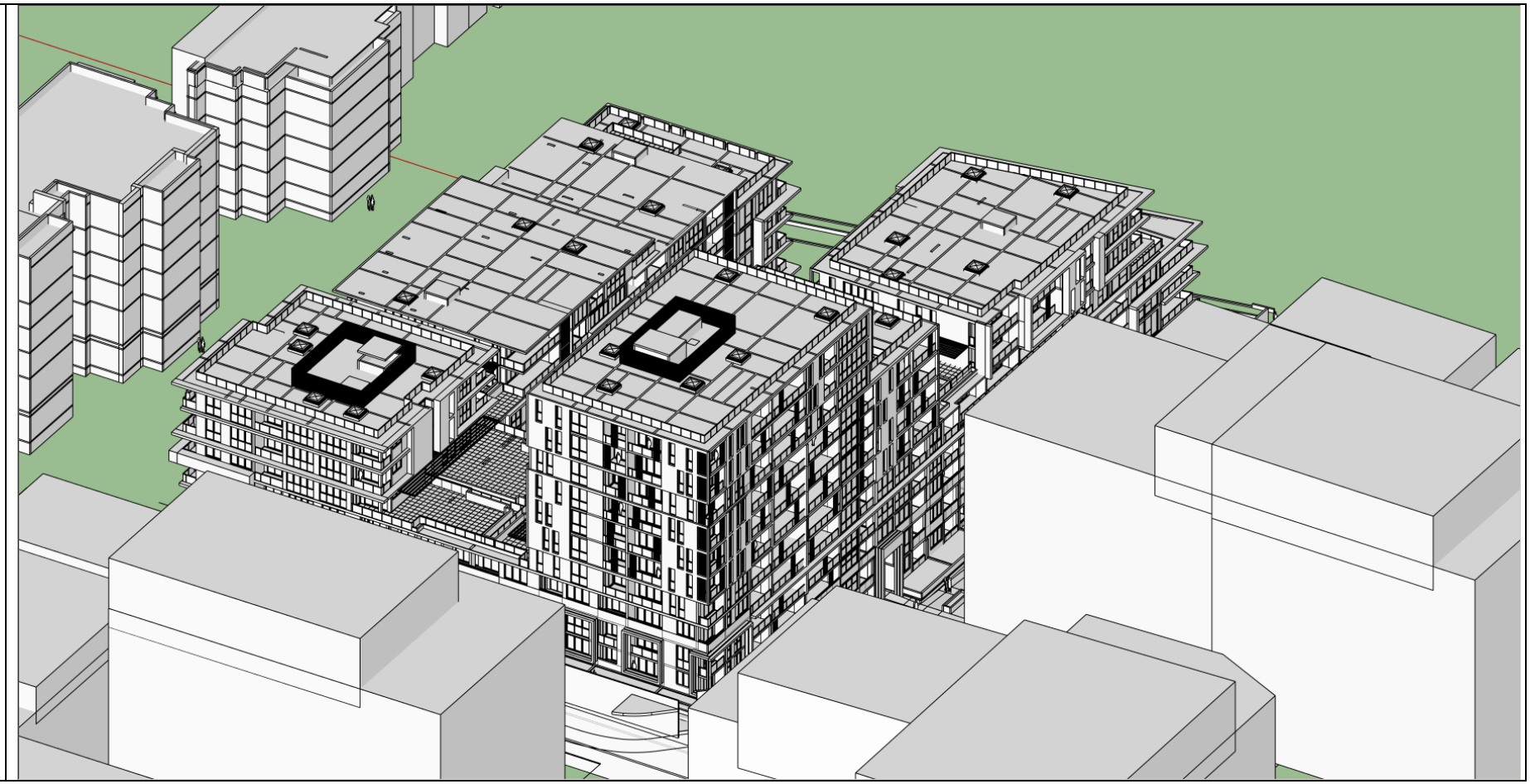

Kogan
FRUGAL FRIDAY: Car Tablet Holder $22 | Car Phone Holde...
See inside for more great phone and tablet accessories.
November 2013 Shop Kogan

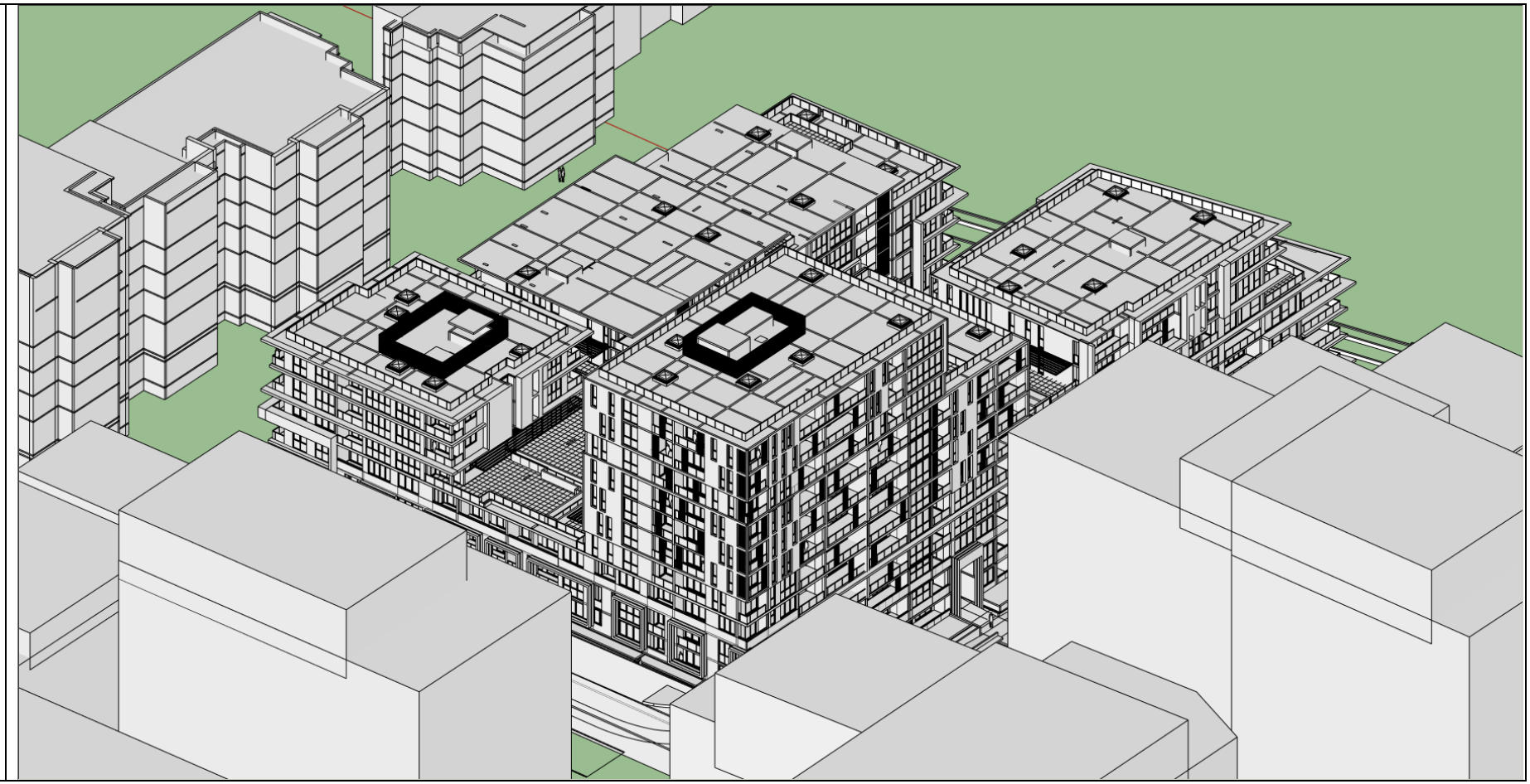
1030

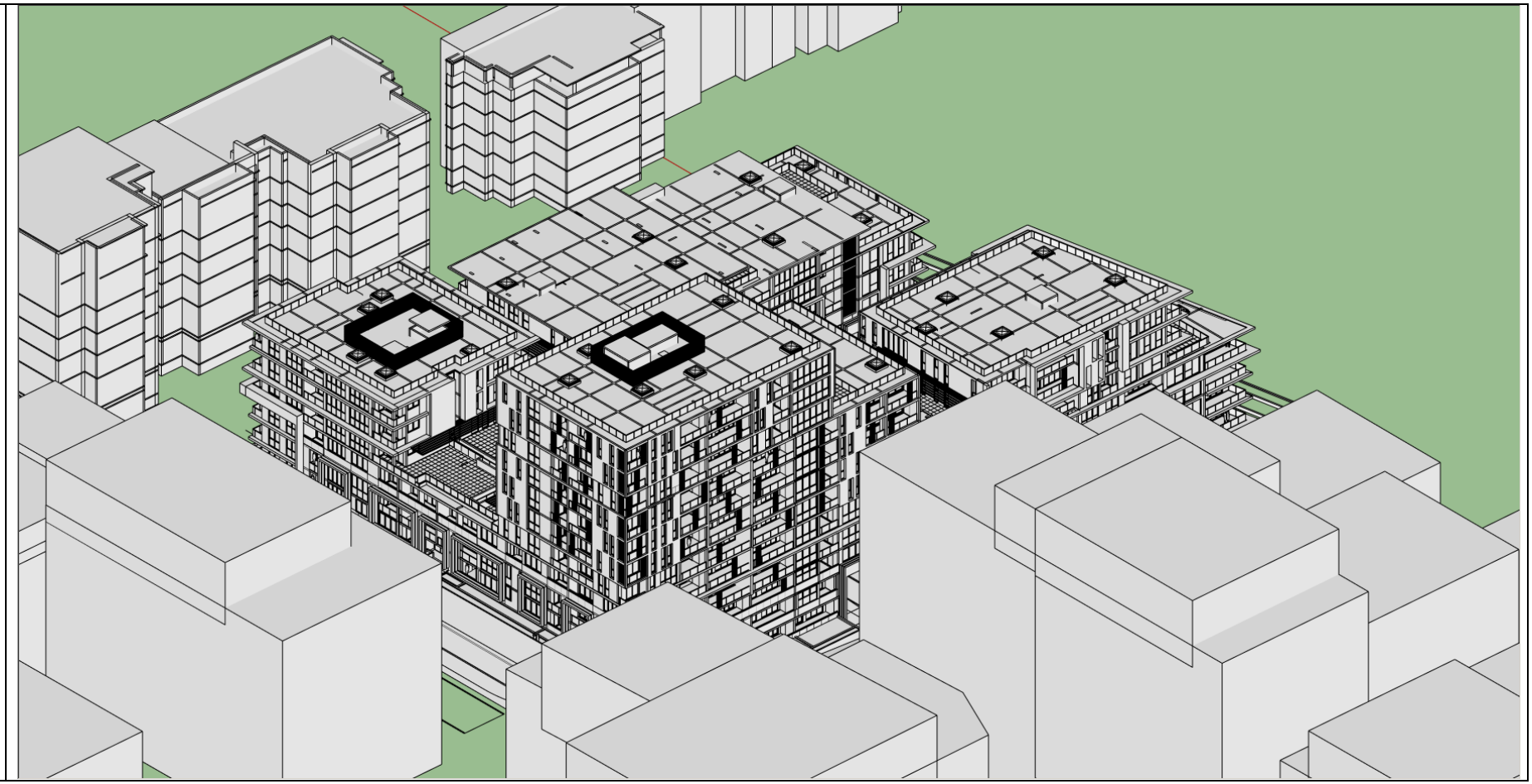


1100

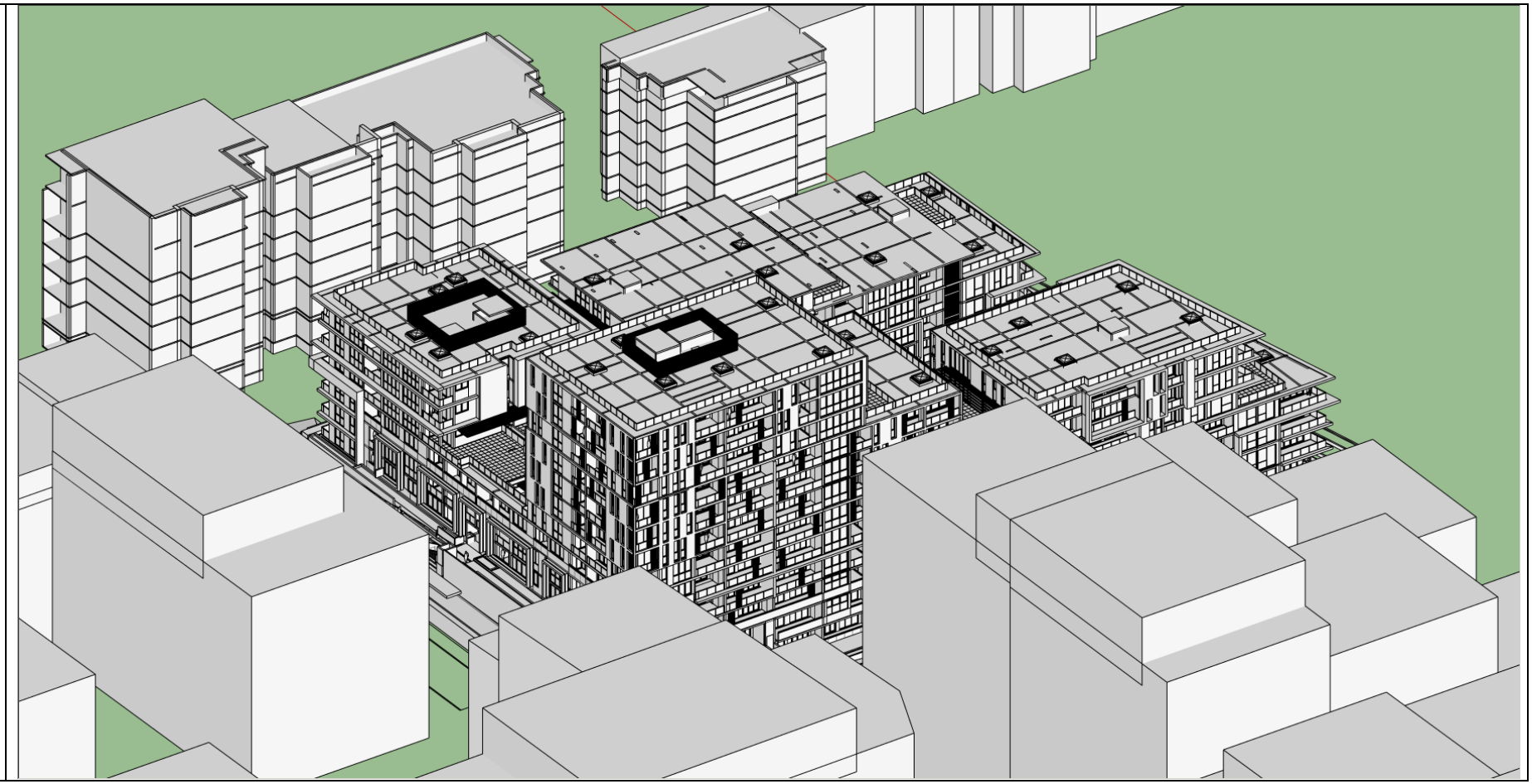


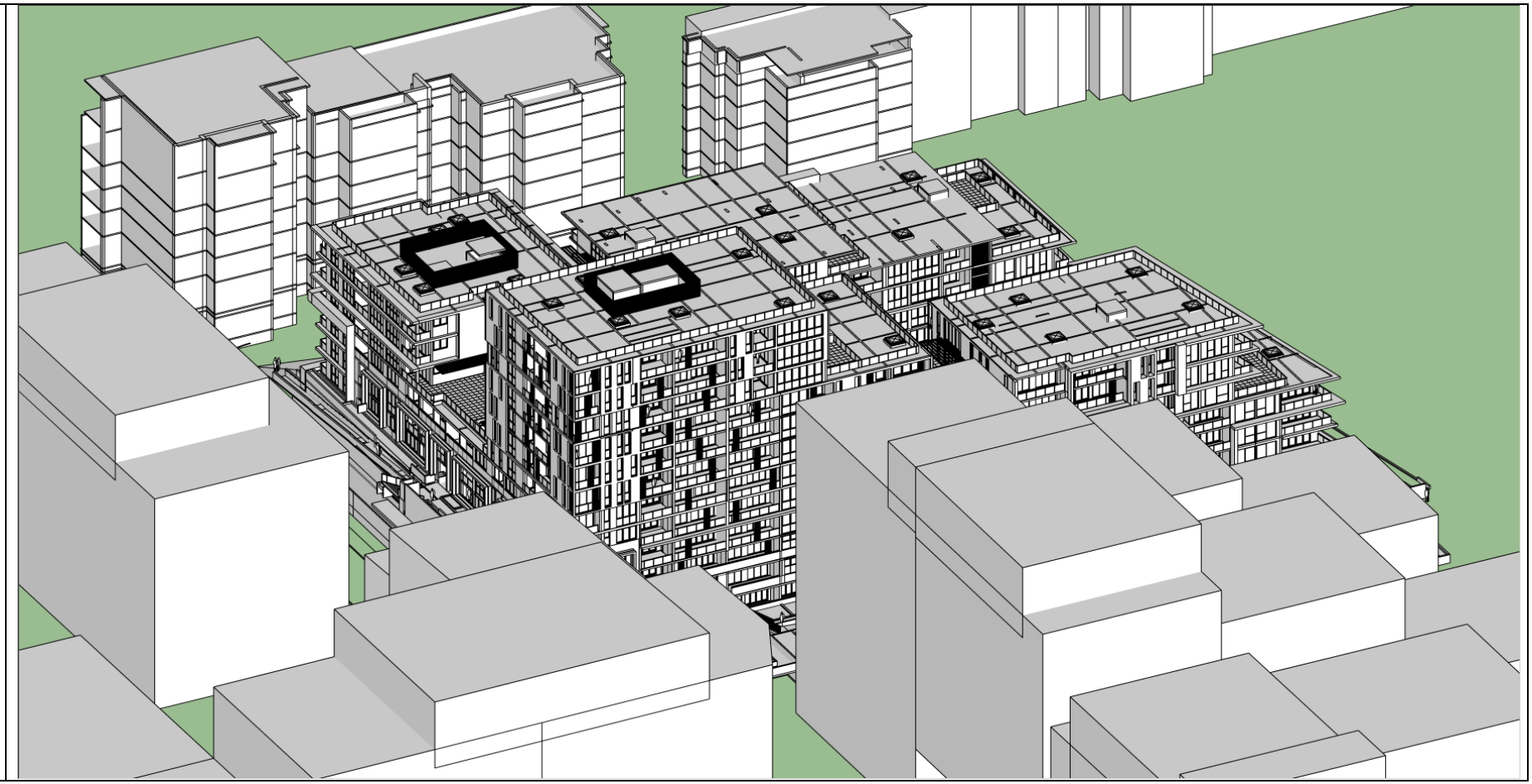
1130	

1200	

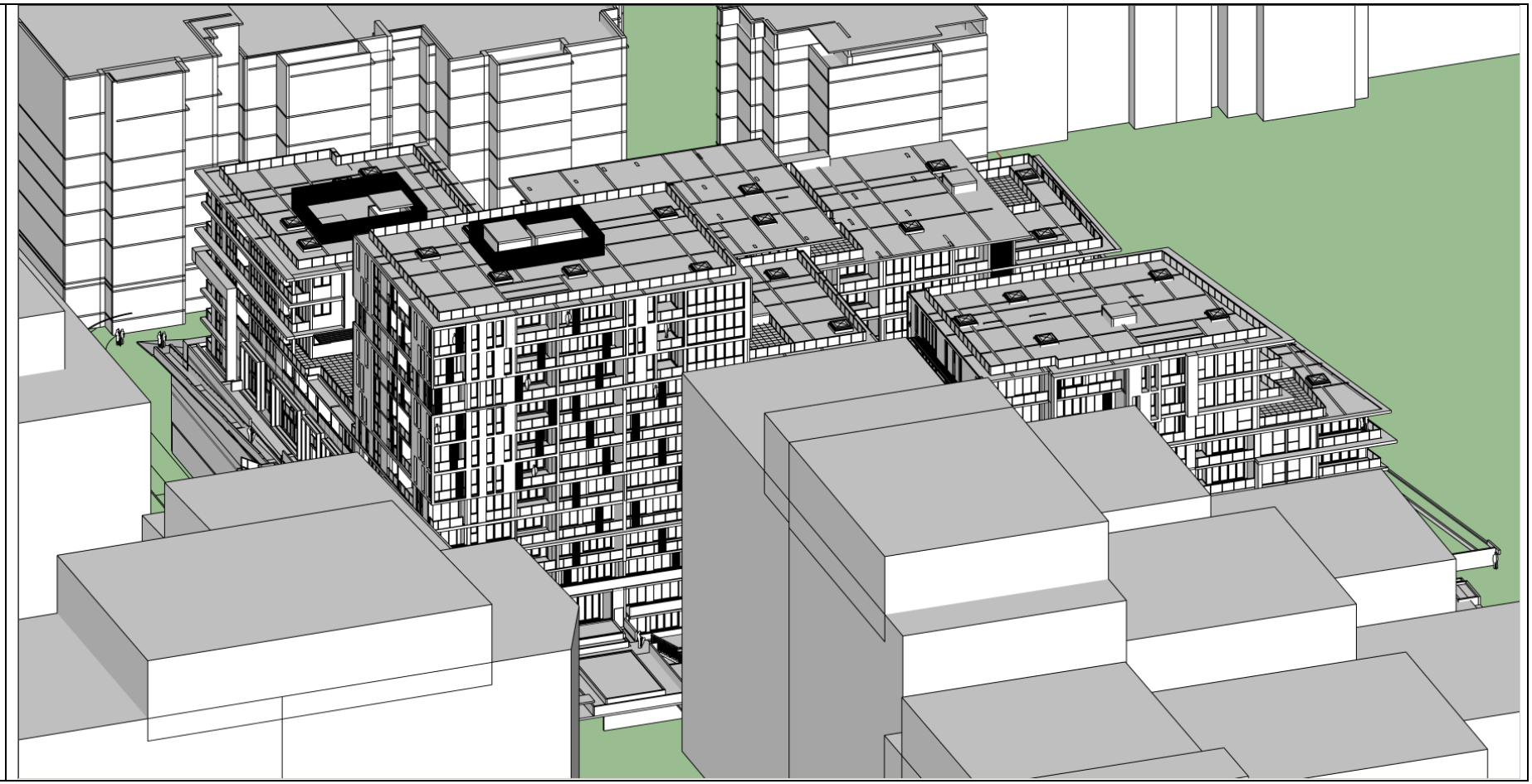
1230	

1300

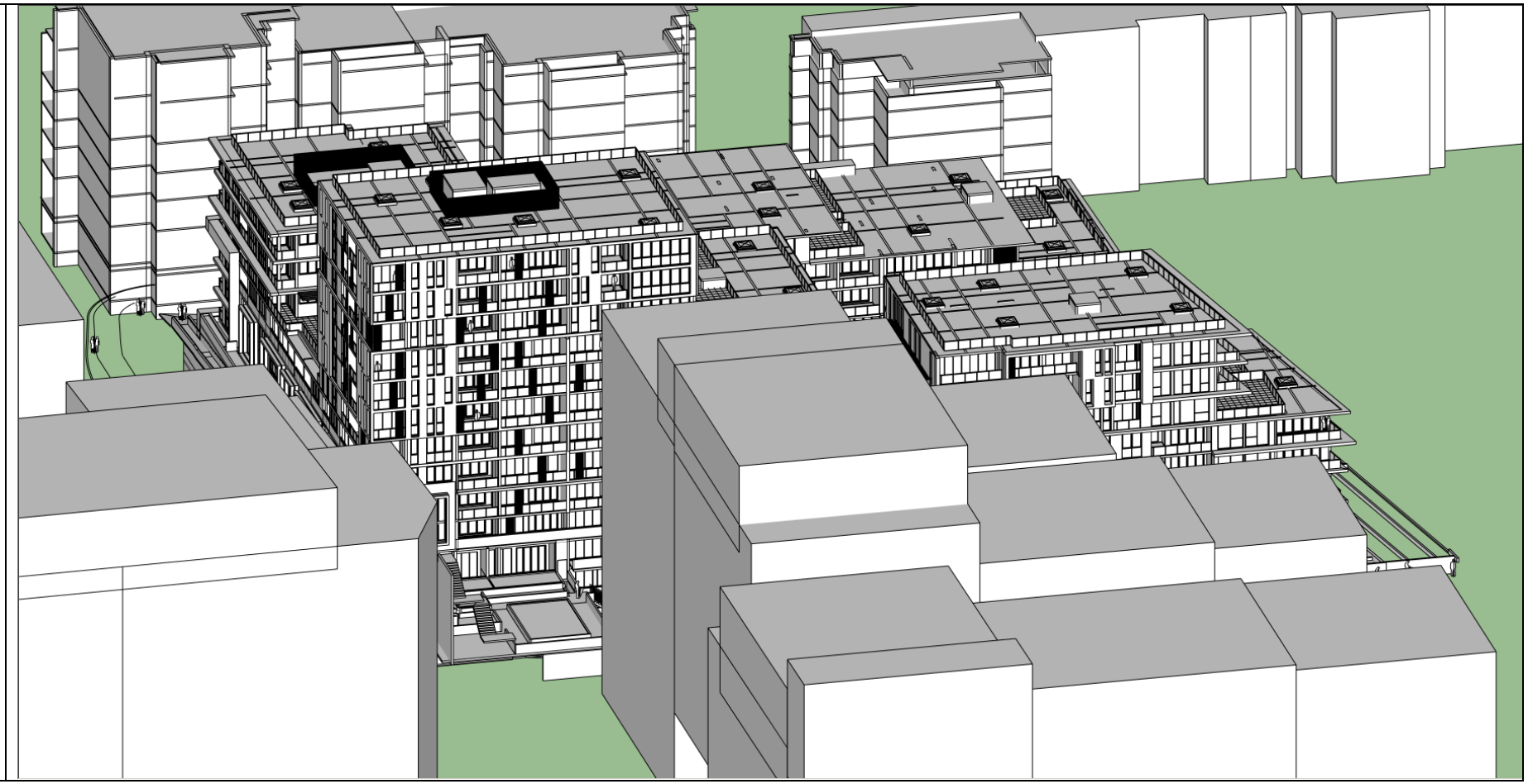


1330	

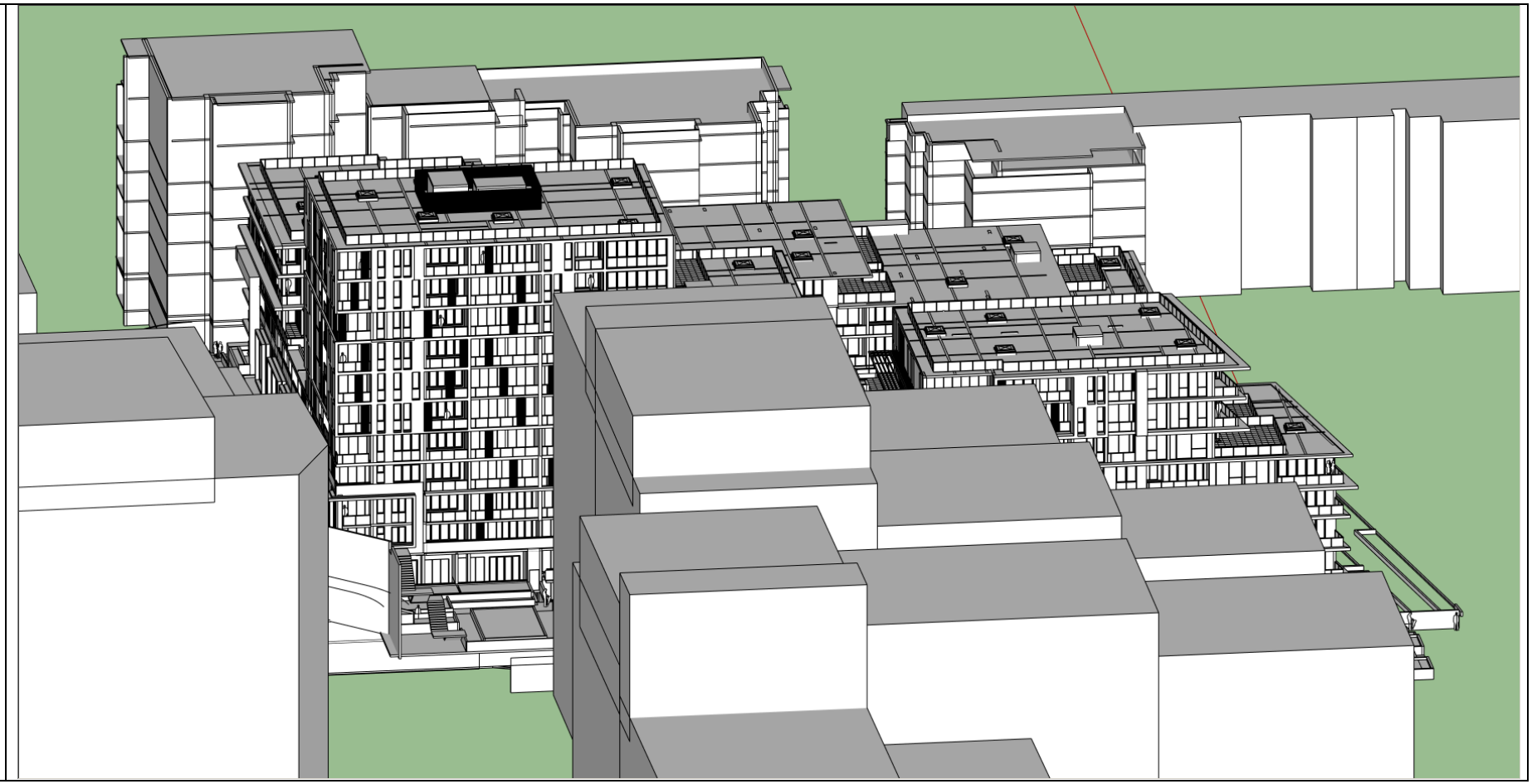
1400



1430



1500



1530	

1600