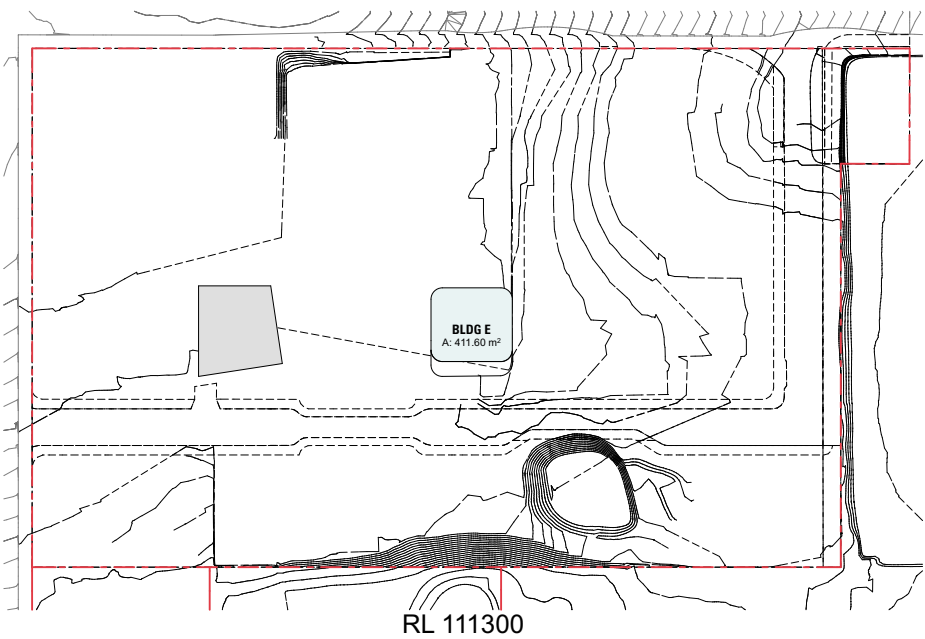
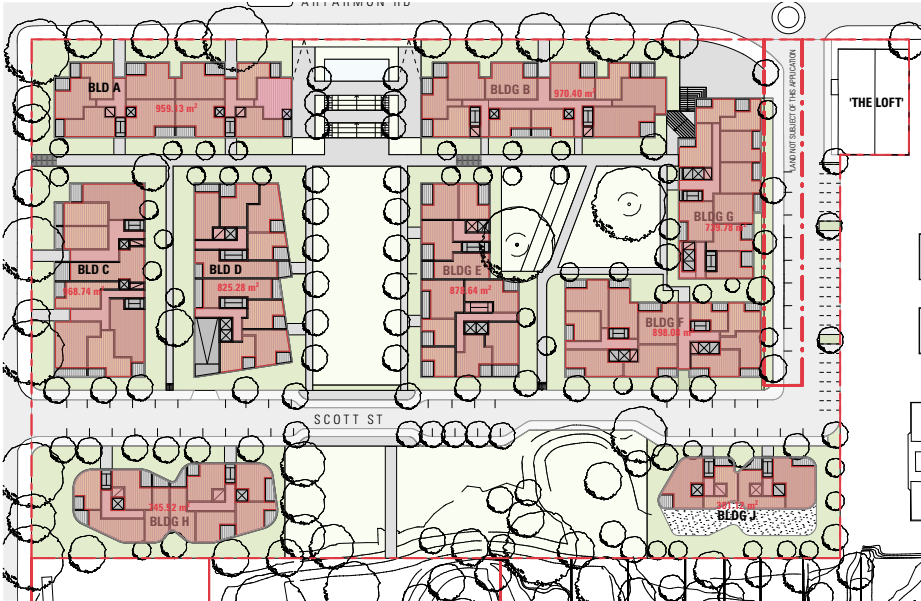


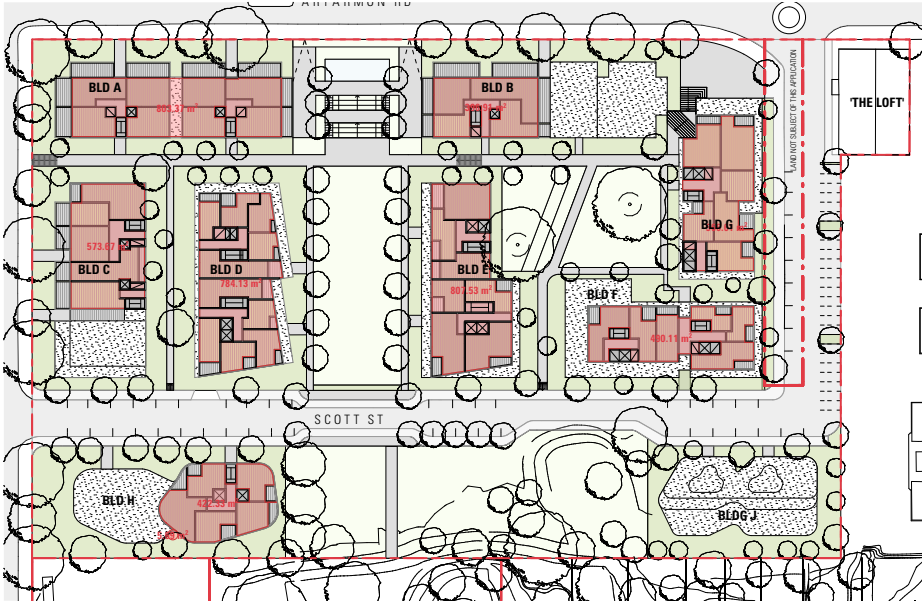
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02	31.03.17	S75W MODIFICATION 2 CONCEPT MASTERPLAN SUBMISSION											
03	16.10.17	S75W MODIFICATION 2 CONCEPT MASTERPLAN SUBMISSION											
						CHOI ROPHA FIGHERA P/L ACN 144 714 695 ATF CHOI ROPHA FIGHERA UNIT TRUST T/A CHROFI ABN 22 365 257 187 NOMINATED ARCHITECT JOHN CHOI 8706 TAI ROPHA 6568 STEVEN FIGHERA 6609 THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATION, REPORT AND DRAWINGS. DO NOT SCALE DRAWINGS. DIMENSIONS GOVERN. VERIFY ALL DIMENSIONS ON SITE BEFORE CONSTRUCTION. COPYRIGHT OF THIS DRAWING IS VESTED IN CHROFI.							
						PROJECT NUMBER	PLOT DATE	DRAWN	CHECKED	SHEET SCALE	SHEET SIZE	SHEET NUMBER	ISSUE
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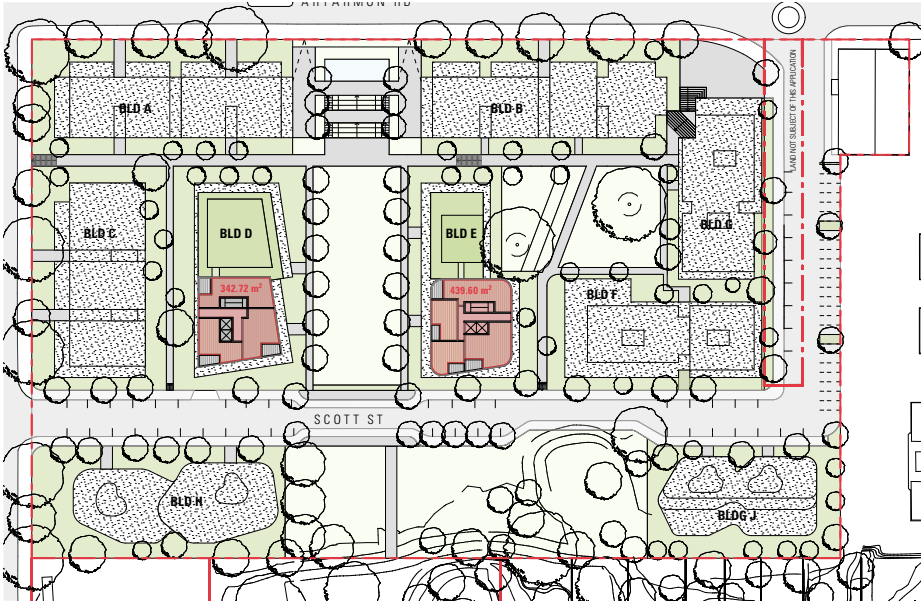
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S4 RL 80300



S7 RL 89600



S11 RL 102000

ISSUE	DATE	DESCRIPTION
01	14.07.16	S75W MODIFIED CONCEPT MASTERPLAN SUBMISSION
02	31.03.17	S75W MODIFICATION 2 CONCEPT MASTERPLAN SUBMISSION
03	16.10.17	S75W MODIFICATION 2 CONCEPT MASTERPLAN SUBMISSION

ISSUE	DATE	DESCRIPTION

ARCHITECT

CHROFI

3/1 THE CORSO MANLY NSW 2095 AUSTRALIA T +61 2 8096 8500 F +61 2 8007 0411 E info@chrofi.com

CHOI ROPHA FIGHERA P/L ACN 144 714 885 ATF CHOI ROPHA FIGHERA UNIT TRUST T/A CHROFI ABN 22 365 257 187
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PROJECT					
CHANNEL 9 SITE MASTERPLAN					
PROJECT NUMBER	PLOT DATE	DRAWN	CHECKED	SHEET SCALE	
1566	16/10/17	GB	TR	1:2000	

NORTH

SHEET TITLE

GFA AREAS TYPICAL LEVELS

SHEET NUMBER

ISSUE

03

A-S75W-406



2 APPENDIX SOLAR ANALYSIS

MASTERPLAN REPORT - S75W MODIFICATION NO.2

On Behalf of LEPC 9 Pty Ltd

16.10.17 ISSUE 01

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1.1 SOLAR ANALYSIS -
SUMMARY

Summary of Changes since S75W Submission Modification NO. 01

This S75W modification NO. 2 includes a change in built form and therefore a change in solar impact for Walter St to the south and Castlevale to the east. The following shadow diagrams and summary tables have all been updated to represent the impact of the new massing.

In summary the following solar impact changes have occurred:

- The new position of building F and G further into the site (with the retention of Scott St) has reduced overshadowing on Castlevale significantly. The proposed new massing reduces overshadowing at all times between 1-3pm compared with the approved scheme. Overall the number of apartments overshadowed is reduced, and the length of time overshadowing occurs across all apartments is reduced by 3 hours.
- Moving Scott St south has increased the massing of buildings D and E 1.5m south. However building F, G and H have reduced in area, and changed in location which has altered their solar impact. Changes to the top level of building E have resulted in further solar improvements.
- Overall, Walter St has a nett overall improvement in solar access for facades and private open spaces from the approved scheme. There is a further improvement from the exhibited S75W scheme. The following tables outline the changes in solar access.
- 15 of the 20 study areas remain an improvement or no change and the largest reduction in time for solar access is 30 mins for facade and 1 hour for backyard. (Further improvement from the exhibited S75W submission and still an improvement on the approval).

1.2 SOLAR ANALYSIS - SUMMARY

Summary of Approach

Solar access and over shadowing analysis has been a key determinate in the design and location of the proposed massing. Artarmon Rd and Richmond Ave properties will not incur any overshadowing impact in either the approved or proposed scheme. However Walter St to the south and the Castle Vale towers to the east have been both carefully studied for over shadowing impacts.

The local topography including the steep escarpment to the south and the site drop to the east currently do cause an impact to Walter St and Castle Vale properties.

The proposed scheme has located higher buildings in the middle of the site, as far from boundaries as possible. This has helped to mitigate overshadowing impacts on the neighboring properties.

Overall the proposed scheme will provide a net improvement in over shadowing impacts to both Walter St and the Castle Vale properties from the approved scheme.

The following pages demonstrate a detailed solar analysis including both plan and perspective angles to analyse the over shadowing impact in Summer, Spring and Winter. As winter demonstrates the “worst case” solar access due to the low angle of the sun, calculation in this section have been based on this time of year (winter solstice).

Calculations Process

The following description explains how the proposed scheme has calculated a nett overall improvement to both Walter St and Castle Vale.

Solar calculation has been completed at the 22nd June (winter solstice) for Walter St as required by Willoughby DCP. For Castle Vale the date has been set at the 21st June (winter solstice) as required by the SEPP 65 Apartment Design Guide (ADG) for apartment buildings. Regardless, this change of one day has very little impact on the results.

Sunlight has been calculated between 9am - 3pm as required by both the Willoughby DCP and SEPP 65 ADG.

Views have been provided at each hour for the approved and proposed scheme. To help understand the elevational impact of overshadowing, a perspective view of both Walter St and Castle Vale towers has been provided in addition to the plan.

SEPP 65 ADG requires a minimum of 2 hours direct sunlight is required between 9am and 3pm at mid winter to both the living rooms and private open spaces. For the Walter St properties the Willoughby DCP requires 3 hours of direct sunlight between 9am and 3pm at mid winter. In some cases for properties on Walter Street the existing topography including the steep slope and deep terrace areas surrounded by retention walls do not receive sufficient sunlight under this control regardless of any built form on the proposed site. These properties are noted on the plan.

No trees or fences have been included in any calculations.

Walter St Calculations:

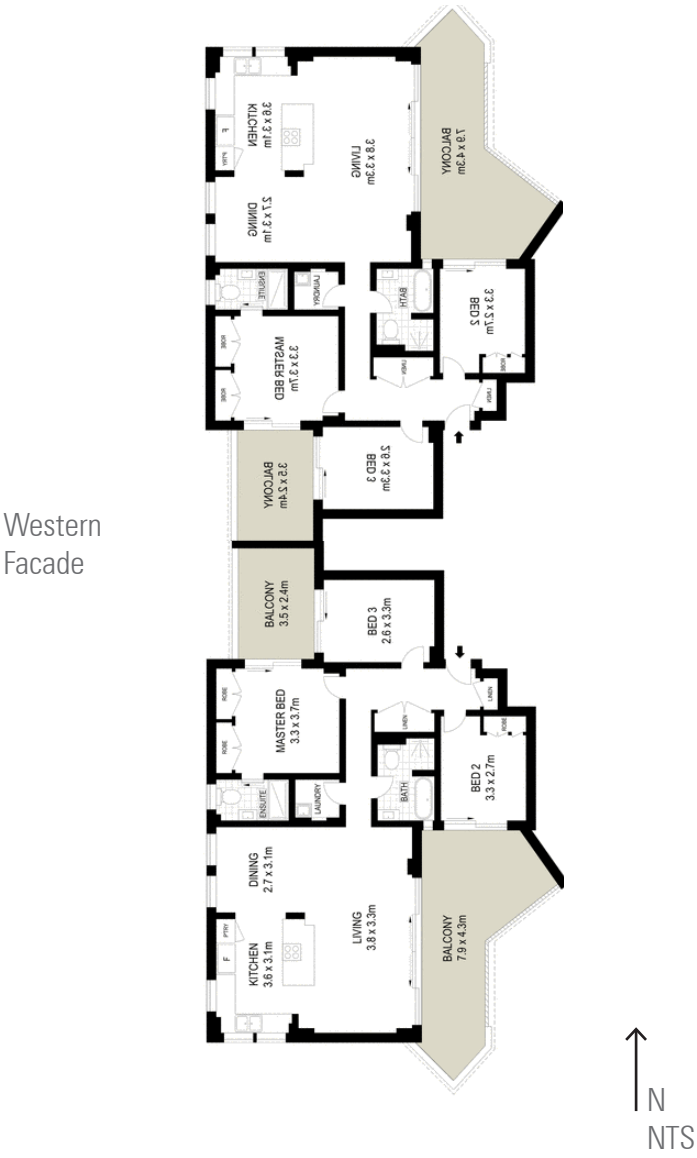
- For Walter St facade calculations, the number represents the amount of sun received by the northern (rear) facade of the property or the backyard private open space.
- For the rear facade the sunlight must be received for a minimum of 15 minutes, with an minimum 1m² area, measured between 1m high and 2m high on the ground floor facade. This is to ensure sunlight is high enough to penetrate into the room, and not so high that it would be above eye level. Despite the fact living rooms may be located in other parts of the assessed houses, all rear facades were assessed to ensure north facing rooms receive direct sunlight.
- For private open space sunlight must be received for a minimum of 15 minutes, with a minimum area of 10m². This is to ensure the area is large enough to be used by a table and chairs. Private open space was assumed to be adjacent to the house where terraces, patios, verandahs are located and connection to internal living spaces is most convenient.

Castle Vale Calculations:

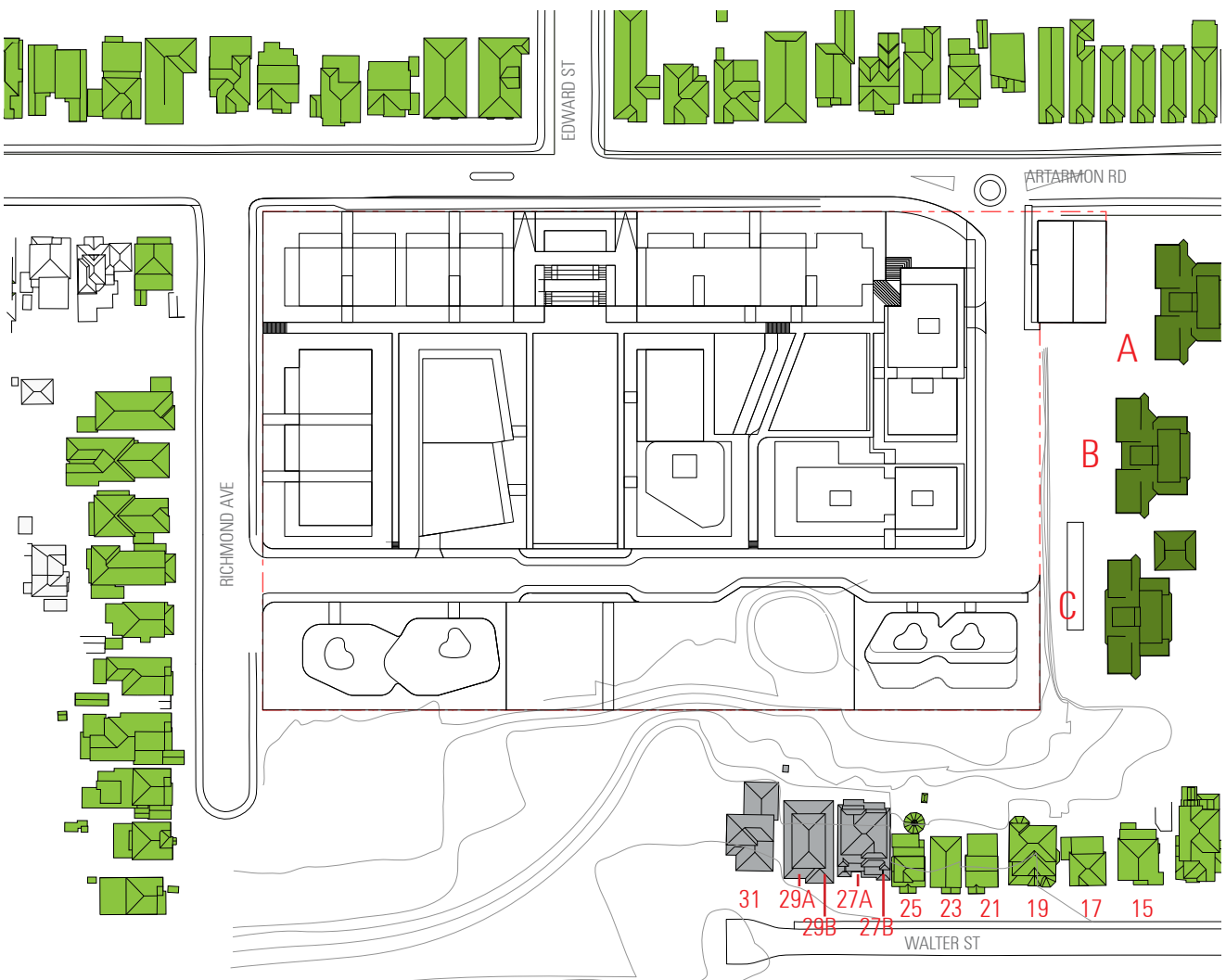
- As opposed to measuring hours of solar access, for the Castle Vale development the scheme was assessed based on the number of apartment which were over shadowed by the approved and proposed development.
- Overshadowing caused by the proposed site, which is located to the west of the towers was assessed at winter solstice between 9am and 3pm (to meet SEPP 65 ADG). Sunlight reaches these facades between 12-3pm, and overshadowing from the approved starts at 1.30pm.
- Overshadowing was assessed at each 15 minutes interval during these hours. To be excluded as ‘over shadowed’ the north or west facing kitchen or dining

room windows required a minimum area of sunlight on the windows at 1m² for the full 15 minute interval.

- We note private open spaces in these towers are located to the east of the buildings and was not therefore affected by the approved or proposed scheme.
- A plan of the west facing Castle Vale development apartments is included below for reference. Dining room and kitchen windows have been modeled and calculated for this solar analysis. These plans have been checked against the development approval documents issued by Willoughby City Council for the development.



1.3 SOLAR ACCESS RESULTS



- COMPLIANT WITH SOLAR ACCESS WITH SEPP65 ADG (MIN 2 HOURS BETWEEN 9AM - 3PM))
- COMPLIANT WITH WILLOUGHBY COUNCIL DCP (MIN 3 HOURS BETWEEN 9AM-3PM)
- NON COMPLIANT DUE TO ESCARPMENT OVERSHADOWING

1.4 SOLAR ACCESS RESULTS -
CALCULATIONS

WALTER STREET
HOURS OF SOLAR ACCESS RECEIVED BY EACH PROPERTY
Winter Solstice 22nd June (9am-3pm)

ST NO.	REAR FAÇADE (HOURS)		REAR PRIVATE OPEN SPACE (HOURS)	
	APPROVED	RTS SCHEME	APPROVED	RTS SCHEME
31	4.25	5	2	3.25
29A	3.5	4.25	0	0
29B	4	4.25	0.25	0.75
27A	3.25	3.5	0	0
27B	3.5	3.75	0	0
25	5.75	5.75	5.75	4.75
23	6	6	4.25	4.25
21	6	6	5.5	6
19	5.25	5	4.75	4.25
17	6	5.5	6	5.5
47.5		49	28.5	28.75
		+ 1 hr 30mins		+ 15mins

- Green represents no change from the approved scheme
- Dark Green represents an improvement from the approved scheme
- Red represents increased overshadowing/ a reduction in solar access.

Results - 15 of the 20 study areas in this table show a no change or improvement to the solar access. (an improvement from the exhibited S75W submission)

Of the remaining houses where the proposed massing has reduced solar access, no more than 30 mins of solar access has been lost in any facade and 1 hour in any back yard and despite this in every case each affected house continues to receive in excess of the DCP requirement.

CASTLE VALE TOWERS
NUMBER OF APARTMENTS OVERSHADOWED
Winter Solstice 21st June (1pm-3pm)

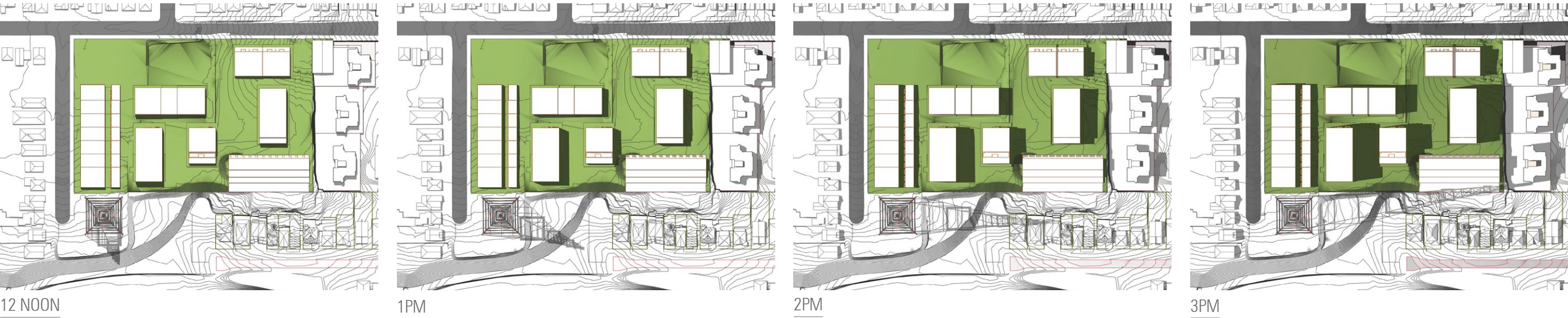
BLD #	1-1:15		1:15-1:30		1:30-1:45		1:45-2		2-2:15		2:15-2:30		2:30-2:45		2:45-3	
	APPROVED	PROPOSED	APPROVED	PROPOSED	APPROVED	PROPOSED	APPROVED	PROPOSED	APPROVED	PROPOSED	APPROVED	PROPOSED	APPROVED	PROPOSED	APPROVED	PROPOSED
Tower A	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
Tower B	0	0	0	0	0	0	0	0	0	0	0	1	1	3	2	4
Tower C	0	0	0	0	1	0	4	3	8	6	10	8	12	9	14	10
TOTAL	0	0	0	0	1	0	4	3	8	6	11	10	14	13	17	15
No change		No change		Improvement (+ 1)		Improvement(+ 1)		Improvement(+ 2)		Improvement(+ 1)		Improvement(+ 1)		Improvement(+ 2)		

- Results:
- Overall the proposed scheme offers a significant improvement for Castlevale
 - The approved scheme will have some overshadowing impact on 18 apartments, whilst the proposed scheme will only affect 15 apartments.
 - Tallying the above table, the length of time that apartments are overshadowed is reduced by 3 hours.
 - In order to achieve the SEPP65 ADG requirement of 2 hours solar access to living rooms at winter between 9am and 3pm, these properties would require sunlight on the western facade between 12 midday and 2pm. Currently 4 properties in the approved scheme will not meet this requirement. In the proposed RTS scheme only 2 apartments will not receive this require solar access at winter solstice (bottom two levels, south side, tower c).

1.5 SOLAR ANALYSIS

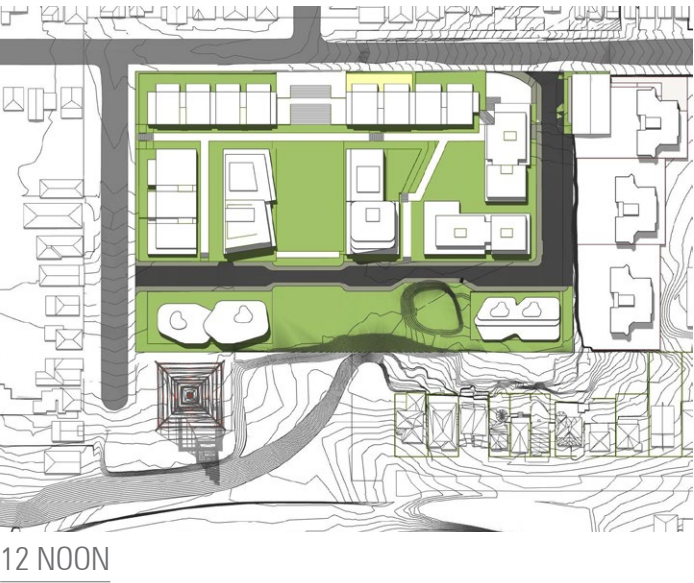
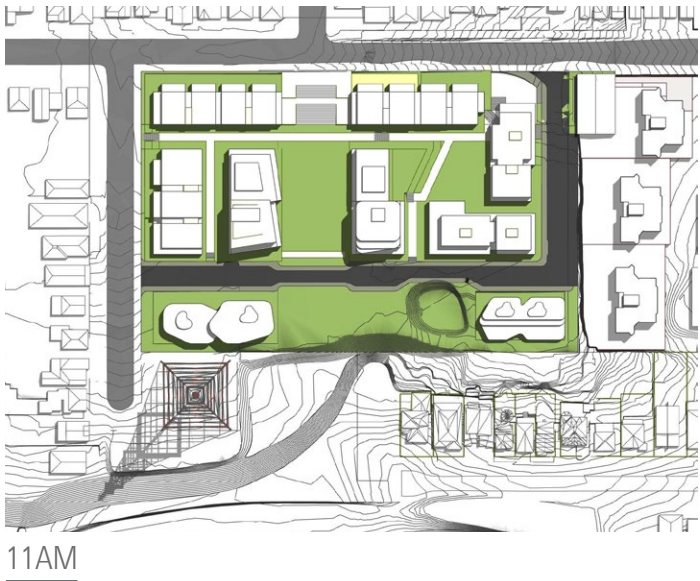
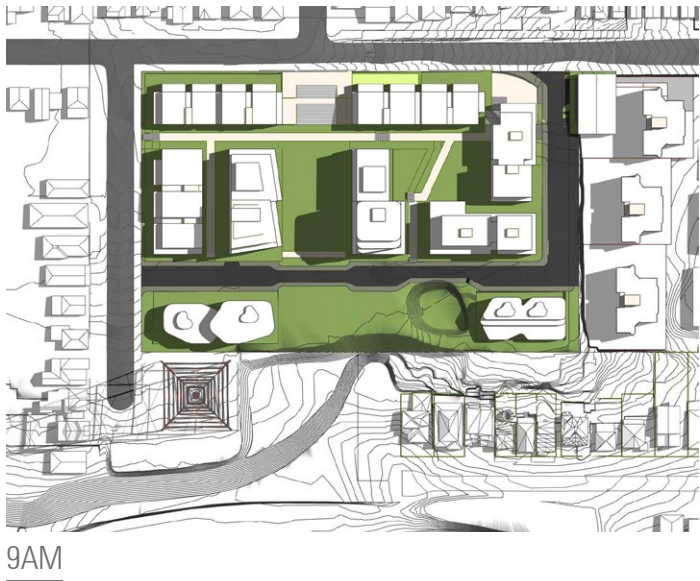
APPROVED SUMMER (21ST DECEMBER)

APPROVED



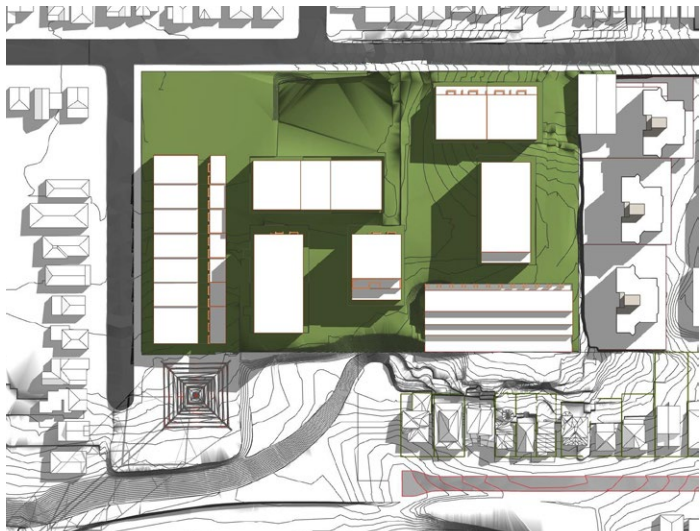
1.6 SOLAR ANALYSIS
PROPOSED SUMMER (21ST DECEMBER)

PROPOSED



1.7 SOLAR ANALYSIS
APPROVED SPRING (22ND SEPTEMBER)

APPROVED



9AM



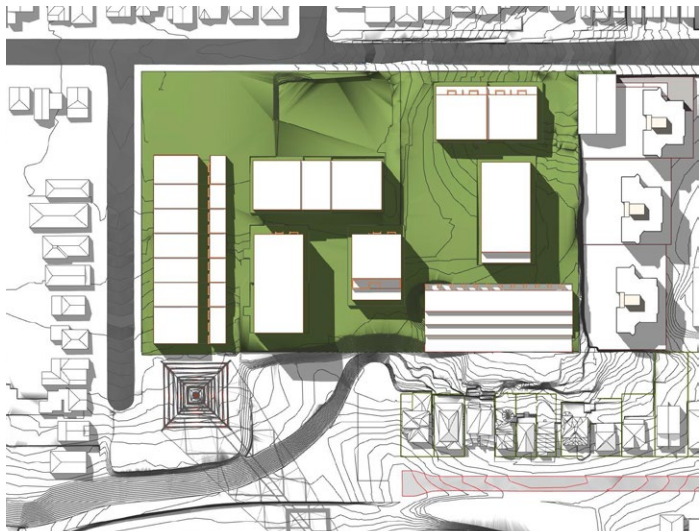
10AM



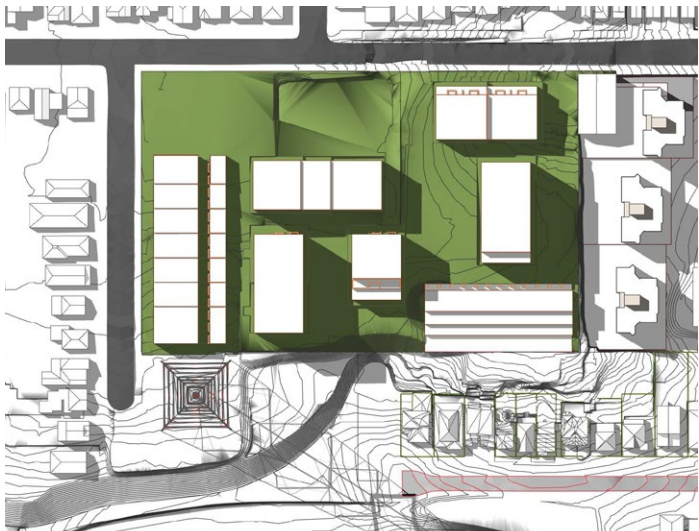
11AM



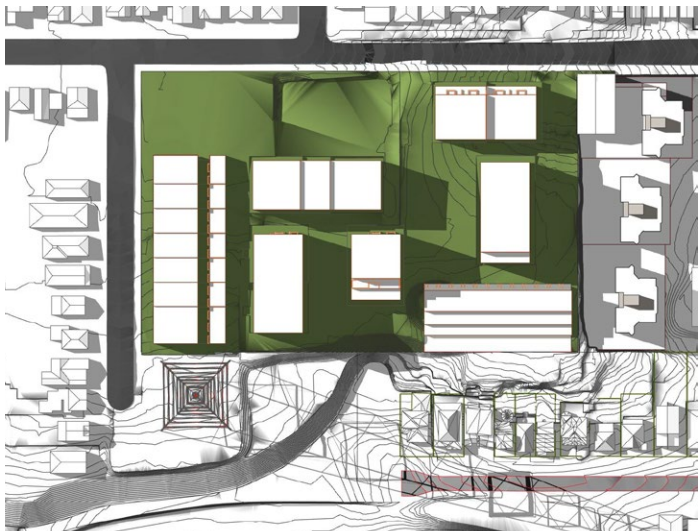
12 NOON



1PM



2PM



3PM