SUPPLEMENTARY OVERSHADOWING IMPACT SENSITIVITY ANALYSIS REPORT

APPENDIX K

Sydney Metro City & Southwest

Pitt Street South Over Station Development:

Supplementary Overshadowing Impact Sensitivity Analysis Report

Applicable to:	Sydney Metro City & Southwest
Author:	Steve King
Owner	Transport for NSW
Status:	Final Draft
Version:	1
Date of issue:	25 10 2018
Review date:	

Table of Contents

1. Preliminaries: Overshadowing impacts

I provide this report as an expert opinion, relating to potential overshadowing impacts on neighboring residential dwellings by the proposed development at 125 - 129 and 131 - 135 Bathurst Street and 296 - 300 and 302 Pitt Street Sydney.

Specifically, I have been tasked to test sensitivity of overshadowing of the existing Century Tower and Princeton Apartment buildings, to variations in setbacks of the subject proposal.

2. Documents

I base my report on digital 3D models of the alternative scenarios, supplied to me by GHDWoodhead, architects.

3. Overshadowing Analysis

3.1 Methodology

My analysis of overshadowing has again been carried out by use of 3D digital models in the *Trimble SketchUp* software package. This model analysis is effectively identical to that normally undertaken for solar access compliance of a proposed multi-residential building under the Apartment Design Guide.

The models were prepared by GHDWoodhead, architects. The existing and proposed building models are inserted into a context of surrounding buildings derived from the so-called 'city model', approved plans obtained from the Council, and survey data supplemented by plans from marketing material.

I particularly note that the resulting composite model includes the Greenland Centre at 115 Bathurst Street, presently under construction.

I have undertaken a summary check of the topographical and building dimensions of the 3D digital model by reference to figured dimensions from the plans and sections. I cannot independently warrant other model dimensions, but I feel confident to rely on the general accuracy of the modelling.

I have independently geolocated the models, and verified the direction of True North by online reference to the cadastral grid north.

My detailed analysis relies primarily on projections known as *'View from the Sun'*. A view from the sun is an aerial perspective from a very large distance, that 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.

To facilitate the comparison of existing and prospective conditions, the proposed building envelope is rendered in the models as semi transparent.

A full table of views from the sun on a 30 minute interval is provided as Attachment A.

4. Overshadowing Impact

4.1 Potentially affected properties

My understanding is that commercial occupancies do not enjoy the protection of any control for overshadowing. The relevant overshadowing impacts are those to residential properties on surrounding sites. The views from the sun readily identify the residential buildings which are potentially impacted by June 21 shadows attributable to the subject proposal.

- *Century Tower*
- *Princeton Apartments*

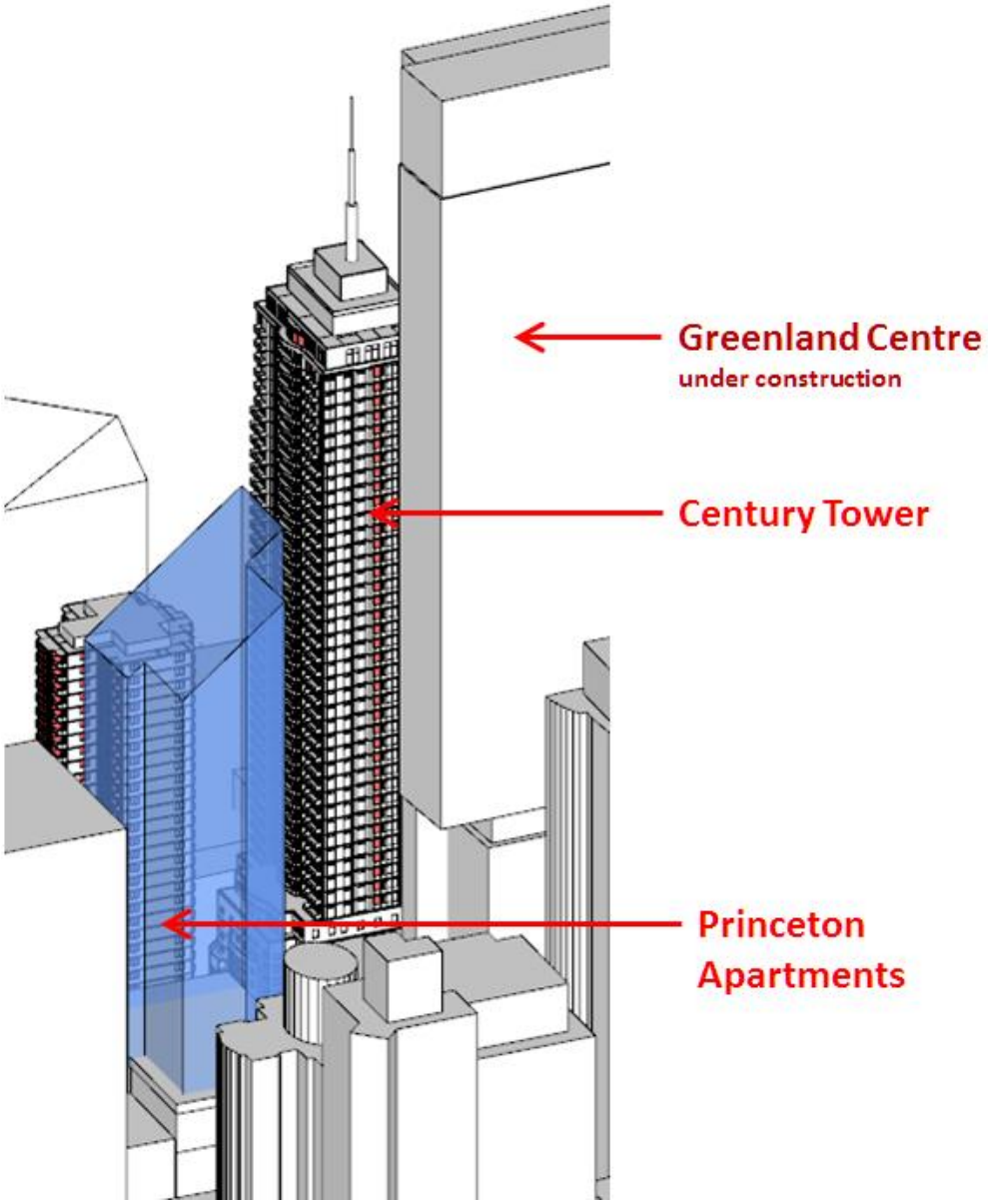


Figure 1: Adjacent properties in context of the proposal
View from the sun at 10 AM

4.2 Predicted overshadowing impact

4.2.1 Options examined

I have been provided with three discrete digital models which allow me to examine the 'retained solar access compliance'– as a measure of overshadowing impact – on both affected buildings, under the following scenarios:

- Existing
- Option 1 is the current proposal;
- Option 2 relates to setbacks which are consistent with the SDCP 2012, and maintains a 12 metre separation to the south.

Figures 2&3 record the modelled setbacks for Options 1 and 2.

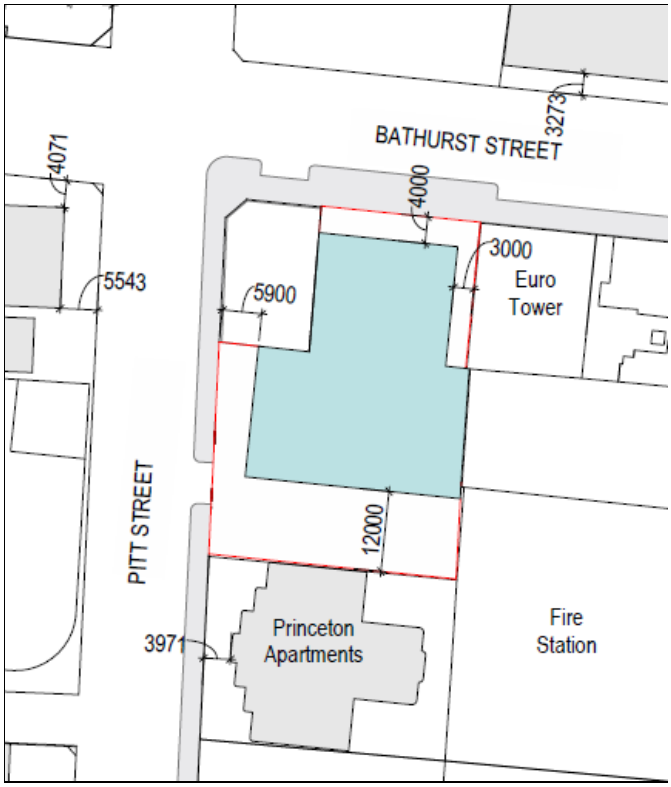


Figure 2: Model setbacks Option 1

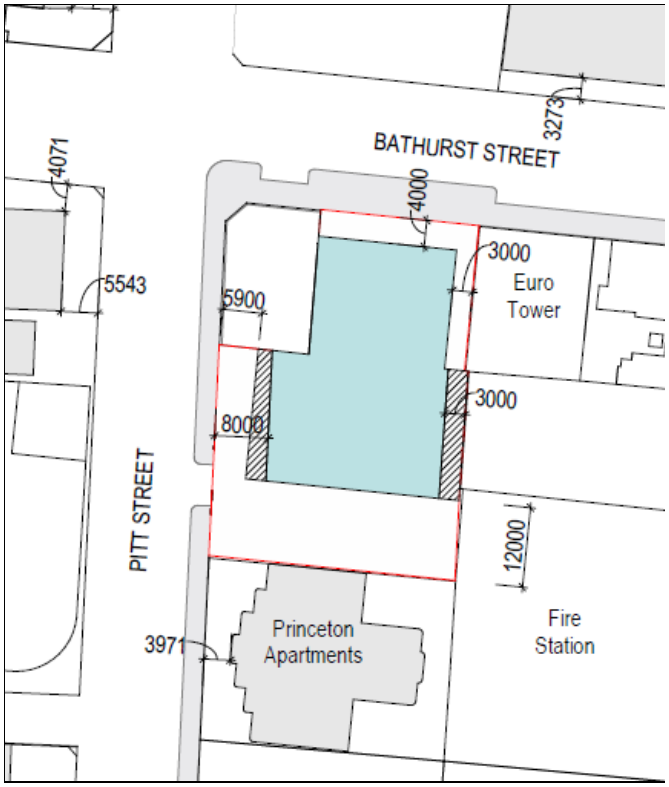


Figure 3: Model setbacks Option 2

4.2.2 Analysis

In order to make an accurate assessment of the overshadowing impact for each of the two affected buildings identified, a full analysis was carried out to record the present nominal solar access compliance of the whole building, and to identify those apartments which were likely to lose their complying status under each scenario.

The change in percentage of dwellings complying for solar access was then computed for each affected building.

The reduction in solar access compliance due to the overshadowing impact of the proposal is calculated as a proportion of the total number of apartments.

4.2.3 Summary outcomes

Table 1 summarises the solar access compliance status for both affected buildings, under all three scenarios.

Century Tower 296 units	>3 hrs 9-3	>2 hrs 9-3 (>3hrs 8-4)	>2 hrs 9-3	>2hrs 8-4	No sun
Existing	5 1.7%	15 5.1% **6.8%**	2 0.7% **7.4%**	50 16.9% **24.3%**	89 30.1%
Option 1	5 1.7%	11 3.7% **5.4%**	6 2.0% **7.4%**	30 10.1% **17.6%**	89 30.1%
Option 2	5 1.7%	12 4.1% 5.7%	5 1.7%	30 10.1%	89 30.1%

Princeton Apartments 116 units	>3 hrs 9-3	>2 hrs 9-3 (>3hrs 8-4)	>2 hrs 9-3	>2hrs 8-4	No sun
Existing	41 35.3%	2 1.7% **37.1%**	19 16.4% **53.4%**	1 0.9% **54.3%**	17 14.7%
Option 1	0 0.0%	5 4.3% **4.3%**	0 0.0% **4.3%**	17 14.7% **19.0%**	17 14.7%
Option 2	0 0.0%	11 9.5% **9.5%**	0 0.0% 9.5%	15 12.9% **22.4%**	17 14.7%

Table 1: Summary of solar access compliance for Century Tower and Princeton Apartments
The full takeoff tables can be provided as Excel spreadsheets.

Comparing overshadowing impact by 'retained compliance', there are very small differences between the scenarios.

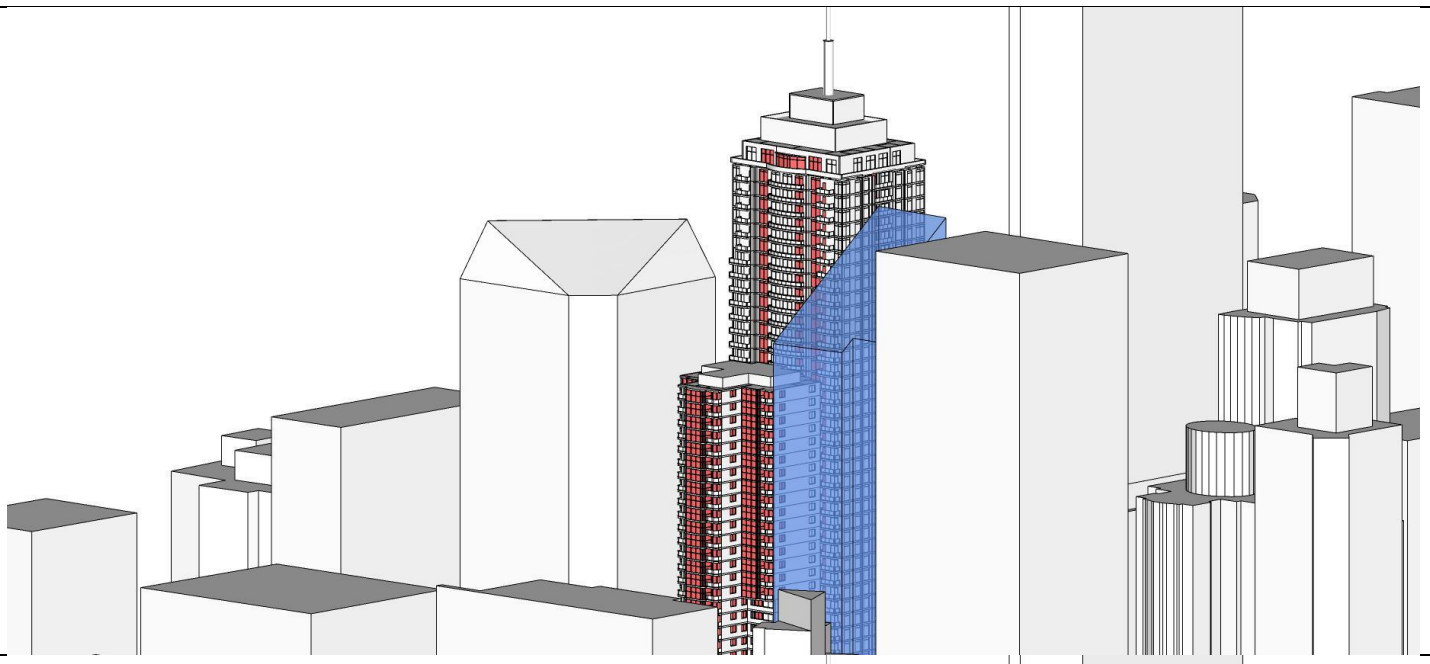
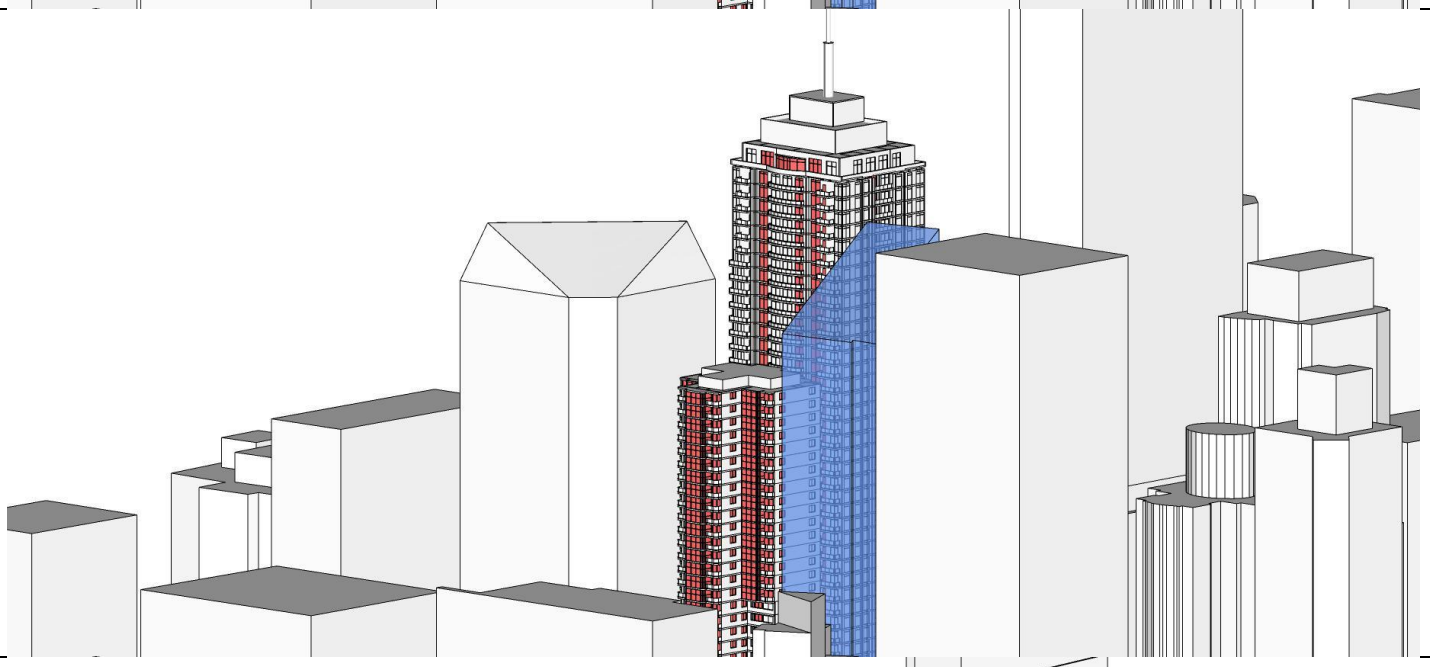
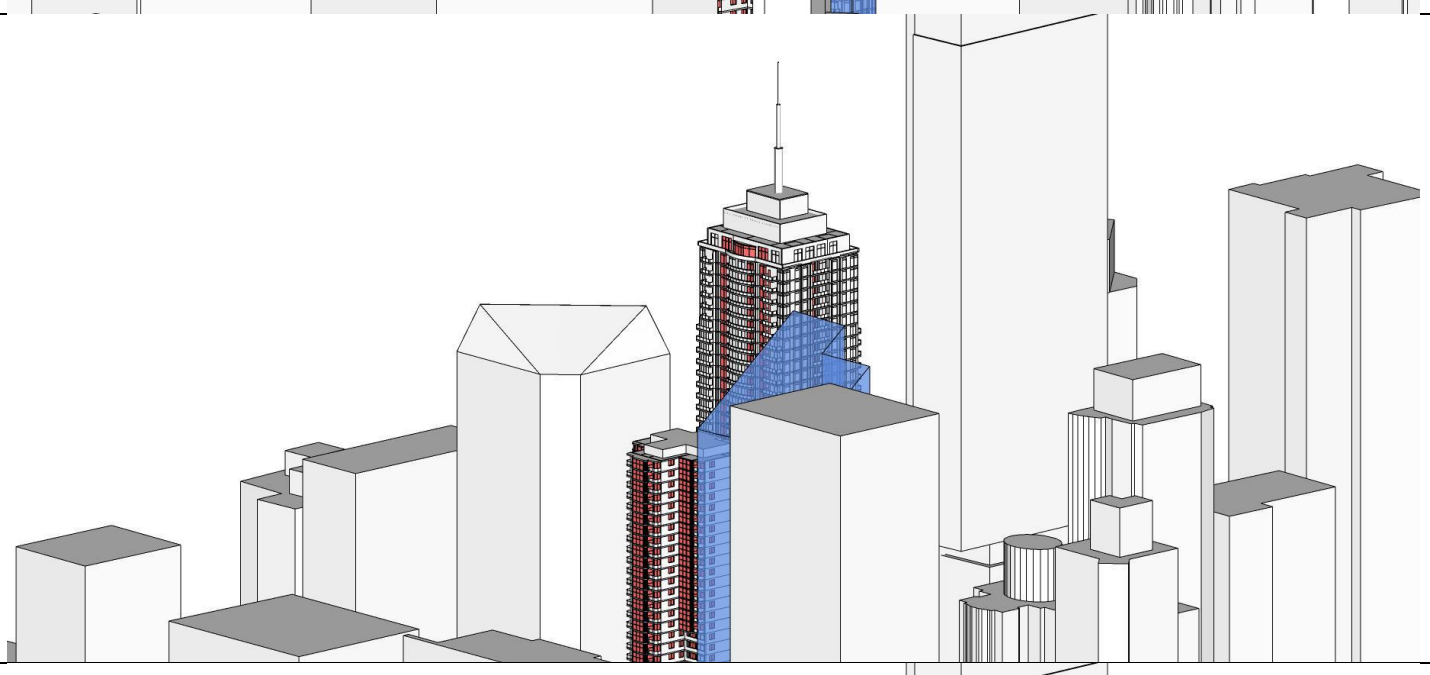
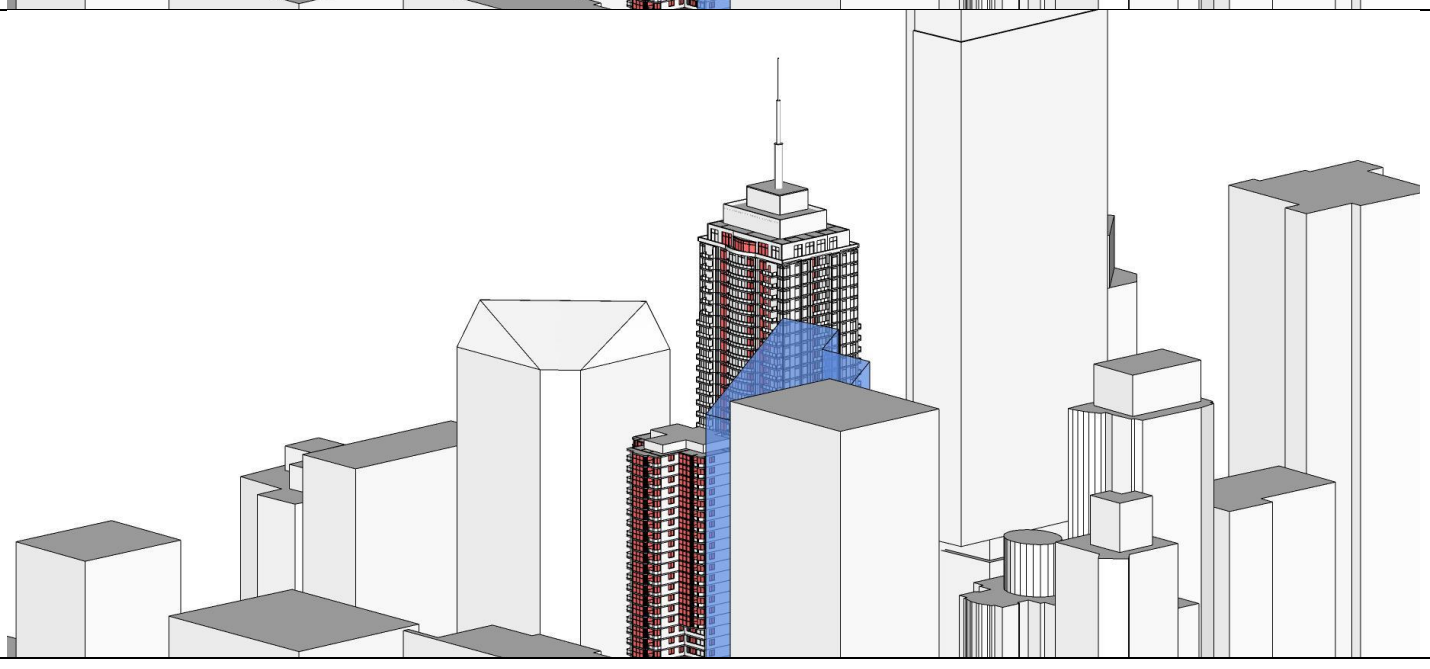
Arguably, the only change of any significance is that Option 2 (compliant east and west setback envelope) shows six (6) more apartments in Princeton Apartments retain solar access compliance of minimum two hours between 9 AM to 3 PM, than in the current proposal, Option 1 (highlighted in the table above). This is partially offset by two apartments with two hours of direct sun between 8 AM and 3 PM.

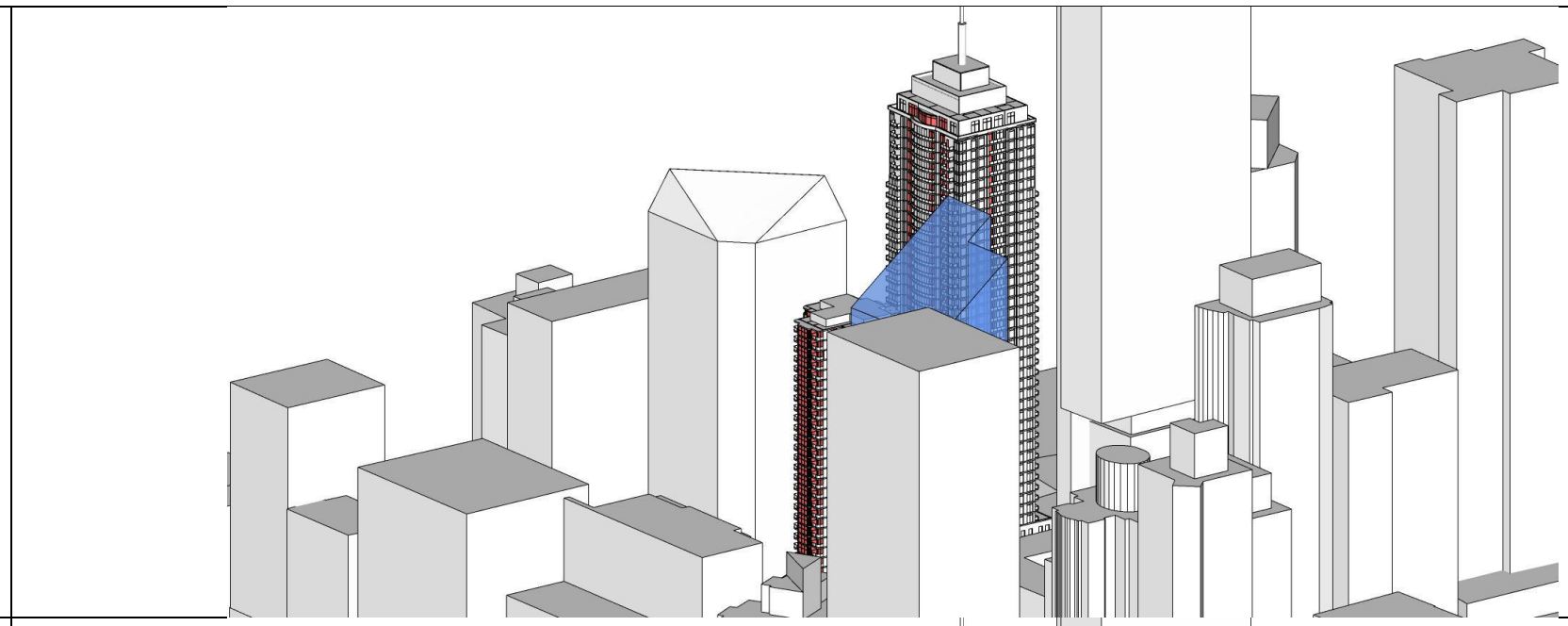
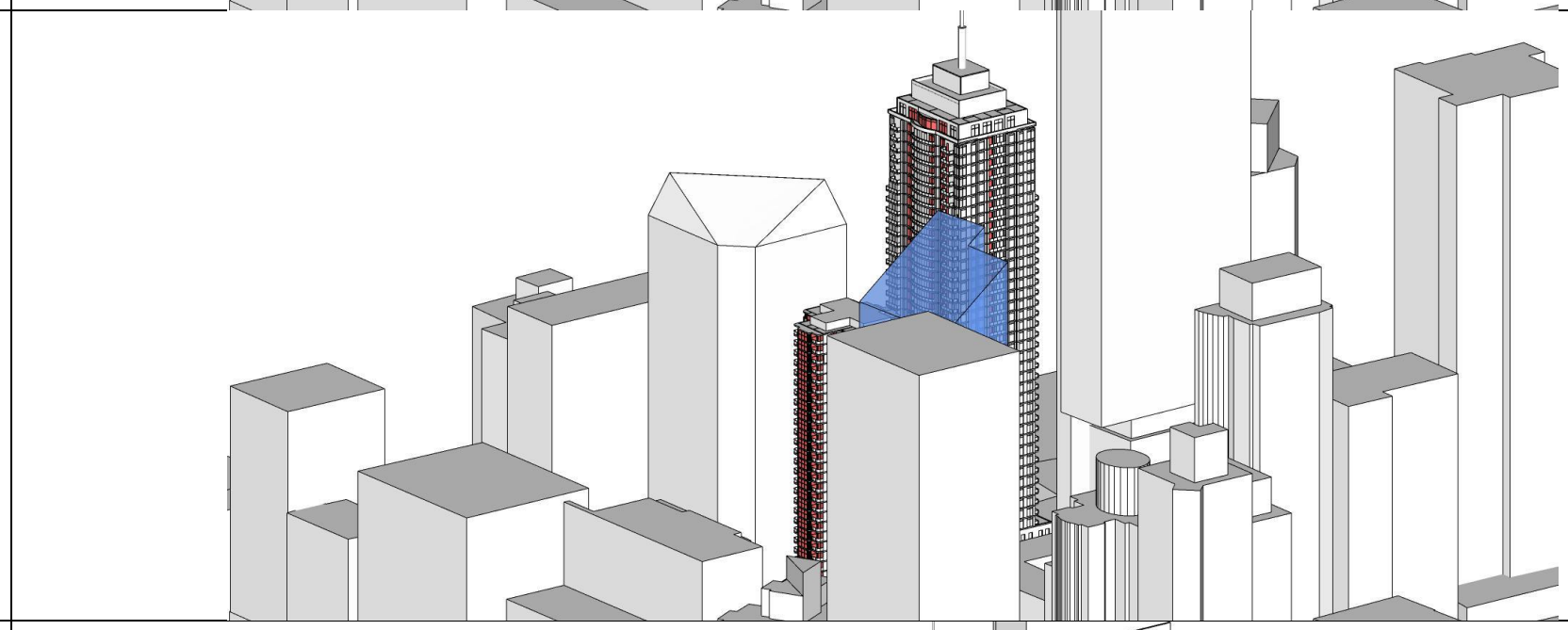
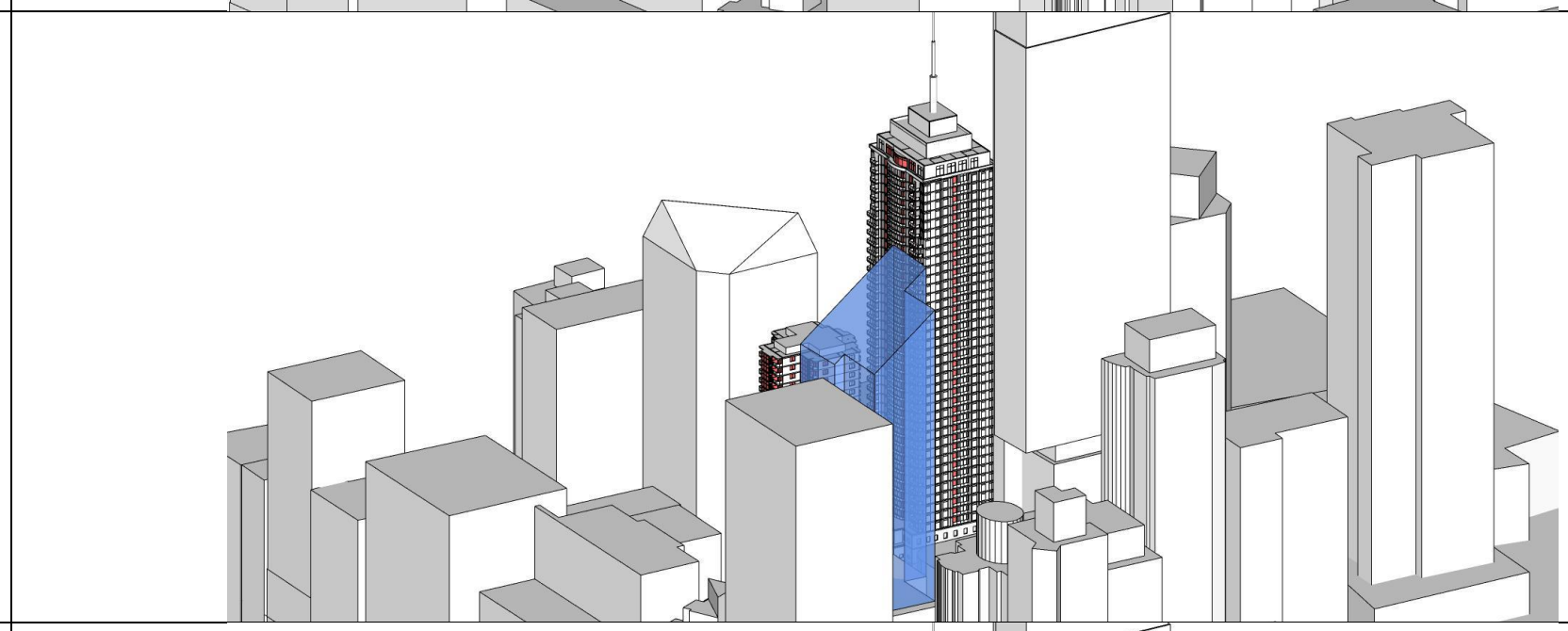
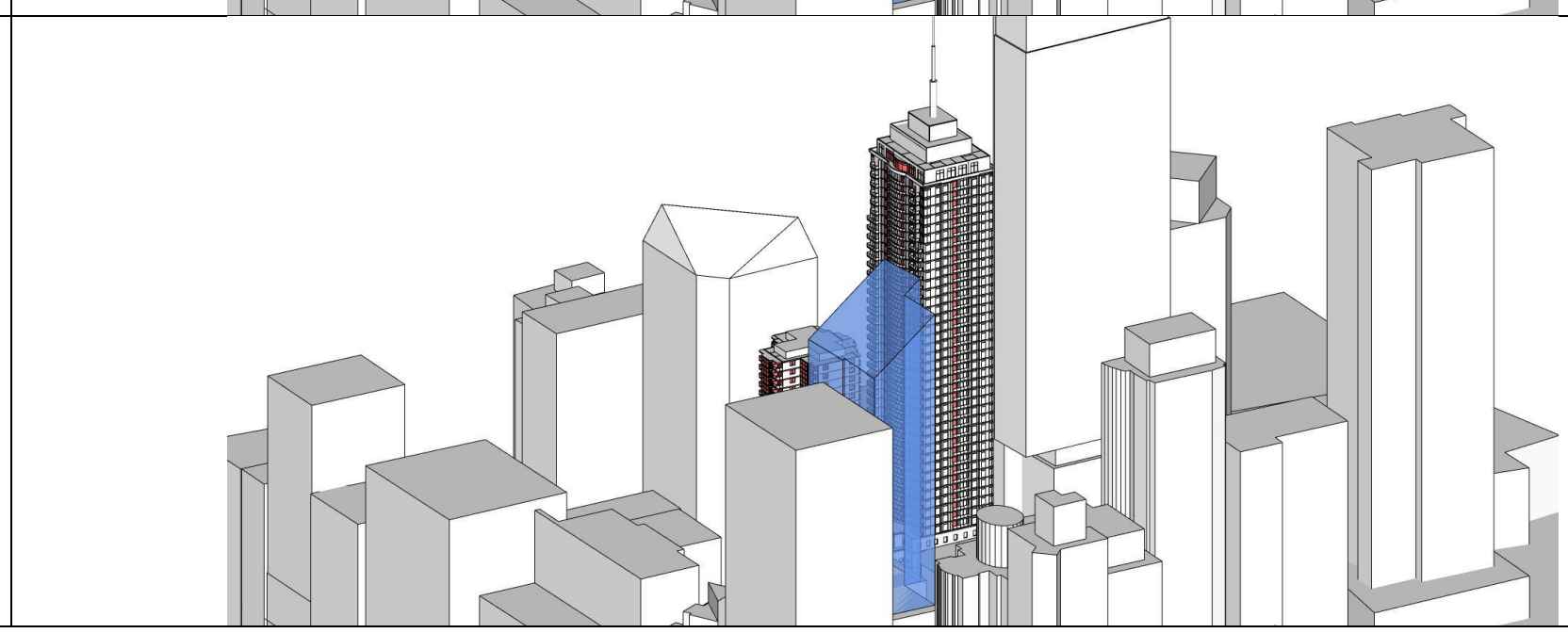
5. Conclusions

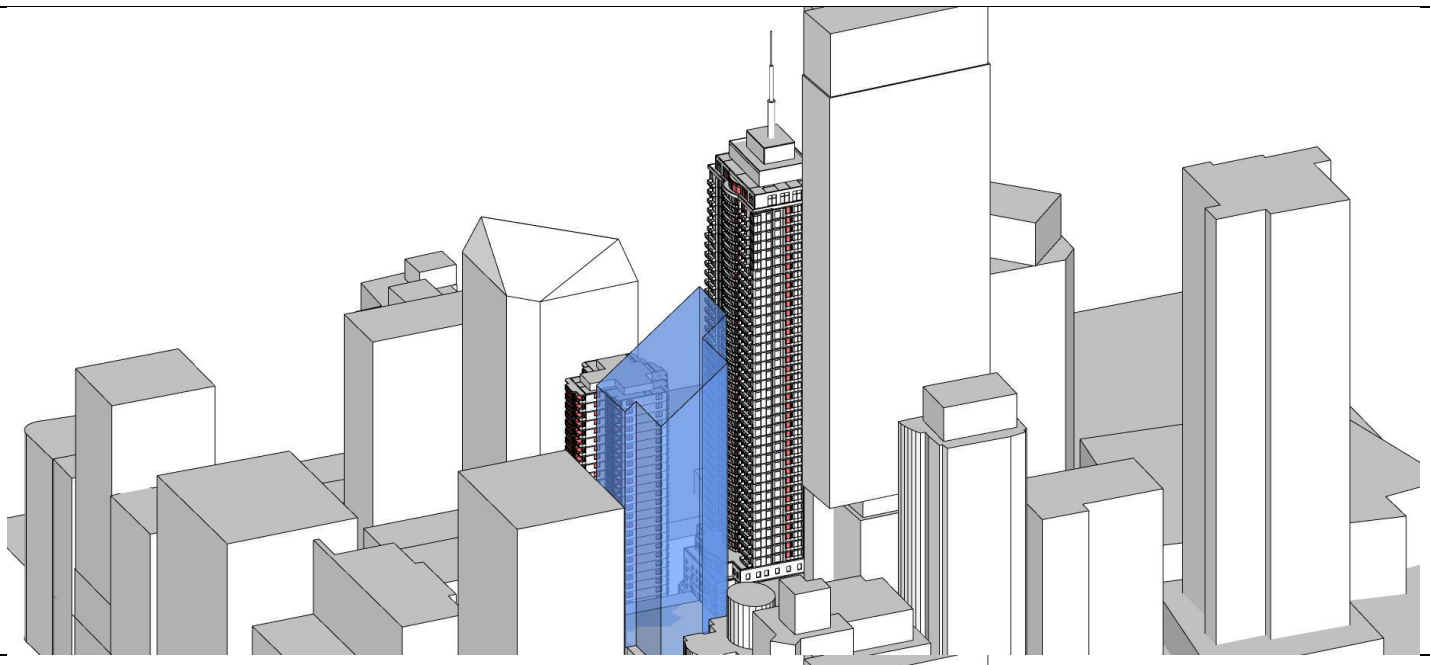
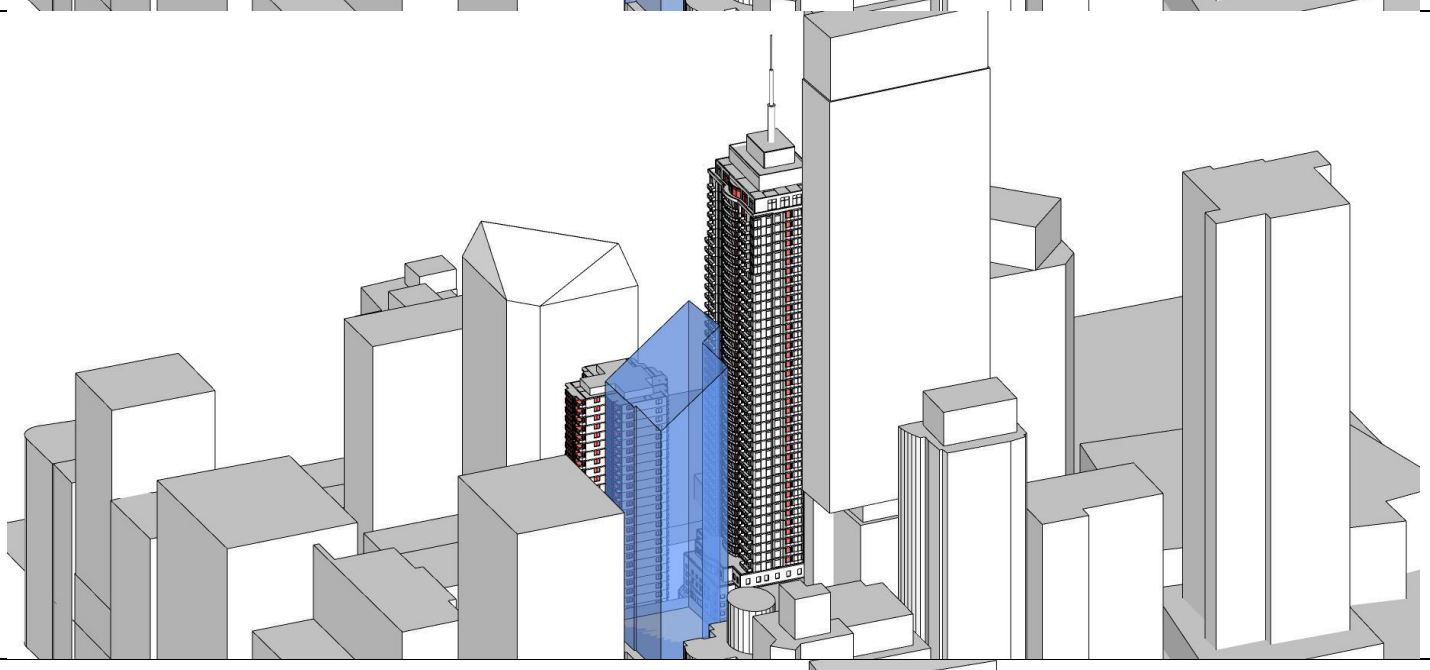
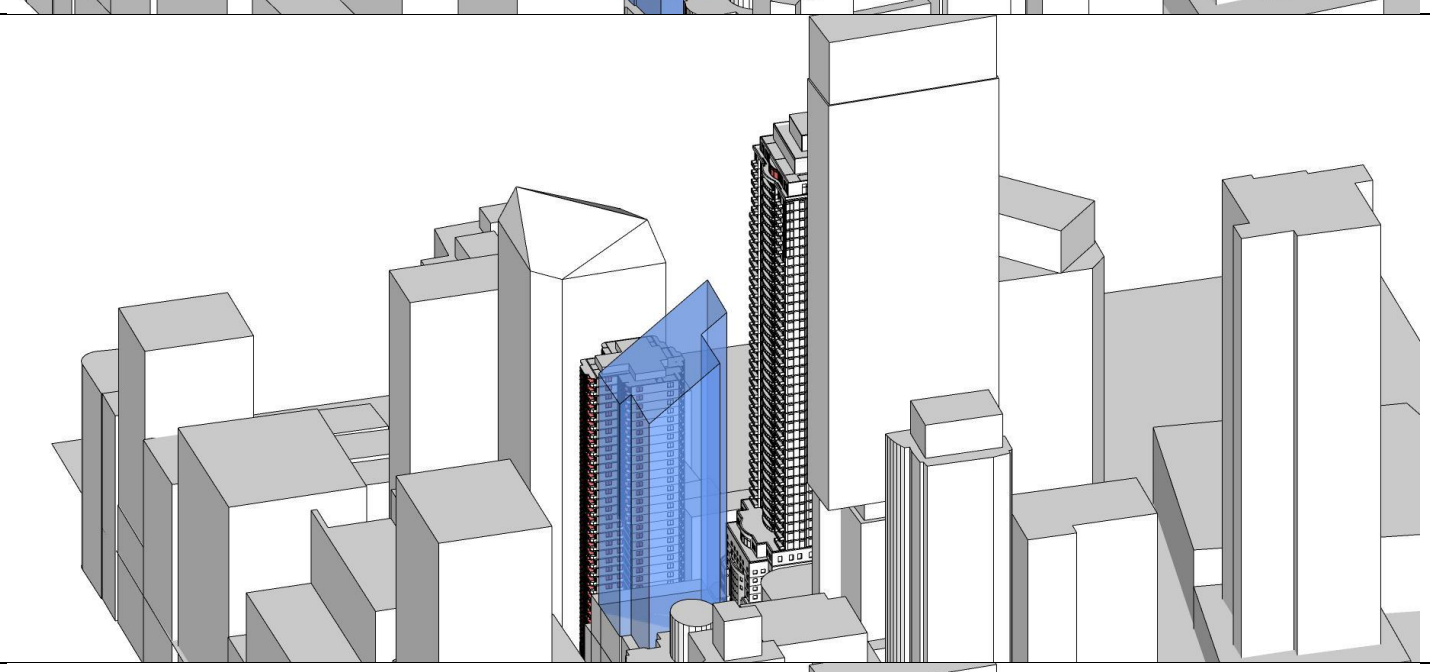
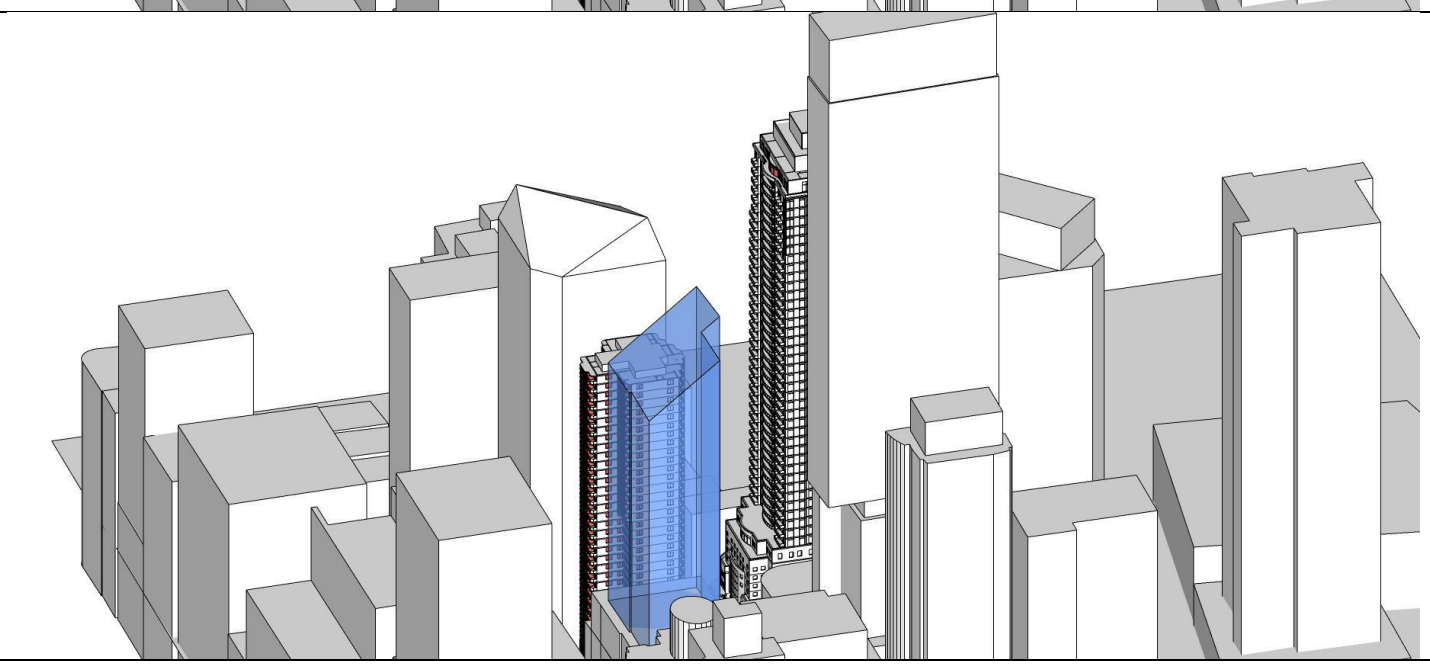
I have examined the differences in overshadowing impact of the current proposal and a scenario with compliant east and west setbacks. I find that differences in retained solar access compliance for the two scenarios are very small, and suggest that any benefit is not substantial.

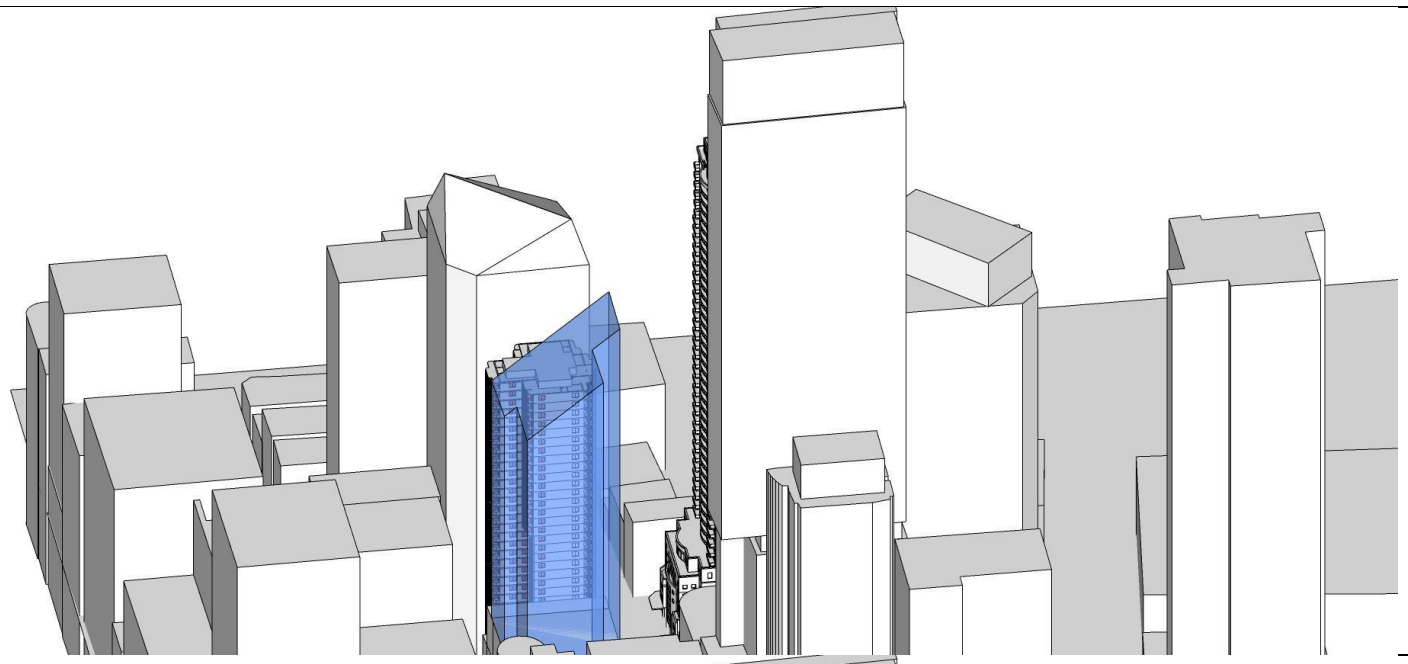
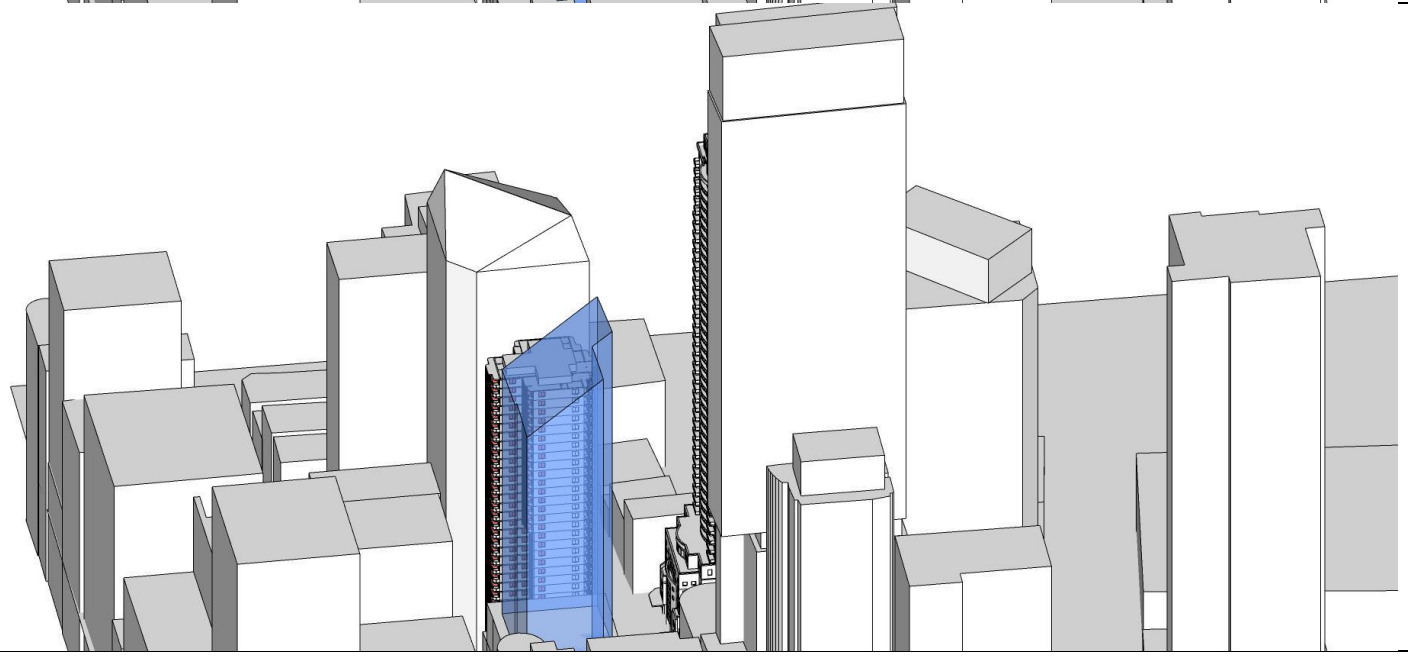
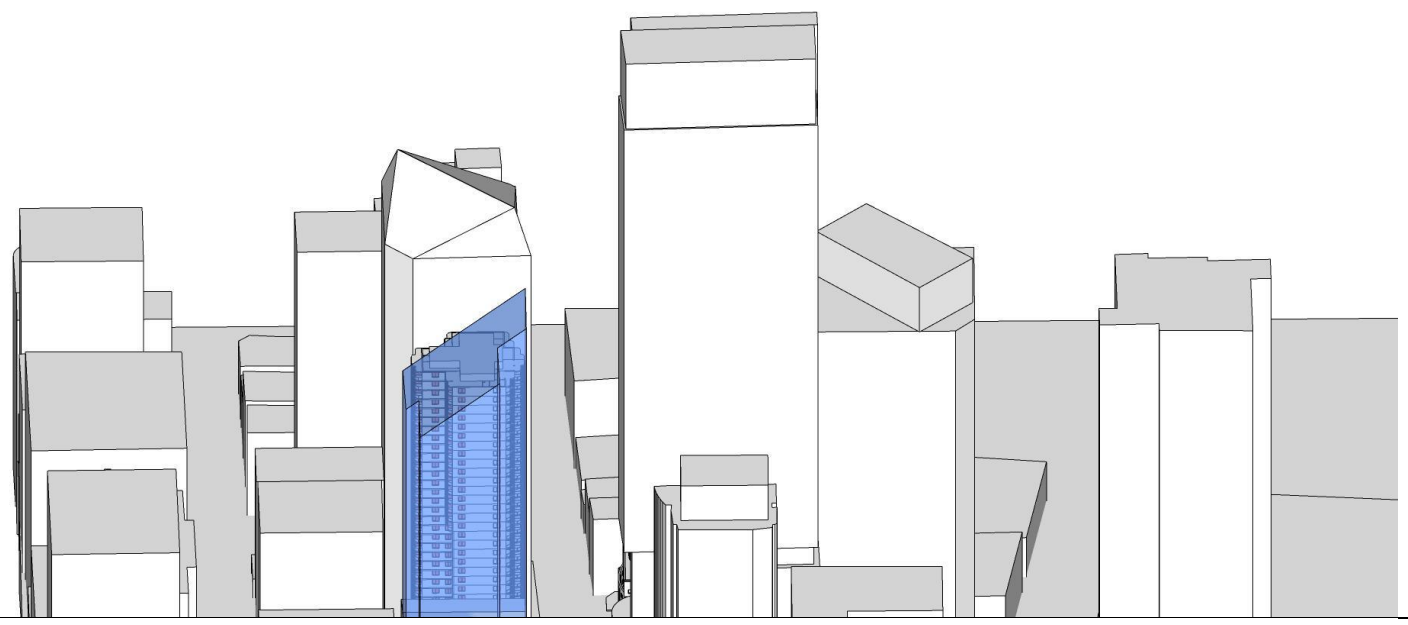
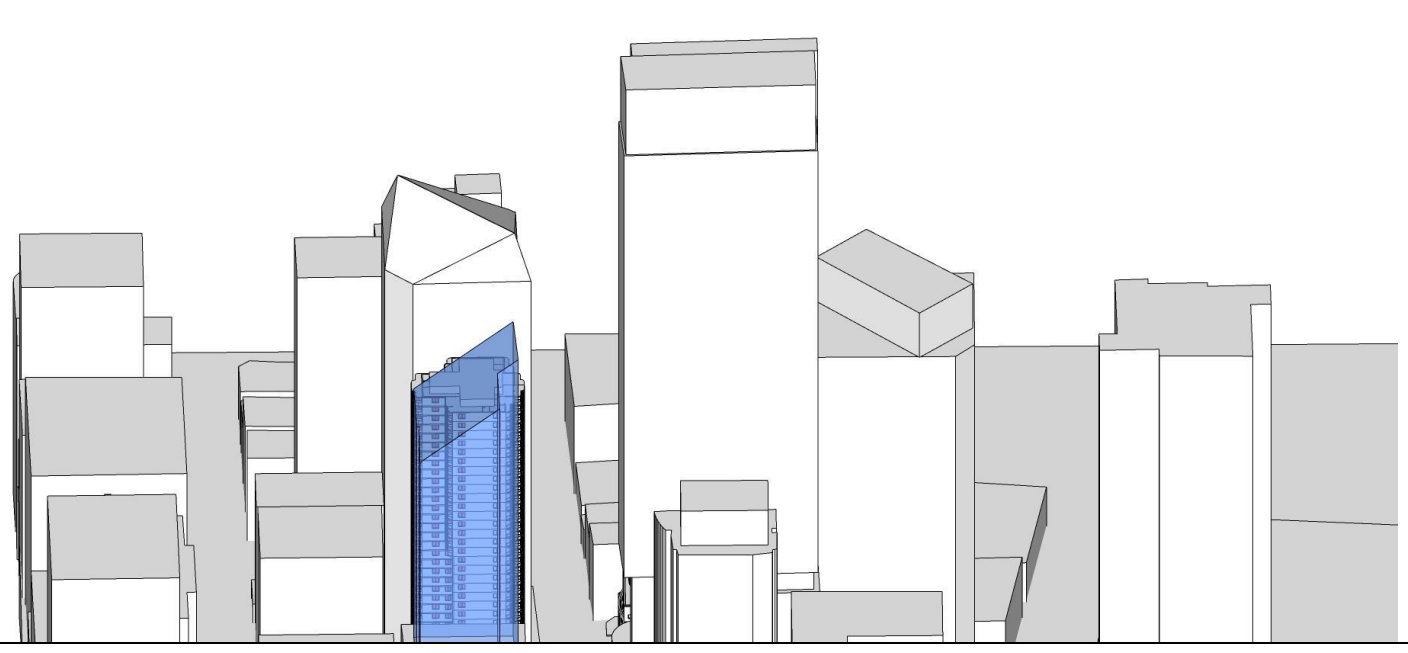
ATTACHMENT A: VIEWS FROM THE SUN

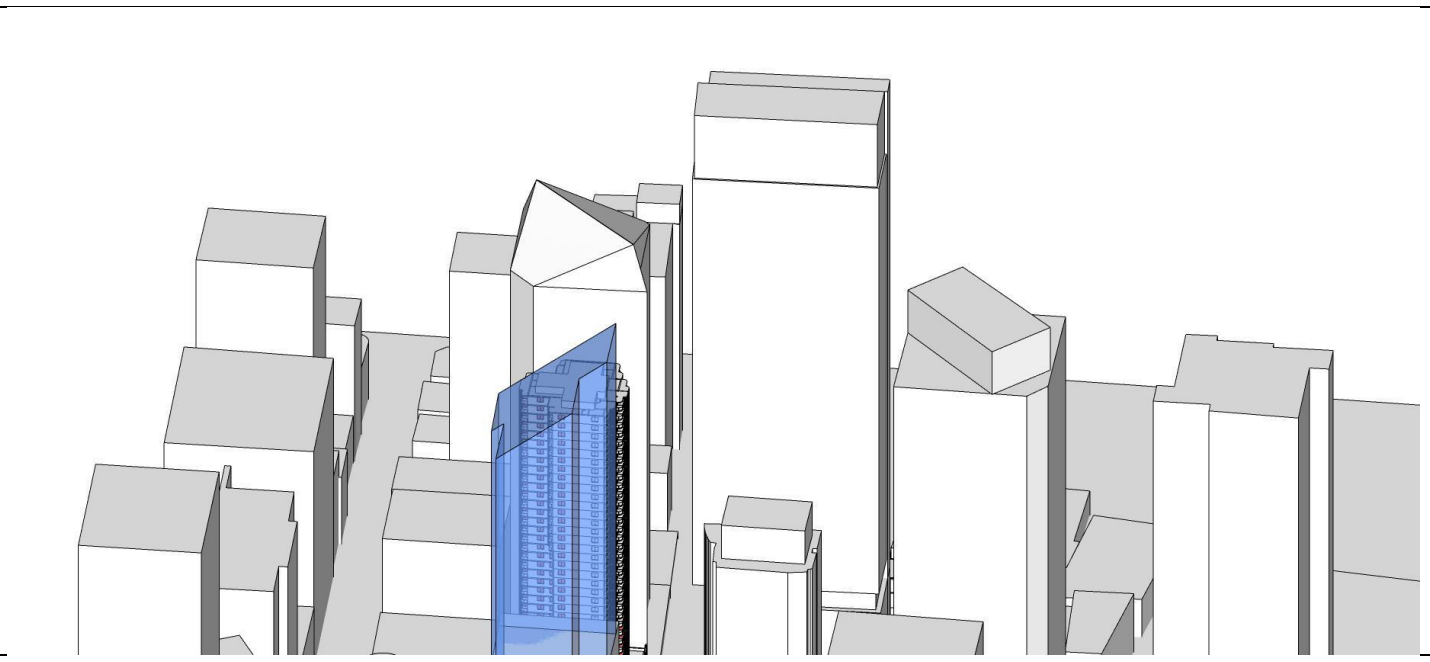
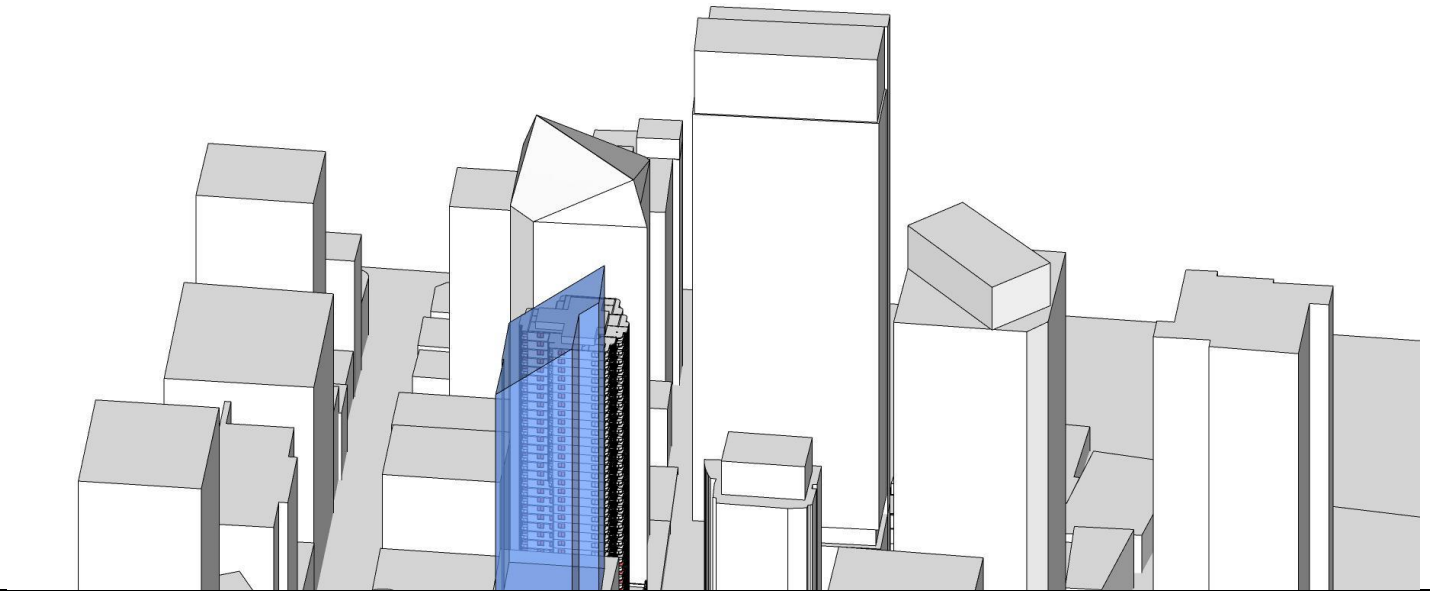
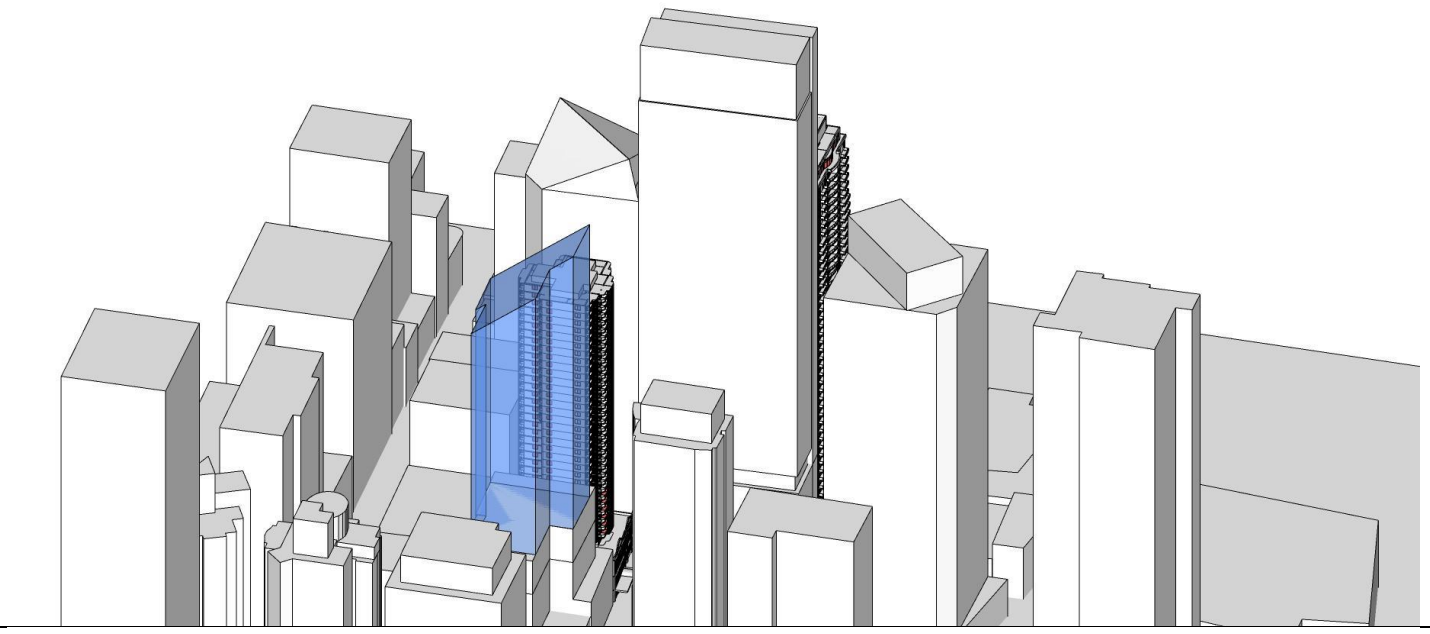
The table below reproduces for reference the detailed ‘views from the sun’ on a half hourly basis, comparing the building envelope as proposed, and with increased setbacks.

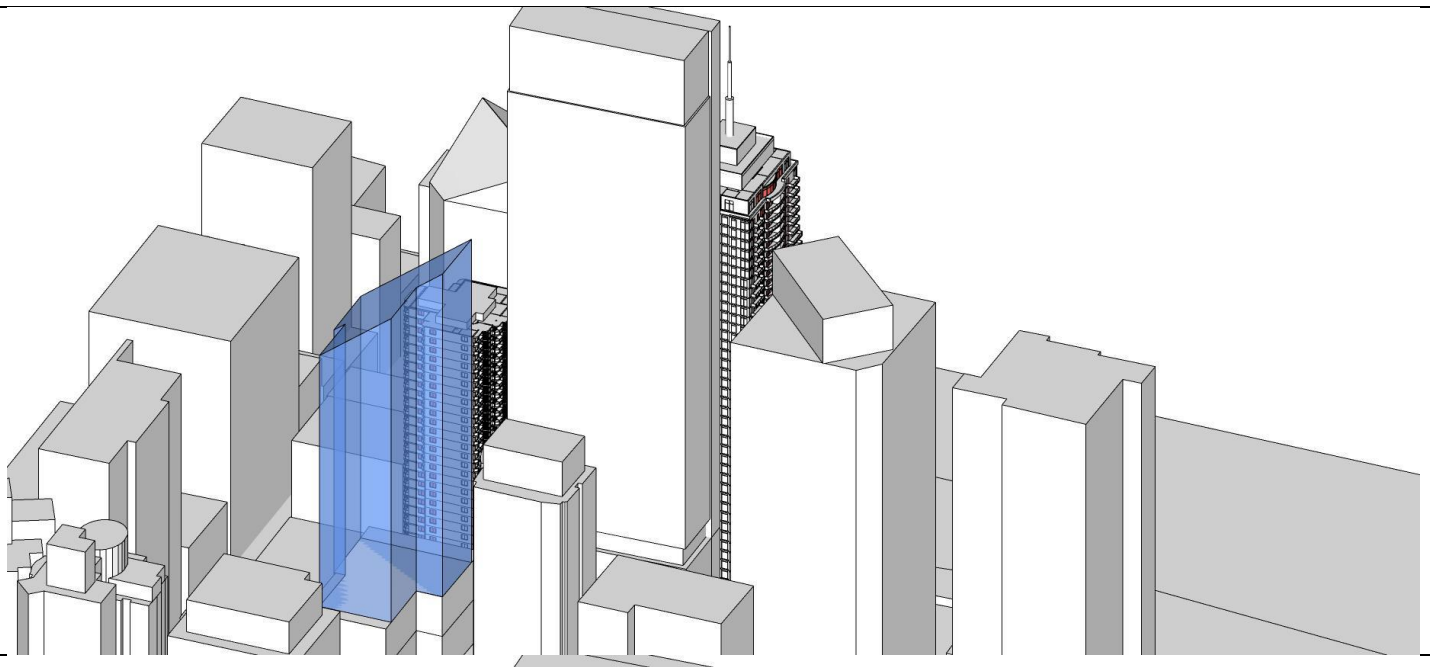
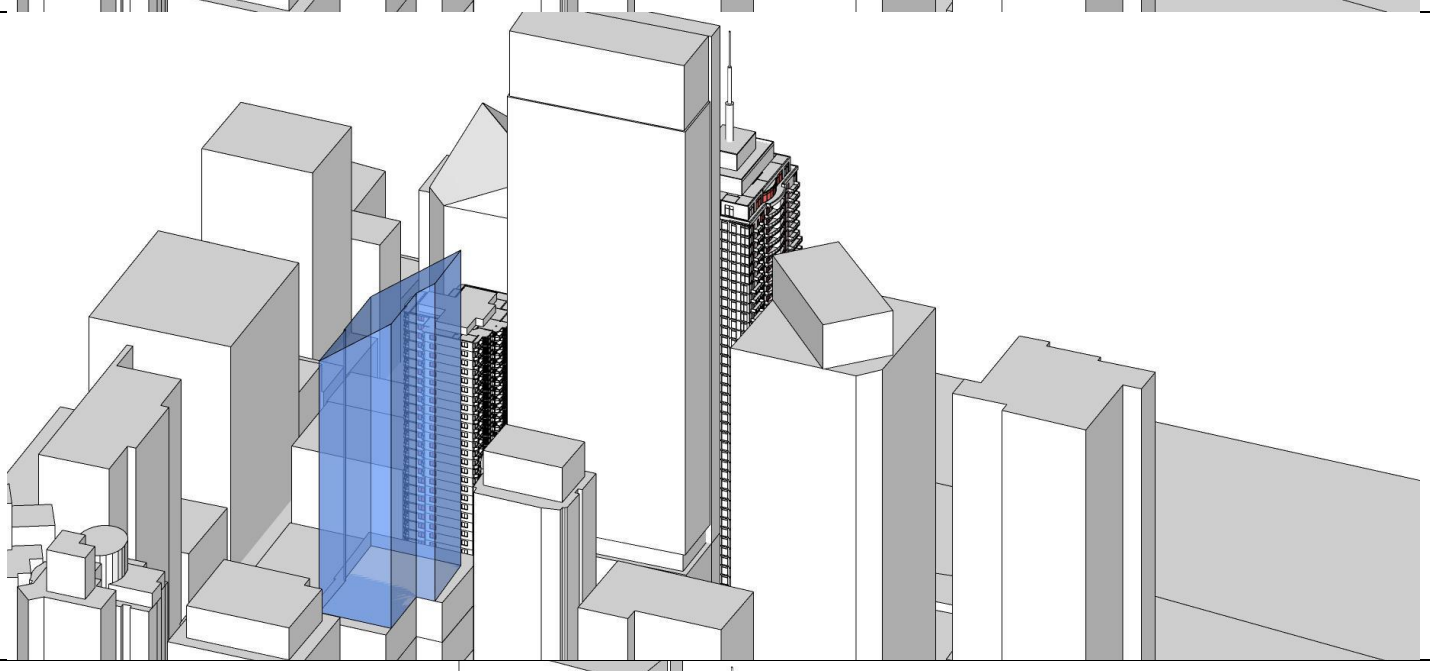
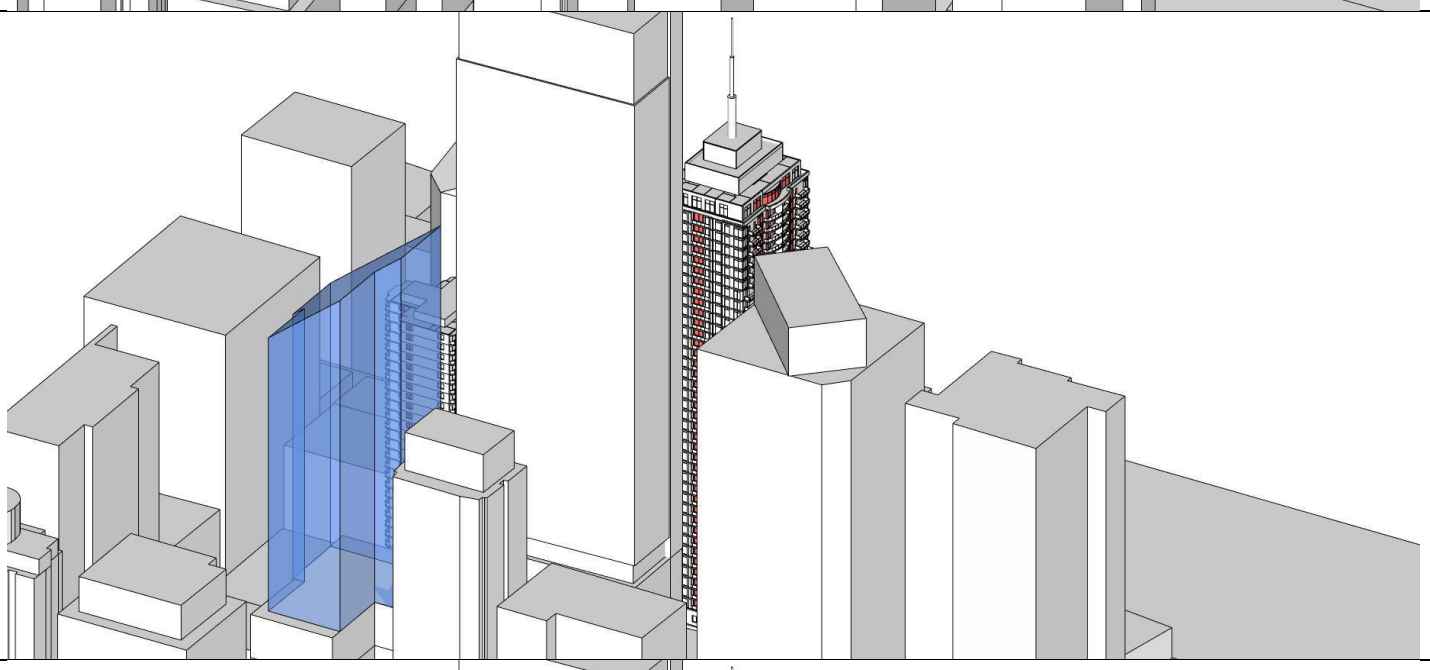
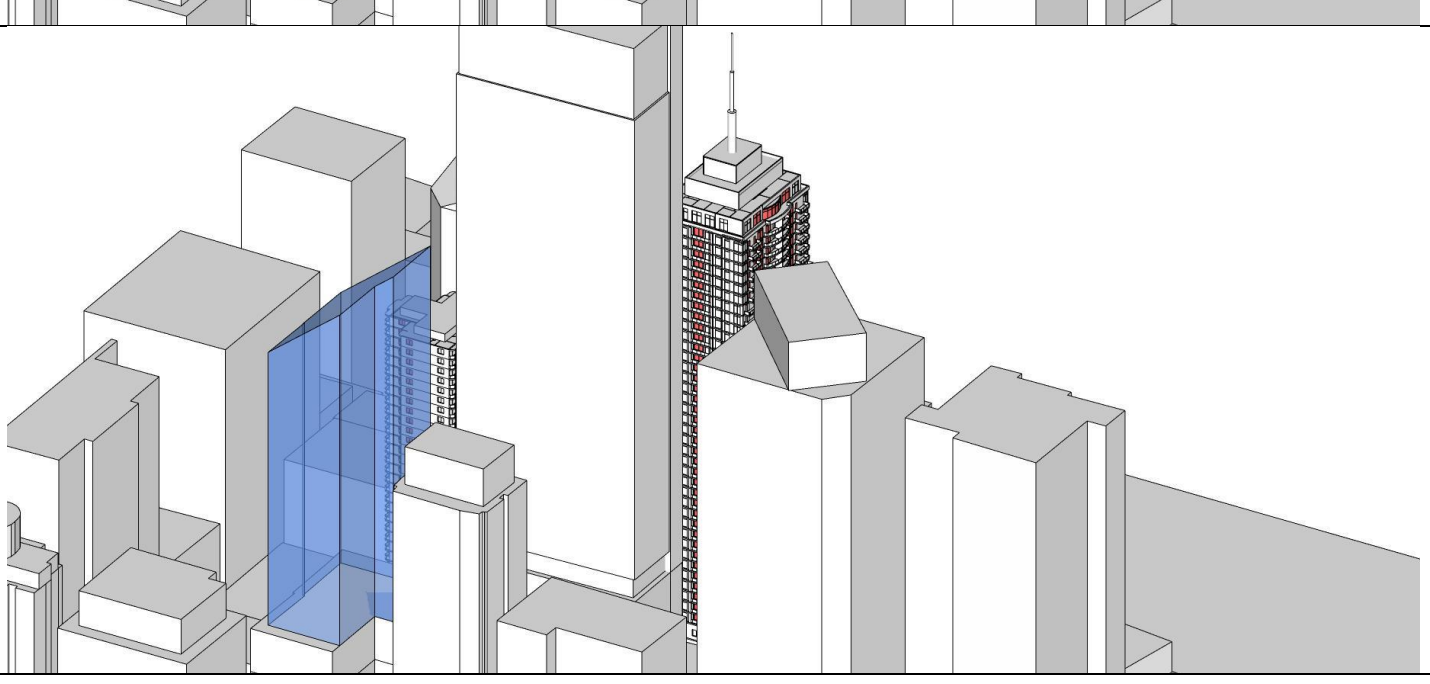
0800 Option 1	
0800 Option 2	
0830 Option 1	
0830 Option 2	

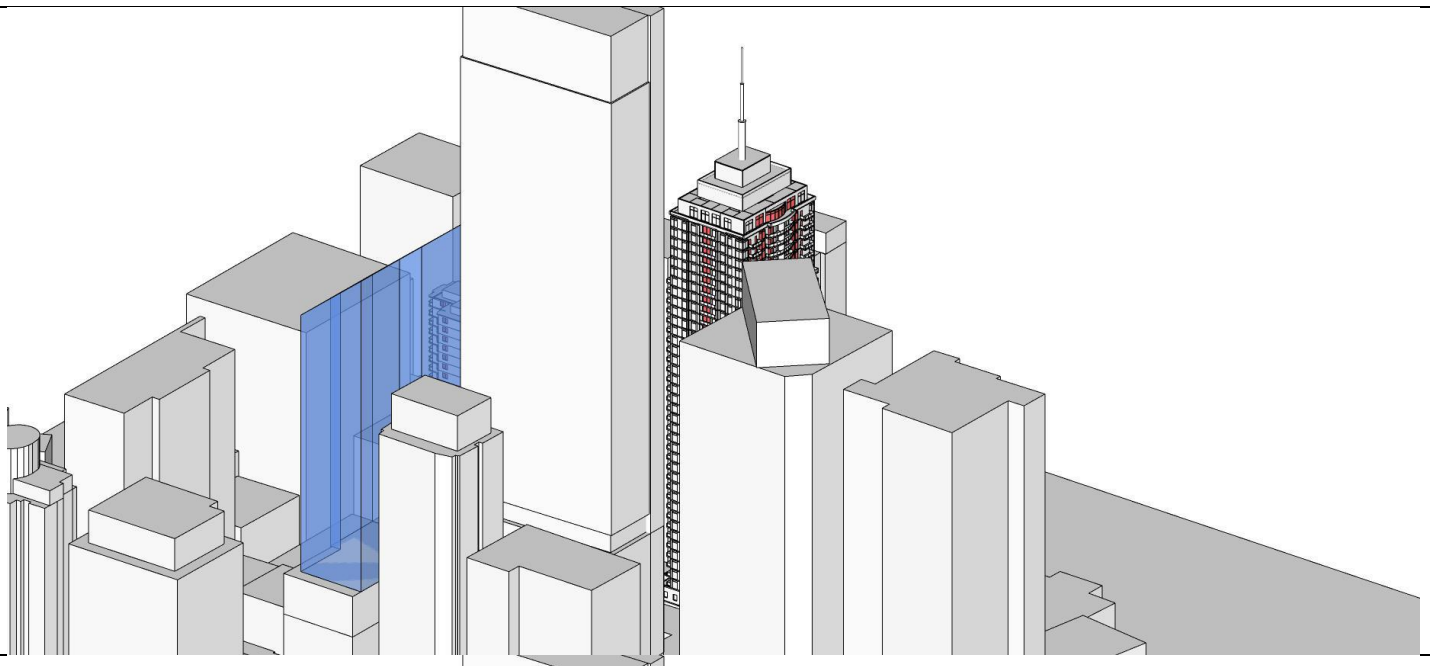
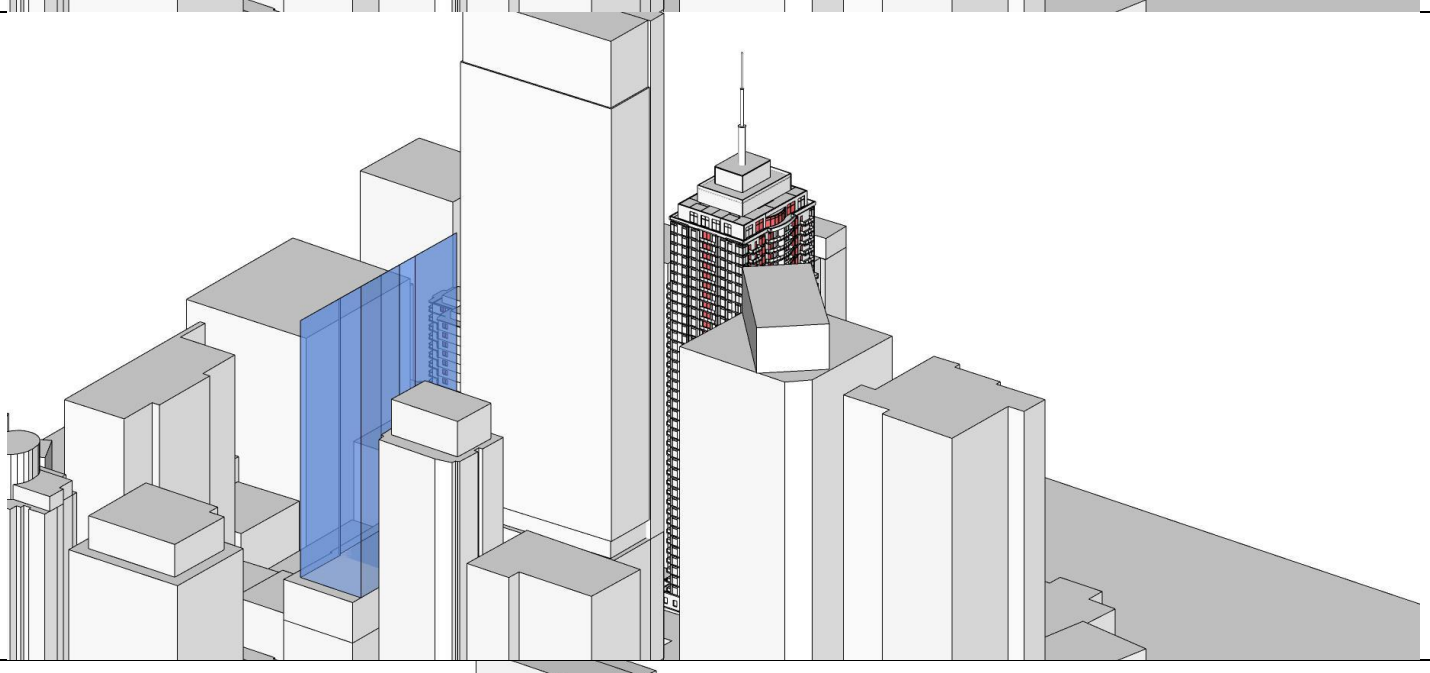
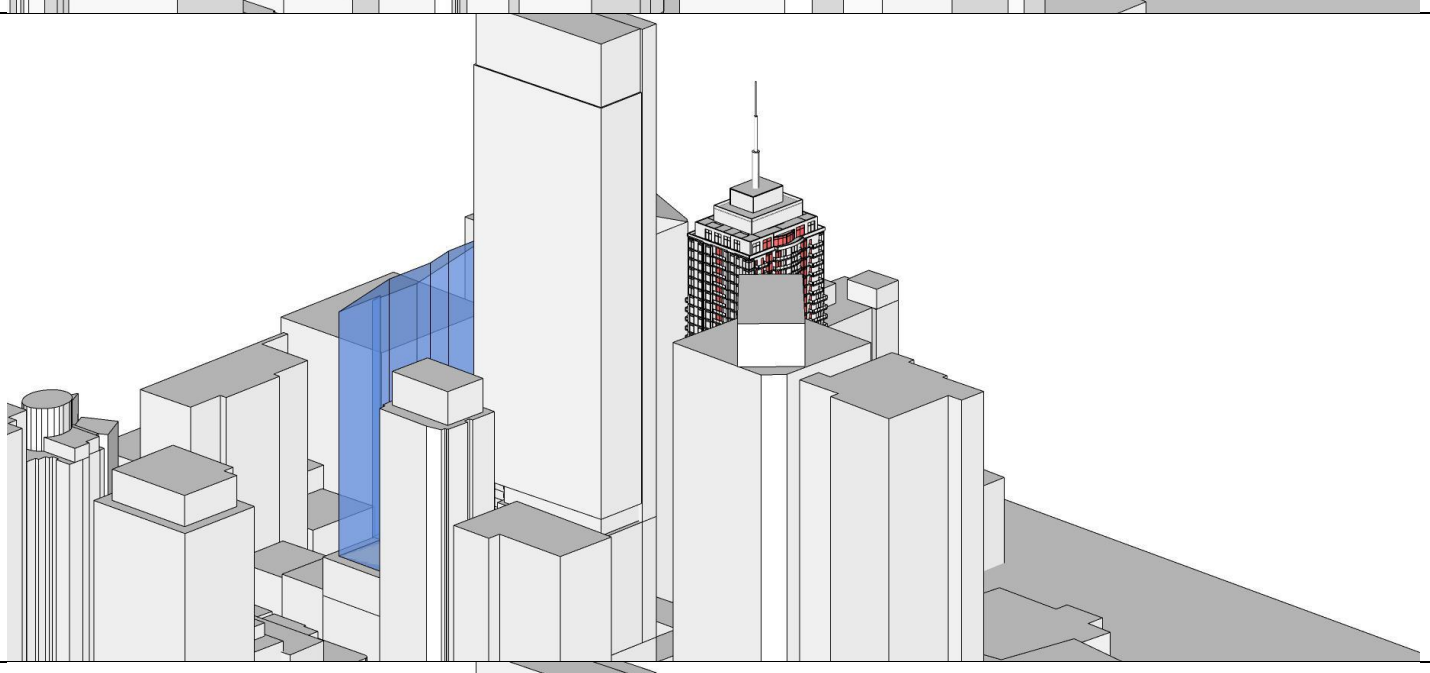
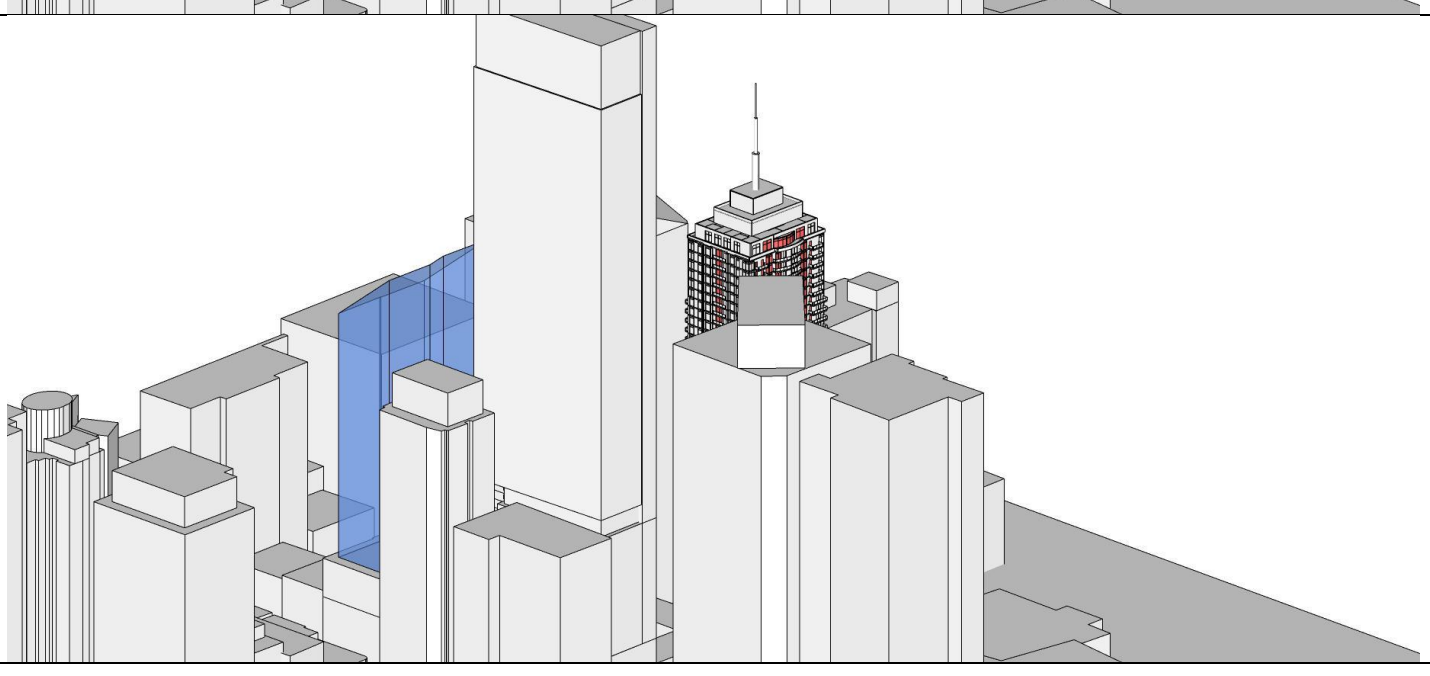
0900 Option 1	
0900 Option 2	
0930 Option 1	
0930 Option 2	

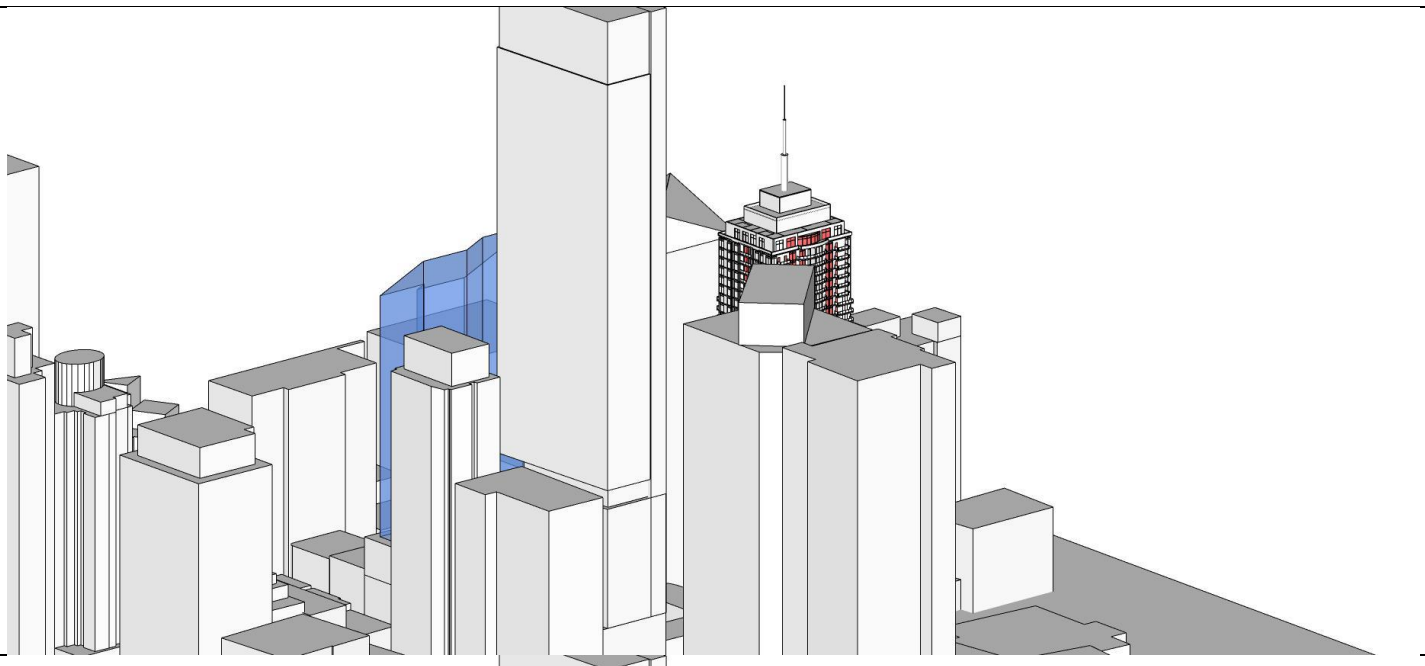
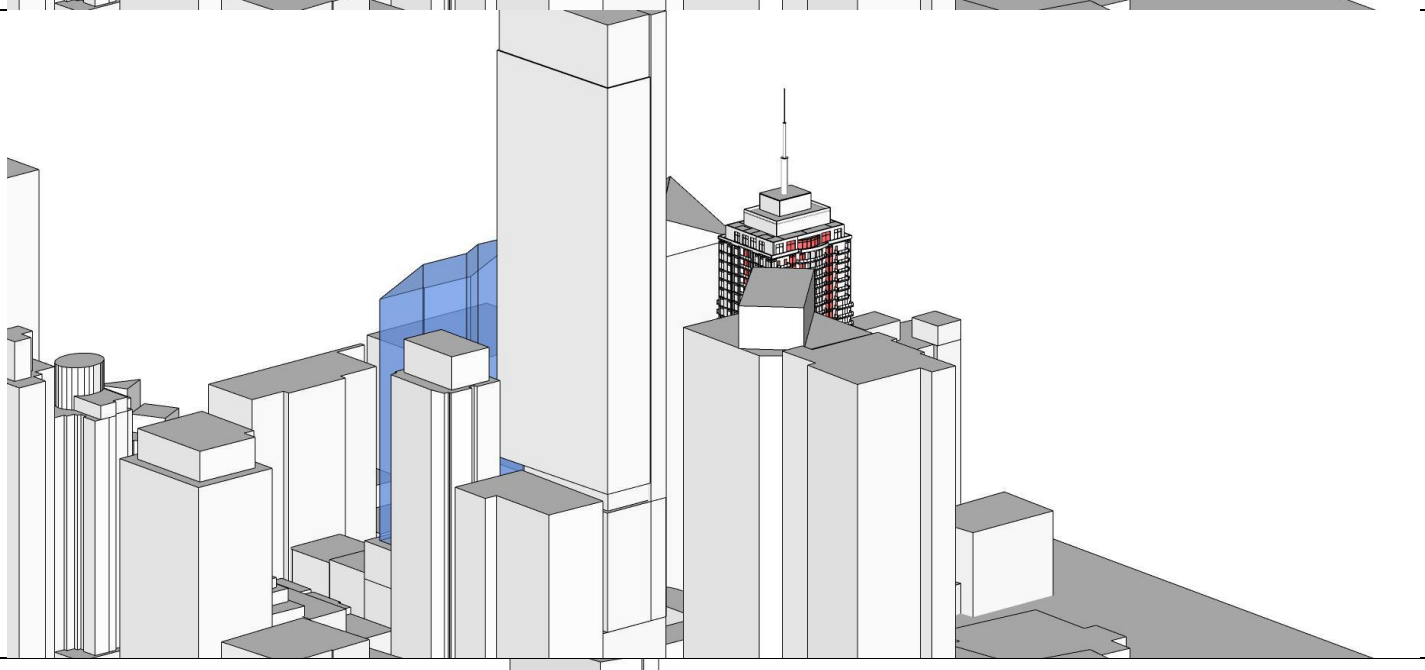
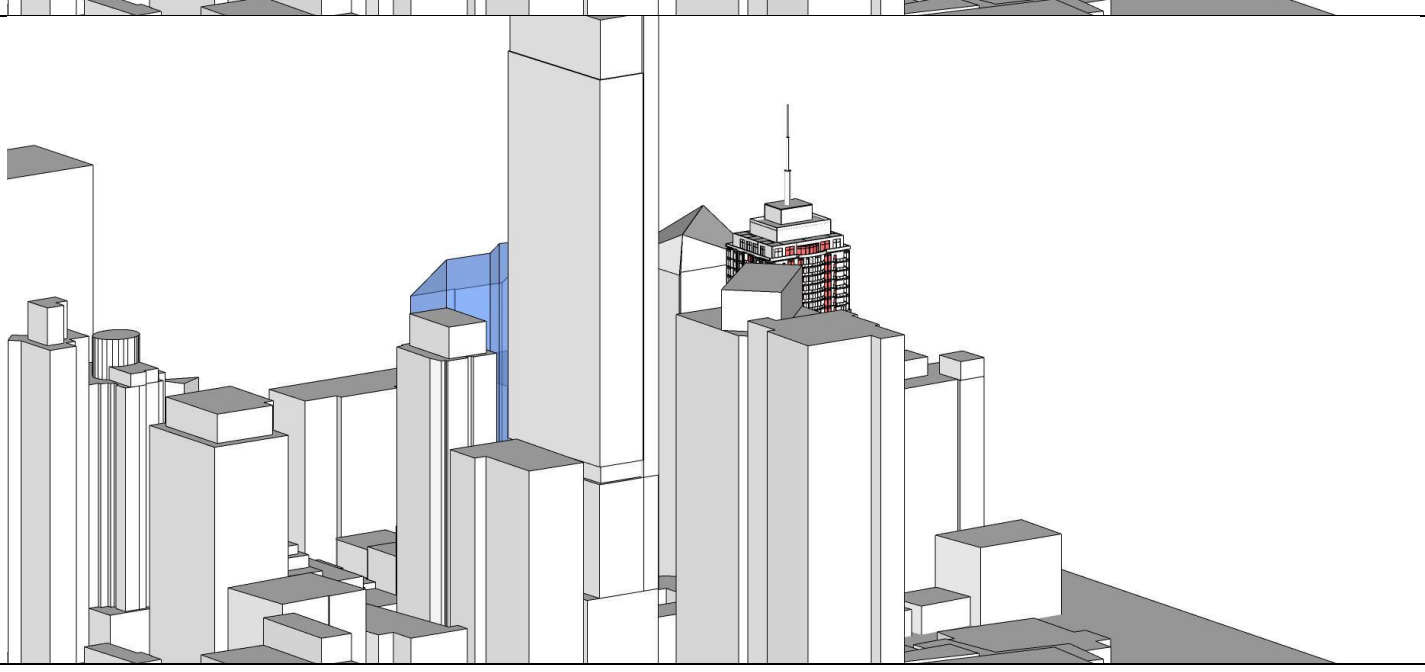
1000 Option 1	
1000 Option 2	
1030 Option 1	
1030 Option 2	

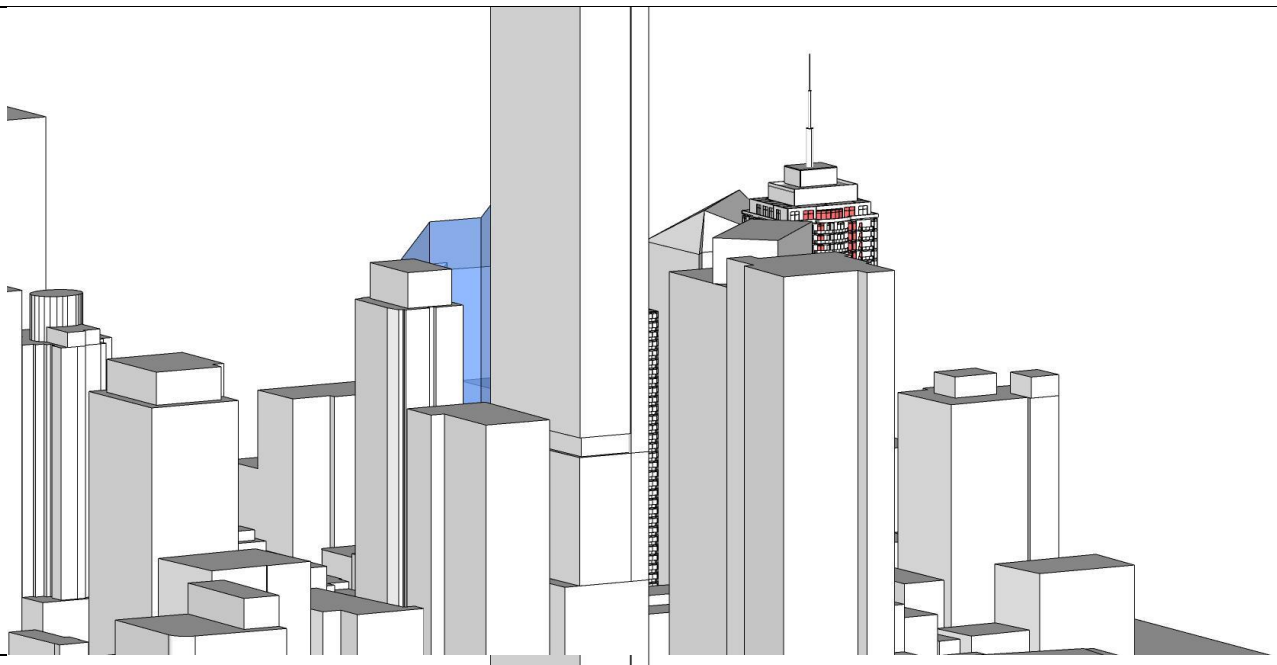
1100 Option 1	
1100 Option 2	
1130 Option 1	
1130 Option 2	

1200 Option 1	
1200 Option 2	
1230 Option 1	
1230 Option 2	

1300 Option 1	
1300 Option 2	
1330 Option 1	
1330 Option 2	

1400 Option 1	
1400 Option 2	
1430 Option 1	
1430 Option 2	

1500 Option 1	
1500 Option 2	
1530 Option 1	
1530 Option 2	

1600 Option 1	
1600 Option 2