

**EXPERT OPINION**  
**OVERSHADOWING IMPACT**  
**500-520 Pacific Hwy St Leonards**  
17 October 2016

**1.0 PRELIMINARIES AND SUMMARY**

1.1 I provide this opinion relating to projected overshadowing impact of the proposed building at the above location, specifically on the approved neighbouring building at 472-494 Pacific Hwy St Leonards (the 'Mirvac development').

1.2 My qualifications and experience are included as Attachment B.

1.3 ***My full 3D digital model analysis demonstrates that there are small, if not negligible differences in the projected overshadowing impact, between that of the originally assumed hypothetical building envelope, and the now proposed DA.***

On each typical floor, impacts are confined to four apartments in Building B / Tower 1 of the Mirvac development:

- For the one 'stack' of apartments which were not achieving a complying minimum of two hours solar access at 21 June, there is actually a small improvement in the late afternoon.
- For the three 'stacks' of apartments which were reported as complying, there is a small loss of sun (approximately 15 minutes), which does not affect their compliance status.

At Appendix A I attach a comprehensive comparison of half-hourly views from the sun on June 21.

**2.0 METHODOLOGY**

**2.1 Provenance of the 3D digital model**

*2.1.1 Base model*

I carried out the original solar access reporting for the 472-494 Pacific Hwy proposal DA, and subsequently supplied summary opinions relating to additional solar access and sun control issues.

For that purpose, I used a 3D digital model of the development itself, set in a wide 'block' model of the surroundings as context. Those models were prepared originally by the architects from survey data, to an accuracy sufficient for design development and compliance reporting for planning approval.

The architects' 3D CAD model was exported to a SketchUp file format for my analysis, and subsequently modified by my office to incorporate the building model based on the CC drawings.

*2.1.2 Assumed building envelope for 500-520 Pacific Hwy*

Importantly, the compliance reporting for the 'Mirvac development' at all times took into account the potential redevelopment of the 500-520 Pacific Hwy site, by way of inclusion of an approvable building envelope. Figure 1 illustrates the model showing the assumed building envelope in the centre foreground.

The overshadowing impact of this prospective development (now known as 'The Landmark') was critical in assessment of solar access for all apartments which rely on the north-west façade of 'Building B / Tower 2' of the Mirvac development.

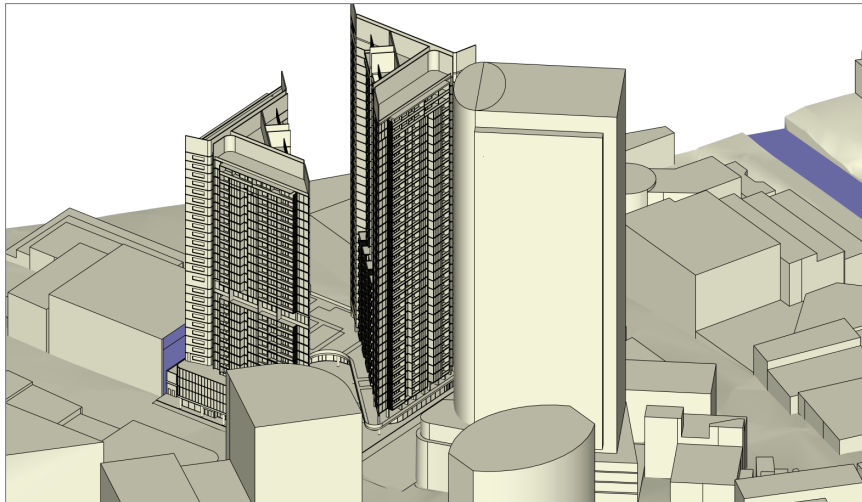


Figure 1: View from the sun at 11am, June 21

### 2.1.2 Building model for 500-520 Pacific Hwy

I have now been supplied with a detailed building model of the DA proposal for 'The Landmark'. The model has been exported by the architects from their CAD model, into SketchUp 2015 .skp file format.

### 2.1.3 The combined model

We have created a combined model incorporating the amended DA building for the 'Mirvac development', and the detailed building model of the DA for 'The Landmark'.

To calibrate the models, we rely on the latest DA plans for 'The Landmark'. We have located the 'Landmark' model by rotating it so that the faces of Mirvac building and Landmark meet along Friedlander Place, then positioned the rear of the carpark to meet the rear corner of Mirvac building.

There is a discrepancy in the nominated RL for Friedlander Place in the two models. Relevant figured RLs are 89.50 for Mirvac and 88.85 for Landmark. We have resolved this by lowering Friedlander Place by 650mm from Mirvac's ground level.

Figure 2 illustrates the combined model. I note that while the small RL anomaly may need checking for other coordination purposes, the relative heights of the two building models are actually not critical to my present analysis.

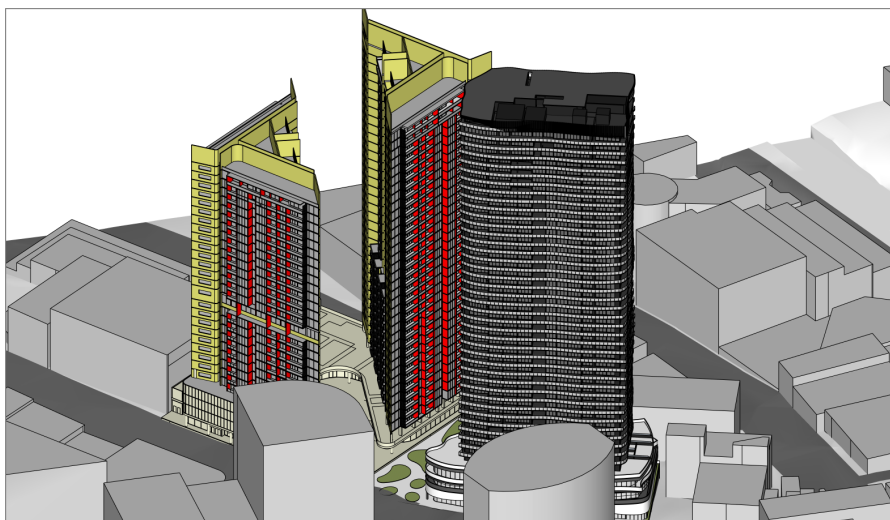


Figure 2: Combined model. View from the sun at 11am, June 21

*I consider the combined model to be sufficiently accurate for the purpose.*

## 2.2 Analysis

### 2.2.1 Views from the sun

As is my usual practice, I examine the solar access/overshadowing impact by use of 'views from the sun'. As it has been repeatedly described in my previous reports, I do not set out here the detailed explanation of this preferred technique.

In Appendix A I provide a table that compares views from the sun on a half hourly basis on June 21. The comparison is between:

- The latest such analysis carried out for the Mirvac building using the hypothetical building envelope for 'The Landmark' site, and
- A newly generated analysis using the DA model for 'The Landmark'.

## 3.0 ANALYSIS OUTCOMES

### 3.1 Potentially impacted units

The potentially impacted apartments in the Mirvac development are those that rely on solar access to glazing or POS on the northwest elevation of Building B (Tower 2) of that development.

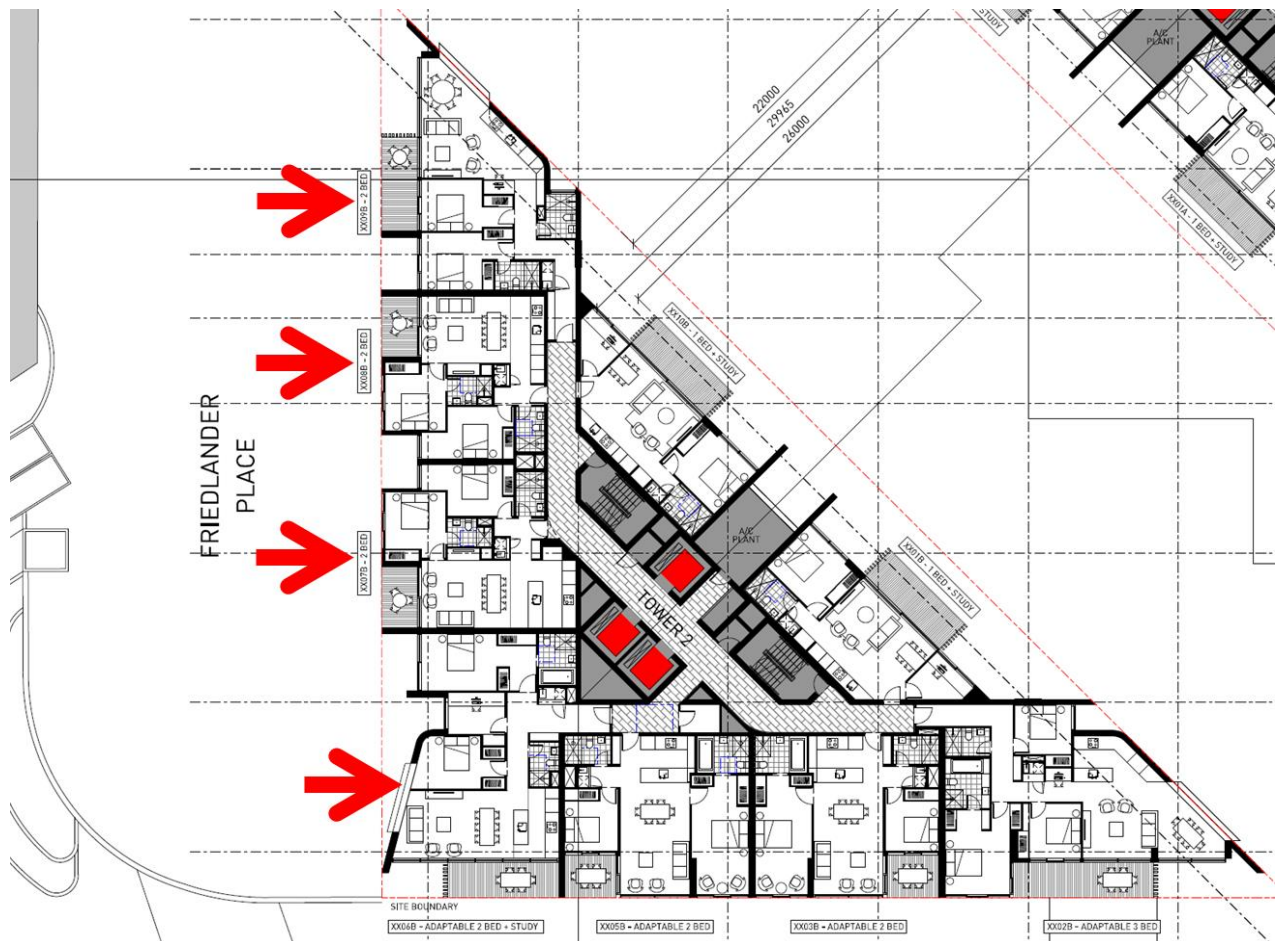


Figure 3 is a partial plan of a typical floor of that building, identifying the key units:

- Unit XX06 is previously reported as non-complying for minimum 2 hours under the ADG.
- Unit XX07 is reported previously as complying under the ADG with direct sun to glazing and POS for over 3 hours.
- Units XX08 and XX09B are reported previously as complying under the ADG with direct sun to glazing and POS for over 2 hours.

### 3.2 Comparison of overshadowing

#### 3.2.1 Refer to view from the sun at 10:30am.

First overshadowing impact. Because projected envelope for #500-520 assumed a curved east elevation, the impact of the subject scheme is very slightly greater on the glazing of the SW corner apartments (Units XX06B) in the Mirvac development.

#### 3.2.2 Refer to view from the sun at say 12:00 noon and 12:30pm.

Typical comparison of advance of the shadow across the façade of the Mirvac development. Because of the difference in shape of the end of 'The Landmark' building, each half hourly shadow appears to be more 'advanced' by approximately one 'bay' of glazing.

However, by comparing successive half hourly images, we may infer more accurately the actual difference in durations of sun exposure. It would be a reasonable estimate that any particular bay of glazing loses its complying sun patch approximately 15 minutes earlier due to the now proposed DA building, compared to the hypothetical envelope previously assumed.

#### 3.2.3 Refer to views from the sun at 14:30pm and subsequently.

Late afternoon sun. The otherwise non-complying Unit XX09B 'emerges' from shadow slightly earlier and more completely with the now proposed DA envelope for 'The Landmark' than was the case with the hypothetical envelope previously assumed.

## 4.0 CONCLUSION

I have compared the projected overshadowing impacts on the 'Mirvac development' due to:

- The hypothetical approvable building envelope for 500-520 Pacific Hwy St Leonards assumed at the time of the amended DA for the Mirvac scheme; and
- The detailed DA building envelope for the proposed 'Landmark' project on the same site.

***I note that the applicable solar access control for the Mirvac scheme was the Apartment Design Guide under SEPP65, not the DCP. It would seem inappropriate to burden any prospective neighbouring development with protecting solar access to a standard higher than the compliance for which the development was actually designed.***

Differences in overshadowing impacts are confined to four apartments on each typical floor plate, which rely on sun to the north-west elevation of 'Building B / Tower 2'. The differences in impacts are summarized below.

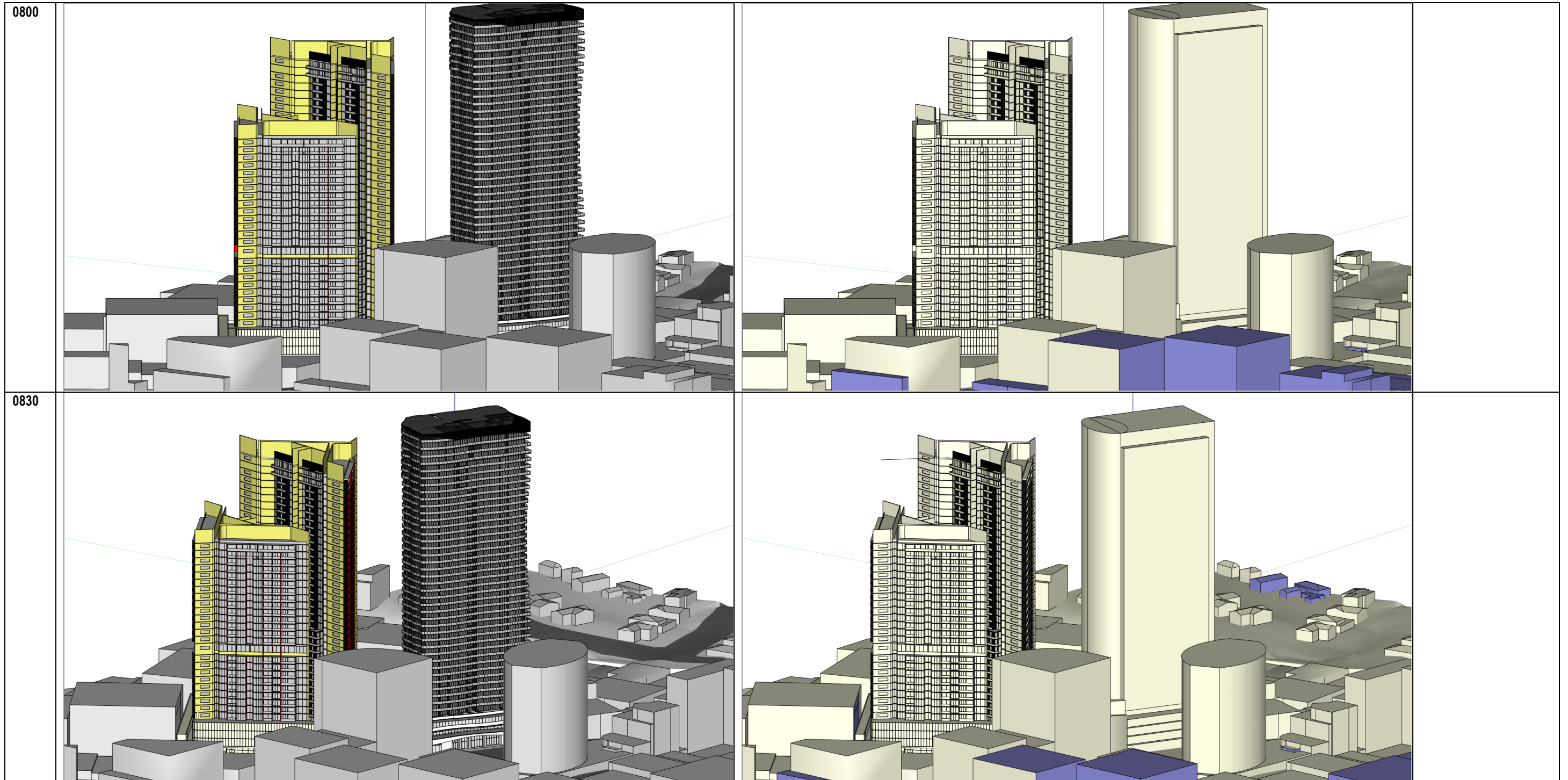
		Impact	ADG Compliance status
Presently complying units	XX06B XX07B XX08B	Sun access finishes approximately 15 minutes earlier in the afternoon	Unaffected
Presently non-complying unit	XX09B	Benefits from approximately 15 minutes additional sun in late afternoon	Unaffected

It is fair to conclude that the hypothetical building envelope for 500-520 Pacific Hwy employed in compliance reporting for the Mirvac DA was remarkably close to that now proposed for the DA for 'The Landmark' development on the same site.

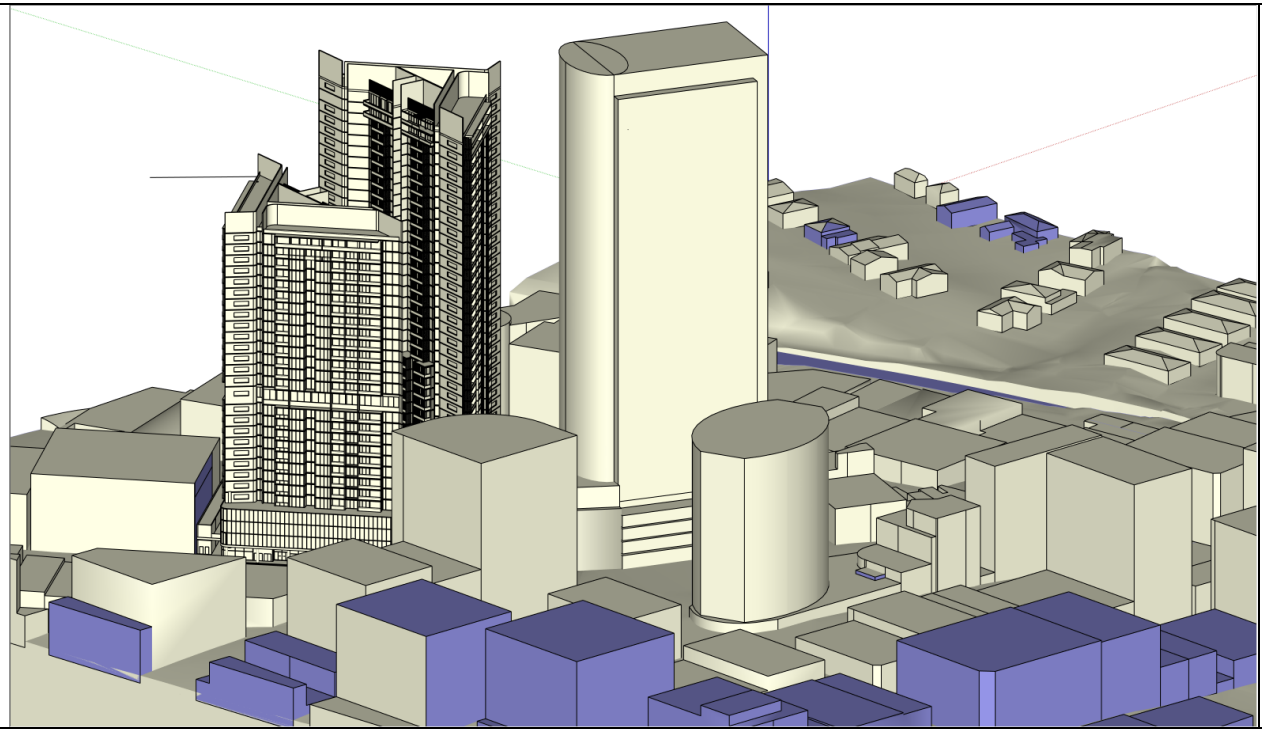
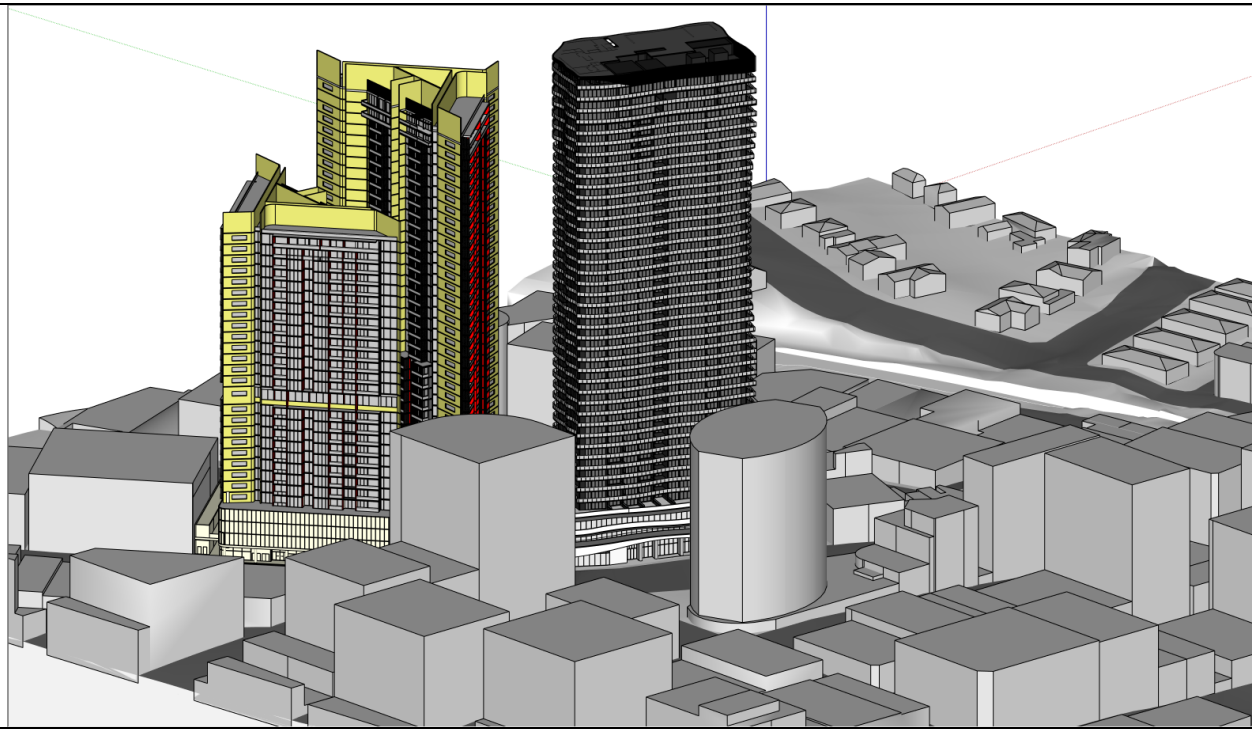
***My full 3D digital model analysis demonstrates that there are small, if not negligible differences in the now projected overshadowing impact:***

- ***For the one 'stack' of apartments which were not achieving a complying minimum of two hours solar access at 21 June, there is actually a small improvement.***
- ***For the three 'stacks' of apartments which were reported as complying, there is a small loss of sun, which does not affect their compliance status.***

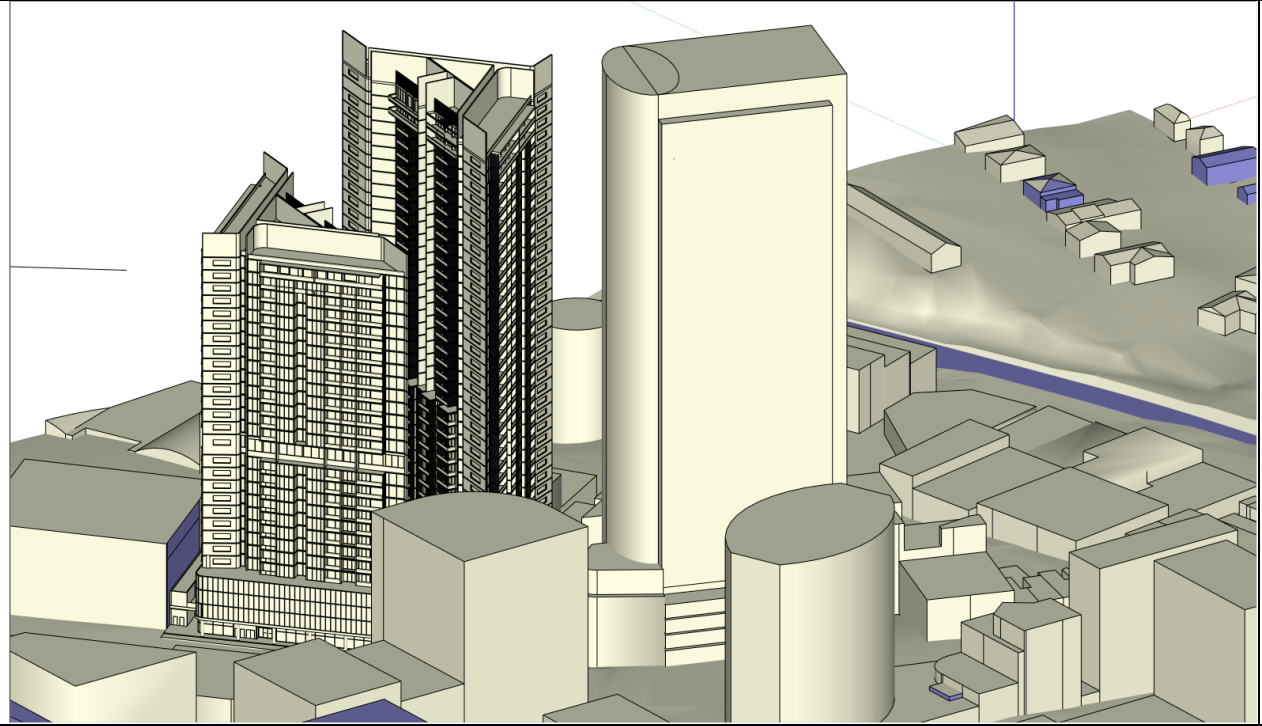
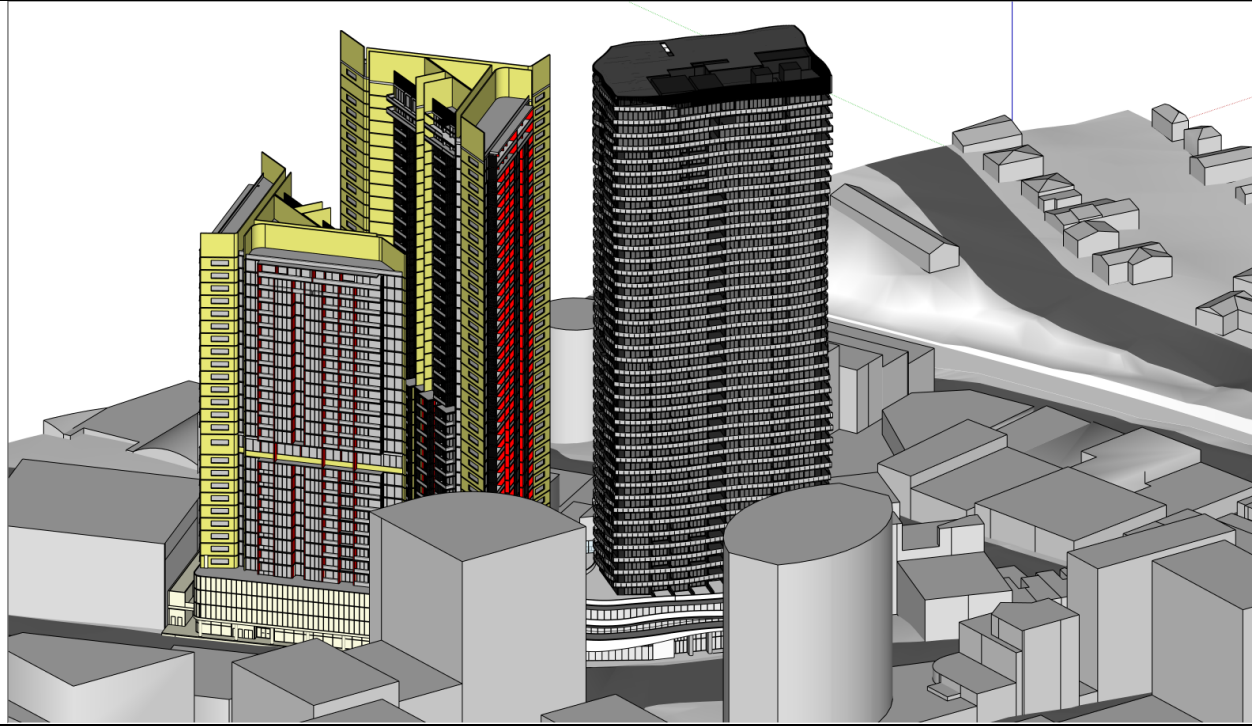
APPENDIX A: COMPARISON OF VIEWS FROM THE SUN



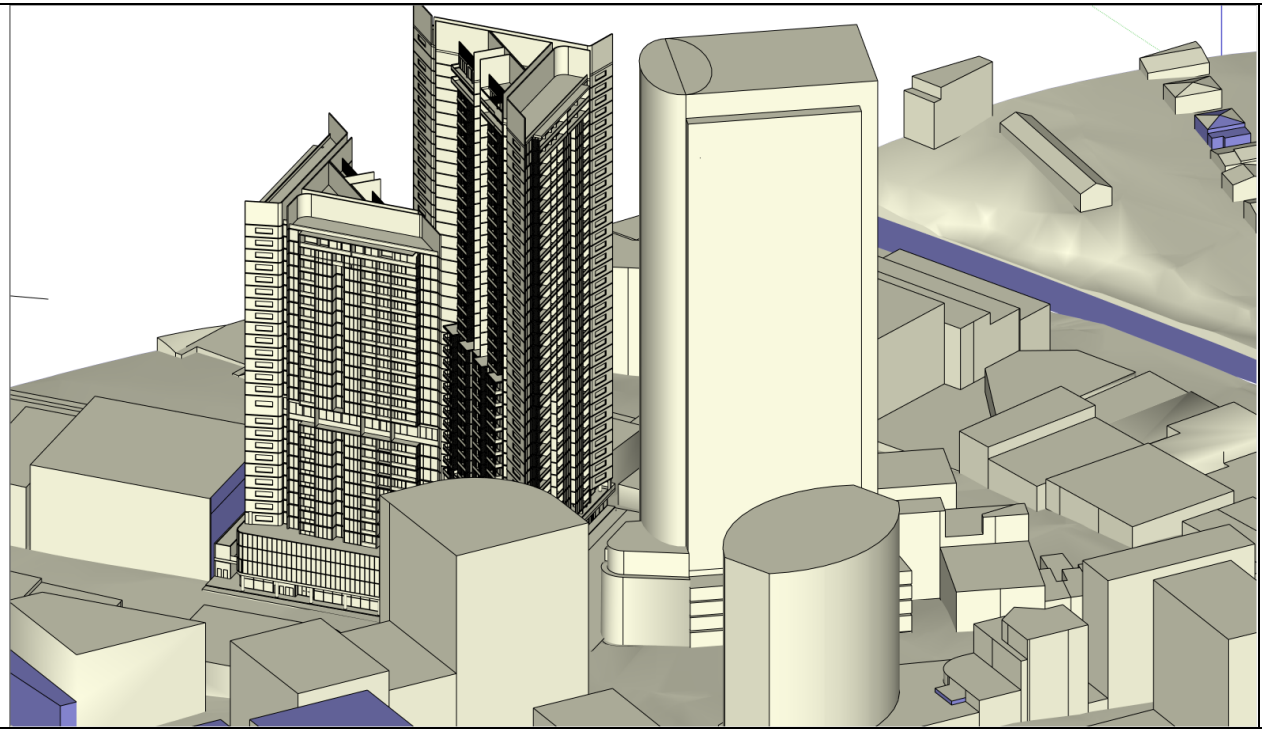
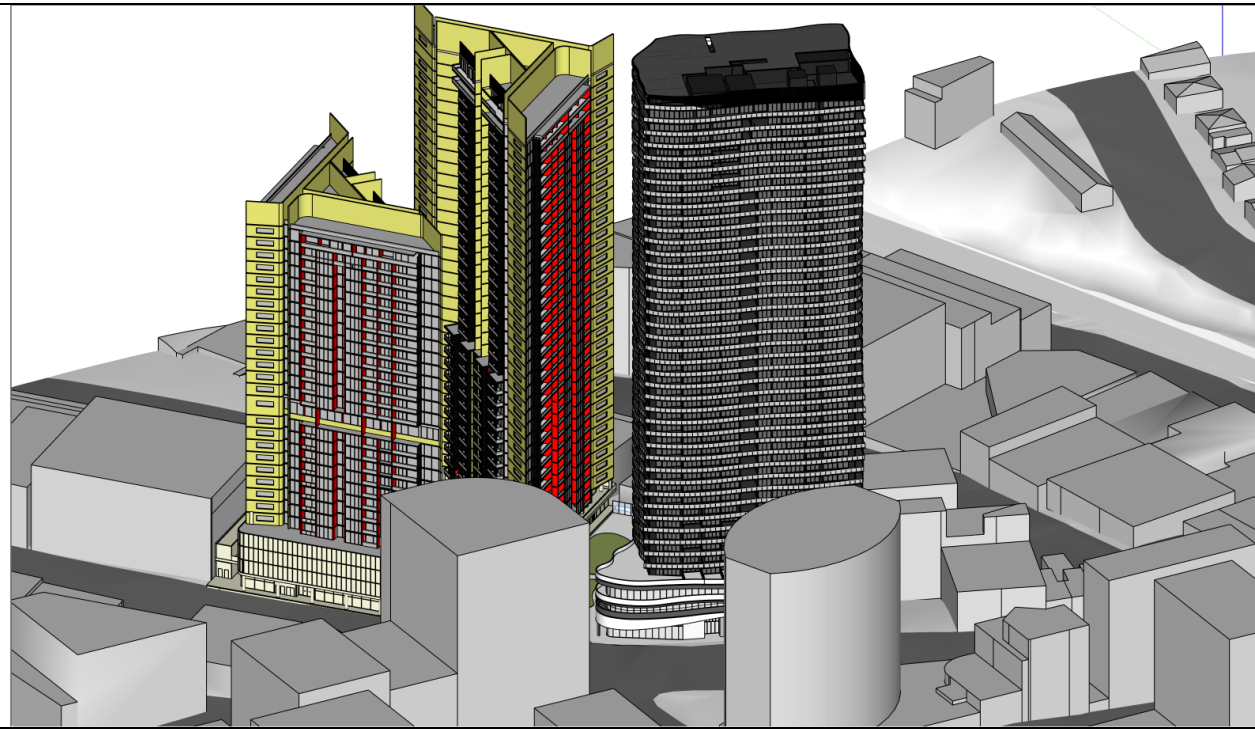
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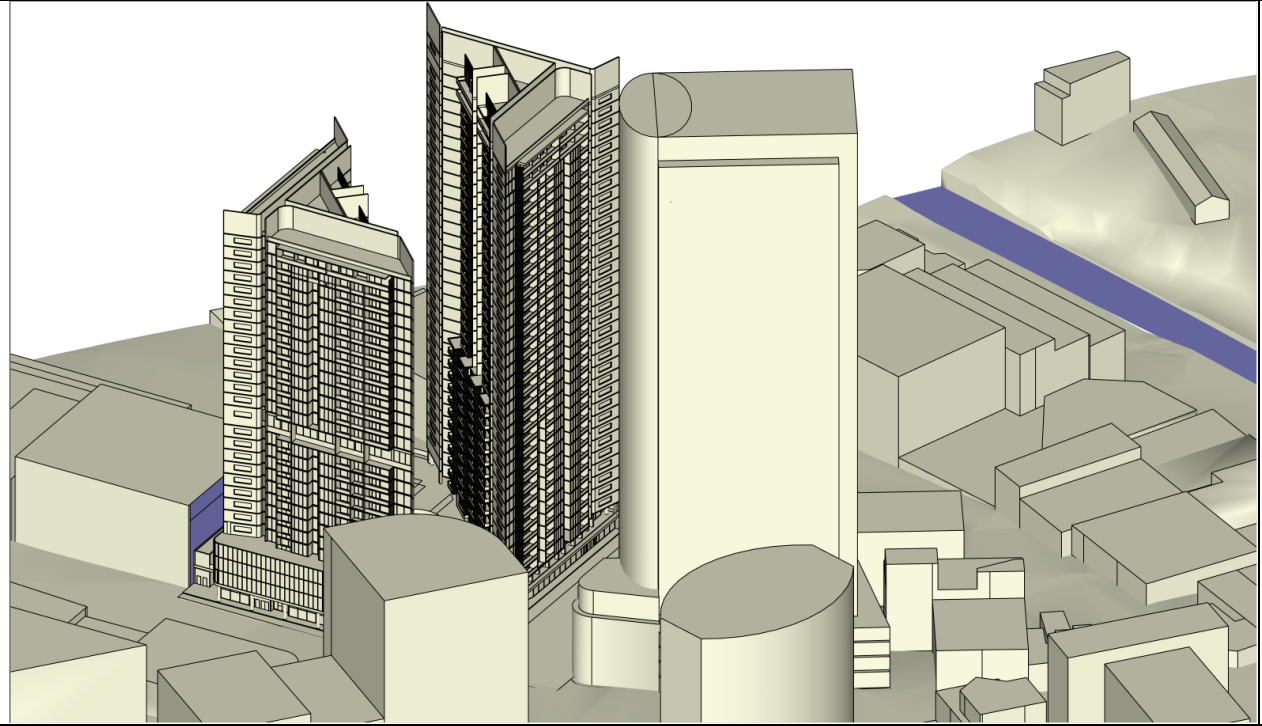
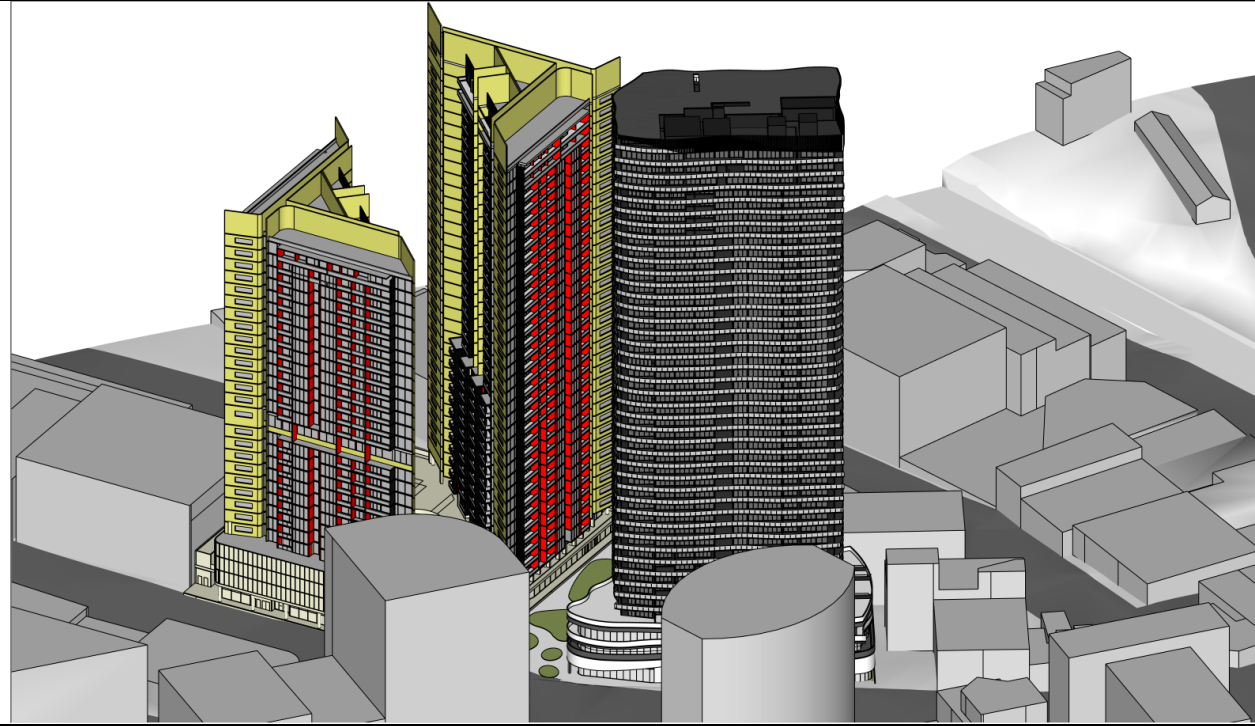
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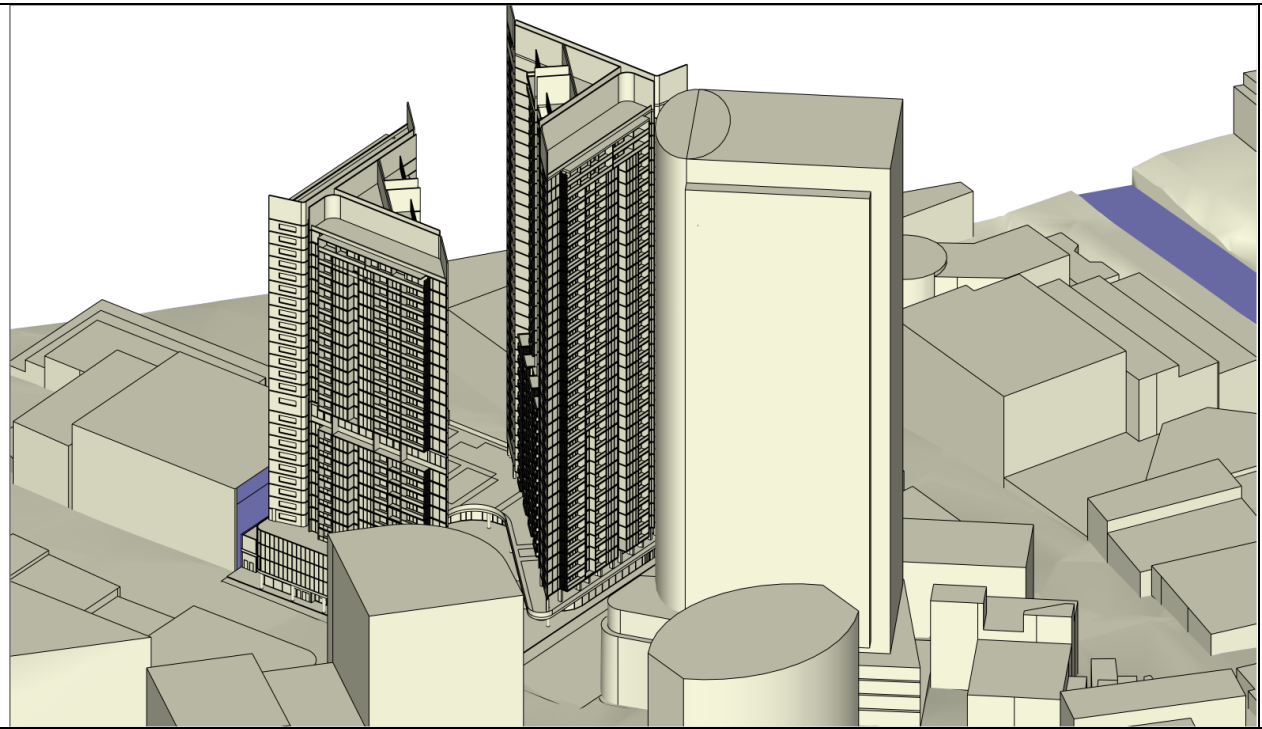
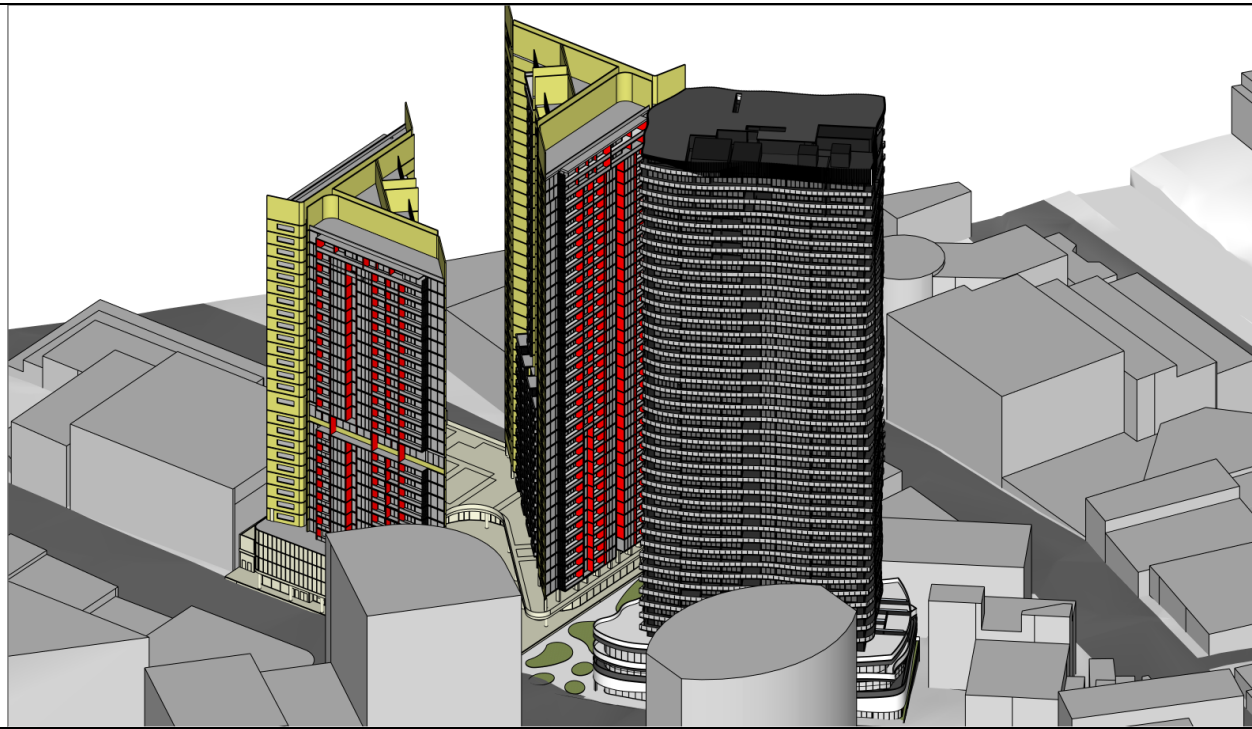


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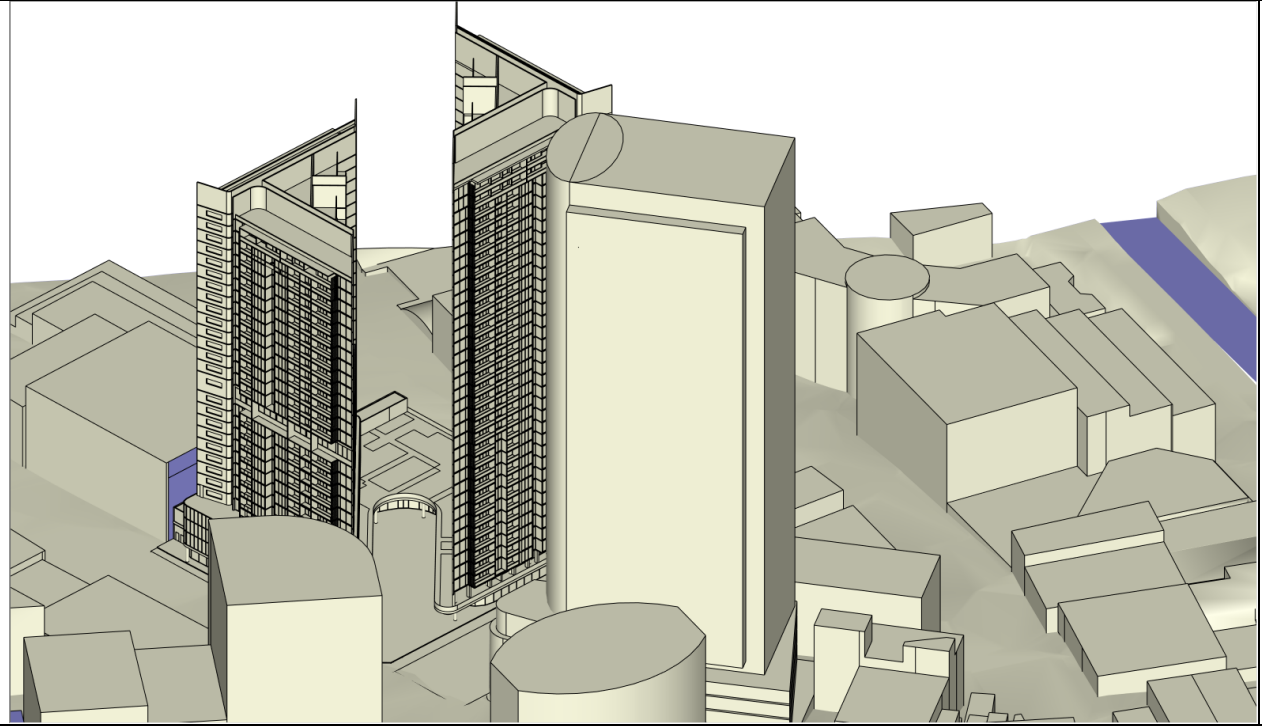
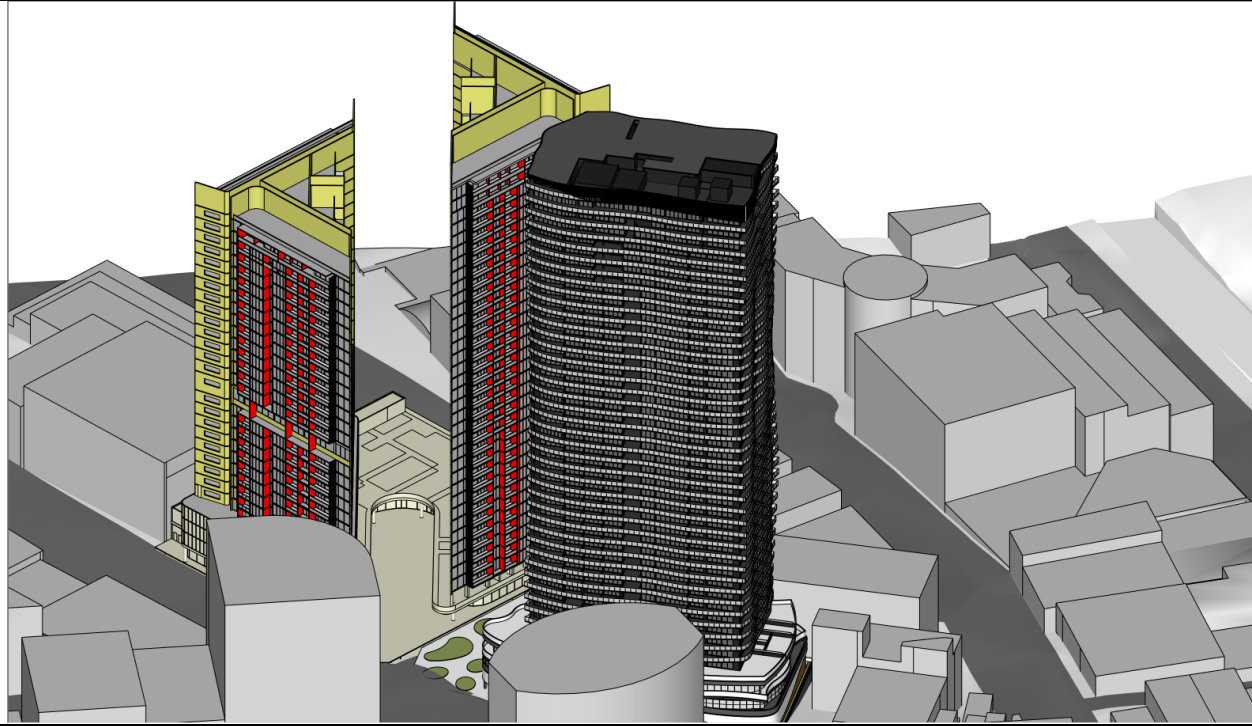


First overshadowing impact. Because projected envelope for #500-512 assumed a curved east elevation, the impact of the subject scheme is very slightly greater on the glazing of the SW corner apartments in the Mirvac development.

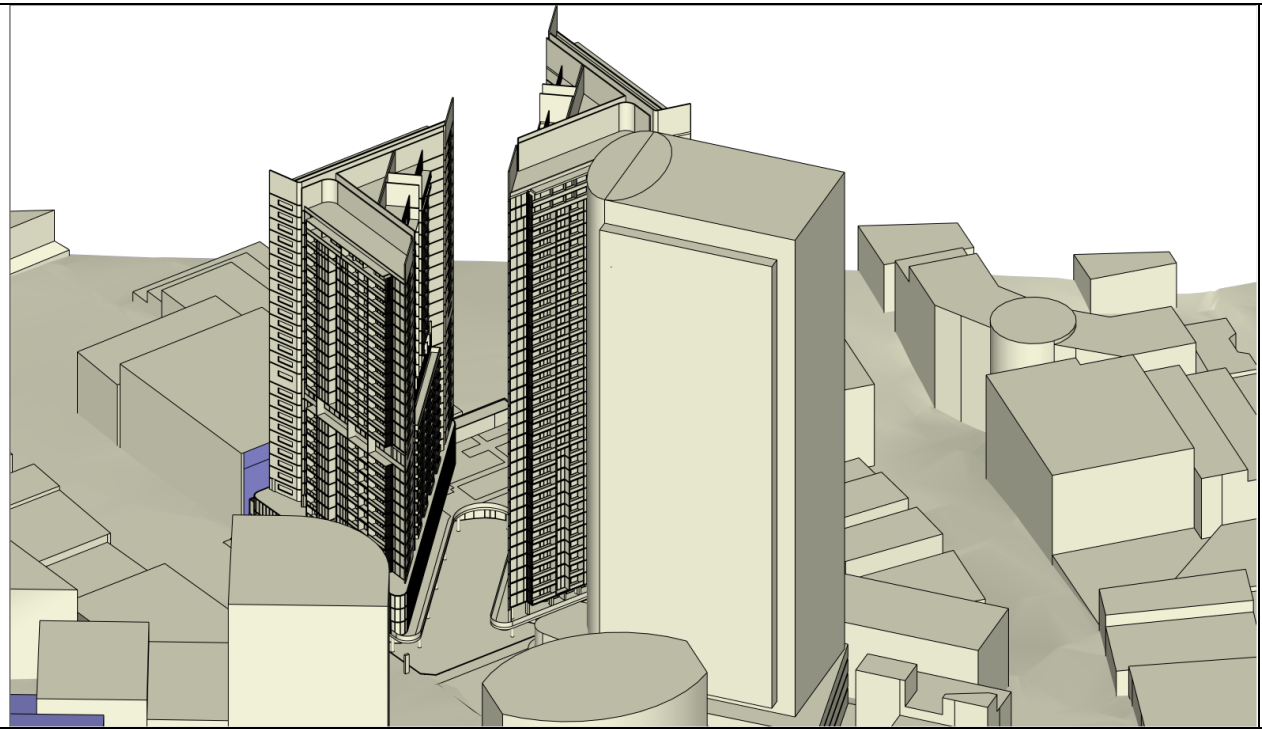
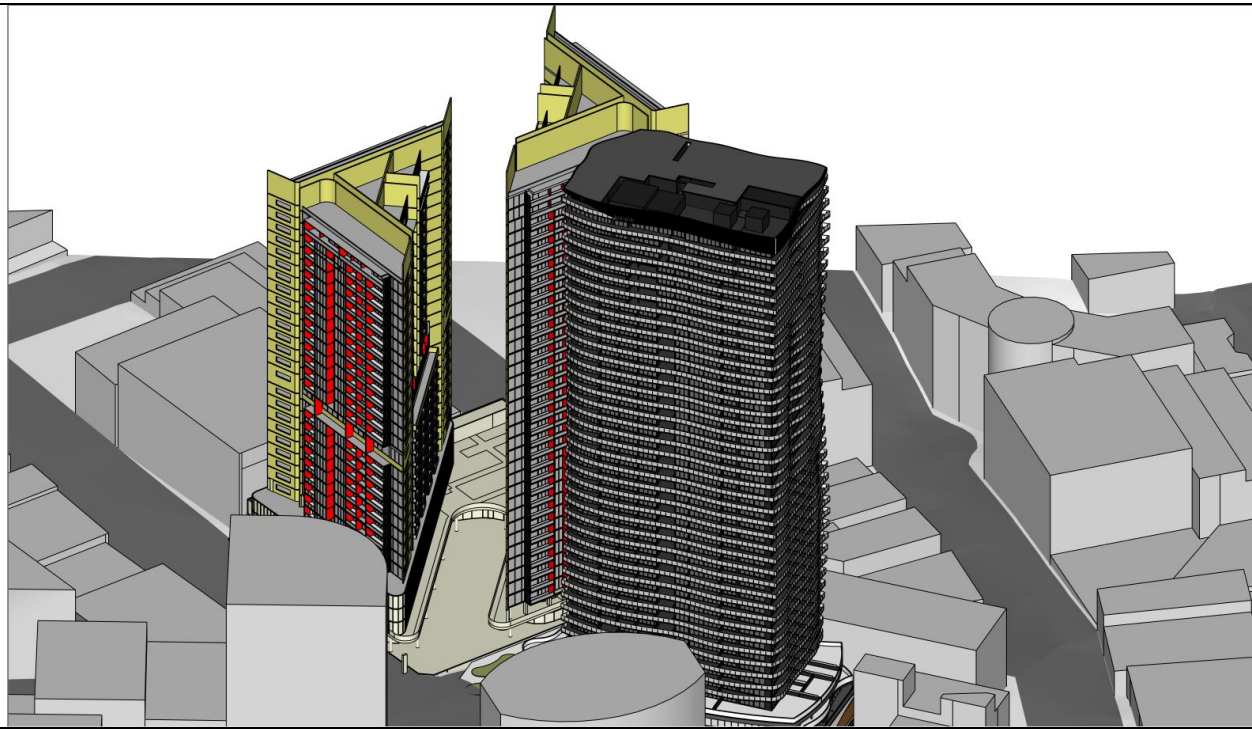
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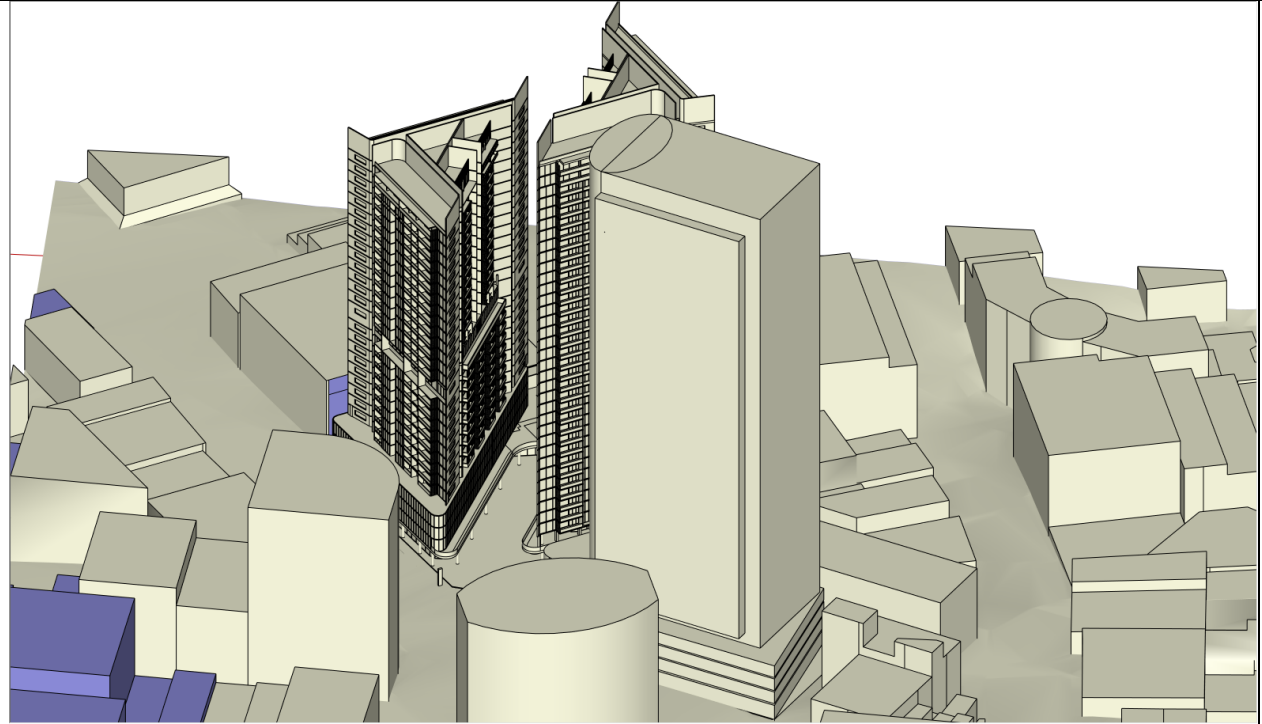
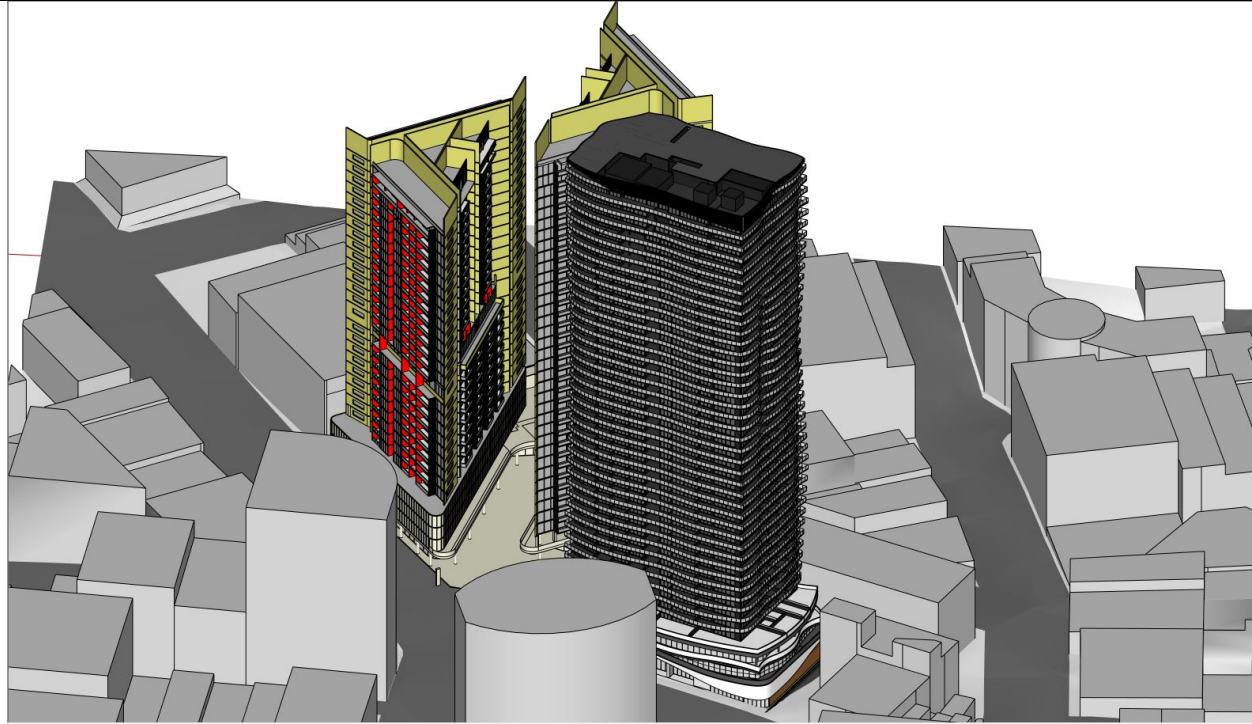
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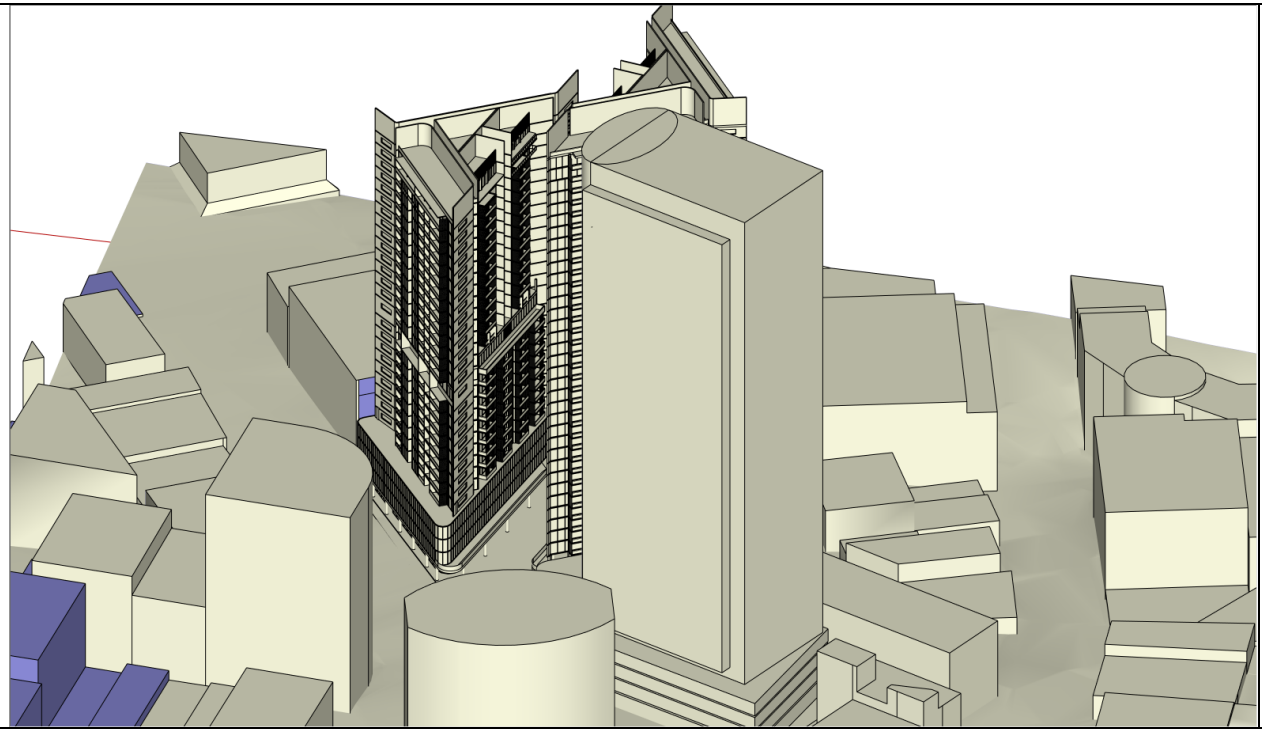
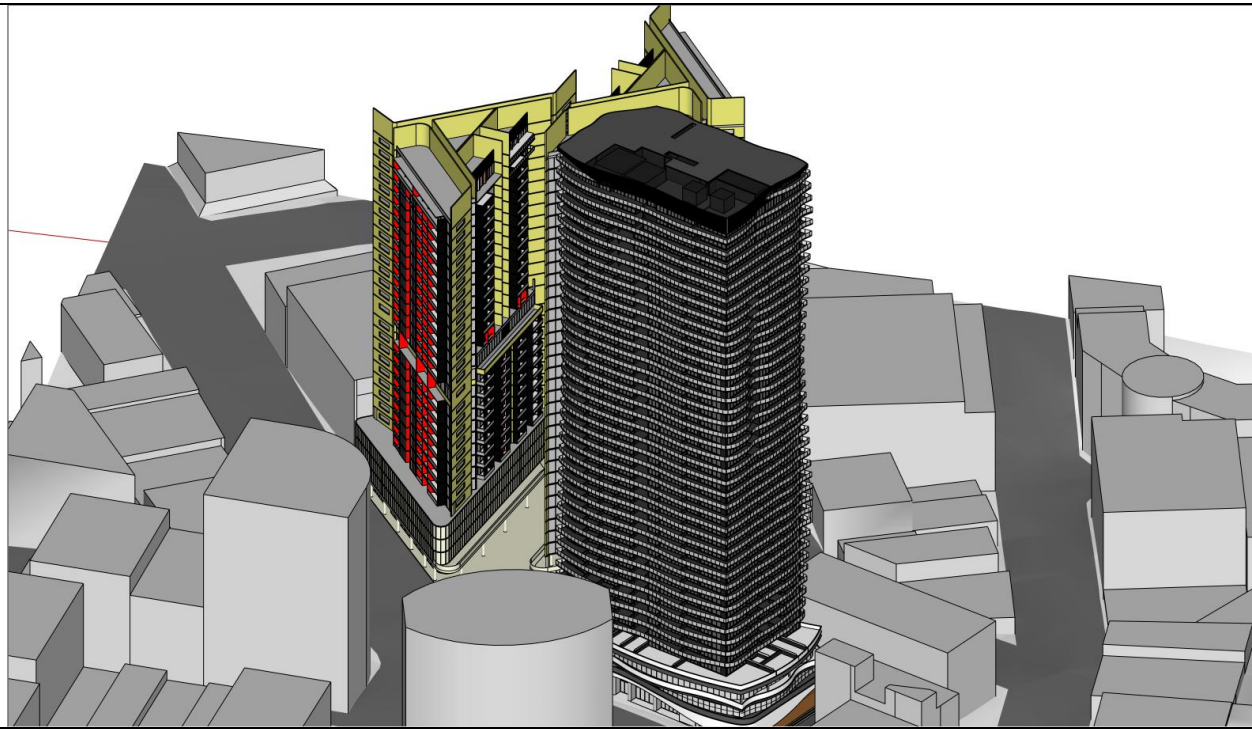
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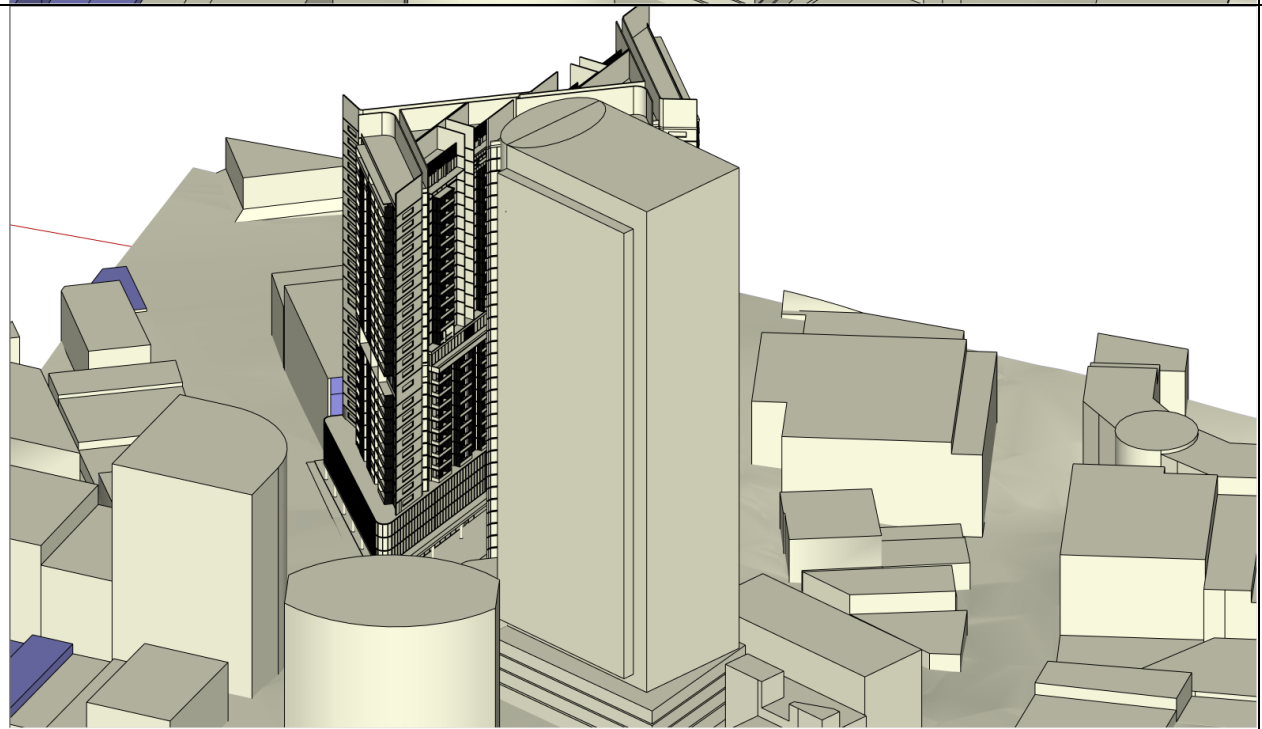
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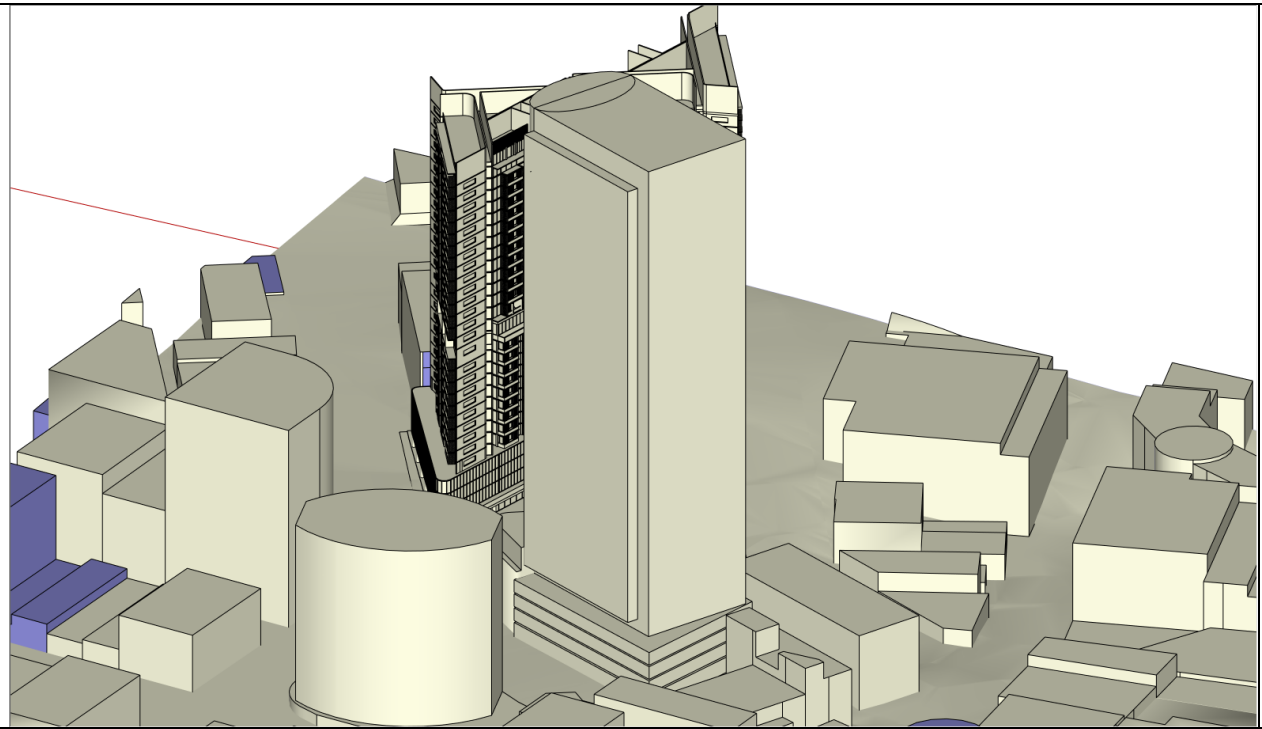
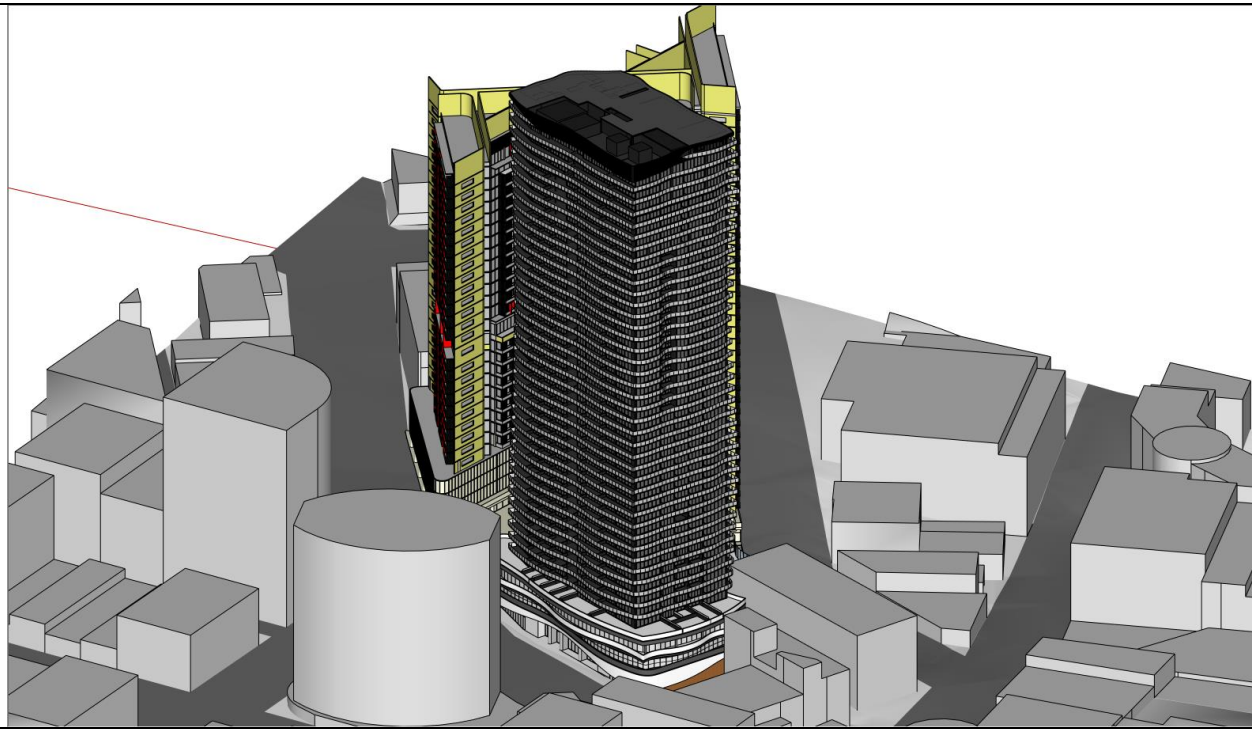
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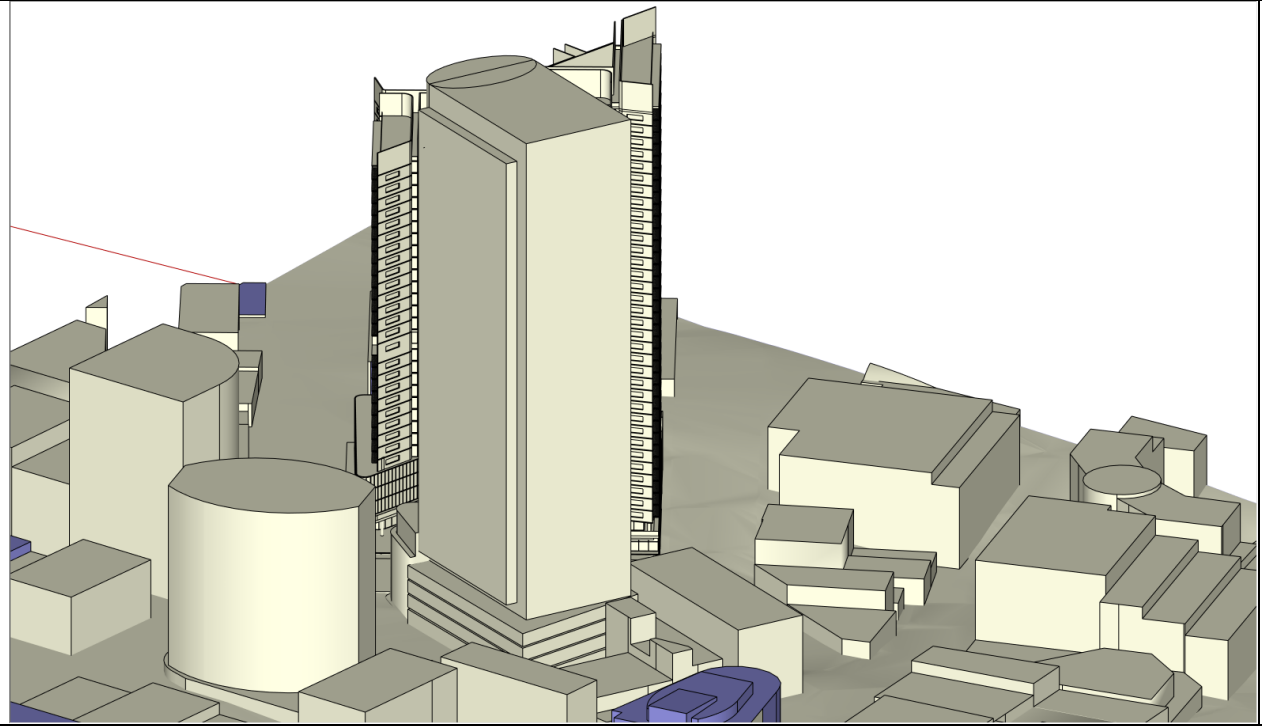
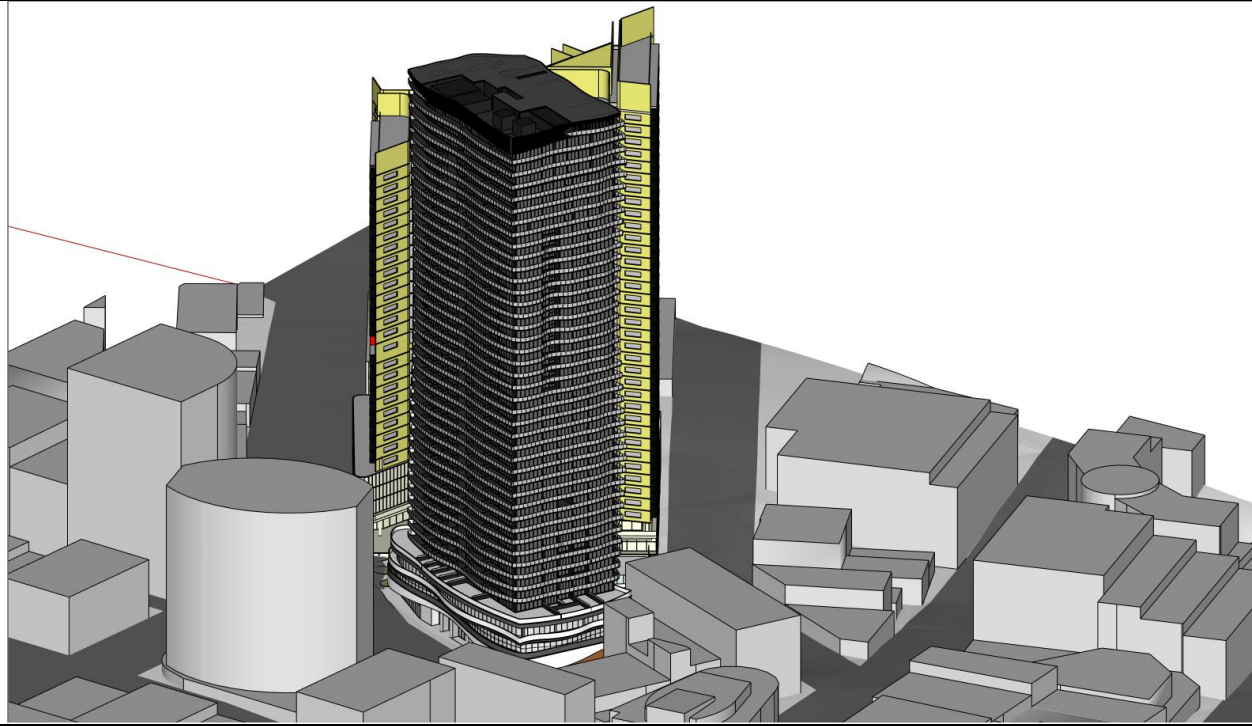
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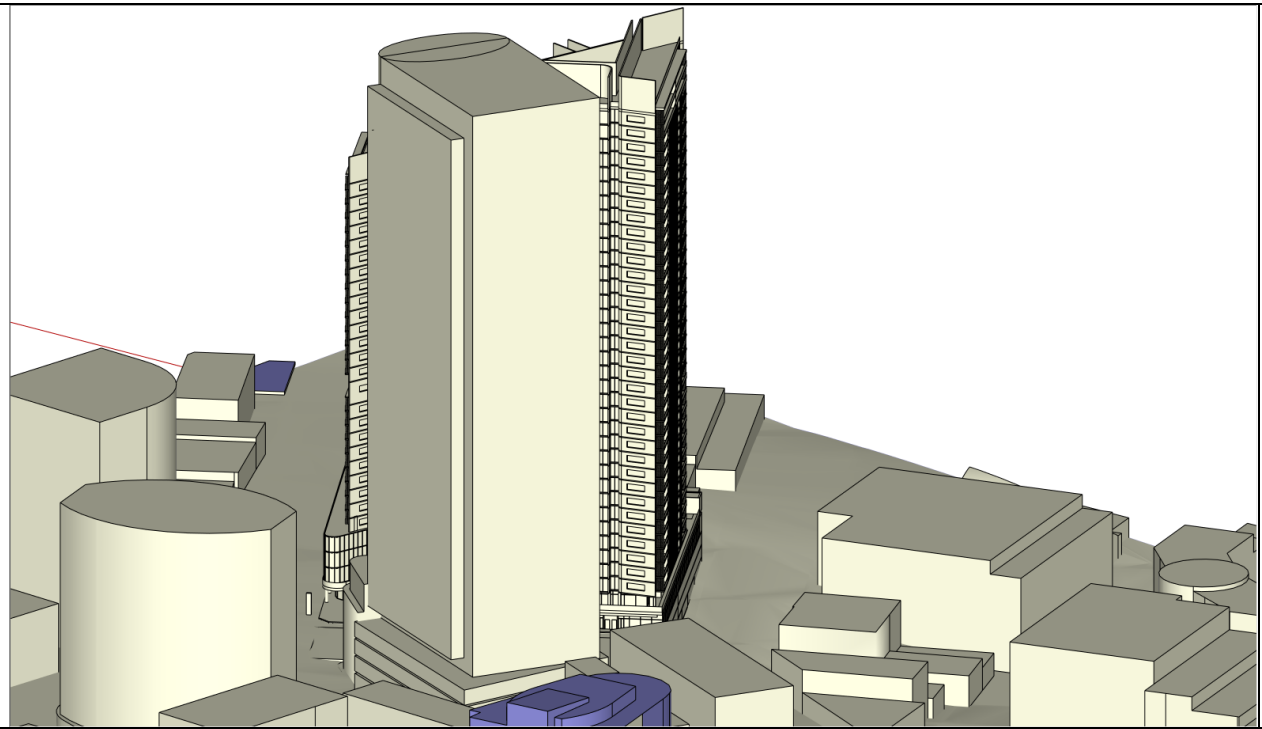
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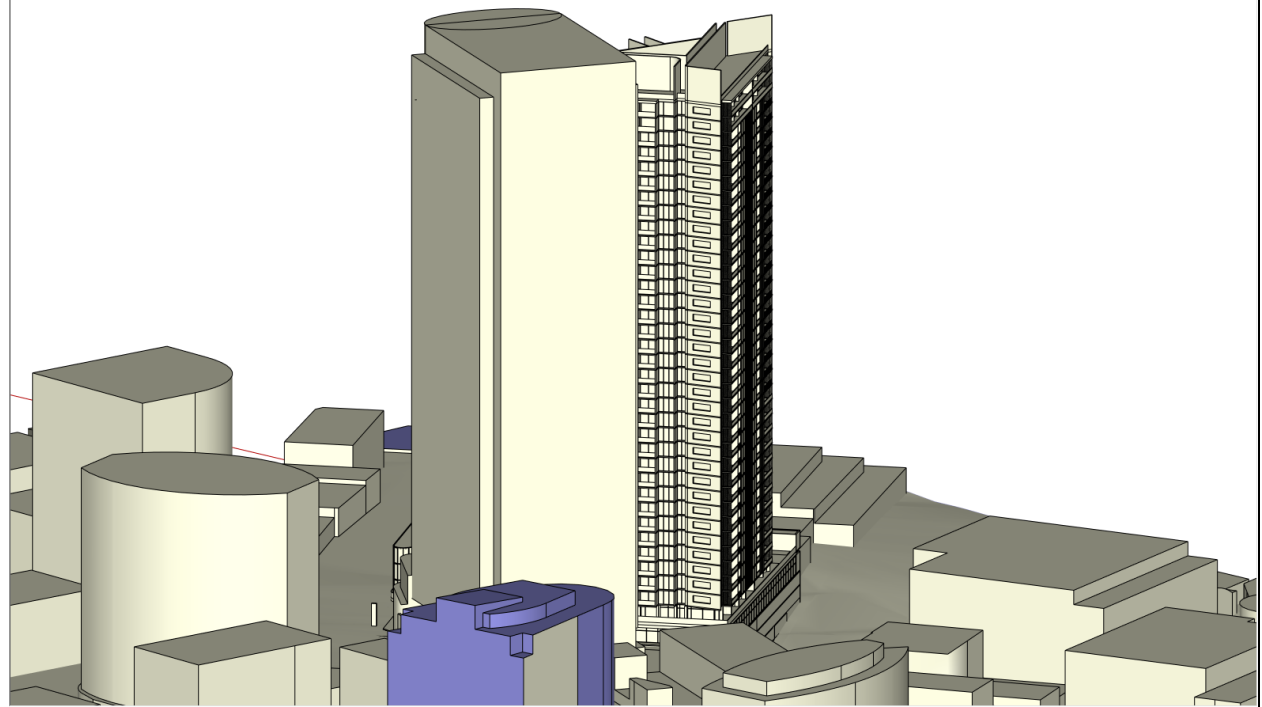
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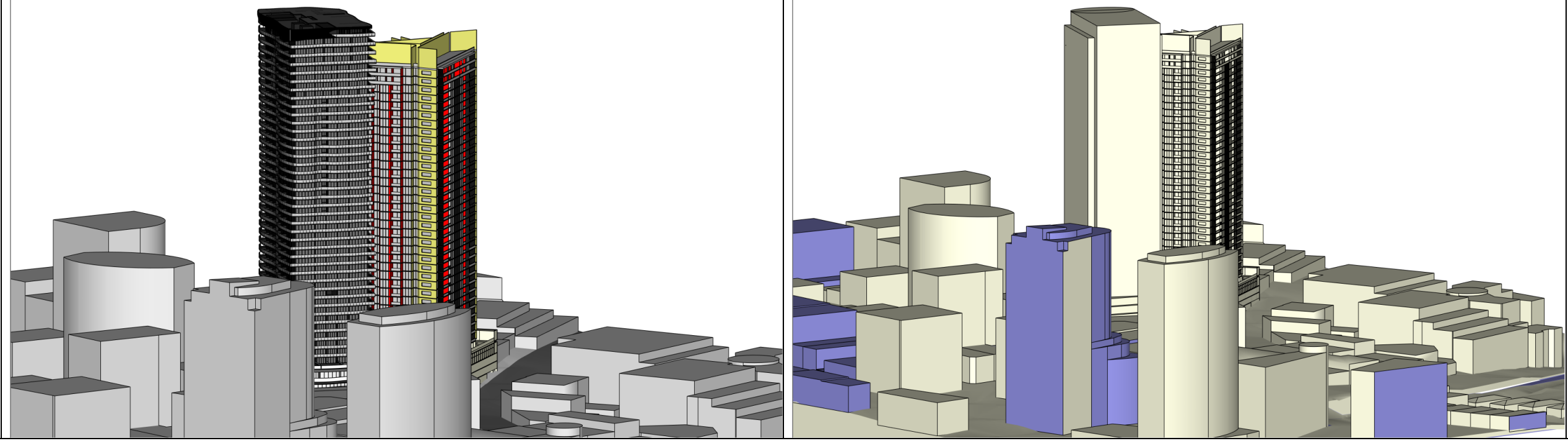
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## APPENDIX B CREDENTIALS



**Steve King** B.Arch(Hons.) Dip.Bdg.Sc. (Sydney)

I have taught 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 its disestablishment in November 2006, I was the Associate Director, Centre for Sustainable Built Environments, UNSW.

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. 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 UNISEARCH, NEERG Seminars and Linarch, I conduct training in solar access and overshadowing assessment for Local Councils. I have delivered professional development courses on topics relating to energy efficient design both in Australia and internationally.

SOLARCH/UNISEARCH were the contractors to SEDA NSW for the setting up and administration of the House Energy Rating Management Body (HMB), which accredits assessors under the Nationwide House Energy Rating Scheme (NatHERS), NSW. I was the technical supervisor of the HMB, with a broad overview of the dwelling thermal performance assessments carried out in NSW over five years. I have been a member of the NSW BRAC Energy Subcommittee, and also a member of the AGO Technical Advisory Committee on the implementation of AccuRate, the new mandated software tool under NatHERS. I undertook the Expert Review for the NSW Department of Planning, of the comparison of NatHERS and DIY methods of compliance for Thermal Comfort under BASIX, and was subsequently a member of a three person expert panel advising on the implementation of AccuRate in BASIX.

I have delivered the key papers in the general area of assessment of ventilation and solar access performance and compliance, for NEERG Seminars, cited by Commissioners of the LEC. Senior Commissioner Moore cited my assistance in reframing of the Planning Principle related to solar access (formerly known as the Parsonage Principle) in *The Benevolent Society v Waverley Council [2010] NSWLEC 1082*.

I practiced as a Registered Architect from 1971 to 2014, and maintain a specialist consultancy in appropriate design for passive environmental control in buildings, specialising in solar access and natural ventilation compliance. I regularly assist the Land and Environment Court as an expert witness in related matters.