SUMMARY EXPERT OPINION

INDEPENDENT VERIFICATION: OVERSHADOWING IMPACT

PROPOSED MIXED USE DEVELOPMENT
2 Mark St, 1-3 Marsden St, Lidcombe

12 November 2018

1.0 PRELIMINARIES/SUMMARY

1.1 I have undertaken a peer review analysis of overshadowing impact for the proposed development of apartments at 2 Mark St, 1-3 Marsden St, Lidcombe, which is the subject of a development application. I supply the following independent expert opinion.

Subject Property:	**2 Mark St, 1-3 Marsden St, Lidcombe**
Affected property:	**Approved mixed use residential flat building at 4-14 Mark St, Lidcombe**

1.2 The scope of this opinion is limited to the overshadowing impact identified in the Record of Deferral by the Sydney Central City Planning Panel of Wednesday, 17 October 2018.

Specifically, I examine the implementation of the recommendation by that Panel to enable a modified design to be provided, which reduces the prospective overshadowing impact on the units immediately to the south of the proposed development.

1.3 In their Reasons for Deferral, the Panel recommends:

> The modification is to follow the midpoint option in the attached Johannsen and Associates Plan (as marked "remove 10 units"). The modification is to achieve compliance with the ADG solar access requirements in at least 65% of the units in the approved building at 4-14 Mark Street.

1.4 In the first instance, I examine the prospective loss of solar access compliance at 4 -14 Mark Street, attributable to the impact of the submitted DA scheme (Option 1).

I verify that in Option 1, loss of solar access compliance would result for eight (8) individual units *on the north façade of the affected building*. I observe that the applicant had previously characterised a further nine (9) units *on the east façade* is losing compliance as a consequence of external overshadowing.

1.5 The applicant has prepared modified plans deleting 10 units from the subject development, generally in accordance with the Panel recommendation (referred to as Option 2).

I verify that in Option 2, loss of solar access compliance is reduced to five (5) individual units. The attributable overshadowing impact then represents only 3.0% of the overall number of units in the affected building.

1.6 I note that the development approval for 4-14 Mark Street was based on 117/165 (70.9%) units complying. *On that basis, neither the submitted DA scheme (Option 1), nor the amended scheme (Option 2) for the subject development would reduce the reported overall solar access compliance for 4-14 Mark Street to less than 65%.*

2.0 DOCUMENTS

2.1 I base my report on the following documents issued to me by Zhinar Architects:

(a) 'DRAWINGS AMENDED AS PER JRPP COMMENTS' dated30/10/18:

- OPTION 1.pdf
  being architectural plans for the submitted DA;
- OPTION 2.pdf
  being amended architectural plans in response to the recommendations of the Sydney Central City Planning Panel of Wednesday, 17 October 2018

(b) Panel_decision_deferral_2017SWC144_17_October_2018.pdf

(c) Marked_Plan_at_Panel_Meeting_17_October_2018.pdf

(d) APPROVED PLANS_no stamp.pdf
being architectural plans for the approved DA for the affected building at 4-14 Mark Street;

(e) 3D digital models of Options 1 and 2, exported in .DXF format from the architects' CAD application.

3.0 DISCUSSION

3.1 Methodology

My review and analysis are undertaken in *Trimble SketchUp* software. The 3D digital model is exported from the CAD file prepared by the architects. By use of the 3D digital model, quantification of solar access takes account of all self-shading within the subject site, as well as relevant external overshadowing.

I independently geolocated the 3D digital model and checked the direction of true north by online reference to cadastral grid north. I am satisfied that the model is sufficiently accurate for the purpose of solar access assessment.

I examine the design by use of 'views from the sun'. The projection referred to as 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.

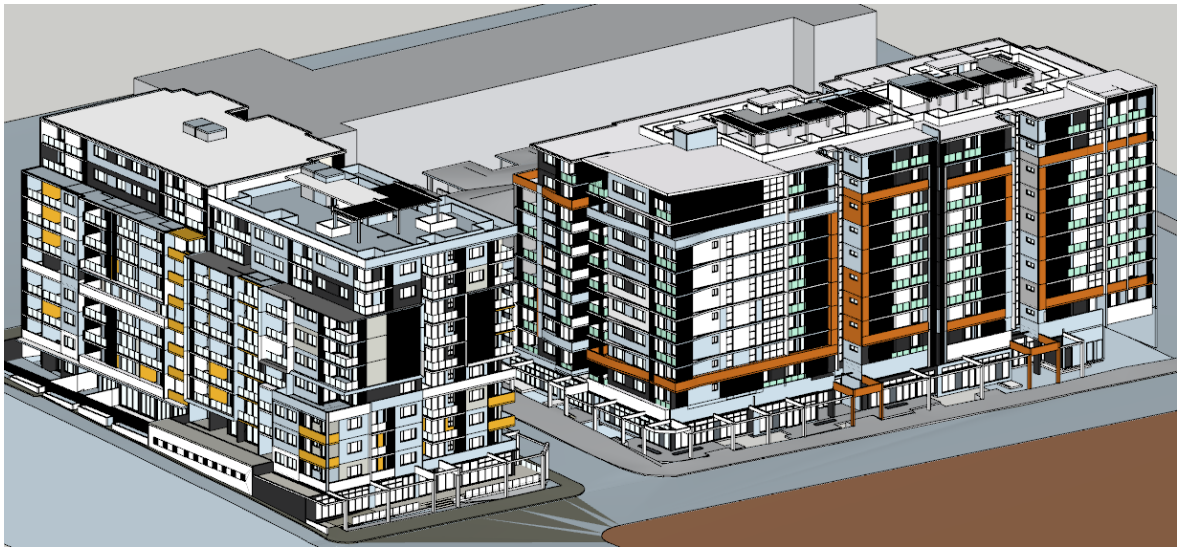


Figure 1: Geolocated detailed model in SketchUp. View from the sun at 3.00pm June 21 (Option 1)

Note that a 'view from the sun' by definition does not show any shadows. The unique advantage of this projection is that it directly identifies which part of a building causes a particular instance of overshadowing.

3.2 Overshadowing by DA scheme (Option 1)

3.2.1 Morning shadows East façade

The applicant provides a detailed compliance table on sheet *8539 DA - E:25H: Shadow Impact to 4-14 Mark St (Winter Solstice) OPTION 1*.

In that table, Units 1.09 to 7.09 and Units 8.07 – 9.07 are characterised as losing solar access compliance due to overshadowing by the subject building. In fact, examination of the view from the sun at 11 AM (Figure 2) shows Units 1.09 to 7.09 to be self shaded, and Units 8.07 – 9.07 to be too high to be externally shaded by any building of similar height.

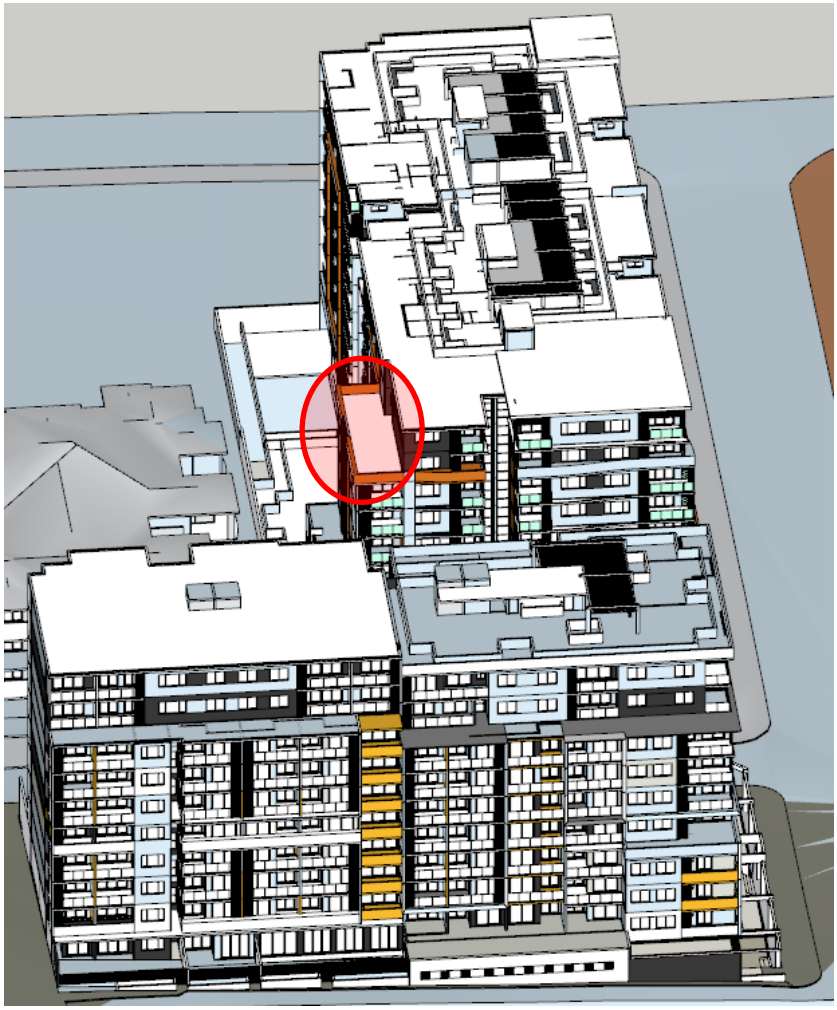


Figure 2: View from the sun 11 AM

In brief, no apartment on the eastern façade of 4-14 Mark Street loses solar access compliance as a consequence of overshadowing by the subject building.

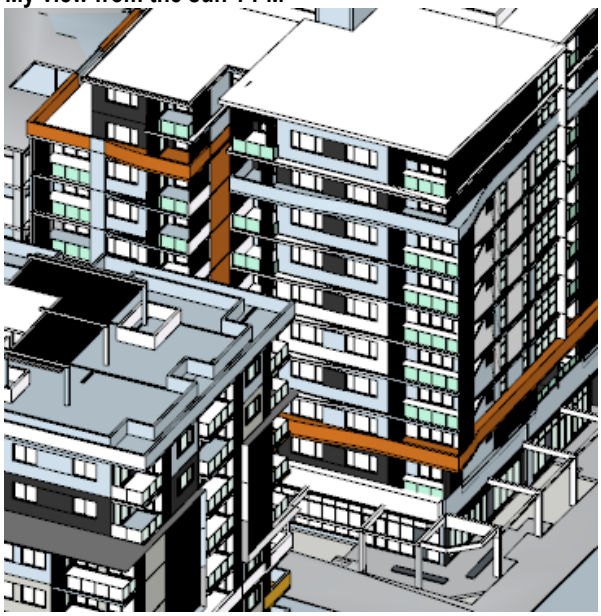
3.2.2 West and North façades

Figure 1 shows that the subject building does not overshadow the affected building at 3 PM. Therefore, any apartment which has complying sun by 1 PM can be said to achieve the minimum two hours of unobstructed direct sun on June 21.

Figure 3 compares my view from the sun, and the applicant's conventional elevational shadows for the North elevation of the affected building, as shaded at 1 PM by the DA scheme (Option 1).

The view from the sun confirms that before 1 PM the subject building cannot overshadow the western elevation of the affected building – therefore additional afternoon overshadowing can only occur on the north façade.

My view from the sun 1 PM



Applicant's shaded elevation 1 PM

Figure 3: 1 PM overshadowing for Option 1

If I focus on the north-east corner, I confirm that the applicant correctly identifies eight units in the lower storeys which do not receive direct sun at 1 PM. Therefore those eight individual apartments lose solar access compliance due to overshadowing by the subject building.

3.2.3 Total overshadowing impact

Based on the overall number of apartments in the impacted building, the total overshadowing impact of Option 1 is to reduce overall compliance by 8/165 (4.8%).

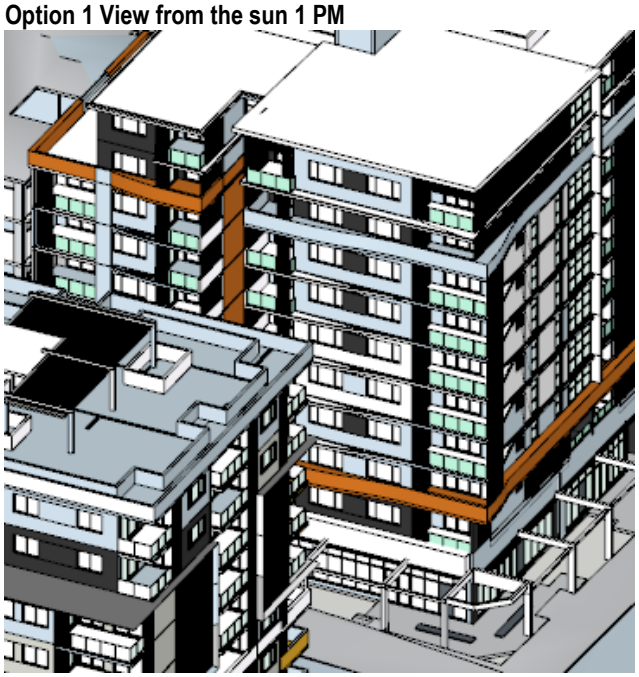
3.3 Overshadowing by amended scheme (Option 2)

The applicant has prepared amended plans deleting 10 units from the subject development, generally in accordance with the Panel recommendation (Option 2). The amendment results in a stepped profile, reducing the height of the southern portion of the subject building (*See Figure 4)*.

Figure 4: amended building envelope for 2 Mark St, 1-3 Marsden St

Figure 5 compares the views from the sun at 1 PM for Options 1 and 2.

Option 1 View from the sun 1 PM



Option 2 View from the sun 1 PM

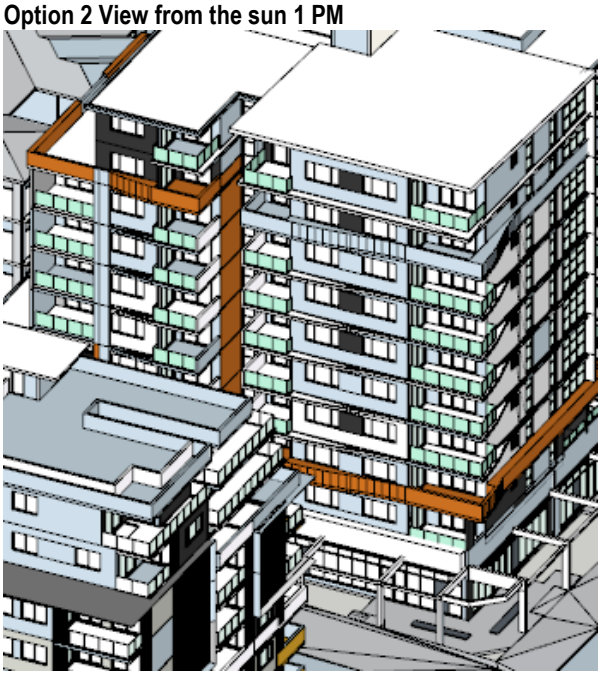


Figure 5: 1 PM overshadowing for DA and amended schemes

If I again focus on the north-east corner, I observe that an additional three units now have complying sun at that time. Therefore the amended scheme (Option 2) reduces the loss of solar access compliance by three individual units, compared to Option 1.

The overshadowing impact of Option 2 is to reduce the overall compliance of the affected building by 5/165 (3.0%).

4.0 CONCLUSIONS

I have carried out my independent analysis of overshadowing impact on the previously approved mixed use residential flat building at 4-14 Mark Street:

- for the **submitted DA scheme** at 2 Mark St, 1-3 Marsden St, Lidcombe **(Option 1)**, *and*
- by an **amended scheme** prepared in response to the Record of Deferral by the Sydney Central City Planning Panel of Wednesday, 17 October 2018 **(Option 2)**.

I confirm that:

- The applicant previously erroneously attributed loss of solar access compliance of nine units on the eastern façade, to external overshadowing.
- In Option 1, eight (8) individual units on the north façade of the affected building would lose solar access compliance. The attributable overshadowing impact for the submitted DA scheme represents 4.8% of the overall number of units in the affected building.
- In Option 2, loss of solar access compliance is reduced to five (5) individual units. The attributable overshadowing impact of the amended design then represents only 3.0% of the overall number of units in the affected building.

I observe that the development approval for 4-14 Mark Street was based on 117/165 (70.9%) units complying.

On that basis, n*either the submitted DA scheme (Option 1), nor the amended scheme (Option 2) for the subject development would reduce overall solar access compliance for 4-14 Mark Street to less than 65%.*

A.1 CREDENTIALS

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.

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 mandated software tool under NatHERS/BASIX. 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.

Through UNISEARCH, NEERG Seminars an Linarch Design, 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. 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 1971-2014, and now maintain a specialist consultancy advising on sustainability and amenity in buildings, with special emphasis on solar access and natural ventilation. I regularly assist the Land and Environment Court as an expert witness in related matters.