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AC/FM
28 July 2017
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Smart people,
people smart.

Dear Claire,

**COUNCL RECOMMENDATION FOR DA863/2016 (2016SYW082 DA)**

This letter has been prepared by Ethos Urban on behalf of Hepburn Carlingford Pty Ltd in relation to the City of Parramatta Council's recommendation for refusal of the above Development Application (DA).

It has been prepared further to the correspondence issued to Council on 12 July 2017 and following Council's finalisation of its assessment report and issue to the Sydney West Central Planning Panel (Planning Panel).

The purpose of this letter is to fundamentally refute the conclusions reached by SJB and Council as to the level of amenity to be afforded to future residents of the development.

In short, the assumed levels of solar access and natural ventilation that the development achieves as calculated by SJB and Council are incorrect. Based on the expert opinion of Mr Steve King, a highly respected authority on solar access and natural ventilation, it is clear that the DA meets Apartment Design Guide (ADG) and SEPP 65 requirements. In summary, Mr King (refer to **Attachment A**) confirms that:

- The ADG performance objectives and design criteria for solar access are satisfied.
- The proposed development fully complies with the relevant control for natural ventilation.

As the recommendation for refusal turns on the issue of internal amenity, there is considered to be in light of the information provided by Mr King overwhelming support to re-examine the reccomendation of Council. A **deferral** of the DA is therefore considered to be the best and most reasonable course of action.

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Throughout the assessment of the DA the Applicant was provided limited opportunity to meet with or discuss the application with SJB, being the independent assessing planners, with direction from Council or SJB largely restricted to formal information requests. In responding to issues identified with regard to internal amenity, the proposal has considered the planning and design standards of the Apartment Design Guide (ADG) to achieve the amenity outcomes as required under SEPP 65. Had Council given the applicant the opportunity to respond to the issues it found on solar access and natural ventilation, the applicant could have responded and assured Council that the key amenity ADG requirements were being achieved. This did not however occur, with Council instead insisting on finalising its assessment report.

Following a detailed review of Council's Assessment Report we are of the opinion that the findings reached by SJB misrepresent the amenity achieved by the proposal. It is partly acknowledged that the difference in solar access levels is linked to an error in the architectural drawings by not aligning to true north (instead of magnetic north).

As outlined in the attached amenity compliance statement and in the table below, the proposal achieves the objectives of the ADG (notwithstanding some minor variations to design criteria) resulting in an acceptable level of internal amenity for future residents. This said and as demonstrated within the amended DA submission (submitted to Council) on the 12 July 2017 the Applicant is willing to work further with Council to achieve further improvements to the development proposal.

The Assessment Report recognises that the proposal is consistent with the built form controls for the site, as stipulated in the *Hornsby Local Environmental Plan 2013* and the Hornsby Development Control Plan 2013, and that there are no overshadowing or amenity impacts on neighbouring properties. In light of this support, and the facts now revealed on levels of amenity, we seek Council's support in seeking to have the matter deferred.

**Table1- Assessment items**

| Assessment Item | Assessment Report | Applicant Assessment |
|---|---|---|
| **Hornsby LEP 2013** | | |
| Zone Objectives | The proposed development fails to provide for the housing needs of the community in a high-density setting because of the lack of amenity provided. | The independent review of ADG compliance prepared by Steve King at **Attachment A** demonstrates that amenity is achieved in accordance with the relevant ADG criteria. As a result, the proposed development remains consistent with the zone objectives. |
| Height of Buildings | 16% breach | • The original DA application building height was compliant with the Hornsby LEP 2013 and was only raised during the post- |

| Assessment Item | Assessment Report | Applicant Assessment |
|---|---|---|
| | | lodgement phase for the following reasons:<br>- Overland flow freeboard requirement, which raised the building by 400mm.<br>- Building was raised by 600mm to accommodate waste collection vehicle access to the basement, in accordance with the City of Parramatta's requirements.<br>- Floor to floor height was increased from 3 metres to 3.1 metres. |
| Preservation of trees or vegetation | Trees 20 and 21 are proposed to be removed, contrary to the request of Council. | Arborist advice indicates that whilst these trees may be retained, the propose development would encroach into the tree protection zone and compromise the health of the trees. |
| **Hornsby DCP 2013** | | |
| Height | 5 storeys – 20.16 metres | Refer to above. |
| Setback | Hepburn Avenue: 6 metres<br>Carlingford Road: 8 metres<br>Side/Rear Boundary: 4-5 metres | Setbacks are provided generally in accordance with the Hornsby DCP 2013, which allows for encroachments up to 2 metres into the setback for a third of the building, with balconies permitted to encroach an additional 1 metre. Where a variation to this is proposed, it is consistent with the approved setback of neighbouring developments. |
| Floorplates | 37 metres | The floor plate proposes a minor variation to the DCP standard. |

| Assessment Item | Assessment Report | Applicant Assessment |
|---|---|---|
| | | A Building Massing Analysis prepared by SWA demonstrates that this is consistent with approved development in the surrounding area where floorplates vary between 35 and 40 metres (**Attachment B**). |
| **Apartment Design Guide** | | |
| Communal Open Space | Solar access is only achieved for one hour between 1pm and 2pm. | Communal open space achieves solar access to over 50% of the area from 11:30am until 2:00pnm, as demonstrated at **Attachment A.** |
| Visual Privacy | **Southern boundary**<br>• Block A<br>– Ground Floor: 4 metres<br>– Levels 1–3: 4 metres<br>– Level 4: 6 metres<br>• Block B<br>– Ground Floor: 4 metres<br>– Levels 1–4: 4 metres<br>– Level 5: 6 -8 metres<br>**Western Boundary**<br>• Ground Floor: 3-4 metres<br>• Levels 1-4: 4 metres<br>• Level 5: 6 metres<br>**Internal Site Separation**<br>• 10 metres | Where possible, building separation in accordance with the ADG design criteria has been provided. Where variations are proposed, privacy measures have been incorporated to minimise any impacts between and habitable and non-habitable areas. |
| Solar Access | 63% (40 out of 63) | 70% (44 out of 63) – refer to **Attachment A.** |
| Natural Ventilation | 52% (33 out of 63) | 62% (39 out of 63) – refer to **Attachment A.** |

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| Assessment Item | Assessment Report | Applicant Assessment |
|---|---|---|
| Apartment size and layout | Some master bedrooms are less than $10m^2$ (number/apartments not specified) | There are a total of 6 apartments that incorporate a master bedroom less than $10m^2$.<br>• A.207 and A.307 (1B): $9.66m^2$<br>• B.G02, B.102, B.202 a nd B.302 (1B): $9m^2$<br>The variation proposed to the ADG recommendation is minor and likely to be imperceptible to future residents. Nonetheless, the design can be amended to achieve $10m^2$ for the master bedroom of these apartments. |
| Common circulation and spaces | Corridor lengths of Block A and Block B exceed 12 metres | Where there is a variation to the 12 metres recommended by the ADG, the design of the common circulation space benefits from access to natural light and the opportunity to incorporate articulation. |
| Storage | 2 and 3 bedroom apartments do not provide minimum storage area | 27 of 63 apartments provide less than the minimum amount of storage. Amendments to the scheme can ensure that the recommended amount of storage is provided, as demonstrated in the amended scheme submitted on 12 July 2017. |

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The non-compliances identified in the Assessment Report which have informed the recommendation for refusal are either contested or of minimal impact, and all matters can be resolved through collaboration with Council to achieve an acceptable outcome on the site. This is further demonstrated by the correspondence and amended scheme submitted on 12 July 2017, in which the applicant responded to all matters raised by Council prior to receiving the detailed Assessment Report. As the applicant has now had the opportunity to review the Assessment Report, it is clearly evident that a suitable outcome can be achieved on the site under the current DA.

We look forward to discussing the matters raised in this letter and the Assessment Report at the August Planning Panel meeting. Should you have any queries, please do not hesitate to contact me on 9956 6962 or at acella@ethosurban.com

Yours sincerely,

**Alexis Cella**
Director
9956 6962
acella@ethosurban.com

EXPERT OPINION

# SEPP 65 AMENITY COMPLIANCE
# SOLAR ACCESS + CROSS VENTILATION

# PROPOSED RESIDENTIAL FLAT BUILDING
# 2-2A Hepburn Ave + 199-203 Carlingford Rd Carlingford

**27 July 2017**

Signed,

Steve King.

.....

Steve King

## 1.0 PRELIMINARIES

1.1 I provide this expert opinion, relating to **solar access** and **cross ventilation** compliance for the proposed residential flat building at 2-2A Hepburn Ave + 199-203 Carlingford Rd Carlingford.

This report is an independent review of the architects' compliance reporting included with the development application DA863/2016 of 20 April this year, and responds to the relevant portions of Council's report of 7 June 2017.

1.2 My qualifications and experience are included at *APPENDIX 3: CREDENTIALS*.

1.3 The documentation on which I rely for this opinion is set out in *2.0 Documents*.

## 2.0 DOCUMENTS

2.1 I base my report on:

- DA drawings by SWA architects supplied to me on 25 July 2017:
    - DA-84_A WINDOW SCHEDULE P4.pdf
    - DA-00_C COVER SHEET.pdf
    - DA-01_E DEVELOPMENT STATISTIC.pdf
    - DA-02_B SITE CONTEXT.pdf
    - DA-03_B SITE ANALYSIS.pdf
    - DA-04_B SURVEY.pdf

**STEVE KING**
CONSULTANT
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PHONE 0414385485

- DA-05_B DEMOLITION PLAN.pdf
- DA-10_E ROOF_SITE PLAN.pdf
- DA-11_B BASEMENT 2 PLAN.pdf
- DA-12_C BASEMENT 1 PLAN.pdf
- DA-13_F GROUND LEVEL PLAN.pdf
- DA-14_E LEVEL 1 PLAN.pdf
- DA-15_F LEVEL 2 PLAN.pdf
- DA-16_E LEVEL 3 PLAN.pdf
- DA-17_E LEVEL 4 PLAN.pdf
- DA-18_E LEVEL 4-MEZZANINE BLOCK B PLAN.pdf
- DA-19_E LEVEL 4-MEZZANINE BLOCK A PLAN.pdf
- DA-21_D NORTH & SOUTH ELEVATION.pdf
- DA-22_D EAST & WEST ELEVATION.pdf
- DA-23_D A WEST ELEVATION & B EAST ELEVATION.pdf
- DA-31_D SECTION A.pdf
- DA-32_D SECTION B&C.pdf
- DA-33_D SECTION 1&2.pdf
- DA-34_C TYPICAL SECTION.pdf
- DA-41_B SHADOW DIAGRAM P1.pdf
- DA-42_B SHADOW DIAGRAM P2.pdf
- DA-45_A COMMUNAL OPEN SPACE SOLAR.pdf
- DA-46_A SOLAR DIAGRAM - SHEET 1.pdf
- DA-47_A SOLAR DIAGRAM - SHEET 2.pdf
- DA-51_D ADAPTABLE UNIT SHEET 1.pdf
- DA-52_D ADAPTABLE UNIT SHEET 2.pdf
- DA-61_B FENCE DETAIL.pdf
- DA-62_C DEEP SOIL & COMMUNAL OPEN SPACE.pdf
- DA-63_C NATURAL VENTILATION P1.pdf
- DA-64_C NATURAL VENTILATION P2.pdf
- DA-71_C HEIGHT PLAN STUDY.pdf
- DA-81_A WINDOW SCHEDULE P1.pdf
- DA-82_A WINDOW SCHEDULE P2.pdf
- DA-83_A WINDOW SCHEDULE P3.pdf

- 3D digital model in SketchUp .skp format prepared by the architects.

## 3.0 SITE

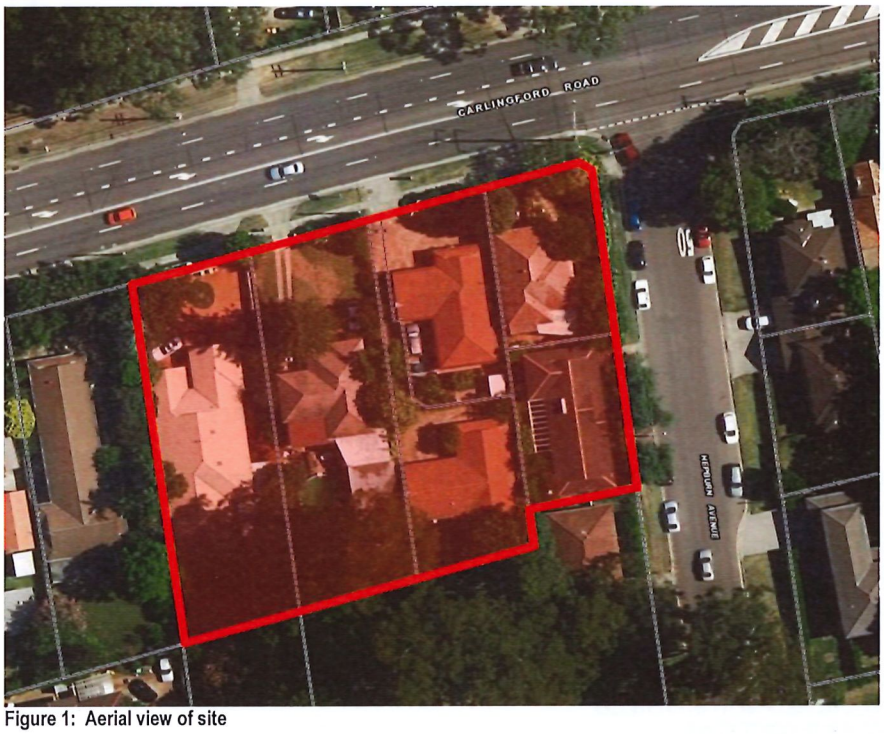



Figure 1: Aerial view of site

The site is an almost regular trapezoid shape illustrated in Figure 1. Carlingford Rd is to the north and Hepburn Road to the east boundary. To the west is the side boundary of site with a single dwelling, and to the south the heavily treed the rear yards of single with their address to Keeler Street.

Because of the subject site location on a north-east corner of relatively wide streets, there is little if any potential impact that can be anticipated from future development on neighbouring sites.

## 4.0 SOLAR ACCESS ANALYSIS METHODOLOGY

This section records my standard analysis methodology and assumptions.

### 4.1 3D digital model

4.1.1 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.

4.1.2 I independently geolocated the 3D digital model and checked the direction of true north by online reference to cadastral grid north. I have spot checked a limited number of relevant heights and dimensions against the architectural drawings, and am satisfied that the model is sufficiently accurate for the purpose of solar access assessment.

4.1.3 I first 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 2 illustrates the technique. *Note that a 'view from the sun' by definition does not show any shadows.*

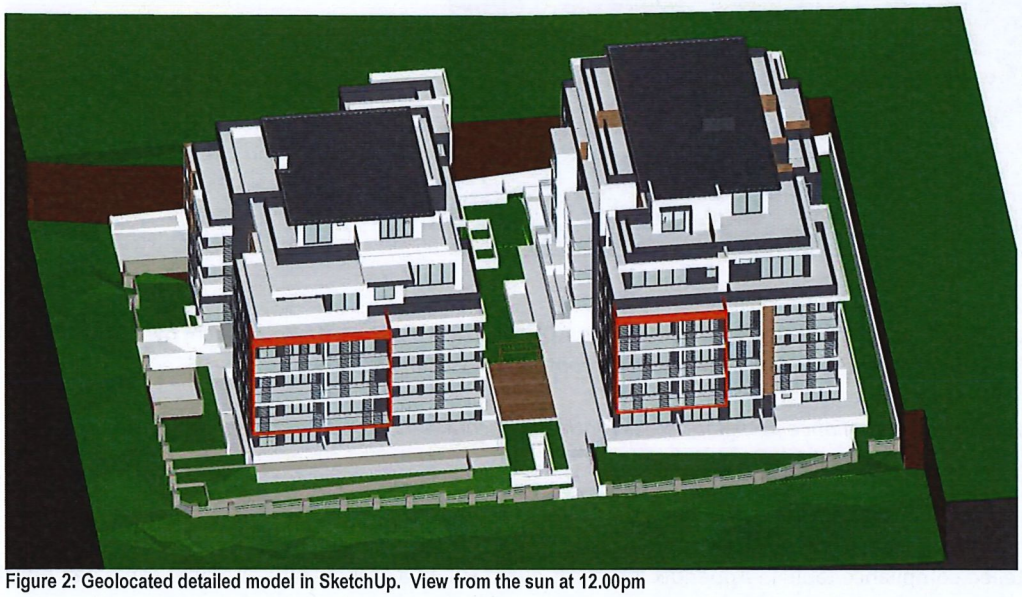


**Figure 2: Geolocated detailed model in SketchUp. View from the sun at 12.00pm**

I include at Appendix B copies of half-hourly views from the sun for June 21.

### 4.2 Characterisation of solar access compliance

For the purpose of calculating the compliance with the control, I have first examined sun patches on the relevant glazing of each apartment. I characterise as complying when sun access is over two hours total of partially or fully sunlit glazing between 9am and 3pm mid-winter.

I generally ignore very large angles of incidence to the glazing surface, and small areas of sunlit glazing. For the determination of what is 'effective sunlight' for characterisation of compliance, for both glazing and private open space, I refer specifically to the application of the relevant *L+EC Planning Principle (The Benevolent Society v Waverley Council [2010] NSWLEC 1082.*

## 3.2 COMMUNAL OPEN SPACE

Referring to the views from the sun for June 21, I observe that:

- The north facing portions within the Carlingford Road setback receive uninterrupted solar access throughout the day;
- The smaller west facing portions within the Hepburn Avenue setback are in full sun from before 9am until after 1pm;
- The central portion between the two buildings is over 50% sunlit from approximately 11:30am to nearly 2:00pm.

*In brief, the aggregate solar access for communal open space conservatively exceeds the minimum two hours required by the relevant controls.*

## 6.0 SOLAR ACCESS TO APARTMENTS

### 6.1 Relevant solar access standards

*6.1.1 Apartment Design Guide*

The Apartment Design Guide gives the following quantified recommendations:

| ***Design criteria*** |
|---|
| 1. Living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 2 hours direct sunlight between 9 am and 3 pm at mid winter in the Sydney Metropolitan Area and in the Newcastle and Wollongong local government areas |
| 2. In all other areas, living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 3 hours direct sunlight between 9 am and 3 pm at mid winter |
| 3. A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm at mid winter |

*6.1.2 Local controls*

I note that **Solar access (6.1)** *Design criteria* in the ADG are *discretionary controls* which, by virtue of Cl. 6A of SEPP65, ***take precedence over these controls contained in Councils' DCPs***.

*In quantifying the compliance for solar access for this application, I rely on satisfying the ADG as also satisfying the DCP.*

### 6.2 Achieved solar access

*6.2.1 Interpreting the detailed compliance table*

The detailed compliance table in Appendix A records direct sun in a graphic format on the same half hourly basis as the views from the sun in Appendix B.

Table 1 summarises the projected solar access compliance of the development overall.

| | | |
|---|---|---|
| Total number of dwellings | 63 | |
| Units with over two hours of sun on June 21 to Living and POS 9am – 3pm | **44** | **70%** |
| Units with no sun 9am to 3pm | 0 | |
| | | |

**Table 1: Summary of solar access for units**

The proportion of dwellings which comply with the performance objectives for solar access amenity is 44 units from a total of 63, being 70%. The ADG *Design criteria* nominate as a minimum 70%.

I note that a further three units could be slightly amended to receive an additional half hour of direct sun and therefore comply for a minimum of two hours between 9am and 3pm. The dwellings in question are:

- B404 at 1pm
- B403 at 1pm
- A404 at12pm

## 7.0 NATURAL VENTILATION

### 7.1 Performance Objectives

SEPP65 itself does not refer to prescribed quantitative standards. The Apartment Design Guide gives the following *Design criteria*:

| | |
|---|---|
| 1. | At least 60% of apartments are naturally cross ventilated in the first nine storeys of the building. Apartments at ten storeys or greater are deemed to be cross ventilated only if any enclosure of the balconies at these levels allows adequate natural ventilation and cannot be fully enclosed |
| 2. | Overall depth of a cross-over or cross-through apartment does not exceed 18m, measured glass line to glass line |

### 7.2 Cross ventilation

*6.2.1 Simple cross ventilation*

In Appendix A, I report the cross ventilation status of each apartment. I characterise as cross ventilated for amenity all corner and 'through' apartments with openings in two principal facades.

As I note in the compliance table, to realise the cross ventilation potential of some corner units, I have assumed an additional opening, typically to a bedroom.

### 7.3 Achieved natural ventilation compliance.

39 (62%) of the 63 apartments are cross ventilated. Therefore, compliance with the ADG is fully satisfied.

## 8.0 CONCLUSIONS

I carried out my own independent analysis and quantification of the predicted solar access and cross-ventilation achieved.

### 8.1 Solar access.

In my view, the aggregate solar access for communal open space conservatively exceeds the minimum two hours required by the relevant controls.

44 units out of the total 63 (70%) receive a minimum 2 hours of sun to Living area glazing and POS on June 21. The ADG *Design criterion* nominates as a minimum 70%. I note that another three units could be easily amended to have the benefit of minimum 2 hours of direct sun on June 21.

No unit 'receives no sun' as defined by the ADG *Design criterion*.

***The ADG performance objectives and Design criteria for solar access are satisfied.***

### 8.2 Cross ventilation

39 of the 63 (62%) apartments are simply cross ventilated. The *Design Criteria* of the Apartment Design Guide are fully satisfied.

***The proposed development fully complies with the relevant control for natural ventilation.***

## APPENDIX A

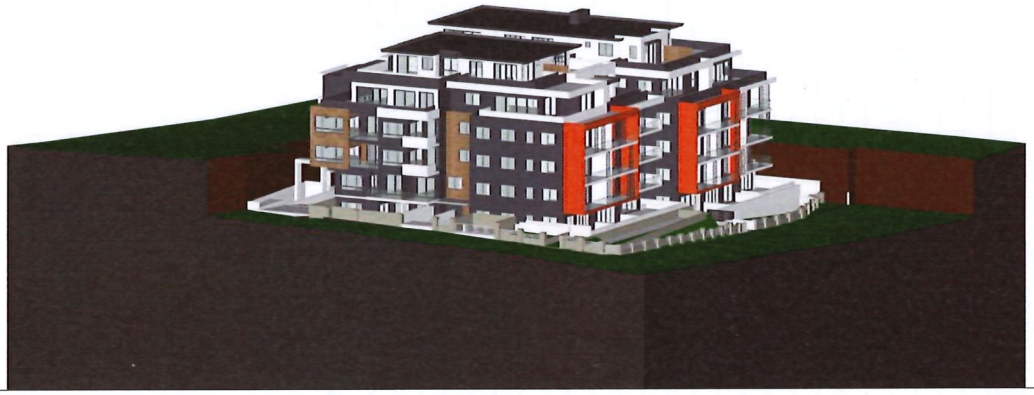
The table below shows the detailed solar access and cross ventilation compliance status of each unit.

| | | Sun | | | | | | | | | | | | | | | | Solar access compliance | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Level | UNIT | 8 | 830 | 9 | 930 | 10 | 1030 | 11 | 1130 | 12 | 1230 | 13 | 1330 | 14 | 1430 | 15 | 1530 | 16 | >3 hrs 9-3 | >2 hrs 9-3 (>3hrs 8-4) | >2 hrs 9-3 | No sun | POS 9-3 | Cross ventilation | |
| GROUND | AG01 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | AG02 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | NO | |
| | AG03 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | AG04 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | YES | | | | YES | YES | |
| LEVEL 1 | A101 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | A102 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | NO | |
| | A103 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | A104 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | B | | | YES | | YES | NO | |
| | A105 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | | | | | | YES | |
| | A106 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | YES | | | YES | YES | |
| | A107 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | YES | | | YES | NO | |
| LEVEL 2 | A201 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | A202 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | NO | |
| | A203 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | A204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | YES | | | YES | NO | |
| | A205 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | | | YES | | YES | YES | |
| | A206 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | YES | | | | YES | YES | |
| | A207 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | YES | | | | YES | NO | |
| LEVEL 3 | A301 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | A302 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | NO | |
| | A303 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | A304 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | YES | | | YES | NO | |
| | A305 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | YES | | | YES | YES | |
| | A306 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | YES | | | | YES | YES | |
| | A307 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | YES | | | | YES | NO | |
| LEVEL 4 | A401 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | B | B | B | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | DOUBLE STOREY |
| | A402 | B | B | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | DOUBLE STOREY |
| | A403 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | DOUBLE STOREY |
| | A404 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | YES | | | YES | YES | DOUBLE STOREY |
| BG | BG01 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | BG02 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | NO | |
| | BG03 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | YES | | | | YES | YES | |
| | BG04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B | B | 1 | 1 | 0 | | | | | | NO | |
| | BG05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B | B | B | B | 0 | | | | | | YES | |
| | BG06 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | YES | |
| | BG07 | 0 | 0 | 0 | 0 | 0 | 0 | B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | NO | |
| LEVEL 1 | B101 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | B102 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | NO | |

| | | Sun | | | | | | | | | | | | | | | | | Solar access compliance | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Level | UNIT | 8 | 830 | 9 | 930 | 10 | 1030 | 11 | 1130 | 12 | 1230 | 13 | 1330 | 14 | 1430 | 15 | 1530 | 16 | >3 hrs 9-3 | >2 hrs 9-3 (>3hrs 8-4) | >2 hrs 9-3 | No sun | POS 9-3 | Cross ventilation | |
| | B103 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | B104 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B | B | 1 | 1 | 1 | | | | | | NO | |
| | B105 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B | B | B | B | B | | | | | | YES | |
| | B106 | 0 | 0 | 0 | 0 | 0 | B | B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | YES | Add window in B1 |
| | B107 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | NO | |
| LEVEL 2 | B201 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | B202 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | NO | |
| | B203 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | B204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B | B | 1 | 1 | 1 | | | | | | NO | |
| | B205 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B | B | B | B | B | | | | | | YES | |
| | B206 | 0 | 0 | 0 | 0 | 0 | B | B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | YES | Add window in B1 |
| | B207 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | NO | |
| LEVEL 3 | B301 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | B302 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | NO | |
| | B303 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | |
| | B304 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B | B | 1 | 1 | 1 | 1 | 1 | | | | | | NO | |
| | B305 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B | B | B | B | B | | | | | | YES | |
| | B306 | 0 | 0 | 0 | 0 | B | B | B | B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | YES | Add window in B1 |
| | B307 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | NO | |
| LEVEL 4 | B401 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | DOUBLE STOREY |
| | B402 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | YES | | | | YES | YES | DOUBLE STOREY |
| | B403 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B | 1 | 1 | 1 | 1 | 1 | | | | | | NO | DOUBLE STOREY (single aspect) |
| | B404 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | YES | DOUBLE STOREY |
| | B405 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | YES | | | YES | YES | DOUBLE STOREY (LIVING ON LEVEL 2) |
| | B406 | B | B | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | YES | | YES | NO | DOUBLE STOREY (single aspect) |
| | 63 | | | | | | | | | | | | | | | | | | 34 | 7 | 3 | 0 | 44 | 39 | |
| | | | | | | | | | | | | | | | | | | | 54.0% | 11.1% | 4.8% | 0.0% | 69.8% | 61.9% | |
| | | | | | | | | | | | | | | | | | | | | | 69.8% | | | | |

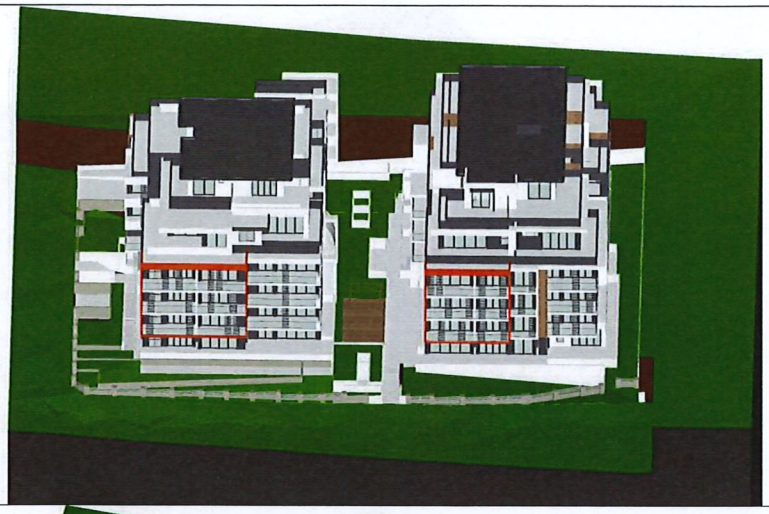
## APPENDIX B

The table below shows the views from the sun on a half-hourly basis on June 21.

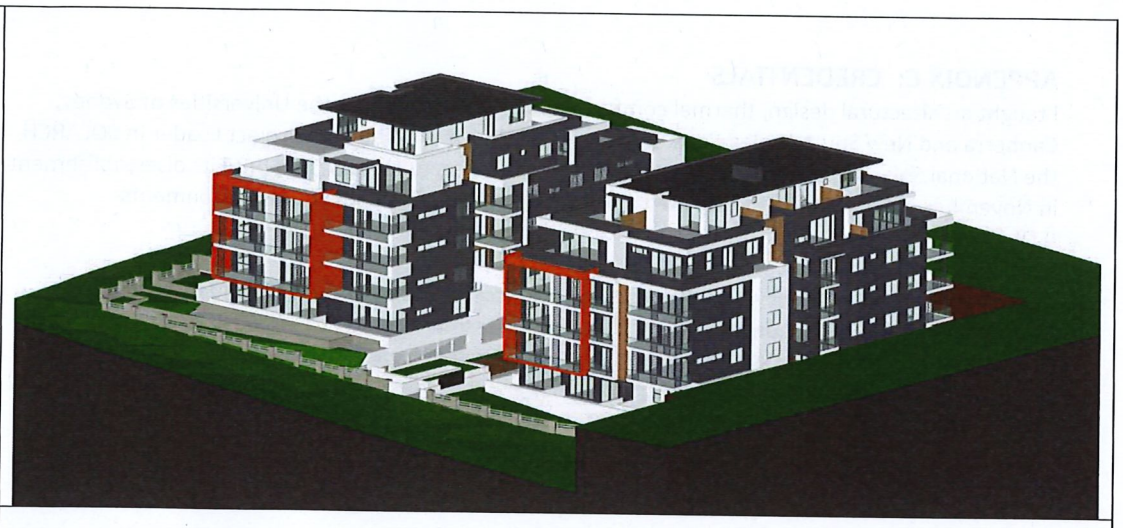
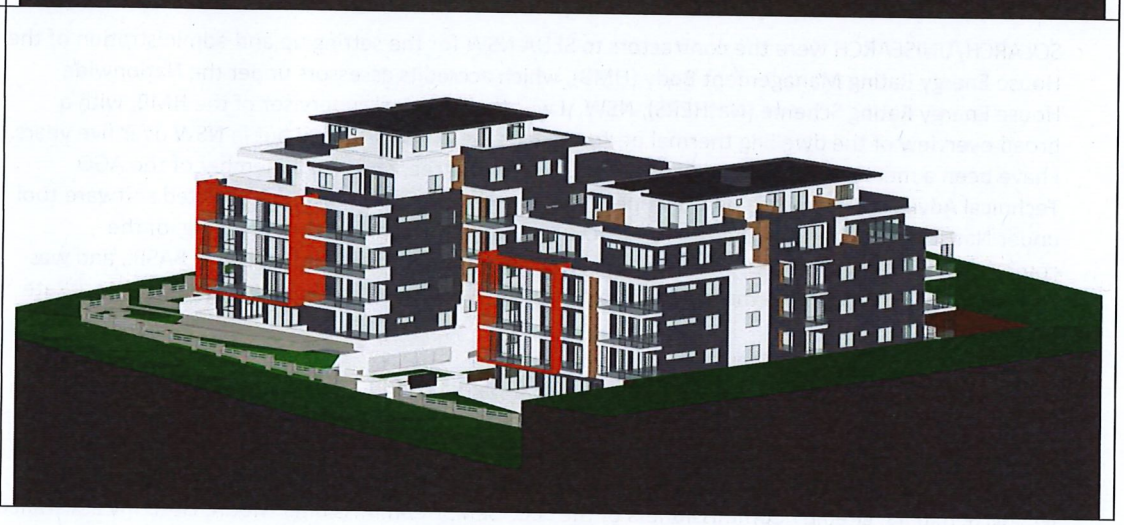
| | |
|---|---|
| 0800 |  |
| 0830 |  |
| 0900 |  |

| | |
|---|---|
| 0930 |  |
| 1000 |  |
| 1030 |  |

| | |
|---|---|
| 1100 |  |
| 1130 |  |
| 1200 |  |

| | |
|---|---|
| 1230 |  |
| 1300 |  |
| 1330 |  |

| | |
|---|---|
| 1400 |  |
| 1430 |  |
| 1500 |  |

| | |
|---|---|
| 1530 |  |
| 1600 |  |

## APPENDIX C: CREDENTIALS

I 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, and until its disestablishment in November 2006, I was the Associate Director, Centre for Sustainable Built Environments (SOLARCH), 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 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.

Through UNISEARCH, NEERG Seminars and 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, including 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 practice advising on passive environmental performance and sustainability in buildings. I regularly assist the Land and Environment Court as an expert witness in related matters.