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Planning Panels Victoria Expert Statement – Daylight
Whitehorse Planning Scheme Amendment C175



Whitehorse Planning Scheme Amendment C175 Daylight Amenity Advice

Internal Daylight Amenity
Statement of Evidence
Instructed By: MinterEllison

14th July 2017

S3096 EES.V1

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1. Introduction

- 1) This expert statement is provided in relation to the proposed Amendment C175 for the Whitehorse Planning Scheme. Specifically it addresses the proposed height and setback controls with relation to properties within Sub-Precinct F4.
- 2) Our client, Longriver Group Pty Ltd, owns a parcel of land which will fall into the proposed Sub-Precinct F4 and therefore be affected by the proposed Schedule 6 to the Design and Development Overlay (DDO6).

2. Witness Qualifications and Instructions

- 3) I have over eight (8) years of experience in daylight modelling and ten (10) years of experience in ESD consulting and related matters that are relevant to the provision of expert opinion on the impact this amendment will have on daylight amenity to buildings within this precinct. My curriculum vitae is attached as Appendix A.
- 4) MinterEllison, on behalf of Longriver Group Pty Ltd, has instructed me to review plans for the proposed hotel development at 874-878 Whitehorse Road, Box Hill, to consider the impact of that proposal on the daylight access received by any adjacent development. In subsequent briefing this scope was verbally limited to the impact on the neighbouring properties directly to the East of 874-878 Whitehorse Road.
- 5) I was also verbally instructed to assess what the potential difference in internal daylight amenity for habitable rooms in the proposed 874-878 Whitehorse Road hotel development would be under a number of potential future development conditions for the neighbouring sites to the East.
- 6) Finally, I was instructed to prepare an expert statement summarising my opinions on these matters.
- 7) I have reviewed plans of the proposed 874-878 Whitehorse Road hotel development prepared by Buchan Group and some example massing plans and floor plate designs of the neighbouring sites at 888 Whitehorse Road and 902-910 Whitehorse Road prepared by Buchan Group. The plans prepared for the neighbouring sites to the East were provided for reference to demonstrate how alternative designs which meet the requirements of Clause 58 of the Planning Scheme may be developed.
- 8) I have reviewed aerial photographs of the site and area on Nearmap to help form my opinions outlined within this statement.
- 9) I confirm that all the daylight modelling investigations have been undertaken by me and that I have not relied upon any other tests or experiments undertaken by other parties in this matter.

3. Current Standards and Requirements

- 10) The recently released Clause 58 in the planning scheme includes a number of standards which should be adhered to in the design of new apartments to ensure a minimum level of internal daylight amenity is provided. For commercial developments there is no similar Clause which relates to provision of internal daylight amenity.
- 11) The Whitehorse Planning Scheme includes Clause 22.10 Environmentally Sustainable Design which includes an objective “to achieve a healthy indoor environment quality for the wellbeing of building occupants, including the provision of fresh air intake, cross ventilation, and natural daylight”. This clause applies to all residential developments of over 3 dwellings and all non-residential development with a gross floor area over 500m² and thus would be likely to be relevant to any proposed development within Sub-Precinct F4.
- 12) All developments are required to comply with the building code requirements outlined in Part F4 of the relevant National Construction Code / Building Code of Australia (NCC/BCA) for daylight access.

4. Proposed DDO6 Objectives and Requirements Relevant to Daylight Amenity

- 13) There are three (3) objectives listed within Schedule 6 to the Design and Development Overlay which relate to daylight amenity. These are outlined below:
 - a) Building Depth – To optimise access to natural daylight in dwellings.
 - b) Building Separation – To ensure buildings achieve adequate access to daylight and ventilation.
 - c) Overshadowing – To ensure sufficient daylight into living rooms and private open spaces is achieved.
- 14) Further information is then provided in Table 6 which outlines the design guidelines for Sub-Precinct F4.
- 15) An extract of Table 6 is provided below for ease of reference.
- 16) The major design requirements which have been assessed in my daylight assessments to determine what effect they have on the internal daylight amenity of future developments in Sub-Precinct F4 are:
 - a) Preferred setback of 5m above podium to all sides (minimum);
 - b) Preferred maximum height of 20 storeys;
 - c) Minimum 5m setback from side and rear boundaries for 6-20 storeys.

Table 6 –Sub-Precinct F4 Guidelines – Whitehorse Road and Prospect Street

Urban Design Attribute	Precinct Objectives	Built Form Response
Subdivision Pattern	<p>To establish a transition between Whitehorse Road West (Sub-Precinct F5) and the Traditional Town Centre (Sub-Precinct C/F1).</p> <p>To support high density mixed use development.</p> <p>To facilitate a series of tall separated building forms on large and extra-large sites.</p> <p>To encourage lot consolidation for medium and smaller sites.</p> <p>To ensure sufficient separation between buildings to avoid excessive visual bulk.</p>	<p>100% site coverage for podium.</p> <p>Refer to objectives and requirements under Clauses 1 and 2.</p>
Street walls and preferred maximum heights	<p>To establish a pedestrian scale urban environment.</p> <p>To establish a consistent urban presentation along Whitehorse Road.</p> <p>Retain a sense of openness along Whitehorse Road.</p> <p>To establish a sense of transition on sites with a direct residential interface (outside the Activity Centre).</p> <p>To achieve activated ground level along its street interfaces.</p>	<p>5 storey street wall to achieve a maximum 1:1 (street wall to street width) ratio.</p> <p>Preferred setback of 5m above podium to all sides (minimum).</p> <p>Preferred maximum height of 20 storeys.</p> <p>A minimum 30 degrees angled setback profile above 15 storeys for allotments with sensitive residential interface to Hopetoun Parade, Thurston Street and Elgar Road.</p> <p>No setback from side and rear boundaries for up to 5 storeys.</p> <p>Minimum 5m setback from side and rear boundaries for 6-20 storeys.</p>

Heritage	To recognise the presence of an individually significant heritage building.	
Key Views	Refer to objectives and requirements under Clauses 1 and 2. To establish a sense of openness and retention of view corridor along Whitehorse Road to the Dandenong Ranges to the east.	Refer to objectives and requirements under Clauses 1 and 2.
Additional street/laneway address	Refer to objectives and requirements under Clauses 1 and 2.	Set back ground level and level 1 from rear boundary by 1.5m to facilitate vehicular/ service access from rear laneways as required.
Amenity/access to daylight	Refer to objectives and requirements under Clauses 1 and 2.	Refer to objectives and requirements under Clauses 1 and 2.
Landscape	Refer to objectives and requirements under Clauses 1 and 2.	Encourage establishment of green walls, or landscape elements within the building façade. Incorporate landscaped gardens on podium roof top.

5. Assessment Methodology

- 17) The assessment to determine the impact of restricting new development height and installing mandatory setbacks from side and rear boundaries was undertaken using 3-dimensional modelling to predict the daylight factor (which is the percentage of light available inside compared to that in the sky outside) within the affected habitable zones of the proposed 874-878 Whitehorse Road hotel development and a potential neighbouring development scheme prepared by Buchan Group for this exercise.
- 18) Additionally I have considered a number of other potential boundary interactions and modelled the impact on the habitable rooms of the proposed 874-878 Whitehorse Road hotel development.
- 19) The daylight modelling undertaken makes use of the same modelling methodology required to be used to show compliance with the daylight modelling credit within relevant Green Star tools. This methodology has been accepted by many councils as appropriate for the provision of advice regarding how a development is likely to perform with respect to internal daylight amenity. Further to this, the Green Star tool is an example tool for large developments to use to demonstrate compliance with Whitehorse Planning Scheme Clause 22.10 Environmentally Sustainable Design.

5.1 CAD Based 3-Dimensional Modelling

- 20) The assessment of potential daylight penetration to habitable zones was made by developing a 3-dimensional model of the example projects, to scale, in the CAD based program Autodesk Ecotect Analysis 2011 with the daylight levels modelled by the Radiance Plug-in.
- 21) The program Autodesk Ecotect Analysis 2011 is a comprehensive modelling program that makes use of material types and finishes, glazing properties, reflectance off internal and external surfaces as well as local weather, latitude and longitude coordinates for the proposed site.
- 22) The modelling was undertaken using an overcast design sky for Melbourne.
- 23) Daylight factors are a percentage (%) of the available daylight under a design sky. An overcast design sky is used for daylight modelling as it assumes the sky lighting output for a worst case scenario (ie no sun). This avoids skewing results due to direct sunlight penetration at different times of the year or at different times of the day. It relies more on the amount of direct sky that can be viewed from the measurement point, and the amount of internal and external reflections which can be received by the measurement point.
- 24) The analysis grid points are all within 0.75m of the walls surrounding them, typically closer, and the grid is set to be 100mm above the finished floor level in the apartments being modelled. Each grid point is approximately 0.5m apart in each direction (or closer).
- 25) All building fabric which may overshadow the rooms modelled, such as the surrounding buildings, balcony balustrades at the edge of the balconies, and the balconies of the floor above have been built within the model to provide an accurate understanding of the available light under the proposed conditions.

5.2 Daylight Modelling Reflectance and Transmission Values

- 26) The following reflectance and transmission values have been used. These values are conservative and are based on worst case scenario (such as internal walls and windows that are not cleaned or matte paint is applied rather than glossy). These values are similar (and comparatively conservative) to those outlined as typical standards within the Green Star daylight modelling protocol:

Building Fabric	Reflectance / Visual Light Transmission
White Ceilings	0.7
Internal Plasterboard Partitions (White)	0.7
External Walls (Grey/Mid tone)	0.5
Internal Flooring (Carpet or Dark)	0.3
External Glazing (Clear)	0.7 (VLT)*
External Glazing (Obscured or tinted glass)	0.4 (VLT)*
Balcony Floors	0.4
Underside of Balcony	0.4

*VLT = Visual Light Transmission

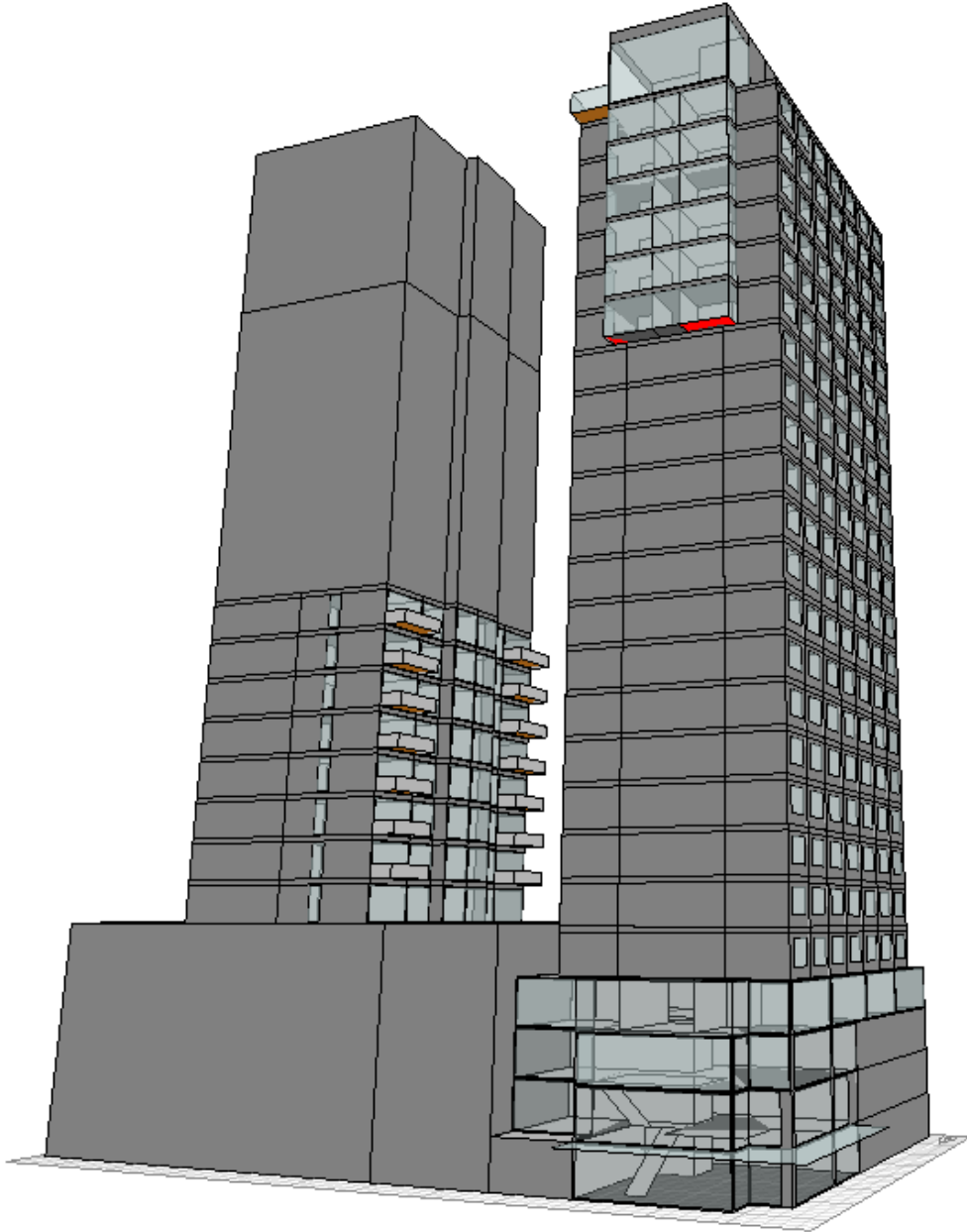


FIGURE 1: IMAGE TAKEN FROM THE MODEL DEMONSTRATING PROPOSED 25 STOREY DEVELOPMENTS.

6. Summary of Assessments Undertaken

6.1 Analysis of Building Height Impact

- 27) In order to assess the impact of the height of buildings in Sub-Precinct F4, I have modelled the proposed 874-878 Whitehorse Road hotel development as designed (3m setback of tower off side boundary and total of 25 floors in height) as well as with a height reduction (no setback reduction) to 20 floors to be in line with the proposed C175 amendment requirements outlined in Table 6 of DDO6.
- 28) To test the impact that the additional 5 storeys above the DDO6 requirements designed into the hotel proposal will have on the neighbouring developments to the East, I modelled a potential development (prepared by Buchan Group referred to as Option A1) testing the lowest floor level (first floor above podium) which has apartments facing towards the common boundary.
- 29) The Option A1 model makes use of a 16m tower separation. This is based on the likely scenario whereby the 888 Whitehorse Road site is developed to podium level (5 Storeys only as it is too narrow to include a tower which meets the setback requirements), and then a 5m setback is provided to the tower of the next site along (902-910 Whitehorse Road).
- 30) In this modelling scenario, as demonstrated by the results provided in Figure 2 and 3 below, the internal daylight amenity of the apartments which could face towards the shared boundary condition perform very well with both developments at either 25 storeys total height or 20 storeys.

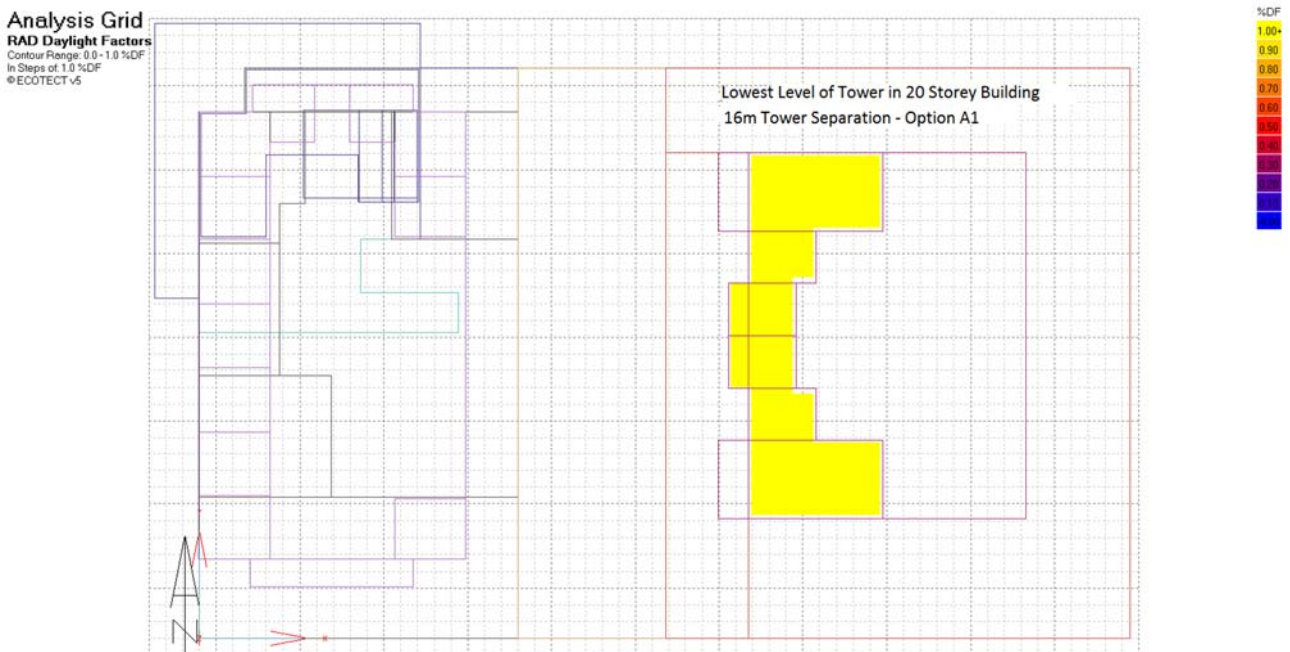


FIGURE 2: DAYLIGHT MODELLING RESULTS FOR WEST FACING APARTMENTS IN OPTION A1 DEVELOPMENT (20 STOREY TOWERS).

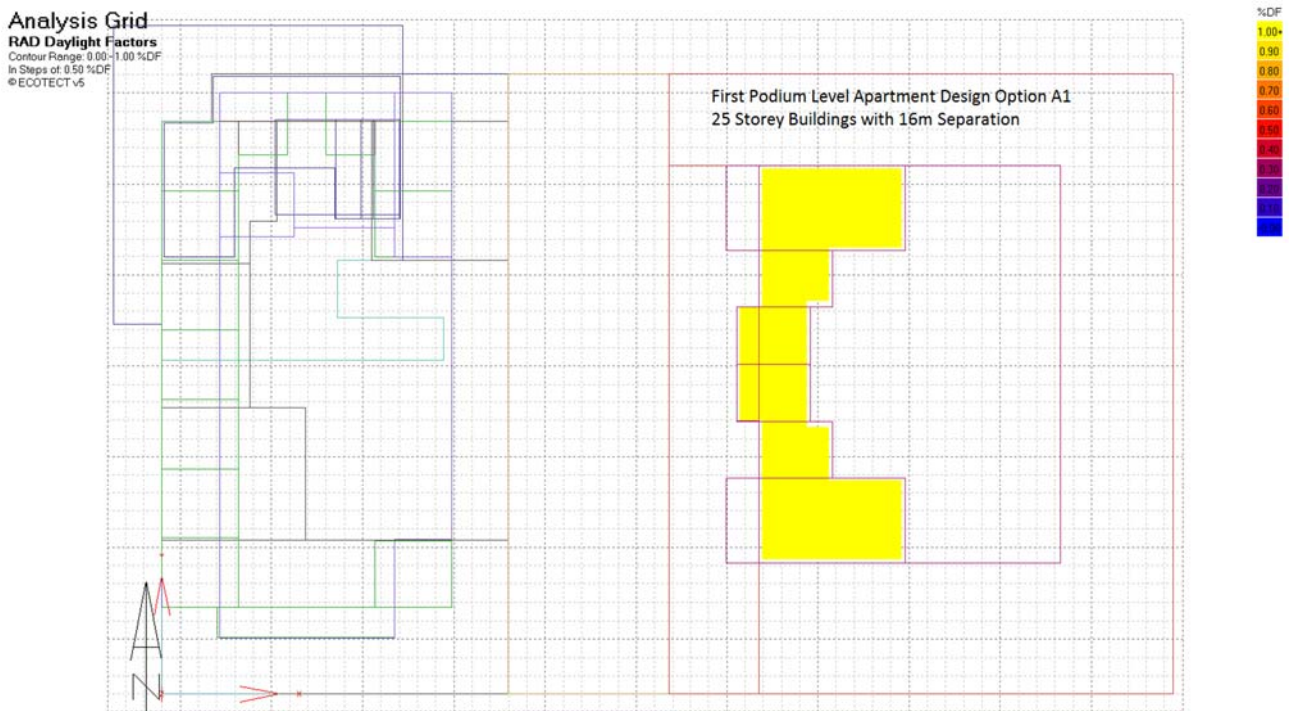


FIGURE 3: DAYLIGHT MODELLING RESULTS FOR WEST FACING APARTMENTS IN OPTION A1 DEVELOPMENT (25 STOREY TOWERS).

- 31) The results above demonstrate that this layout of apartment and the separation of the buildings provides for the desired daylight levels which Council typically require for apartment buildings when assessing compliance against the indoor environment quality (IEQ) section of Clause 22.10. The height of the buildings at 25 storeys compared to 20 storeys has almost no impact on the daylight achieved in those apartments modelled.
- 32) To further test what the impact of height could have on the internal daylight amenity of neighbouring developments I have tested some alternative scenarios for the neighbouring properties to the East of 874-878 Whitehorse Road to find out what impact they have on the daylight provision within the proposed hotel rooms facing the side boundary. The results of these tests is provided in Figures 4-9 below.



FIGURE 4: DAYLIGHT MODELLING RESULTS FOR EAST FACING BEDROOMS IN THE PROPOSED 874-878 WHITEHORSE ROAD HOTEL (20 STOREY TOWERS 6M TOWER SEPARATION).

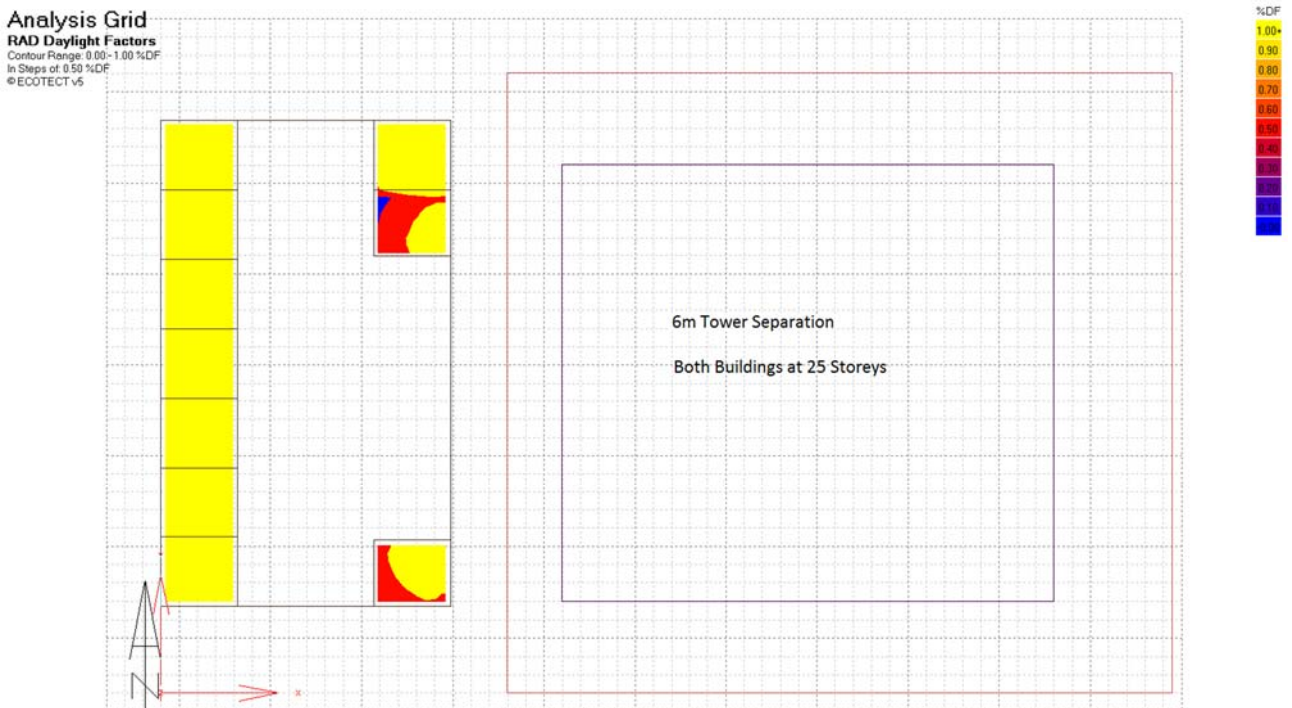


FIGURE 5: DAYLIGHT MODELLING RESULTS FOR EAST FACING BEDROOMS IN THE PROPOSED 874-878 WHITEHORSE ROAD HOTEL (25 STOREY TOWERS 6M TOWER SEPARATION).

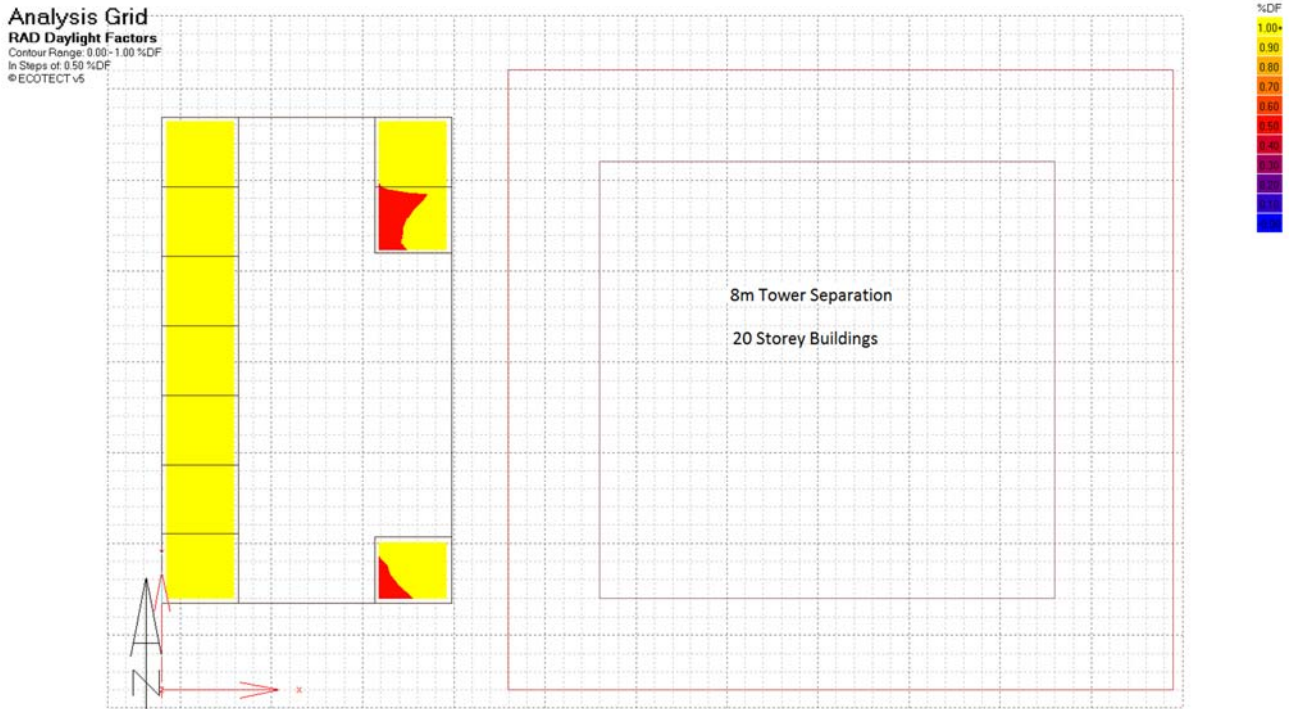


FIGURE 6: DAYLIGHT MODELLING RESULTS FOR EAST FACING BEDROOMS IN THE PROPOSED 874-878 WHITEHORSE ROAD HOTEL (20 STOREY TOWERS 8M TOWER SEPARATION).

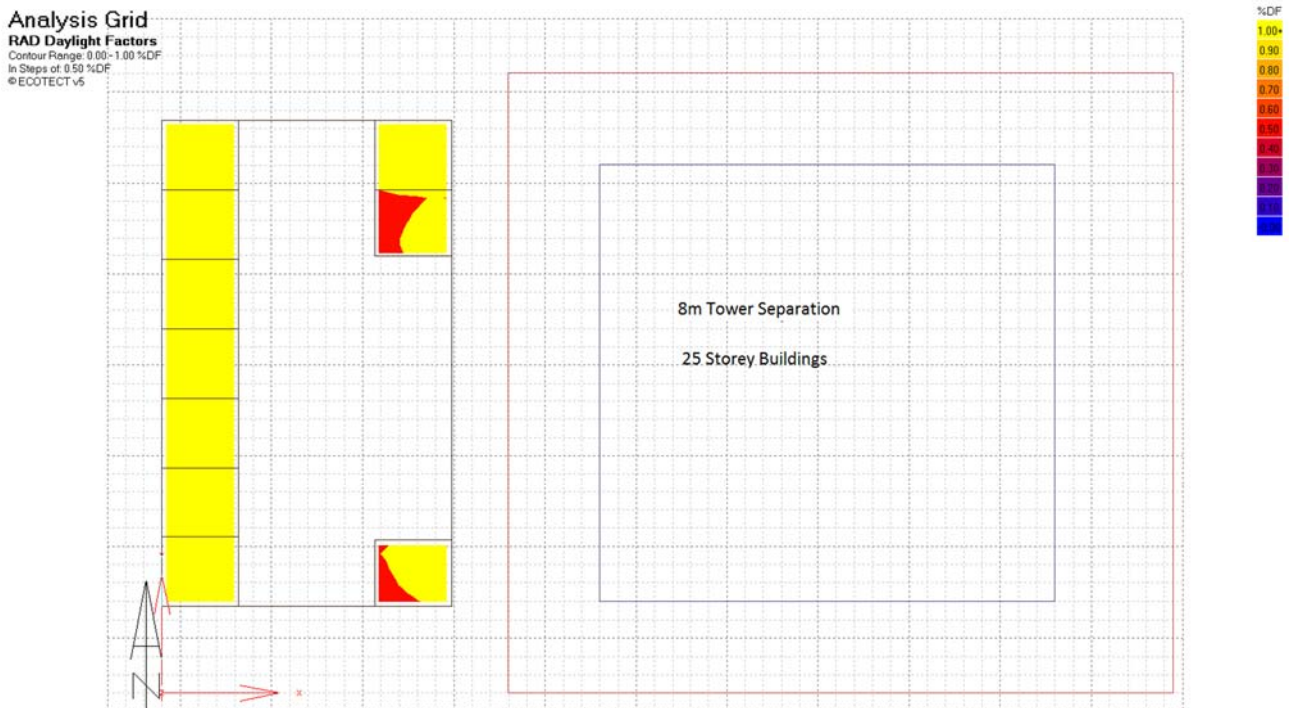


FIGURE 7: DAYLIGHT MODELLING RESULTS FOR EAST FACING BEDROOMS IN THE PROPOSED 874-878 WHITEHORSE ROAD HOTEL (25 STOREY TOWERS 8M TOWER SEPARATION).

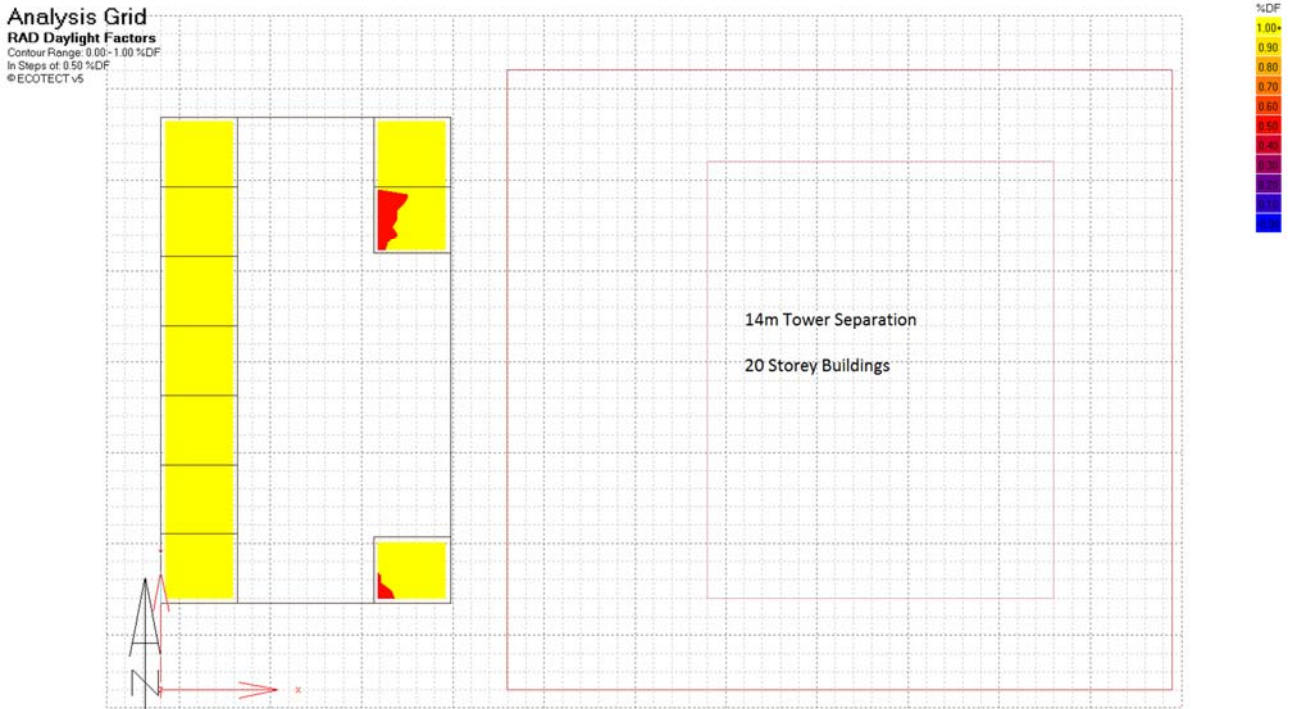


FIGURE 8: DAYLIGHT MODELLING RESULTS FOR EAST FACING BEDROOMS IN THE PROPOSED 874-878 WHITEHORSE ROAD HOTEL (20 STOREY TOWERS 14M TOWER SEPARATION).

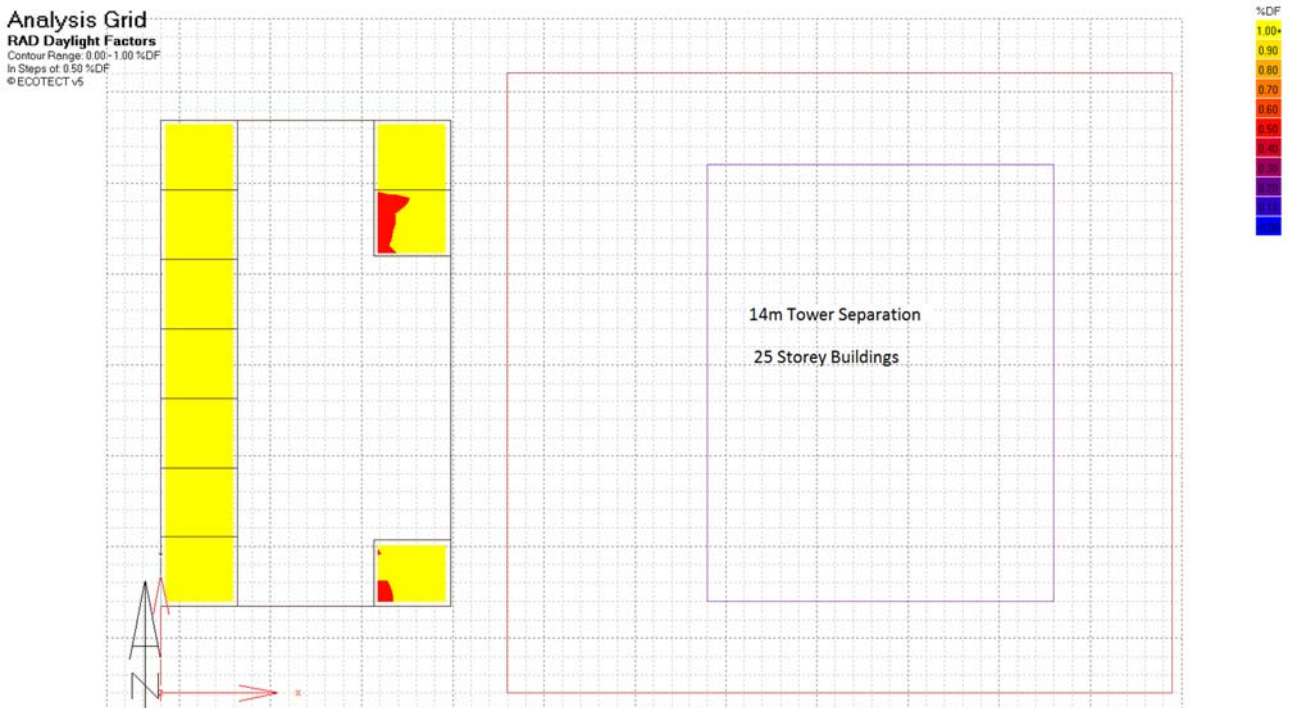


FIGURE 9: DAYLIGHT MODELLING RESULTS FOR EAST FACING BEDROOMS IN THE PROPOSED 874-878 WHITEHORSE ROAD HOTEL (25 STOREY TOWERS 14M TOWER SEPARATION).

33) The results above demonstrate that the height of the neighbouring building does not impact significantly on the daylight amenity received by the bedrooms being modelled (these are the Level 3 bedrooms which sit directly above the podium at the base of the tower).

- 34) When comparing the daylight amenity received by the bedrooms at the same tower separation distance (e.g. between Figure 4 and 5) it is demonstrated that there is minimal difference in daylight received by these bedrooms with the change in height of the neighbouring development from 20 storeys to 25 storeys. This is demonstrated for each of the separation distances tested.
- 35) The daylight modelling undertaken to test the impact that a modest increase in height above the proposed 20 Storey maximum, demonstrates that on sites which can accommodate an appropriate design response (such as those modelled), there is little to no impact on the internal daylight amenity achieved within those developments or their direct neighbours.

6.2 Analysis of Tower Setback Impact

- 36) In order to assess the impact of the tower separation in Sub-Precinct F4, I have modelled the proposed 874-878 Whitehorse Road hotel development as designed (3m setback of tower off side boundary and total of 25 floors in height) and modelled a number of options for towers on the neighbouring sites to the East (either stand-alone sites or conglomerated sites) with differing setbacks off the boundary to define the overall impact that tower separation has on the daylight amenity within the proposed hotel rooms which face that site boundary.
- 37) The tower separation distances modelled are 6m (assumes that 874-878 Whitehorse Road and 888 Whitehorse Road buildings have 3m setback off boundary), 8m (assumes 3m setback to 874-878 Whitehorse Road tower and 5m setback to 888 Whitehorse Road tower), 14m (assumes 888 Whitehorse Road is developed to podium level only and then a 3m setback to the tower on 902-910 Whitehorse Road) and 16m (assumes 888 Whitehorse Road is developed to podium level only and then a 5m setback to the tower on 902-910 Whitehorse Road).
- 38) The results of these models are based on the lowest floor of hotel rooms (Level 3) which sit directly onto the podium and are provided as Figures 10-13 below.
- 39) In order to assess the impact of the change in setback from 5m to 3m it is most appropriate to compare the results in Figure 10 and 11 (which assumes tower separation for a conglomerated site between 888 Whitehorse Road and 902-910 Whitehorse Road) and then the results in Figure 12 and 13 (which assumes that 888 Whitehorse Road is a stand-alone site developed only to the podium height with the tower located on 902-910 Whitehorse Road).
- 40) The separation distance modelled between the towers located on 874-878 Whitehorse Road and the 902-910 Whitehorse Road sites are reasonable for a development which chooses to orientate living zones towards a side boundary with a neighbouring development of the scale contemplated in this precinct. Typically orientating living zones towards neighbouring buildings is not desirable, but on larger conglomerated sites where a significant separation between buildings can be provided it is possible for a design to include living zones facing a side boundary and still meet the IEQ requirements of Clause 22.10.
- 41) Figures 14 and 15 demonstrate the impact that the reduction in setback from 5m to 3m will have on an appropriately designed development which has living zones orientated towards the shared boundary between two tower elements on neighbouring sites.



FIGURE 10: DAYLIGHT MODELLING RESULTS FOR EAST FACING BEDROOMS IN THE PROPOSED 874-878 WHITEHORSE ROAD HOTEL (25 STOREY TOWERS 6M TOWER SEPARATION).

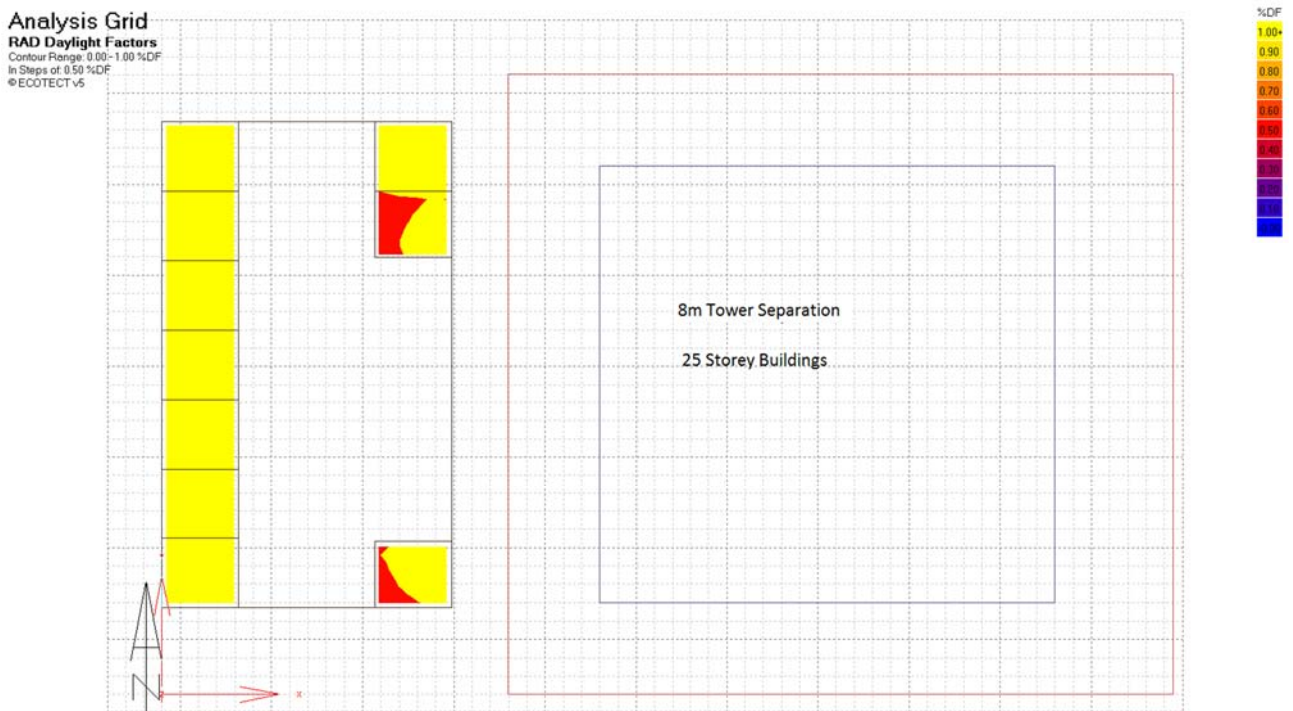


FIGURE 11: DAYLIGHT MODELLING RESULTS FOR EAST FACING BEDROOMS IN THE PROPOSED 874-878 WHITEHORSE ROAD HOTEL (25 STOREY TOWERS 8M TOWER SEPARATION).

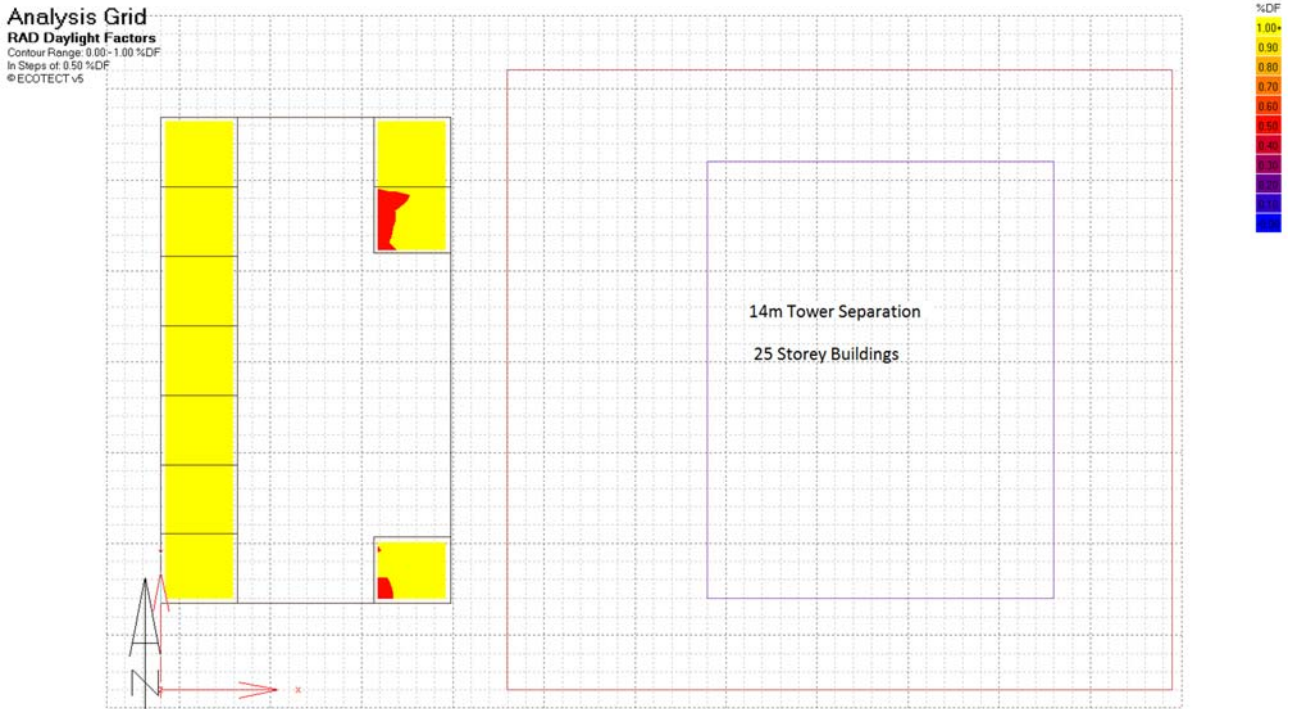


FIGURE 12: DAYLIGHT MODELLING RESULTS FOR EAST FACING BEDROOMS IN THE PROPOSED 874-878 WHITEHORSE ROAD HOTEL (25 STOREY TOWERS 14M TOWER SEPARATION).

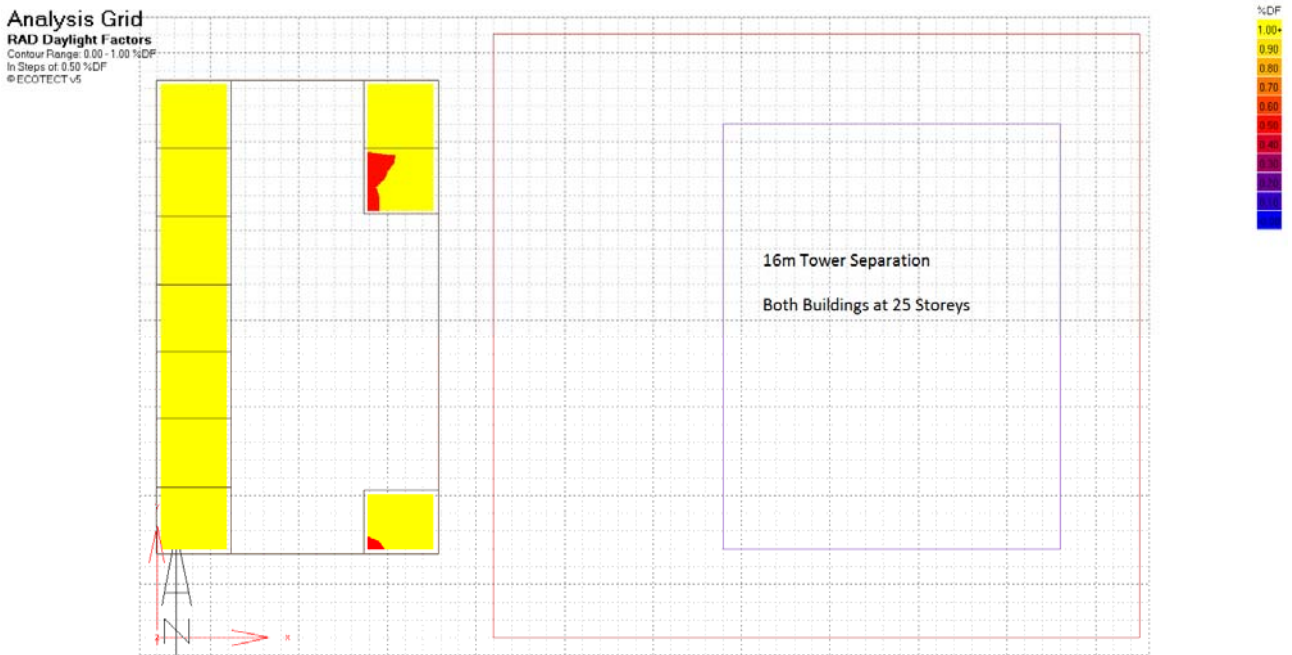


FIGURE 13: DAYLIGHT MODELLING RESULTS FOR EAST FACING BEDROOMS IN THE PROPOSED 874-878 WHITEHORSE ROAD HOTEL (25 STOREY TOWERS 16M TOWER SEPARATION).

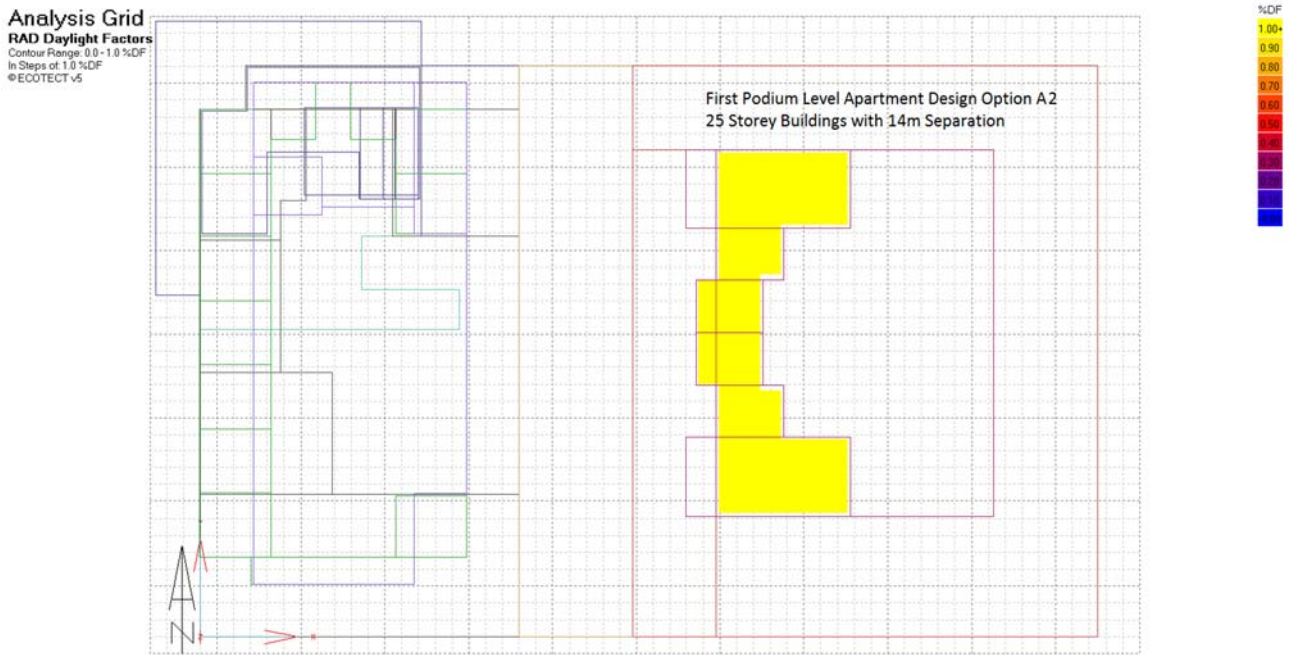


FIGURE 14: DAYLIGHT MODELLING RESULTS FOR WEST FACING APARTMENTS IN THE OPTION A2 DEVELOPMENT TO THE WEST OF 874-878 WHITEHORSE ROAD (25 STOREY TOWERS 14M TOWER SEPARATION).

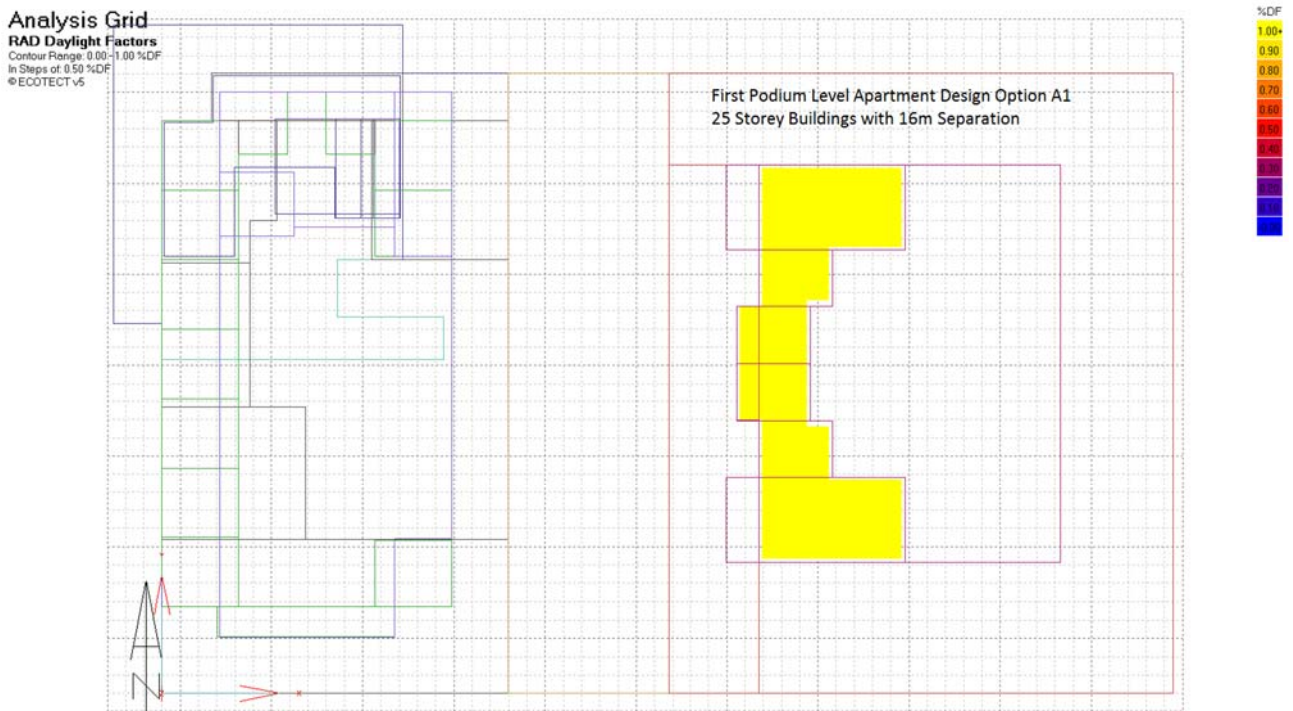


FIGURE 14: DAYLIGHT MODELLING RESULTS FOR WEST FACING APARTMENTS IN THE OPTION A1 DEVELOPMENT TO THE WEST OF 874-878 WHITEHORSE ROAD (25 STOREY TOWERS 16M TOWER SEPARATION).

- 42) The results above demonstrate that the greater the distance between the towers, the better the daylight will be in the rooms facing towards the neighbour. This is as expected and is a common sense outcome.
- 43) The most important finding which I draw from this assessment is that with appropriately designed buildings which may not technically comply with the design guidelines in Table 6 of DDO6, on sites such as 874-878 Whitehorse Road, the daylight amenity to the worst case scenario rooms (lowest levels) can still meet the standards that Council typically require to meet the IEQ objectives of Clause 22.10.
- 44) Figure 10 and 11 demonstrate that if sites such as 874-878 Whitehorse Road and a conglomerated site between 888 Whitehorse Road and 902-910 Whitehorse Road were to be developed with podiums and then tall towers above with only a 3m setback off the side boundary then the design of the building can still allow for a good internal daylight amenity outcome. This would be dependent on the building design appropriately dealing with this interface.
- 45) The design features of the proposed hotel at 874-878 Whitehorse Road which help ensure that the internal daylight amenity requirements of Clause 22.10 are met is that the core is aligned along the innermost zone of this boundary condition. This space doesn't require daylight and is therefore perfect to be located in this position on the site, where the most constrained access to natural light is located.
- 46) Further to this, the remaining habitable rooms in the 874-878 Whitehorse Road hotel proposal which face this boundary condition are bedrooms. Bedrooms are by nature small and not deep from the window, thereby allowing the desired level of daylight to penetrate into the room even with the reduced setback off the boundary of 3m, instead of the minimum 5m proposed in Amendment C175.
- 47) For larger sites within Sub-Precinct F4, which could accommodate apartments that orientate towards the side boundary, it is my opinion that these sites can also provide good internal daylight amenity across the whole apartment even with a reduced setback as long as they are designed to good principles which are in line with the Clause 58 requirements recently set in place for apartments.
- 48) I am not of the opinion that all sites within Sub-Precinct F4 are suitable to have reduced setbacks, however, the design of a building can overcome any reduced internal daylight amenity caused by a modest reduction in setback, if the right design principles are followed.

7. Conclusion

- 49) In conclusion, it is my opinion that the proposed amendment C175 to the Whitehorse Planning Scheme does not require absolute minimum setback distances above podium or absolute maximum height restrictions in order to ensure that good internal daylight amenity outcomes are still provided to new developments, such as that proposed for 874-878 Whitehorse Road.
- 50) The daylight modelling undertaken has demonstrated that the objectives of the proposed DDO6 that relate to internal daylight amenity can be met even with flexible guidelines surrounding setbacks above podiums and the preferred height of buildings. This is assuming that good building design principles are followed.
- 51) I am of the opinion that the daylight amenity objectives are sufficiently covered by other clauses in the Whitehorse Planning Scheme, and that whilst they should remain in the objectives of the proposed Amendment C175 and the associated DDO6, that flexibility in the maximum height and minimum setback above podium will not be detrimental to the internal daylight amenity outcomes achieved.

8. Declaration

- 52) I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.



Lindsay Richardson

Director

Sustainable Development Consultants Pty Ltd

EXPERT EVIDENCE STATEMENT APPENDICES DAYLIGHT ANALYSIS – AMENDMENT C175

Appendix A – Curriculum Vitae

Lindsay Richardson

ESD Consultant

Key Skills and Experience

Lindsay is an experienced environmental engineer who is a Director of Sustainable Development Consultants. He has been involved in numerous projects and is experienced in assessing and modelling the daylight impacts of developments and the predicted daylight levels within proposed developments. He has over 8 years' experience with the daylight modelling program Ecotect and its application in projects required to achieve compliance with multiple council regulations as well as Green Star compliance.

Personal Details

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Education

Bachelor of Engineering (Environmental) (Honours)
The University of Melbourne, Parkville 2002-2007

Career Profile

September 2007 – August 2011	Sustainable Development Consultants Pty Ltd ESD Consultant Carry out projects including, for example, green building projects, daylight modelling, energy modelling, water strategies, sustainability management plans, and sustainability guidelines.
August 2011 – Present	Sustainable Development Consultants Pty Ltd Director Manage the growth and development of an established sustainable development consulting firm. Generate new projects and respond to client needs and requests. Carry out projects including, for example, green building projects, daylight modelling, energy modelling, water strategies, sustainability management plans, and sustainability guidelines.