

Attachment E

**External Consultants Report – Peer Review
of Lighting Impact Assessment**

POINTOFVIEW

PEER REVIEW OF LIGHTING IMPACT ASSESSMENT

J3321-SL-7000

PROPOSED DIGITAL SIGNAGE

1 MISSENDEN RD, CAMPERDOWN

CITY OF SYDNEY

REVISION V3

27.08.2018

1.0 INTRODUCTION

POINTOFVIEW has been engaged to undertake a peer review of the LIGHTING IMPACT ASSESSMENT for OUTDOOR SIGNAGE AT 1 MISSENDEN RD, CAMPERDOWN. The assessment and associated submission was provided by the City of Sydney.

This peer review includes the following:

- Site Visit to the proposed location for the new digital signage to assess the relevant properties have been captured
- Review of the Relevant Legislation providing metrics and regulations for external illuminated signage
- Review of the Area Classification used in the assessment
- Review of Technical Lighting Parameters assessed
- Review of compliance demonstrated
- Consideration as to whether sufficient measures have been proposed by the applicant to manage illumination from the sign during different conditions (i.e. day to night) including any specific conditions/requirements for the sign.
- Consideration of scale, location, illumination, of the new sign and location of residential receivers to determine what appropriate dwell times should be applied to the new LED sign. The dwell times should consider the amenity of residential receivers during different conditions
- Recommendation to mitigate any adverse amenity impacts identified
- Summary of findings

2.0 SITE INVESTIGATION

POINTOFVIEW visited the proposed digital signage site at 1 Missenden Rd, Camperdown on Monday 30th July, 2018. The purpose of the site visit was to review the site conditions, proximity of adjacent properties and ensure the considerations and assumptions made and compliance calculations demonstrated in the Lighting Impact Assessment are appropriate.

2.1 EXISTING CONDITIONS

The Lighting Impact Assessment illustrates calculations on the northern facades of the properties on the south side of Brodrick St, the north facing facades of the properties at 69-71 Parramatta Rd and the south facing facades of the properties on the north side of Parramatta Rd. Due to its proximity to the proposed signage, the most at risk property of being negatively impacted by the proposed signage is the rear building façade (north facing) of the property at 69-71 Parramatta Rd. Refer to Figure 1, below. The windows on this façade are windows in living areas and bedrooms. It is our opinion that the assessment captures all the residential and commercial facades potentially impacted by the new digital signage.

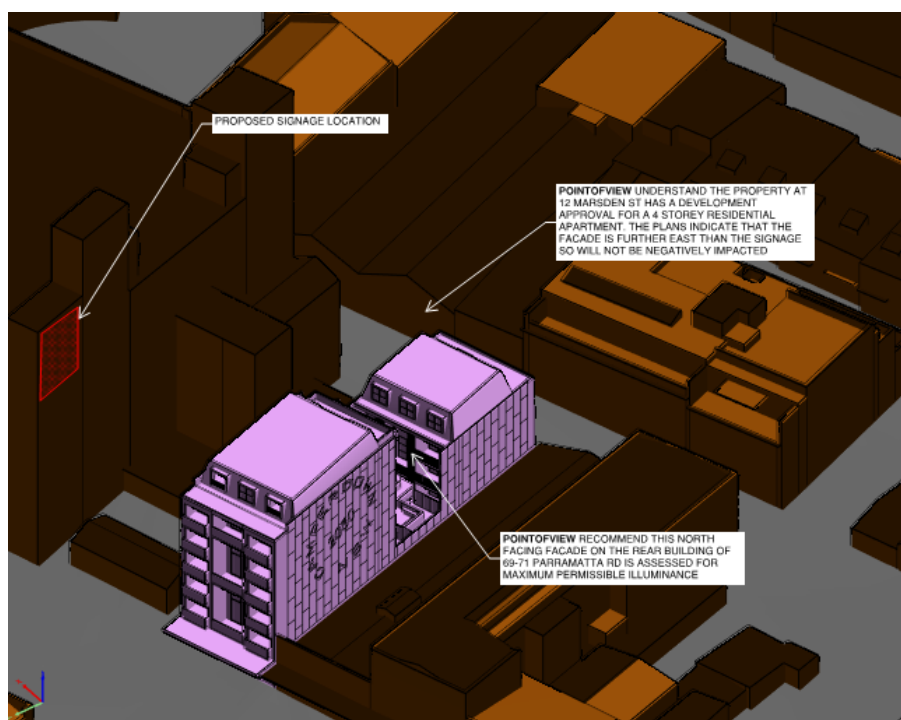


Figure 1. Model of site showing signage location and the north facing facade at 69-71 Parramatta Rd as well as the location of new development at 12 Marsden St.

2.2 APPROVED FUTURE DEVELOPMENTS

POINTOFVIEW understand there is residential development approval for the property at 12 Marsden St with Building B backing onto Brodrick St. Figure 1 shows the location of the future residential development. As the plans in Figure 2 indicate, the majority of the habitable windows on the northern side of Building A (backing onto Brodrick St) are east of the vertical plane of the proposed signage and therefore. The portion of habitable windows west of the vertical plane of the proposed signage have been assessed adequately, and this is outlined in Section 4.1.

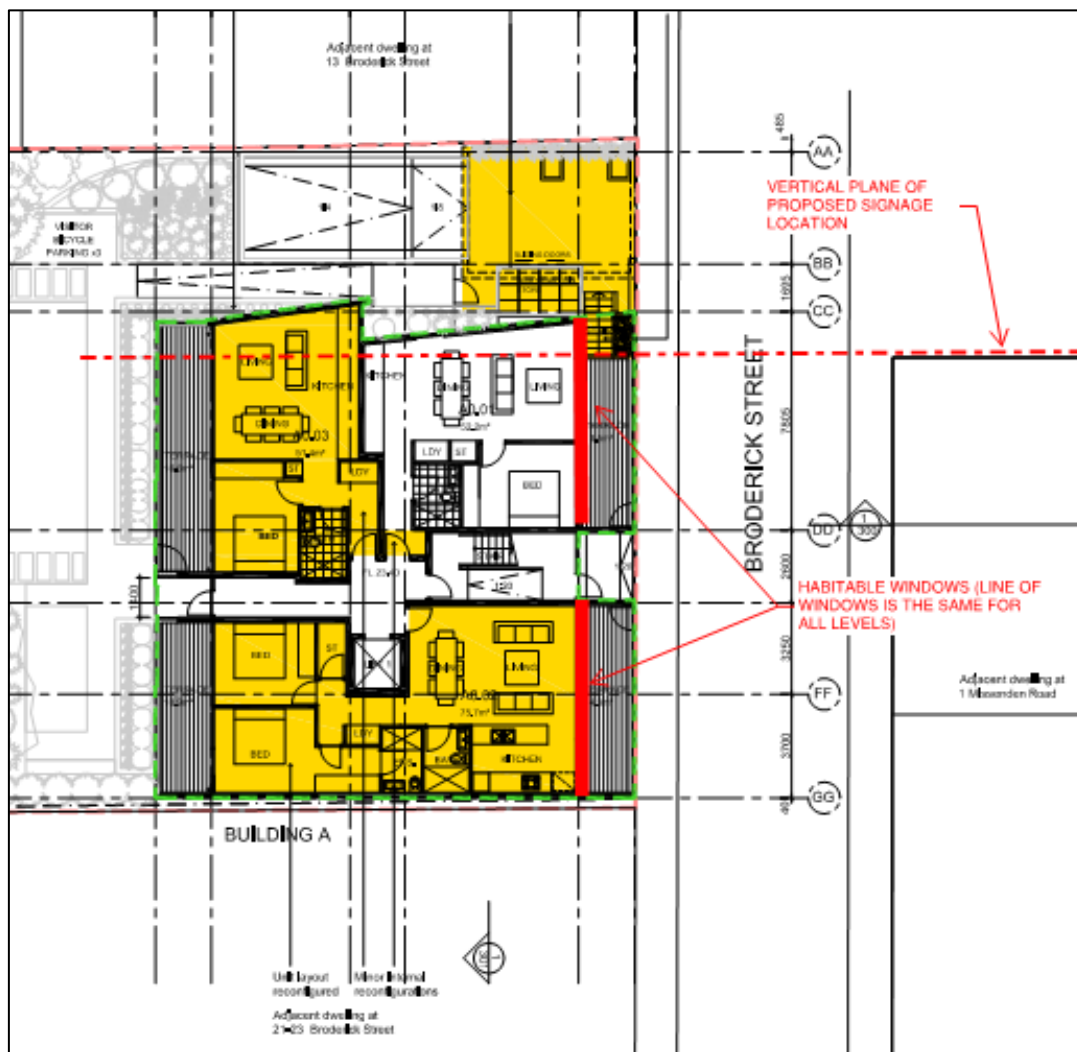


Figure 2. Extract of Plans of new approved development at 12 Marsden St showing the habitable windows on the Brodrick St façade in relation to the vertical plane of the proposed signage.

3.0 ASSESSMENT CRITERIA

3.1 RELEVANT LEGISLATION

The metrics calculated and assessed in the Lighting Impact Assessment are assessed in accordance the following regulatory legislations and guidelines:

- > NSW State Environmental Planning Policy No. 64 (SEPP 64) legislation
- > Sydney Development Control Plan (2012)
- > Transport Corridor Outdoor Advertising and Signage Guidelines (2017)
- > AS 4282-1997 Control of the Obtrusive Effects of Outdoor Lighting

It is our opinion that these regulatory legislations and guidelines are appropriate for the Lighting Impact Assessment undertaken.

Where the aforementioned regulatory legislations have differing limits or guidelines, in all assessment criteria, metrics have been assessed against the more stringent of limits or guidelines.

3.2 AREA CLASSIFICATION

In our opinion, the classification of the proposed signage location, nominated in the Lighting Impact Assessment, are accurate for the area. These are summarised below:

- > Zone 3 – commercial areas with medium ambient lighting (Transport Corridor Outdoor Advertising and Signage Guidelines)
- > Business or Industrial Zones within 100m of an accommodation land use (Sydney DCP, 2012)
- > Commercial Area or at Boundary of Commercial and Residential Areas, curfewed hours being between 11pm and 6am (AS 4282-1997)

Given the proximity of the residential accommodation on Parramatta Road and Brodrick St, the Sydney DCP offers a more appropriate classification as it considers accommodation in its zoning criteria.

The report demonstrates an accurate assessment of the Sydney DCP area classification.

3.3 TECHNICAL LIGHTING PARAMETERS

In our opinion, the report uses globally accepted technical lighting parameters to measure the lighting impact of the proposed outdoor signage. Chapter 2 of the Lighting Impact Assessment includes definitions of these parameters, which are listed below:

- > Luminance (also referred to a “nits” for screen/signage applications), used to assess quantity of light corresponding to human perception of brightness
- > Illuminance, used to assess obtrusive, spill or nuisance light
- > Threshold Increment, used to assess glare

The parameters used in the Lighting Impact Assessment to assess the visual impact of the proposed signage align with the metrics of measurement outlined in the relevant legislation identified in Section 2.1 of this report

Chapter 2 also identifies the use of lighting simulation software AGi32, a global benchmark for lighting calculations and assessment and one which CoS requires for demonstrating compliance.

4.0 COMPLIANCE

4.1 LIGHTING COMPLIANCE

In our opinion, the Lighting Impact Assessment demonstrates compliance with the lighting parameters listed below, as required in the relevant legislation, for all of the adjacent properties. This includes the south facing façade at 128 Parramatta Rd, the north facing façade of the property at 69-71 Parramatta Rd and the proposed residential development at 12 Marsden St (formerly 15-21 Brodrick St). This is demonstrated in Figure 3, on the following page.

- > Maximum Permissible Daytime Luminance (cd/sqm) – 6000 cd/sqm, as per the Sydney DCP (2012)
- > Maximum Permissible Twilight and overcast Weather Luminance – 600 cd/sqm, as per the Sydney DCP (2012)
- > Maximum Permissible Night Time Luminance – 110 cd/sqm, less than the Sydney DCP (2012) which has a maximum limit of 200 cd/sqm
- > Maximum Permissible Illuminance on Nearby Habitable Windows – 1.93 lux, less than the Sydney DCP (2012) which has a maximum limit of 2 lux
- > Threshold Increment (glare to motorists) – does not exceed 0.16%, less than AS4282-1997 and Sydney DCP (2012) which have a maximum allowance of 20%

Provided the signage is operated within the dimming levels outlined in Section 5 of the Lighting Impact Assessment for the different times of day, it is our opinion, that the compliance is demonstrated accurately.

Proposed digital signage, Luminance: 100 cd/m2

| Calculation Summary | | | |
|----------------------------------|-----------------------|-------|------|
| Label | CalcType | Units | Max |
| 1-11 Brodrick Street 3 Side 3 | Illuminance | Lux | 0.00 |
| 124-126 Parramatta Road Side 4 | Illuminance | Lux | 1.51 |
| 128 Parramatta Road 1 Side 4 | Illuminance | Lux | 1.76 |
| 13 Brodrick Street 2 Side 3 | Illuminance | Lux | 0.44 |
| 130 Parramatta Road 2 Side 4 | Illuminance | Lux | 1.72 |
| 134 Parramatta Road 4 Side 4 | Illuminance | Lux | 1.23 |
| 136 Parramatta Road 5 Side 4 | Illuminance | Lux | 0.00 |
| 15-21 Brodrick Street 1 Side 3 | Illuminance | Lux | 0.32 |
| 23-25 Brodrick Street Side 3 | Illuminance | Lux | 0.00 |
| 69-71 Parramatta Road Cd Seg1 | Obtrusive Light - Cd | N.A. | 11 |
| 69-71 Parramatta Road Ill Seg1 | Obtrusive Light - Ill | Lux | 1.9 |
| Building Side 5 | Illuminance | Lux | 0.0 |
| ObtrusiveLight TI Parramatta Roa | Obtrusive Light - TI | % | 0.14 |

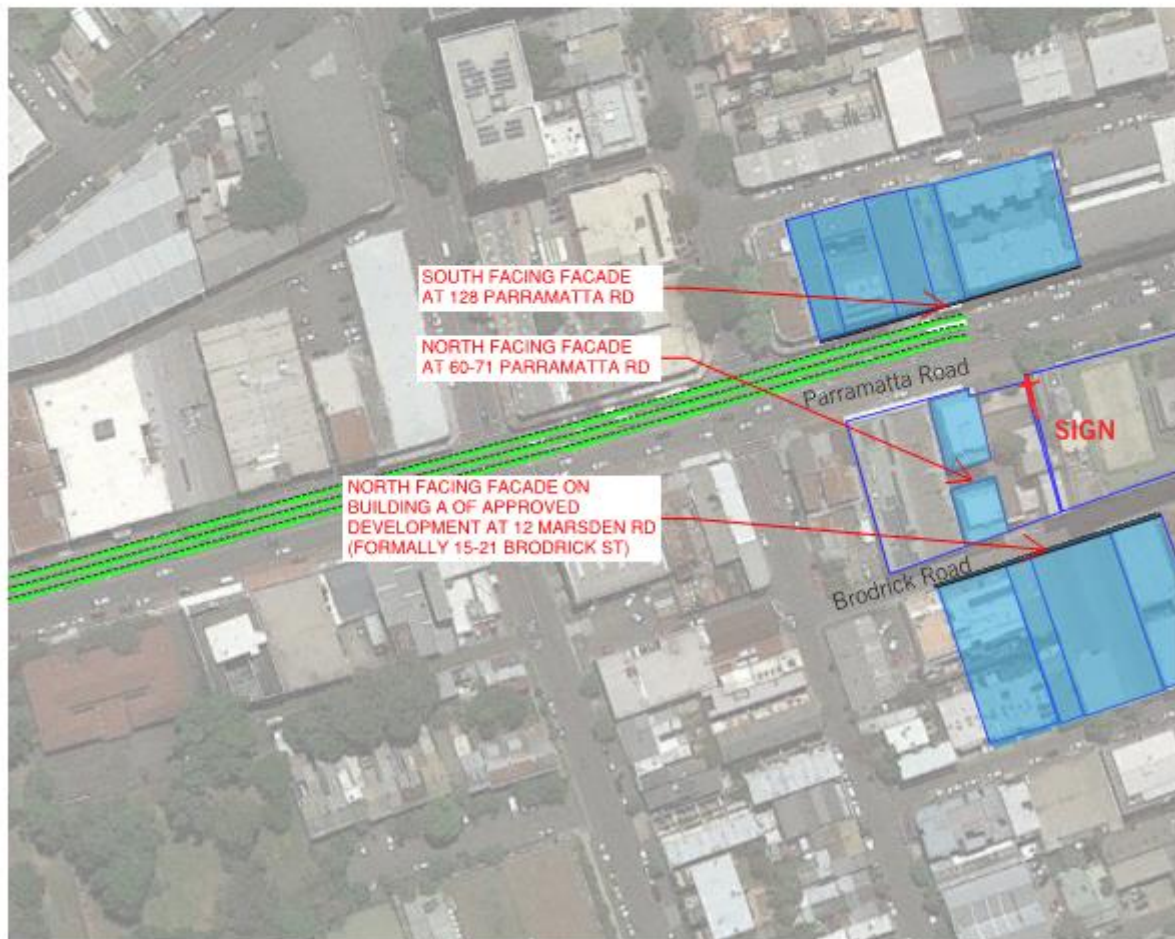


Figure 3. Extract of Lighting Impact Assessment, Appendix D with highest illuminance levels calculated at 128 Parramatta Rd south facing facade, 69-71 Parramatta Rd north facing facade or rear building and the proposed development at 12 Marsden St Building A north facing facades.

4.2 DIMMIBILITY

It must be noted that the compliances outlined in the Lighting Impact Assessment rely on the ability to dim the proposed Digital Signage.

The table in Chapter 7, on page 9 of the Lighting Impact Assessment, nominates the maximum dimming levels required to achieve compliance.

On page 4, the report advises, "the brightness of the LEDs can be controlled to provide upper and lower thresholds as required..." The specification of the Digital Signage, identified in Appendix B nominates the signage has the ability to be dimmed.

In our opinion, the specifications of the Digital Signage confirm dimming capabilities adequately.

4.3 PHOTOELECTRIC CELLS/LIGHT SENSORS

On page 4, the report advises, "the brightness of the LEDs can be controlled to provide upper and lower thresholds as required as well as automatically via a local light sensor to adjust to ambient lighting conditions." The specification of the Digital Signage, identified in Appendix B does nominates the PE cell (multi-directional light sensor) to provide the automatic adjustment. This devices features the ability to take lux (Illuminance) readings on the face and the back of the sign as well as ambient light. This information is used to dim or brighten the sign.

The specification for the multi-directional light sensor states that in the event of a multi-directional light sensor failure, the control system enables GPS dimming. It also states if this GPS dimming fails, the control system detects the issue and automatically sets the display to the lowest dimming level.

Section 3.16.7.2 part 8a of the Sydney DCP (2012) nominates that in the case of a malfunction, the display screen shall display and entirely black screen.

In our opinion, while the specifications the PE Cell (multi-directional light sensor) satisfies the requirements in section 3.16.7.2 part 4b of the Sydney DCP (2012), it does not satisfy the requirements Section 3.16.7.2 part 8a in the Sydney DCP, unless there is a "lowest dimmed setting" which is equal to 0 (zero) nits, thus creating a black screen.

4.4 ASTRONOMICAL TIMECLOCKS

Although not discussed in the Lighting Impact Assessment, astronomical time clocks can be used in conjunction with Photoelectric Cells or Light Sensors to ensure compliance is achieved during twilight and night-time settings. Astronomical time clocks can trigger dimming in accordance with the time of sunrise and sunset on any given day of the year. Any time clock device shall be in be in accordance with Section 3.16.7.2 part 4c of the Sydney DCP (2012).

In our opinion, the specifications the GPS location and timeclock feature, of the nominated multi-directional light sensor, satisfies the requirements in section 3.16.7.2 part 4b of the Sydney DCP (2012).

5.0 CONTENT TIMING

While the Lighting Impact Assessment demonstrates compliance with technical lighting parameters (for those adjacent properties which have been considered in the Lighting Impact Assessment) required in the relevant legislations, there are elements around timing of content it does not address, which impacts the amenity of the nearby residents and road users. These are related to the luminance and illuminance and are outlined in the following three sections.

5.1 DWELL TIMES

Dwell times correspond to the frequency at which the display changes from one image to the next. The longer the dwell time, the less frequent the changes. Most international guidelines for digital signage nominate a minimum dwell time of between 6-10 seconds. The City of Brisbane determines dwell time as a function of the speed limit for signs visible from the roadway – for speeds under 80km/h, the minimum dwell time is 8 seconds. Toronto, Ottawa and Massachusetts all have minimum dwell times of 10 seconds.

However, these dwell times are for digital signage intended to be viewed by road users. They do not address the amenity of nearby residents.

As the content is changeable for the digital signage, there is the possibility for the one display to be predominately black and the next to be predominately white and the next to be a saturated colour. While all three scenarios may comply with obtrusive light limits, in accordance with Sydney DCP (2012) and AS4282-1997, there is the potential for lux levels incident on nearby residential windows (which have been considered in the Lighting Impact Assessment) to vary from virtually 0 lux to 1.93 lux. The limitations outlined in the Sydney DCP and AS4282-1997 are founded on static lighting installations, not changing digital signage. This potential change in lux levels would be perceptible in a dark interior room and could be a nuisance if it occurs every 10 seconds.

It is our opinion that dwell times used during the night time settings should vary from those dwell times used during the daytime settings. While 10 seconds is appropriate for daytime settings, a more appropriate dwell time for nighttime settings is 30 seconds.

5.2 TRANSITION TIMES

Transition times refer to the time taken to transition from one static image to the next. International guidelines for transition times vary from instantaneous to 2 seconds. Instantaneous transitions have a risk of generating “after image” on the retina and can also create flash distractions, so should be avoided. Transitions longer than 2 seconds can also be distracting for road users.

As with dwell times, there are potential lux level changes that are perceptible to nearby residents in dark interior rooms. These can present more of a nuisance with instantaneous transitions than slower transitions.

It is our opinion that transition times used during the nighttime settings should be 1-2 seconds. Transition times used during the daytime settings could be shorter if desired but not less than 0.1 seconds, as outlined in Section 3.16.7.2 part 5d of the Sydney DCP (2012)

Additionally, no effects should be used during the transitions.

5.3 TRANSITION FROM DAYTIME TO NIGHTTIME

The transition of luminance from daytime to twilight to nighttime is an important transition to ensure the signage is appropriately lit for the time of day. However, there is no definition of when twilight begins and ends, or when day or nighttime begins or ends.

The City of Los Angeles recommends displays transition smoothly and consistently from daytime to nighttime, starting at 45 minutes prior to sunset and reaching night-time mode at 45 minutes after sunset. An astronomical clock, described in Section 3.4 could achieve this.

It is our opinion that a smooth transition dictated by sunset and sunrise times, as recommended in the City of Los Angeles guidelines, would be desirable and provide clear parameters as to the beginning and end of twilight hours.

6.0 RECOMMENDATIONS ON FURTHER CONTROL MEASURES

6.1 BLACK OUT

In the case of the display malfunction, freezing or having no content being transmitted, the display should revert to a default black screen automatically, as outlined in Section 3.16.7.2 part 8a of the Sydney DCP (2012).

6.2 MAINTENANCE

The installation should be regularly maintained, keeping an electronic log, for the duration of the development consent, as outlined in Section 3.16.7.2 part 8b of the Sydney DCP (2012).

We recommend the digital signage should be modular in construction, so in the event of a failure, only one section needs replacing.

6.3 MONITORING

The installation shall have an lighting impact audit undertaken by a professional lighting engineer within 12 months of operation and submitted to the consent authority to confirm the operational effect, with recommendations for necessary action to be taken where unacceptable glare, negative safety outcomes for road users or loss of amenity for accommodation land uses are identified, as outlined in Section 3.16.7.2 part 4f of the Sydney DCP (2012).

7.0 SUMMARY

In our opinion, the Lighting Impact Assessment accurately nominates the relevant legislation, the technical lighting parameters and area classifications.

The report demonstrates compliance with these technical lighting parameters in accordance with the relevant regulatory legislations. This includes the newly assessed north facing façade of the rear Building at 69-71 Parramatta Rd. In fact, the report demonstrates there will be less obtrusive light onto adjacent properties than the existing signage.

POINTOFVIEW has advised that the nominated display and light sensors satisfy the requirements for dimming, as outlined in the Lighting Impact Assessment or the Sydney DCP (2012). However, the malfunction control measures of the specified screen and light sensor do not satisfy the requirements of the Sydney DCP (2012), which calls for a black out in the case of a malfunction. This should be addressed.

While the Lighting Impact Assessment demonstrates compliance for illuminance and obtrusive light on the adjacent properties nominated, it does not address the impact of dwell and transition times of the digital display on the safety of road users or the amenity of the nearby residential accommodation.

POINTOFVIEW has provided recommendations on both dwell and transition times in Section 5 of this report. It is our opinion that the times for the daytime settings should vary to those times in the nighttime setting, to protect the amenity of the nearby residential accommodation uses.

POINTOFVIEW has provided recommendations on further control measures in Section 6 of this report, which align with the requirements outlined in the Sydney DCP (2012).

Although the proposed signage is technically compliant, with the exception of the malfunction device, it is our opinion that implementing the recommendations outlined in Section 5 and 6 of this peer review would further assist in minimising any impacts on the amenity of nearby residents.