

17th August 2022

Mediaworks Outdoor Limited

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Attention: Simon Berry

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re: Application to install an LED Advertising Billboard – 47 The Esplanade, Petone

Introduction

My name is Russ Kern. I hold certificates in Electrical and Illumination Engineering. I have been a member of the Illuminating Engineering Society of Australia and New Zealand Limited (MIES) since 1993 and am currently serving on the New Zealand Lighting Society Chapter Management Committee (CMC) as a member of the Qualifications Committee.

This report has been prepared in response to a request by Mediaworks Outdoor Limited to provide a lighting assessment for a proposed LED billboard activity that is proposed to be established at 47 The Esplanade, Petone in the Petone Commercial Area 2 zone. The issue arises as the result of a request for further information from the Hutt City Council dated 22 June 2022. The relevant question was as follows:

Provide a night-time visual assessment of the billboard and provided a details assessment of visual effects at night and effects on natural 'coastal' character. Your nighttime assessment should include any areas where the signage would be visible at night, including nearby walking paths, Petone Beach, Wellington CBD (if visible), Te Ara Tupua (Ngauranga to Petone) walkway (if visible) and State Highway 2 (if visible). Given the close proximity to the coastal environment it is important the billboard doesn't detract from the coastal amenity values at night. We would strongly recommend you offer a condition that the sign off at dusk (noting that this is about 9pm during mid-summer) to minimise visual effects at night during a time when the signage is likely to be most visible.

This report is intended to inform a further urban design assessment by Richard Knott and should be read alongside Mr Knott's report.

Context

Specific billboard location, size, orientation, and mounting height information has been included in separate documentation provided by Mt Hobson Group for this project.

The Esplanade runs parallel to the Petone foreshore and across the road from an adjacent walkway. The proposed billboard site is proposed to be located in front of a two-storey commercial building approximately 90m away from Petone beach. A floodlit Bunnings pylon sign is located approximately 55m away. The proposed billboard site is in a 50kmh zone.

The proposed digital billboard will be:

- 3.5m wide x 7m high back-to-back display faces with 150mm border and will be located 2.5m above ground level oriented near perpendicular to the road frontage in an open yard.
- The total height will be 9.5m.
- Oriented in portrait format and will have a 1m wide x 0.5m high illuminated operator name panel located on the road edge of the billboard that will be 2.0m above ground level to the bottom edge of the name panel.

Reference documentation

Documentation used in preparing this report comprises: -

1. Mt Hobson Group planning assessment of effects for a proposed digital billboard to be located at 47 The Esplanade, Petone, on behalf of Mediaworks Outdoor Limited.
2. An assessment from a site visit on 14th July 2022.
3. Results from live tests on similar billboards in Whangarei, Auckland, Hamilton, Tauranga, Gisborne, New Plymouth, Wellington, Blenheim, Rangiora and Christchurch over many years.
4. Reference to AS/NZS 4282 : 2019 Control of the obtrusive effects of outdoor lighting.
5. Reference to Waka Kotahi Digital Billboard Guidance – Addendum to TCDM-3.

I have experience with over 100 digital billboard consent applications since their introduction into New Zealand in 2011. The predominant consented dwell times for these billboards has been 8 to 15 seconds.

I have referred to acceptable luminous intensity limits and minimum dwell times associated with external lighting for pre-curfew and curfew situations as contained in the joint Australian and New Zealand Lighting Standard applicable to outdoor lit surfaces, being AS / NZS 4282 : 2019 Control of the obtrusive effects of outdoor lighting as well as the Waka Kotahi Digital Billboard Guidance in respect of lighting. (The term 'curfew' is defined in AS/NZS 4282 as 11pm being the time that permitted spill light and glare reduces from the higher values between sunset and curfew.)

Reference has been made to the Council to the Waka Kotahi Digital Billboard Guidance - Addendum to the Traffic Control Devices Manual - Part 3 TCDM-3. Section 5.1 Lighting of the Waka Kotahi Digital Billboard Guidance suggests a digital billboard application be assessed against AS/NZS 4282 : 2019.

Following concerns about the accuracy of that document and the process was arrived at, Waka Kotahi has removed the Waka Kotahi Digital Billboard Guidance from its website pending a review of the document. In relation to the Guidance the Waka Kotahi website says: "Withdrawn. See Review guidance note", with a link to a PDF document.

The "Digital Billboard Guidance Review Note" referred to states:

"Waka Kotahi received feedback from industry on the Digital Billboard Guidance previously appended to the Traffic Control Devices Manual. We have decided to withdraw this guide to enable further consultation to take place. So that Waka Kotahi can complete this process in good faith, we request that the

guide is not relied upon as representing the Waka Kotahi position. There may be changes to the guide as a result of this consultation.”

(Emphasis mine.)

On that basis it is clear that the Waka Kotahi Digital Billboard Guidance should not be applied pending the outcome off the forthcoming review.

Proposed illuminated LED billboard

The proposed back-to-back LED illuminated billboard for this project will include: -

- LED panels fixed in a grid to provide a fixed V-shape display with both sides of the same dimension.
- LED's with 10mm pitch or less.
- The billboard will be internally lit and will operate 24 hours day / 7 days a week.
- Daytime maximum luminance (brightness) 5,000 cd/m² (Nits).
- Nighttime maximum luminance of 250 cd/m².
- Minimum dwell time set at 8 seconds and transition time set at 0.5 seconds for a soft change between images.
- Automated controllable luminance using an LED display intensity adjustment system based on ambient light.
- Use of LED technology that does not have the filament visible to motorists.
- LEDs have built in eyebrow type shields to limit up light and reduce impact of bright sunshine washing out creative images.
- Material used in the billboard will not reflect sunlight or headlights.
- The billboard will be designed to avoid nuisance back spill lighting when operating.
- The billboard will not include any visible mechanized movement of any kind.

Applicable lighting requirements

Hutt City Council District Plan: Chapter 5B – Petone Commercial Activity Area 2.

Rulle 5B.2.2.1.1 provides the permitted lighting standards for any activity in the Petone Commercial Activity Area 2 zone, being:

- i. The emission of light (including glare) shall ensure that direct or indirect illumination does not exceed 8 lux (lumens per metre square) at the windows of residential activities; and
- ii. Subject to the above standard, pedestrian routes and carparks available for public use during hours of darkness shall be lit at a minimum of 10 lux, measured in accordance with AS/NZS 1158.3.1 : 2005 and amendments.

Hutt City Council District Plan: Chapter 14B General Rules – Signs.

Rule 14B.2.1.5(d) provides the permitted minimum illumination standards for signs in all Commercial Activity Areas, Business Activity Areas and Community Iwi Activity Area 3 – Kokiri Centres, excluding the Petone Commercial Activity Area 1, as follows:

- iii. If a sign is to be lit, they shall be lit by constant illumination, and shall not flash. Such signs may be lit by directional illumination or lit from within.
- iv. Artificial light shall not result in added illumination in excess of 8 lux measured at the window of any dwelling house within a residential, recreation or rural activity area, Community Iwi Activity Area 1 – Marae, or Community Health Activity Area.
- v. All measures shall be taken to ensure there is no unreasonable light spill beyond the boundary of the site.

Field investigations undertaken and viewing audience

I visited site during the day and at night on 14th July 2022 to assess the proposed billboard location and likely environmental effects from a lighting perspective. The site has an existing floodlit Bunnings pylon sign and wall mounted floodlights facing out towards Petone beach to light the carpark.

I visited the surrounding area including the beachfront, Te Ara Tupua walkway, public toilets across the road, Te Puni Reserve and carpark, Petone Carnival area, Wellington Waterski Club, Wellington Rowing Club, Ngauranga Train Station, Wellington CBD, various locations along The Esplanade, Petone Walk, Heretaunga Boating Club and Bendigo Grove residential area.

My assessment concluded that most of the above areas will not provide a vantage point to see the proposed billboard as a separate entity. The commercial nature of the Petone area means that when viewed from a distance, existing lighting from commercial activities, streetlights, buildings and signage will absorb any additional light source. Existing ambient light adjacent to the proposed billboard is 15 lux. There are significant trees and bushes along Petone beach foreshore that combine with the natural ground contour to provide an effective screen so the proposed billboard will not be easily seen.

Motorists and cyclists will be able to see the proposed billboard from approximately 380m away when traveling west along The Esplanade and 475m away when travelling east after exiting Hutt Road off ramp. The proposed billboard will not be easily seen from other roadways.

Existing illuminated signage at 47 The Esplanade ranged from 12.4cd/m² to 512cd/m². This is significantly more than the proposed digital billboard nighttime luminance.

Lighting effects based on billboard location

In the vicinity of the proposed billboard, there are:

- existing streetlights, floodlighting and illuminated signs on commercial properties
- existing building mounted floodlights located on site facing the road to illuminate the carpark area between the Wet & Forget building and The Esplanade.

The existing Bunnings double-sided static sign further along the road is illuminated by two floodlights on each face. Maximum luminance on the Bunnings sign measured 512cd/m² near the top of the sign decreasing to 1.5cd/m² at the bottom of the sign.

Ambient light in the vicinity of the proposed billboard will be reasonably high at night as is typical for a commercial locality. Tests taken during my site assessment indicated ambient light is 15 lux.

The proposed billboard will have an automated ambient light brightness control system to comply with Council standards regarding lighting overspill at night given its location with respect to the boundary and neighbouring commercial properties and adjacent roadway.

The closest residential properties are approximately 350m away to the east of the proposed billboard, the closest being 83 The Esplanade. There are large buildings and trees between the two locations with the result that there will be no noticeable effect for residents.

The Esplanade has a grassed dividing strip between opposing traffic and trees have been planted on this strip. This landscaping provides an effective screen until a motorist is approximately 380m away from the proposed billboard when travelling west. Similarly, large trees would screen the proposed billboard from motorists exiting State Highway 2 until they enter the roundabout at Hutt Road Slip and this is approximately 475m away.

Trees located between The Esplanade and adjacent walkway and Petone Beach would obscure views of the proposed billboard in most locations apart from a small area east of the beach carpark toilet block where there are no trees for several metres.

It would be difficult to identify the proposed billboard from the State Highway 2 Expressway at night given the distance and height of nearby streetlights and commercial lighting in the area. It may be possible to see the digital billboard at dusk before streetlighting and commercial outdoor lighting turns on, but the image would be very small given the distances involved. For example, the proposed billboard would be approximately 750m from State Highway 2 behind the Rowing Association Building to the proposed billboard and approximately 5km from Ngauranga Train Station.

Views of the proposed billboard from Wellington CBD approximately 10.5km away will be very limited given the 10.5km distance and would not be easily identifiable with the naked eye as it blends into the Petone foreshore landscape. The proposed V arranged double-sided billboard will be oriented similarly to the existing Bunnings sign with the unlit edge facing the city.

Direct sunlight can wash out LED brightness; however, experience from similar LED billboards in New Zealand indicates that, with appropriate brightness levels, LED billboards can be as effective in daylight as at night. The proposed northwest facing LED face, in particular, will be subjected to direct sunlight in the afternoons when there is no cloud. The ambient light sensors will detect any bright daylight and adjust luminance accordingly while keeping brightness within preset limits.

I consider that it is highly unlikely that motorists would confuse a digital image with road signage or traffic lights. At night, the proposed billboard luminance will be significantly less than traffic lights. For example, the Red signal measured 5,730cd/m², Orange 5,820cd/m² and Green 3,410cd/m² at the pedestrian crossing traffic lights adjacent to Lollipops on The Esplanade.

Lighting effects based on dwell time

Dwell time for LED billboards is not specifically referred to in the Hutt City Council District Plan standards; however, AS/NZS 4282 : 2019 provides guidance for minimum dwell time in Section 3.3.5.4 where it states:

“Where graphical content or colours can change, the dwell time of the image shall be 10 seconds or more”.
The intent is that a dwell time of less than 10 seconds can at times create a distraction.

The proposal includes a dwell time of 8 seconds as included in many digital billboard consent conditions in New Zealand.

The proposed transition time of 0.5 seconds between images will create a soft transition that that has been designed not to draw peripheral attention from motorists, cyclists or pedestrians and is typical for LED billboards installed in New Zealand. It is not considered to result in a flash or rapid change of light that can be distracting, particularly for motorists.

Lighting effects based on spill light and glare

Spill lighting and glare will be very low from the proposed LED billboard. Spill light and glare are both dependent on luminance, not dwell time.

Tests completed following commissioning adjustments on other billboards in Wellington resulted in acceptable readability with a night value as low as 72.4cd/m² and daytime maximum value of 3,590cd/m².

AS/NZS 4282 notes that the determination of when spill light becomes obtrusive to others is difficult since both physiological and psychological effects are involved. Light falling on surrounding properties, the brightness of the digital images, views for nearby residents and glare to users of adjacent transport systems can be determined and measured.

Note that AS/NZS 4282 only applies to nighttime operation of lighting as indicated in Section 1.1 Scope of this standard.

Potential lighting effects on residents generally involves changes in luminance in the peripheral vision due to effects such as variable content in signage or trees moving across a digital billboard. The nearest residential property is approximately 350m away on The Esplanade, 370m away on Koroko Road and 2.1km away on Bendigo Drive so views of the proposed billboard will be limited if visible at all, noting there are trees and buildings that are likely to block direct views of the proposed billboard.

Motorists can be affected if the relative contrast of the proposed billboard is high compared to the surrounding environment. General ambient lighting will be high in the commercial area where the billboard is proposed. Nighttime luminance will be reduced at night to a maximum of 250cd/m²; however, as noted earlier, the actual billboard luminance will, in practice be significantly less than this maximum figure.

AS/NZS 4282 classifies commercial areas as lighting zone A4 and the applicable luminance intensity limit is set at 2,500cd. It also recommends:

- A maximum average surface luminance of 350cd/m² however when a billboard is viewed against a dark sky, the surface luminance should be no more than 150cd/m² as indicated in Table 3.5.
- That vertical spill light on residential properties is recommended to have a maximum value of 1 lux.

These values are all higher than effects from the proposed LED billboard, so compliance will be achieved.

Billboard ambient light monitoring

The electronically illuminated LED billboard associated with this proposal will comply with Hutt City District Plan requirements for LED billboards. The billboard will be programmed to ensure the automated brightness control system limits luminance to acceptable values.

LED displays that are available for billboard applications can have a brightness of up to 10,000 cd/m² if the image is white (or lower brightness if denser coloured LEDs are used); - however, creatives displayed at that intensity would be uncomfortable to view during daylight hours. The maximum luminance typically consented for LED billboards is 5,000 cd/m² during the day; this is significantly less than what it is capable of. The same image brightness (luminance) would appear to be too bright on dull days and at night and is therefore automatically dimmed to an appropriate lower luminance level due to the darker surrounds providing a higher brightness contrast. This is to prevent flaring of the digital creative image that would render it unreadable.

Natural daylight illuminance from the sun can be as high as 150,000-lux at midday in direct sunlight and 60,000-lux at 3.00pm. The point is that daylight varies hugely each day, and the proposed automated controls are required to accommodate a wide variance in natural ambient light particularly during the day.

In light of my assessment of this consent application, I consider that the lighting effects of the proposed billboard are less than minor based on the following:

- Illuminance is localized and will not intrude into neighbouring commercial properties or distant residential properties.
- Added illuminance at residential windows will be less than 8 lux.
- Effects will be discernable at night but are too small to adversely affect other persons.
- To achieve daytime readability, daytime luminance will be higher than nighttime luminance and will be automatically adjusted in response to ambient light conditions.
- Luminance will be limited to 5,000 cd/m² in daytime.
- Nighttime luminance will be limited to a maximum of 250 cd/m²
- The proposed LED billboard will be designed and installed to avoid any back spill nuisance lighting when operating.
- Illuminance from the billboard at 2m above road level will not exceed 10 lux.
- Daytime luminance will not be too bright and nighttime luminance will not be too dim.

The use of adjustable display intensity controllers as proposed will automatically control luminance during daylight hours and during nighttime operation as described above.

Conclusions

Having regard to the above analysis, I consider the proposed LED billboard with an image dwell time of 8 seconds and 0.5 second transition will not alter the evening / nighttime lighting environment in the area in respect of overspill and glare (brightness) from lighting associated with the billboard.

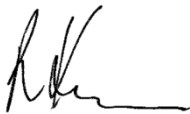
The luminance limit during daytime, nighttime and inclement weather will be automatically adjusted based on varying ambient light conditions to enable the creative image to be readable and control should be left to the proposed automated ambient light system as proposed above.

In terms of proposed luminance associated with the LED billboard, the effects of automatically adjusting brightness during daylight hours is suitable having regard to the environmental characteristics that prevail, such as the possibility of direct sunlight falling on the billboard and overcast days and will provide an appropriate level of luminance for the effective readability of the billboard in varying daylight conditions.

The proposed dwell time of 8 seconds and transition of 0.5 seconds is in line with accepted conditions in many New Zealand billboards and with AS/NZS 4282 requirements. I consider the effects of the proposed billboard will be less than minor.

I also consider this aspect to be a complying activity in terms of dwell time, light spill and glare.

Prepared on behalf of
Kern Consultants Ltd

A handwritten signature in black ink, appearing to read 'Russ Kern', with a horizontal line extending to the right.

Russ Kern MIES