

oOh! Media

LIGHTING IMPACT ASSESSMENT -
OUTDOOR SIGNAGE AT TEAL ST, KOORAGANG, NSW "LOCATION 9"

20th May 2022
Ref: 3065.2

Lighting Impact Assessment

Outdoor Signage at Teal St, Kooragang, NSW "Location 9"

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1. INTRODUCTION

Electrolight have been appointed by oOh! Media to undertake a Lighting Impact Assessment on the proposed double sided pylon signage (Sign 1 & Sign 2) to be installed at Teal St, Kooragang, NSW “Location 9”. The objective of the assessment is to report on compliance with the State Environmental Planning Policy (Industry and Employment) 2021, NSW Transport Corridor Outdoor Advertising and Signage Guidelines, and AS4282-2019 Control of the Obtrusive Effects of Outdoor Lighting.

2. DEFINITIONS

2.1 Illuminance

The physical measure of illumination is illuminance. It is the luminous flux arriving at a surface divided by the area of the illuminated surface. Unit: lux (lx); 1 lx = 1 lm/m².

(a) Horizontal illuminance (E_h) The value of illuminance on a designated horizontal plane

(b) Vertical illuminance (E_v) The value of illuminance on a designated vertical plane

Where the vertical illuminance is considered in the situation of potentially obtrusive light at a property boundary it is referred to as environmental vertical illuminance (E_{ve}).

2.2 Luminance

The physical quantity corresponding to the brightness of a surface (e.g. a lamp, luminaire or reflecting material such as the road surface) when viewed from a specified direction. SI Unit: candela per square metre (cd/m²) – also referred to as “nits”.

2.3 Luminous Intensity

The concentration of luminous flux emitted in a specified direction. Unit: candela (cd).

2.4 Obtrusive Light

Spill Light which, because of quantitative, directional or spectral attributes in a given context, gives rise to annoyance, discomfort, distraction or a reduction in the ability to see essential information.

2.5 Threshold Increment

The measure of disability glare expressed as the percentage increase in contrast required between a standard object and its background (the carriageway) for it to be seen equally as well with the source of glare present as with it absent, derived in the specified manner. This metric is directly related to Veiling Luminance.

NOTE: The required value is a maximum for compliance of the lighting scheme.

2.6 AGI32 Light Simulation Software

AGI32 (by U.S. company Lighting Analysts) is an industry standard lighting simulation software package that can accurately model and predict the amount of light reaching a designated surface or workplane. AGI32 is a has been independently tested against the International Commission On Illumination (CIE) benchmark, CIE 171:2006, Test Cases to Assess the Accuracy of Lighting Computer Programs.

2.7 Upward Light Ratio (ULR)

The ratio between the luminous flux emitted above the horizontal plane to the total flux emitted by a light source. The ULR is used as a measure to limit direct spill light to the sky.

3. SITE DESCRIPTION AND SCOPE

The double sided signage (Sign 1 and Sign 2) is proposed to be installed on a pylon at Teal St, Kooragang, NSW "Location 9". Sign 1 is externally illuminated signage and is oriented towards the westbound direction of traffic on Teal St. Sign 2 is digital signage and is oriented towards the eastbound direction of traffic on Teal St. The total active display area of each proposed sign is 18.64 m². Sign 1 is to operate all night and be switched off during the day and Sign 2 is to be in 24 hour operation. Refer to Appendix A for proposed signage location plan and elevations.

The proposed externally illuminated signage (Sign 1) is illuminated using two top mounted 120W LED flood lights mounted on a 2m outreach arm that are aimed towards the sign face (i.e directed away from normal traffic viewing direction), with performance parameters as outlined in Appendix B.

The proposed digital signage (Sign 2) is illuminated using LEDs installed within the front face. The brightness of the LEDs shall 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.

For the purpose of this report the proposed manufacturer of Sign 2 is noted as Daktronics model type JVX-1200-10MN-6000-WO with performance parameters as outlined in Appendix B. The signage includes baffles which mitigate upward waste light, resulting in an Upward Light Ratio (ULR) of less than 50%. Alternative digital sign manufacturers may be used for this installation as long as they have equivalent lighting and performance characteristics and are commissioned as described in this report.

4. DESIGN GUIDELINES AND STANDARDS

The Lighting Impact Assessment will review the proposed signage (Sign 1 & Sign 2) against the following Criteria, Design Guidelines and Standards.

- State Environmental Planning Policy (Industry and Employment) 2021 (Refer Appendix C)
- Transport Corridor Outdoor Advertising & Signage Guidelines 2017
- AS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting

5. LUMINANCE ASSESSMENT

The maximum permissible night time luminance of the signage is determined by the existing lighting environment of its surroundings. AS4282 outlines maximum average luminances for different Environmental Zones as shown in Table 1 below:

TABLE 1 - MAXIMUM NIGHT TIME AVERAGE LUMINANCE FOR SIGNAGE		
Environmental Zone	Description	Max Average Luminance (cd/m2)
A4	High district brightness e.g. Town and city centres, commercial areas, and residential areas abutting commercial areas	350
A3	Medium district brightness e.g. suburban areas in towns and cities	250
A2	Low district brightness e.g. sparsely inhabited rural and semi-rural areas	150
A1	Dark e.g. relatively uninhabited rural areas. No Road Lighting	0.1
A0	Intrinsically Dark e.g. Major Optical Observatories. No Road Lighting	0.1

Note: Where the signage is viewed against a predominantly dark background (e.g. night sky) then the maximum applicable environmental zone is A2

Sign 1 - Externally Illuminated Signage

Based on an assessment of the surrounding environment, the proposed externally illuminated signage (Sign 1) is located within Environmental Zone A4 under AS4282, therefore the maximum night time luminance is 350 cd/m2.

AS4282 does not include limits for daytime operation of illuminated signage. However, the Transport Corridor Outdoor Advertising & Signage Guidelines outlines maximum permissible luminance limits for various lighting conditions, including daytime. Under the Guidelines, the proposed signage is classified as being within Zone 3, which is described as an area with generally medium off-street ambient lighting. The maximum night time luminance of a static sign within Zone 3 is 200 cd/m2, 1/4 of the day time levels.

Table 2 outlines the maximum luminance levels to comply with AS4282 and the Transport Corridor Outdoor Advertising & Signage Guidelines for the various lighting conditions listed below:

TABLE 2 - LUMINANCE LEVELS FOR EXTERNALLY ILLUMINATED ADVERTISEMENTS		
Lighting Condition	Max Permissible Luminance (cd/m2) #	Compliant
Day	N/A (OFF)*	✓
Night Time	200	✓

The signage is to be dimmed on site to ensure the maximum luminance nominated above is not exceeded.

*The maximum daytime luminance under the Transport Corridor Outdoor Advertising and Signage Guidelines is actually 800cd/m2, however the sign is not illuminated during the day so this is not applicable.

Photometric data for the floodlights illuminating Sign 1 was provided by the lighting manufacturer and was used for calculation purposes. The average luminance of Sign 1 was found to be 180cd/m2, less than the maximum allowance of 200cd/m2. Sign 1 therefore complies with the luminance limits outlined in AS4282 and the Transport Corridor Outdoor Advertising and Signage Guidelines.

It is our opinion that signage that is illuminated to the maximum luminances outlined above would be visually consistent with the existing ambient lighting and suitable for the local area. A more detailed night time lighting assessment is provided in Section 6.0.

Sign 2 - Digital Signage

Based on an assessment of the surrounding environment, the proposed digital signage (Sign 2) is located within Environmental Zone A4 under AS4282, therefore the maximum night time luminance is 350 cd/m2.

AS4282 does not include limits for daytime operation of illuminated signage. However, the Transport Corridor Outdoor Advertising & Signage Guidelines outlines maximum permissible luminance limits for various lighting conditions, including daytime. Under the Guidelines, the proposed signage is classified as being within Zone 3, which is described as an area with generally medium off-street ambient lighting. The maximum night time luminance of a digital signage within Zone 3 is 350 cd/m2.

Table 3 outlines the maximum luminance levels to comply with AS4282 and the Transport Corridor Outdoor Advertising & Signage Guidelines for the various lighting conditions listed below:

TABLE 3 - LUMINANCE LEVELS FOR DIGITAL ADVERTISEMENTS		
Lighting Condition	Max Permissible Luminance (cd/m2) #	Compliant
Full Sun on face of Signage	No Limit	✓
Day Time Luminance (typical sunny day)	6000	✓
Morning and Evening Twilight and Overcast Weather	700	✓
Night Time	350	✓

The signage is to be dimmed on site to ensure the maximum luminance nominated above is not exceeded.

It is our opinion that a signage that is illuminated to the maximum luminances outlined above would be visually consistent with the existing ambient lighting and suitable for the local area. A more detailed night time lighting assessment is provided in Section 6.0.

6. AS4282 ASSESSMENT

The proposed pylon signage (Sign 1 & Sign 2) has been assessed against AS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting as outlined in Section 4.

AS4282 provides limits for different obtrusive factors associated with dark hours (night time) operation of outdoor lighting systems. Two sets of limiting values for spill light are given based on whether the lighting is operating before a curfew (known as “pre-curfew” operation) or operating after a curfew (known as post-curfew or curfewed operation). Pre-curfew spill lighting limits are higher than post-curfew values, on the understanding that spill light is more obtrusive late at night when residents are trying to sleep. Under AS4282, the post-curfew period is taken to be between 11pm and 6am daily. As the signage operates all night, the signage will be assessed against the more stringent post-curfew limits.

Illuminance Assessment - Sign 1 & Sign 2

The AS4282 assessment includes a review of nearby residential dwellings and calculation of the amount of illuminance (measured in Lux) that the properties are likely to receive from the signage during night time operation.

The acceptable level of illuminance will in part be determined by the night time lighting environment around the dwellings. AS4282 categorises the night time environment into different zones with maximum lighting limits as shown in Table 4 below:

TABLE 4 - MAXIMUM VALUES OF LIGHT TECHNICAL PARAMETERS			
Environmental Zone	Max Vertical Illuminance (lx)		Description
	Pre-curfew	Post-curfew	
A0	0	0	Intrinsically Dark e.g. Major Optical Observatories. No Road Lighting
A1	2	0.1	Dark e.g. relatively uninhabited rural areas. No Road Lighting
A2	5	1	Low district brightness e.g. sparsely inhabited rural and semi-rural areas
A3	10	2	Medium district brightness e.g. suburban areas in towns and cities
A4	25	5	High district brightness e.g. Town and city centres, commercial areas, and residential areas abutting commercial areas

The proposed signage (and surrounding environment) was modeled in lighting calculation program AGI32 to determine the effect (if any) of the light spill from the proposed signage. Photometric data for the floodlights illuminating Sign 1 was provided by the lighting manufacturer* and was used for calculation purposes. Photometric data for Sign 2 was provided by the screen manufacturer* with luminances corresponding to the night time limits outlined in Section 5. Appendix D shows the lighting model and the results of the calculations. It can be seen that no residential developments fall within the exclusion zone. The signage therefore complies with the maximum vertical illuminance limits for Zone A4 post-curfew operation as outlined in Table 4 above.

Threshold Increment Assessment

The Threshold Increment was also calculated for the traffic approaches on Teal St (eastbound), Teal St (westbound), Curlew St (eastbound), Curlew St (westbound), Raven St (southbound) and Raven St (northbound). The calculation grids were located at 1.5m above ground level for general traffic approaches, with an approach viewing distance of between 5m to 200 m from the sign. The calculation results show that the Threshold Increment does not exceed 10.75% for any traffic approach (the allowable maximum under the standard is 20%).

Luminous Intensity - Sign 1

AS4282 nominates luminous intensity limits where a light source (such as a floodlight) can be directly viewed from a residential dwelling, shown in Table 5 below:

TABLE 5 - MAXIMUM LUMINOUS INTENSITIES PER LUMINAIRE FOR EXTERNALLY ILLUMINATED SIGNAGE			
Environmental Zone	Non-Curfew L1 luminous intensity (cd)	Non-Curfew L2 luminous intensity (cd)	Curfew luminous intensity (cd)
A0	As close to 0 as possible, without impacting safety	As close to 0 as possible, without impacting safety	0
A1	2500	5000	500
A2	7500	12500	1000
A3	12500	25000	2500
A4	25000	50000	2500

* Electrolight takes no responsibility for the accuracy of third party provided photometric data.

It can be seen from the lighting model that there are no residents with direct view of the light source. The signage therefore complies with the maximum A4 AS4282 Luminous intensities limit of 2500 for Curfew operation

It should be noted that the luminuous intensity limits outlines in AS4282 do not apply to internally illuminated/ digital signage

Additional Requirements - Sign 2

The signage operator must ensure that the average luminance difference between successive images does not exceed 30% to ensure compliance with AS4282. The dwell time shall be 10 seconds or greater.

It can therefore be seen that the proposed signage (Sign 1 & Sign 2) complies with all relevant requirements of AS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting

7. SUMMARY

- The proposed externally illuminated signage (Sign 1) to be installed at Teal St, Kooragang, NSW “Location 9”, shall be commissioned on site to yield the following maximum luminances:

LUMINANCE LEVELS FOR EXTERNALLY ILLUMINATED ADVERTISEMENTS		
Lighting Condition	Max Permissible Luminance (cd/m2) #	Compliant
Day	N/A (OFF)	✓
Night Time	200	✓

- The proposed digital signage (Sign 2) to be installed at Teal St, Kooragang, NSW “Location 9”, shall be commissioned on site to yield the following maximum luminances:

LUMINANCE LEVELS FOR DIGITAL ADVERTISEMENTS		
Lighting Condition	Max Permissible Luminance (cd/m2)	Compliant
Full Sun on face of Signage	No Limit	✓
Day Time Luminance (typical sunny day)	6000	✓
Morning and Evening Twilight and Overcast Weather	700	✓
Night Time	350	✓

- The digital signage operator must ensure that the average luminance difference between successive images does not exceed 30% to ensure compliance with AS4282. The dwell time shall be 10 seconds or greater.
- The proposed pylon signage (Sign 1 & Sign 2) has been found to comply with all relevant requirements of AS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting.
- In complying with the above requirements, the proposed pylon signage (Sign 1 & Sign 2) should not result in unacceptable glare nor should it adversely impact the safety of pedestrians, or vehicular traffic. Additionally, the proposed signage should not cause any reduction in visual amenity to residences or accommodation.

8. DESIGN CERTIFICATION

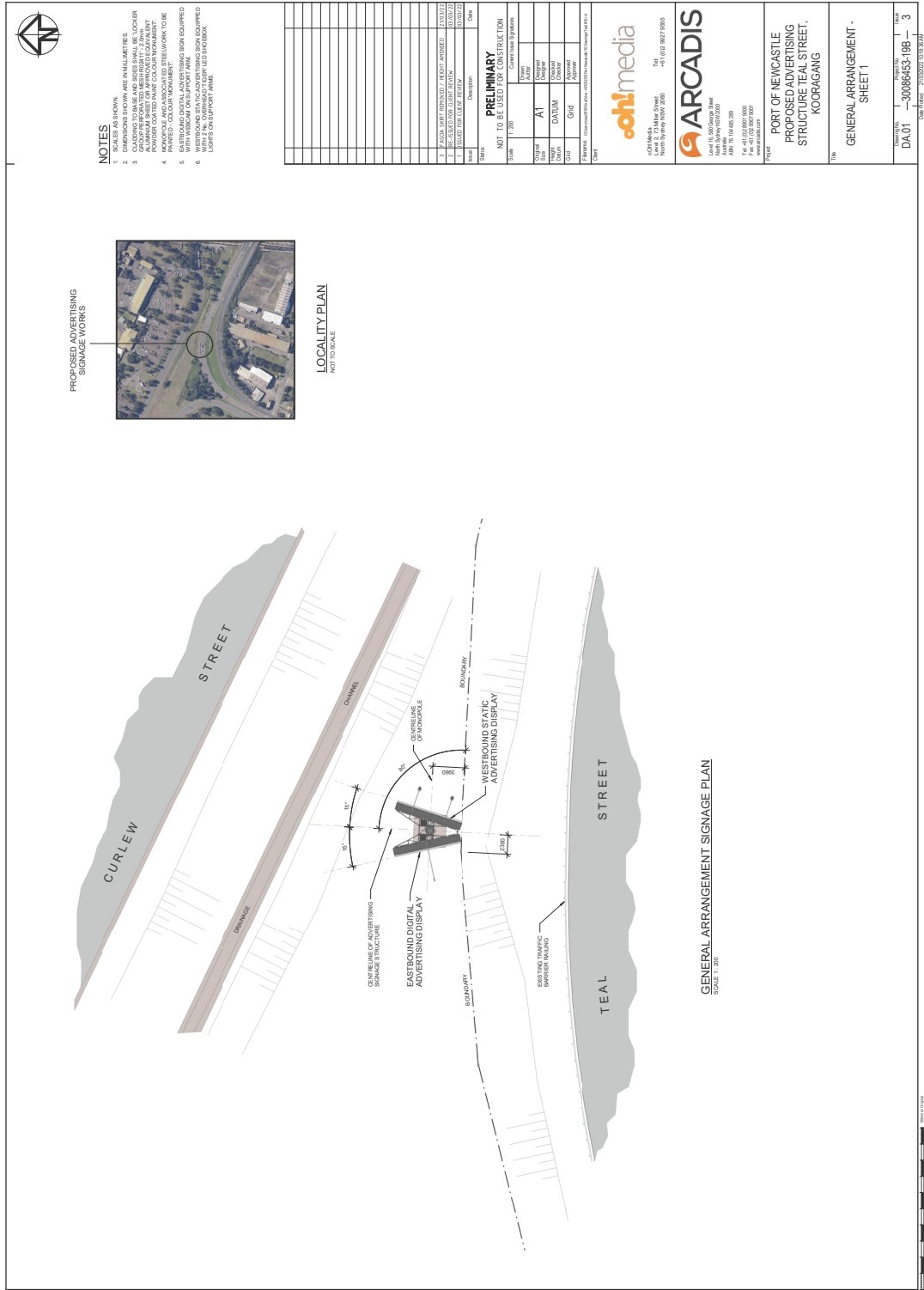
The proposed pylon signage (Sign 1 & Sign 2) to be installed at Teal St, Kooragang, NSW “Location 9”, if commissioned according to this report, complies with the following criteria, guidelines and standards:

- State Environmental Planning Policy (Industry and Employment) 2021 (Refer Appendix C)
- Transport Corridor Outdoor Advertising & Signage Guidelines 2017
- AS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting



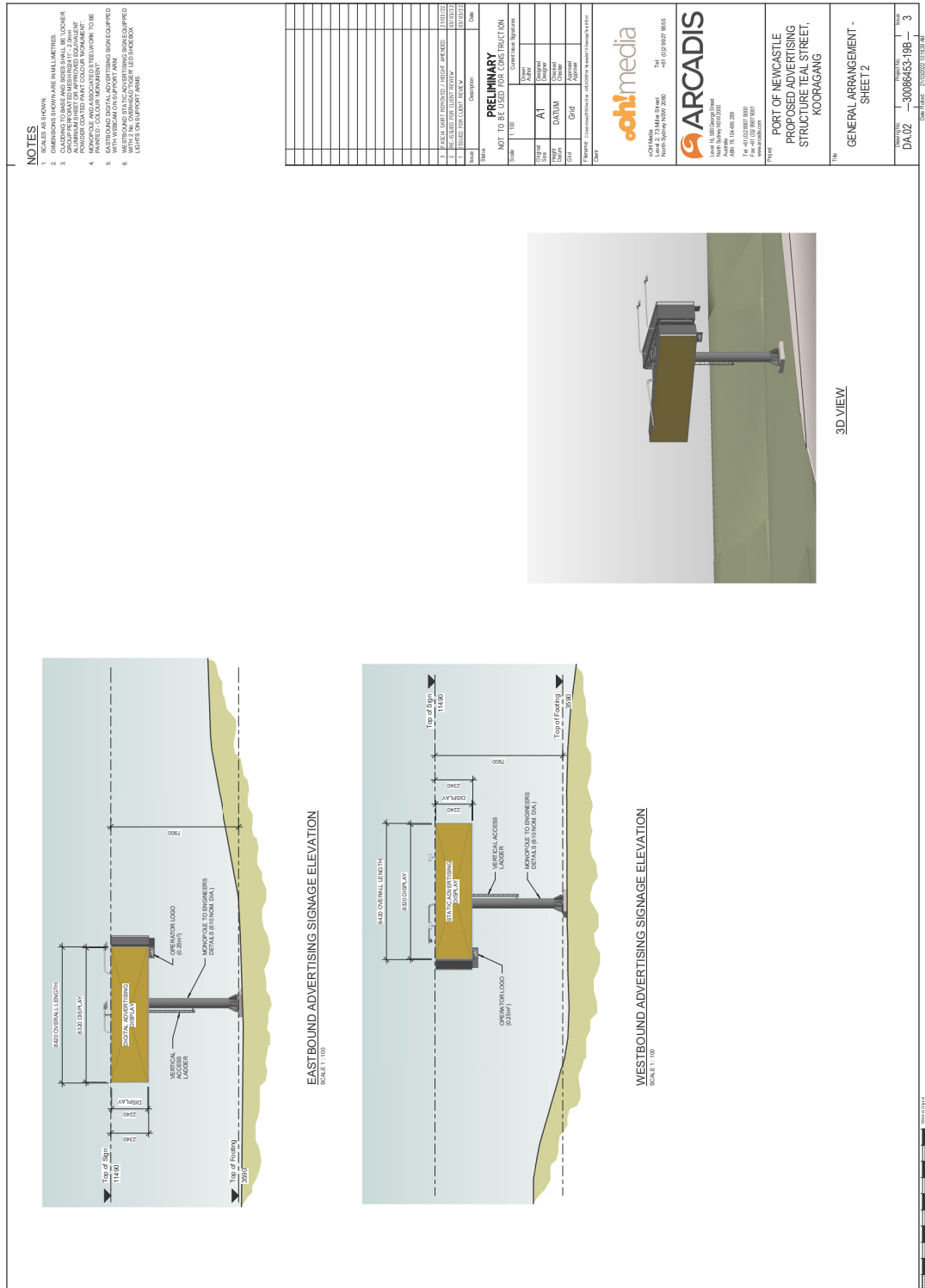
Ryan Shamier
Senior Lighting Designer
Electrolight Sydney
20/05/22

APPENDIX A
SIGNAGE LOCATION



APPENDIX A

SIGNAGE LOCATION



APPENDIX B

SIGN 1 - EXTERNALLY ILLUMINATED SIGNAGE SPECIFICATION



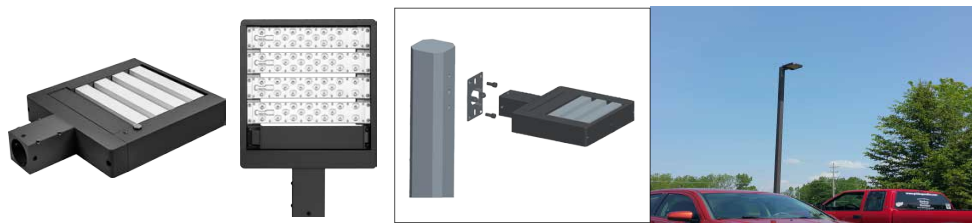
Tiger LED Shoebox Area Lights

120W ■ Fixed or Hinged bracket ■ Lens & colour options

NB OTHER SIZES AVAILABLE ON SPECIAL ORDER - PLEASE ALLOW 7-8 WEEKS FOR DELIVERY

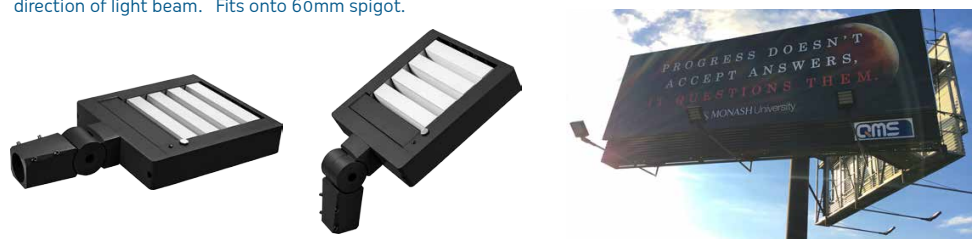
CARPARK SHOEBOX LIGHT - FIXED BRACKET - 120W

Ideal energy efficient replacement for shoebox fitting for carpark, tennis courts, etc.
Fits onto 60mm spigot or onto square pole or wall with adaptor bracket..



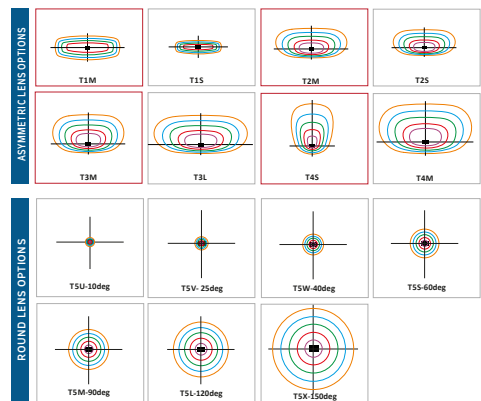
BILLBOARD LIGHT - HINGED BRACKET - 120W

Hinged mounting arm allows fitting to be turned up or down from horizontal or vertical position for precise direction of light beam. Fits onto 60mm spigot.



Photometrics - Lens options available

PLEASE NOTE: Certain size, colour and lens combinations may be special order items and may require 7-8 weeks for assembly & shipping.



Technical Parameters

Specifications	120W
Power consumption: System/LED	121W
Comparable metal halide	250 - 400W
Luminous Flux @ 120 lm/W	16,540 lm
Input current	530mA
Input voltage & frequency	120-277VAC/50-6Hz
Power factor (PF)	≥ 0.95
LED chips	Cree XPG3 x 72
LED driver	Philips Xitanium
Colour rendering index (CRI)	Ra >70
Colour temperature	5,000K
Light distribution	15 lenses available, inc 8 asymmetric
Most common asymmetric lenses	Most common are T2M, T3M, T4S.
Working ambient temperature	-50 ~ +50°C
Warranty	5 years
IP rating	IP67 (modules & driver compartment)
Service life	≥ 50,000 hours
Composition - lenses	Polycarbonate
- Housing/heat sink	Aluminium/steel
- Protective coating on housing	Polyester (100µm min)
- Fascia covering modules	Stainless Steel (304)
Net weight	7.5kg (Carpark) 8kg (Billboard)
Dimensions (LxWxD) fitting	330 x 330 x 110mm exc bracket.
Product order code - shoe box fixed	FA120T (120W)
- shoe box hinged	FA120L (120W)

NB: Please allow 6-8 weeks for shipping of special order items

APPENDIX B

SIGN 1 - EXTERNALLY ILLUMINATED SIGNAGE SPECIFICATION



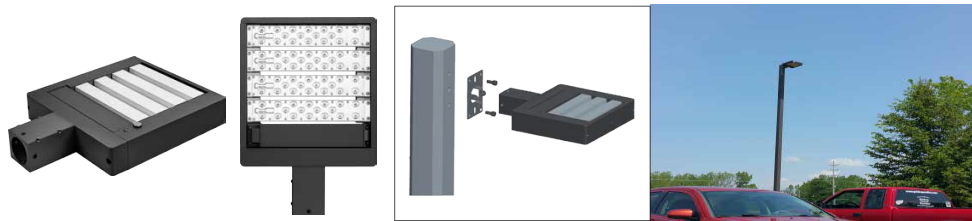
Tiger LED Shoebox Area Lights

120W ■ Fixed or Hinged bracket ■ Lens & colour options

NB OTHER SIZES AVAILABLE ON SPECIAL ORDER - PLEASE ALLOW 7-8 WEEKS FOR DELIVERY

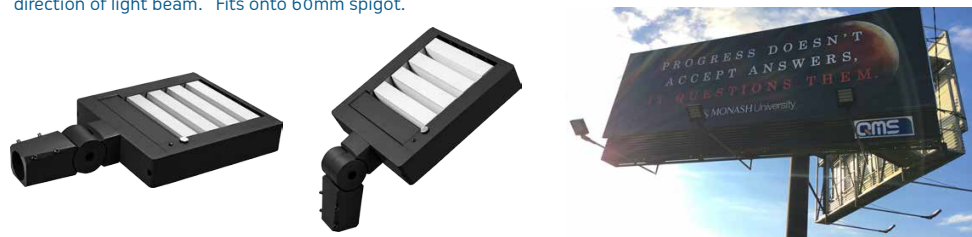
CARPARK SHOEBOX LIGHT - FIXED BRACKET - 120W

Ideal energy efficient replacement for shoebox fitting for carpark, tennis courts, etc.
Fits onto 60mm spigot or onto square pole or wall with adaptor bracket..



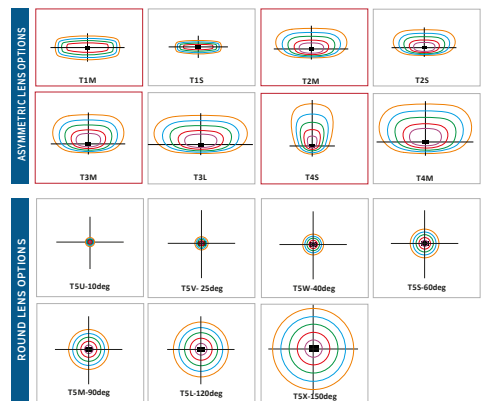
BILLBOARD LIGHT - HINGED BRACKET - 120W

Hinged mounting arm allows fitting to be turned up or down from horizontal or vertical position for precise direction of light beam. Fits onto 60mm spigot.



Photometrics - Lens options available

PLEASE NOTE: Certain size, colour and lens combinations may be special order items and may require 7-8 weeks for assembly & shipping.



Technical Parameters

Specifications	120W
Power consumption: System/LED	121W
Comparable metal halide	250 - 400W
Luminous Flux @ 120 lm/W	16,540 lm
Input current	530mA
Input voltage & frequency	120-277VAC/50-6Hz
Power factor (PF)	≥ 0.95
LED chips	Cree XPG3 x 72
LED driver	Philips Xitanium
Colour rendering index (CRI)	Ra >70
Colour temperature	5,000K
Light distribution	15 lenses available, inc 8 asymmetric
Most common asymmetric lenses	Most common are T2M, T3M, T4S.
Working ambient temperature	-50 ~ +50°C
Warranty	5 years
IP rating	IP67 (modules & driver compartment)
Service life	≥ 50,000 hours
Composition - lenses	Polycarbonate
- Housing/heat sink	Aluminium/steel
- Protective coating on housing	Polyester (100µm min)
- Fascia covering modules	Stainless Steel (304)
Net weight	7.5kg (Carpark) 8kg (Billboard)
Dimensions (LxWxD) fitting	330 x 330 x 110mm exc bracket.
Product order code - shoe box fixed	FA120T (120W)
- shoe box hinged	FA120L (120W)

NB: Please allow 6-8 weeks for shipping of special order items

Calculations have been based on a luminaire tilt angle of 25° for the flood lights illuminating Sign 1. Commissioning of the signage is required to ensure compliance.

APPENDIX B

SIGN 2 - DIGITAL SIGNAGE SPECIFICATION

DAKTRONICS PRODUCT SPECIFICATION

SERIES SPECIFICATION

JVX-1200-10MN-6000-WO

Pixel Configuration	RGB 3-in-1 SMD
Line and Column Spacing	0.394 inches - 10 millimeters
Module Configuration - Pixels (RxC)	32 x 32 pixels
Module Dimensions (HxW)	12.598 x 12.598 inches - 320 x 320 mm
Maximum Power per Module ¹	62.89 Watts
Average Power per Module ¹	15.72 Watts
Display Weight per Module ²	8.58 pounds - 3.89 kilograms
Processing	16 bit
Color Capacity	16 bit (281 Trillion Colors)
Dimming	256 levels
Color Temperature	3,000°-10,000° kelvin (adjustable)
Calibration	pixel to pixel
LED Refresh Rate	3840 hertz
LED Lifetime	100,000 hrs
Brightness - Typical Nits	6000 nits (cd/sm)
Horizontal Viewing Angle	160°
Vertical Viewing Angle (Up/Down)	+15/-55°
Contrast Ratio	1200:1
Service Access	Front or Rear
Cabinet Depth	3.9 inches - 100 millimeters
Cabinet Construction	Die-Cast Aluminum
Ingress Protection Rating	IP-65 Rated Components
Working Temperature Rating ³	-40° to 122° F - -40° to 50° C
Ventilation	Fan
Data Transmission to Display	CAT 6 Cable

Note 1: Power draw varies depending on display ventilation.

Note 2: Display weight includes module, cabinet, and required interconnect hardware and cables. Does not include structure or peripherals.

Note 3: Temperature range is based on typical usage (100% daytime brightness, 50% content, 250W/m² solar, no wind).

Note 4: Ventilation solution may require external supplemental A/C in some areas of the world. Please consult your Daktronics representative regarding your area.

Note 5: Consistent with Daktronics policy of continuing product improvement, specifications shown on this document are subject to change without notice.

Note 6: See contract specific drawings for customized product weights

DISPLAY SPECIFICATION

JVX-1200-10MN-6000-WO-HC-224x800-AUTOBR-LT-NR-FOR-PCA-IPC-CRM

Active Screen Size (HxW)	7.35 feet x 26.25 feet - 2.24 meters x 8 meters
Active Screen Size (Square Dimensions)	192.94 square feet - 17.92 square meters
Number of Modules (HxW)	7 Modules x 25 Modules
Total Modules	175 Modules
Matrix Size (HxW)	224 pixels x 800 pixels
Aspect Ratio	0.28 (Reference - 16:9 = .5625 and 4:3 = .75)
Display Weight ⁴	1501.65 lb - 680.75 kg
Display Weight per Square Dimension	7.79 lb/sq. ft - 37.99 kg/sq. m
Total Average Power Consumed	2751.7 Watts
Total Maximum Power Consumed	11006.37 Watts
Maximum Power Consumption per Square Dimension	57 W/sq. ft - 614.2W/sq. m
Current Draw	47.9 amps @ 230v 1P 16 amps @ 230/400v 3P 45.9 amps @ 120/240v 30.6 amps @ 208Y/120v 3P
Control Method	Packaged Control Components in Control Room via Cat 6 cable

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APPENDIX C

State Environmental Planning Policy (Industry and Employment) 2021

Schedule 5 Assessment criteria

(Clauses 8, 13 and 17)

1. Character of the area

- Is the proposal compatible with the existing or desired future character of the area or locality in which it is proposed to be located?
- Is the proposal consistent with a particular theme for outdoor advertising in the area or locality?

2. Special areas

- Does the proposal detract from the amenity or visual quality of any environmentally sensitive areas, heritage areas, natural or other conservation areas, open space areas, waterways, rural landscapes or residential areas?

3. Views and vistas

- Does the proposal obscure or compromise important views?
- Does the proposal dominate the skyline and reduce the quality of vistas?
- Does the proposal respect the viewing rights of other advertisers?
-

4. Streetscape, setting or landscape

- Is the scale, proportion and form of the proposal appropriate for the streetscape, setting or landscape?
- Does the proposal contribute to the visual interest of the streetscape, setting or landscape?
- Does the proposal reduce clutter by rationalising and simplifying existing advertising?
- Does the proposal screen unsightliness?
- Does the proposal protrude above buildings, structures or tree canopies in the area or locality?
- Does the proposal require ongoing vegetation management?

5. Site and building

- Is the proposal compatible with the scale, proportion and other characteristics of the site or building, or both, on which the proposed signage is to be located?
- Does the proposal respect important features of the site or building, or both?
- Does the proposal show innovation and imagination in its relationship to the site or building, or both?

6. Associated devices and logos with advertisements and advertising structures

- Have any safety devices, platforms, lighting devices or logos been designed as an integral part of the signage or structure on which it is to be displayed?

7. Illumination

- Would illumination result in unacceptable glare?
- Would illumination affect safety for pedestrians, vehicles or aircraft?
- Would illumination detract from the amenity of any residence or other form of accommodation?
- Can the intensity of the illumination be adjusted, if necessary?
- Is the illumination subject to a curfew?

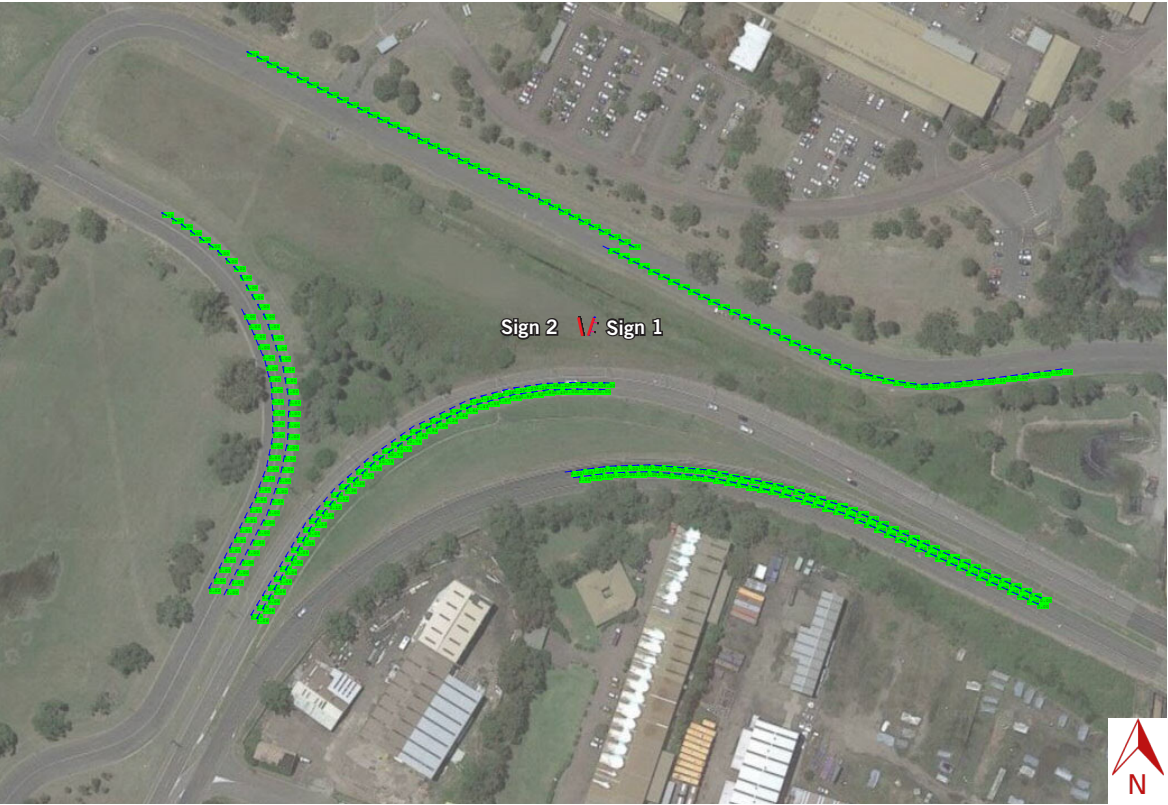
8. Safety

- Would the proposal reduce the safety for any public road?
- Would the proposal reduce the safety for pedestrians or bicyclists?
- Would the proposal reduce the safety for pedestrians, particularly children, by obscuring sightlines from public areas?

APPENDIX D

OBTRUSIVE LIGHTING AND THRESHOLD INCREMENT CALCULATIONS

Calculation Summary			
Label	CalcType	Units	Max
Teal St (eastbound)	Obtrusive - TI	‰	10.75
Teal St (westbound)	Obtrusive - TI	‰	0.00
Curlew St (eastbound)	Obtrusive - TI	‰	0.16
Curlew St (westbound)	Obtrusive - TI	‰	0.00
Raven St (northbound)	Obtrusive - TI	‰	0.02
Raven St (southbound)	Obtrusive - TI	‰	0.00



APPENDIX D

THRESHOLD INCREMENT & OBTRUSIVE LIGHTING CALCULATIONS



APPENDIX D

OBTRUSIVE LIGHTING AND THRESHOLD INCREMENT CALCULATIONS

Obtrusive Light - Compliance Report

AS/NZS 4282:2019, A4 - High District Brightness, Curfew
Filename: 3065.2 Rev B-Copy-58780
19/05/2022 10:23:31 AM

Threshold Increment (TI)

Maximum Allowable Value: 20 %

Calculations Tested (6):

Calculation Label	Adaptation Luminance	Test Results
Curlew St (eastbound)	5	PASS
Curlew St (westbound)	5	PASS
Raven St (southbound)	5	PASS
Raven St (northbound)	5	PASS
Teal St (eastbound)	5	PASS
Teal St (westbound)	5	PASS