



17 February 2022
L168F_R01_P3

SJB Planning
Level 2, 490 Crown Street
Surry Hills NSW 2010

Attention: Leah Dabron

Lilyfield Skate Plaza - Obtrusive Lighting Assessment

Lighting, Art & Science (LA+S) was engaged by SJB Planning to review the obtrusive light of the Lilyfield Skate Plaza, within Leichhardt Park in Lilyfield in accordance with AS4282:2019 *Control of the obtrusive effects of outdoor lighting*.

Australia Standard AS4282 lighting requirements

Australian Standard AS4282 recommends limits to light obtrusion as a benchmark of what a person living in an urban environment can be reasonably expect to tolerate as a result of an adjacent external lighting installation.

The standard recommends differing levels based on time of day and ambient lighting.

There are different criteria for before and after curfew time. As LA+S is uncertain of switch off times for the luminaires at the Lilyfield Skate Plaza, both Non-Curfew and Curfew criteria have been assessed.

There are five main classifications of ambient light level. These classifications are:

- Intrinsically dark
- Dark
- Low district brightness
- Medium district brightness
- High district brightness

Since the site is located in a suburban area, the ambient lighting category for the assessment is considered as category A3 - Medium District Brightness for suburban areas in towns and cities.

There are four parameters that are considered in the obtrusive light assessment:

- **Vertical illuminance** – This is calculated at the property boundary of the affected property for pre-curfew assessments and at the window of habitable rooms for the post-curfew assessment. This is a measure of how much the lighting will light up the rooms in a residence. The illuminance reduces proportional to the square of the distance.

The standard only addresses light coming directly from the light fitting. Light that is reflected off other surfaces is not included in the assessment.

Based on A3 - Medium District Brightness, the maximum vertical illuminance recommended by AS4282 is 10 lux for a Non-curfew assessment and 2 lux for a Curfew assessment.

- **Luminous intensity** – This is an indication of the potential for the installation to cause glare. The luminous intensity does not reduce with distance. Based on medium district brightness, the maximum luminous intensity recommended by AS4282 is 12500 cd for a Non-curfew assessment and 2500 cd for a Curfew assessment.
- **Threshold Increment** - This is a measure of the effect that the lighting will have on the ability for drivers to see objects and signs in the surrounding streets. The recommended limit for dark surrounds is 20% based in an adaptation luminance of 1Cd/m².
- **Upward Light Ratio (ULR)** - This is used as a measure to limit direct spill light to the sky. It is a proportion of the luminous flux of an installation that is emitted at and above the horizontal. Based on medium district brightness A3, the maximum Upward Light Ratio recommended by AS4282 is of 2%.



Lighting Assessment Methodology

In order to establish compliance of the proposed lighting at the Lilyfield Skate Plaza according to the lighting technical criteria in AS4282:2019, computer-based lighting calculation software (AGi32) was used. This computer programme performs illuminance-based calculations. Spill-light calculations are performed on initial luminaire lumens without any maintenance factor applied (MF=1.0).

Photometric data has been obtained from the proposed luminaire manufacturers and used in the obtrusive lighting calculation.

Obtrusive Lighting Assessment Results

Based on the above criteria, the proposed design by Webb Australia meets the lighting criteria requirements of the Australian Standard AS/NZS 4282:2019 for category A3 - Medium District Brightness for suburban areas in towns and cities.

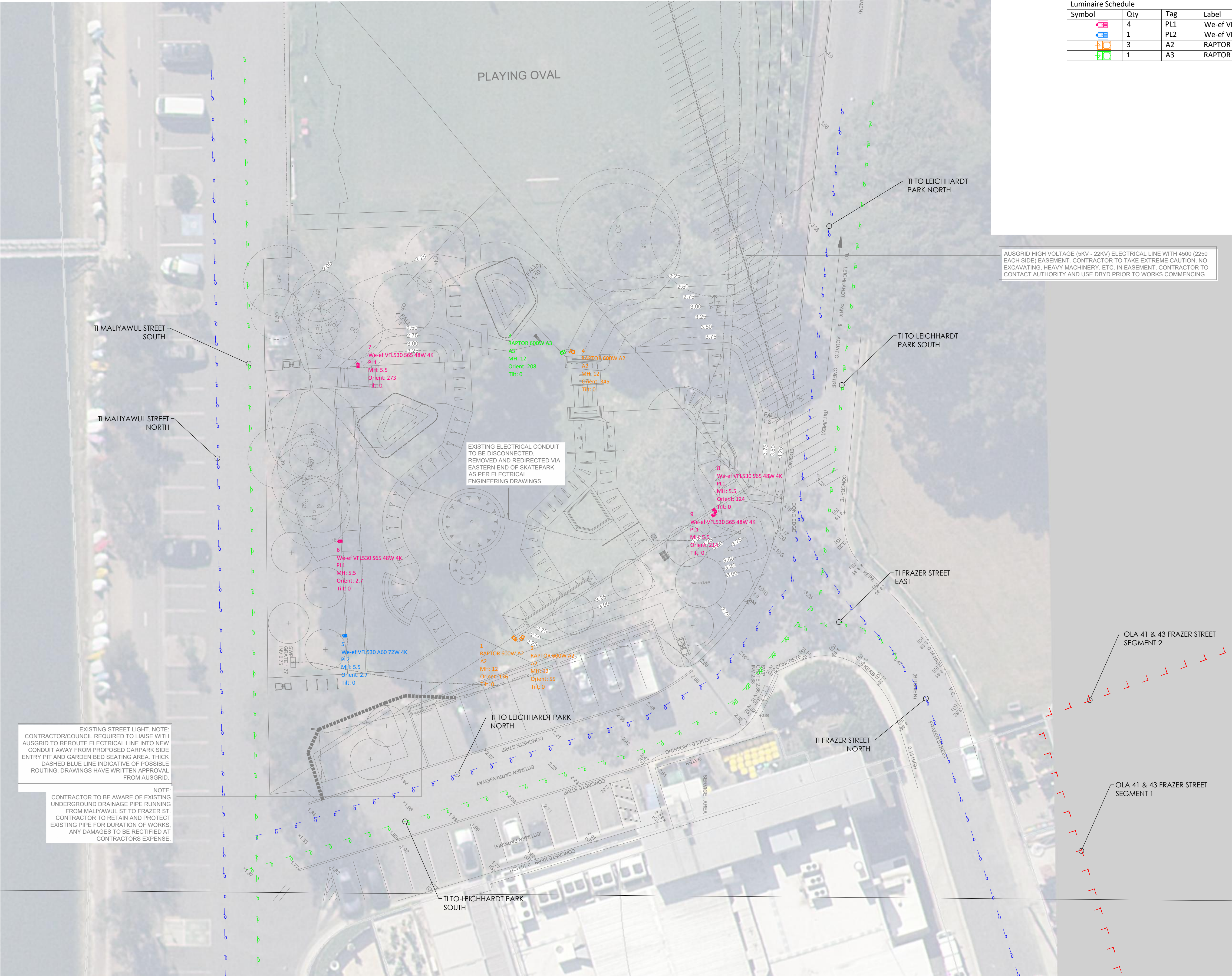
Drawing CL-100 illustrates the proposed lighting design by Webb.

Further Notes

The obtrusive lighting calculation grids shown were traced based on aerial photos retrieved from NSW SIX maps.

Appendix

CL-100 – Obtrusive Lighting Assessment



Luminaire Schedule							
Symbol	Qty	Tag	Label	Arrangement	Total Lamp Lumens	LLF	Description
	4	PL1	We-ef VFL530 S65 48W 4K	SINGLE	N.A.	1.000	108-1178
	1	PL2	We-ef VFL530 A60 72W 4K	SINGLE	N.A.	1.000	108-2041
	3	A2	RAPTOR 600W A2	SINGLE	N.A.	1.000	SR2H740A2LG2
	1	A3	RAPTOR 600W A3	SINGLE	N.A.	1.000	SR2H740A3LG2

Obtrusive Light - Compliance Report

AS/NZS 4282:2019, A3 - Medium District Brightness, Non-Curfew L1
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Illuminance

Maximum Allowable Value: 10 Lux

Calculations Tested (2):

Calculation Label	Test Results	Max. Illum.
OLA 43 & 41 Frazer St_III_Seg1	PASS	0.4
OLA 43 & 41 Frazer St_III_Seg2	PASS	0.4

Luminous Intensity (Cd) At Vertical Planes

Maximum Allowable Value: 12500 Cd

Calculations Tested (2):

Calculation Label	Test Results
OLA 43 & 41 Frazer St_Cd_Seg1	PASS
OLA 43 & 41 Frazer St_Cd_Seg2	PASS

Threshold Increment (TI)

Maximum Allowable Value: 20 %

Calculations Tested (6):

Calculation Label	Adaptation Luminance	Test Results
TI Frazer Street NORTH	1	PASS
TI to Leichhardt Park NORTH	1	PASS
TI Maliyawul St NORTH	1	PASS
TI Maliyawul St SOUTH	1	PASS
TI to Leichhardt Park SOUTH	1	PASS
TI Frazer Street EAST	1	PASS

Upward Waste Light Ratio (UWLR)

Maximum Allowable Value: 2.0 %

Calculated UWLR: 0.0 %

Test Results: PASS

Obtrusive Light - Compliance Report

AS/NZS 4282:2019, A3 - Medium District Brightness, Curfew
Filename: L168F-CL03
17/02/2022 8:59:49 AM

Illuminance

Maximum Allowable Value: 2 Lux

Calculations Tested (2):

Calculation Label	Test Results	Max. Illum.
OLA 43 & 41 Frazer St_III_Seg1	PASS	0.4
OLA 43 & 41 Frazer St_III_Seg2	PASS	0.4

Luminous Intensity (Cd) At Vertical Planes

Maximum Allowable Value: 2500 Cd

Calculations Tested (2):

Calculation Label	Test Results
OLA 43 & 41 Frazer St_Cd_Seg1	PASS
OLA 43 & 41 Frazer St_Cd_Seg2	PASS

Threshold Increment (TI)

Maximum Allowable Value: 20 %

Calculations Tested (6):

Calculation Label	Adaptation Luminance	Test Results
TI Frazer Street NORTH	1	PASS
TI to Leichhardt Park NORTH	1	PASS
TI Maliyawul St NORTH	1	PASS
TI Maliyawul St SOUTH	1	PASS
TI to Leichhardt Park SOUTH	1	PASS
TI Frazer Street EAST	1	PASS

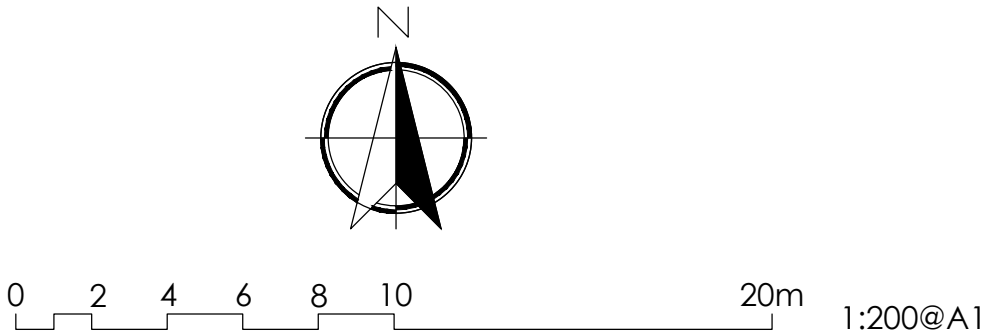
Upward Waste Light Ratio (UWLR)

Maximum Allowable Value: 2.0 %

Calculated UWLR: 0.0 %

Test Results: PASS

Issue	Amendment	Date
P1	PRELIMINARY ISSUE	24-05-21
P2	REVISED ISSUE	08-02-22
P3	REVISED ISSUE	17-02-22



Notes:

- Zoom into digital PDF to read illuminance values
- Obtrusive lighting assessment has been calculated with luminaire maintenance factor of 1.0

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Project	LILYFIELD SKATE PLAZA 70 MARY STREET, LILYFIELD NSW 2040		
Drawing	OBTRUSIVE LIGHTING ASSESSMENT		
Drawn MA	Approv. RM	Date MAY 2021	Scale 1:200@A1
Project No	Drawing No		Rev
L168F	CL-100		P3