

Inner Sydney High School

Electrical Report – Façade Lighting Effects

Prepared for: Grid Electrical

Attention: Luke Greasby

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Prepared by: Steven Brim, Brendan He

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Stantec Australia Pty Ltd

Level 6, Building B, 207 Pacific Highway, St Leonards NSW 2065

Tel: +61 2 8484 7000 Web: www.stantec.com

Revision

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001	06/11/2020	Façade lighting simulation & assessment	BEH	SMB

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1. Introduction

Stantec has been engaged by the Grid Electrical to prepare an assessment of effects of the façade lighting for the Inner Sydney High School tower building. This Report presents the findings of the assessment of lighting effects conducted as part of the environmental assessment of the Project.

The purpose of this Report is to evaluate the potential obtrusive lighting effects from the proposed lighting that has been installed on the tower building façade.

1.1 Lighting Standards

In this Report, the following Lighting Standards have been referred to:

- AS 4282:1997 – Control of the Obtrusive Effects of Outdoor Lighting

The façade lighting level from the activity on site shall not exceed 10 lux (Pre-curfew hours), measured 1.5m inside the boundary of any adjoining rural or residential property.

TABLE 2.1
RECOMMENDED MAXIMUM VALUES OF LIGHT TECHNICAL PARAMETERS
FOR THE CONTROL OF OBTRUSIVE LIGHT
(See Clause 2.7)

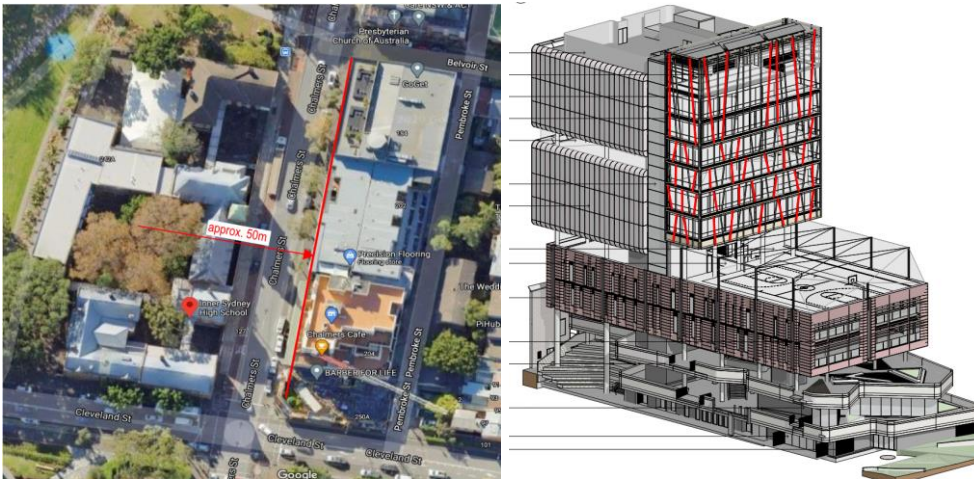
1	2	3	4	5
Light technical parameter	Application or calculation conditions (see also Figure 2.1 and Section 5)	Recommended maximum values		
		In commercial areas or at boundary of commercial and residential areas*	Residential areas	
			Light surrounds†	Dark surrounds‡
Illuminance in vertical plane (E_v)	<i>Pre-curfew:</i> Limits apply at relevant boundaries of nearby residential properties, in a vertical plane parallel to the relevant boundary, to a height commensurate with the height of the potentially affected dwellings. Values given are for the direct component of illuminance	25 lx	10 lx	10 lx
	<i>Curfewed hours:</i> Limits apply in the plane of the windows of habitable rooms of dwellings on nearby residential properties. In the absence of development (i.e. vacant allotment), the limits apply on the potentially affected property, in a vertical plane parallel to the relevant boundary, at the minimum setback permitted for a dwelling, to a height commensurate with land use zoning provisions. Values given are for the direct component of illuminance	4 lx	2 lx	1 lx



2. Lighting Simulation

2.1 Installed Façade Lighting

The building is approx. 50m to the residential building on east, and the façade lighting are installed as per proposed layout.



Façade lighting specs & IES file for simulation are provided by lighting supplier:

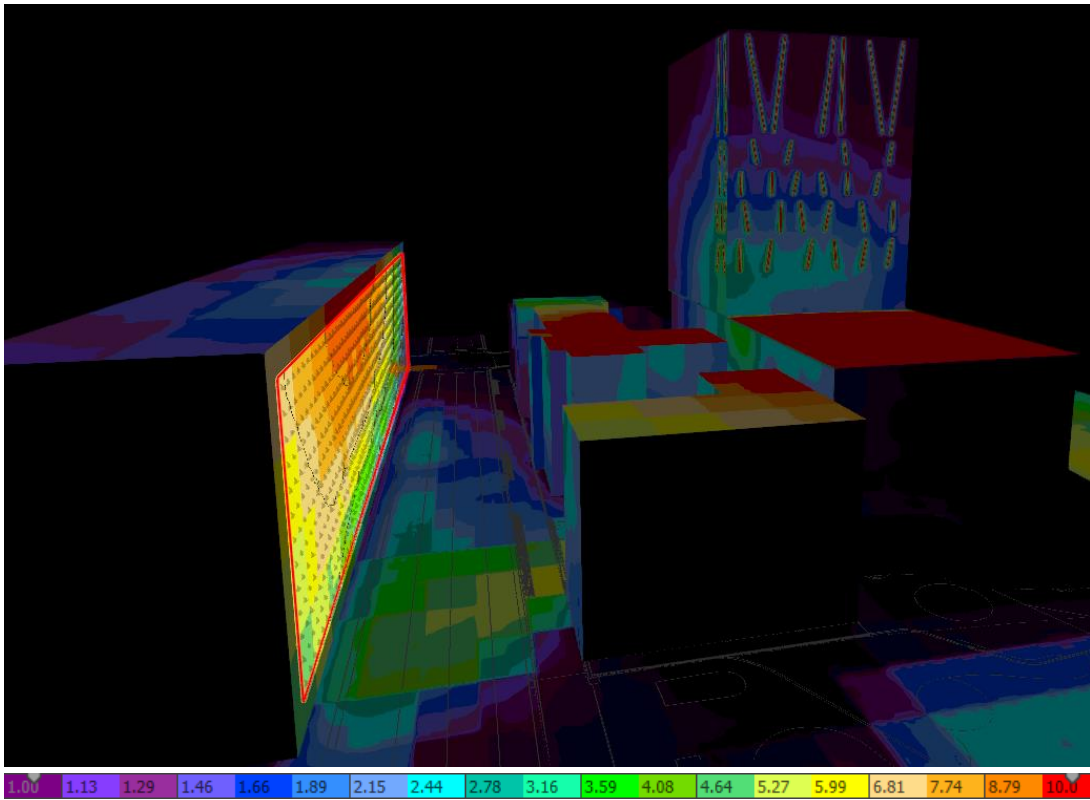
Technical Specification	
Lumen Output range	85lm/m
Module Power	24w/m
Operation Mode	24V Constant Voltage
Color Temperature	2700K / 3000K/ 4000K/ 6000K/ RGB/RGBW
CRI Option	>80, 90+
Lifetime	50000 hrs
Dimension	24mm x 12mm
IP Rate	IP67/IP68*
Dimming Option	1-10V/ DALI
Operating Temp	-40°C - 65 °C

2.1 Simulation Results and False Colour Rendering

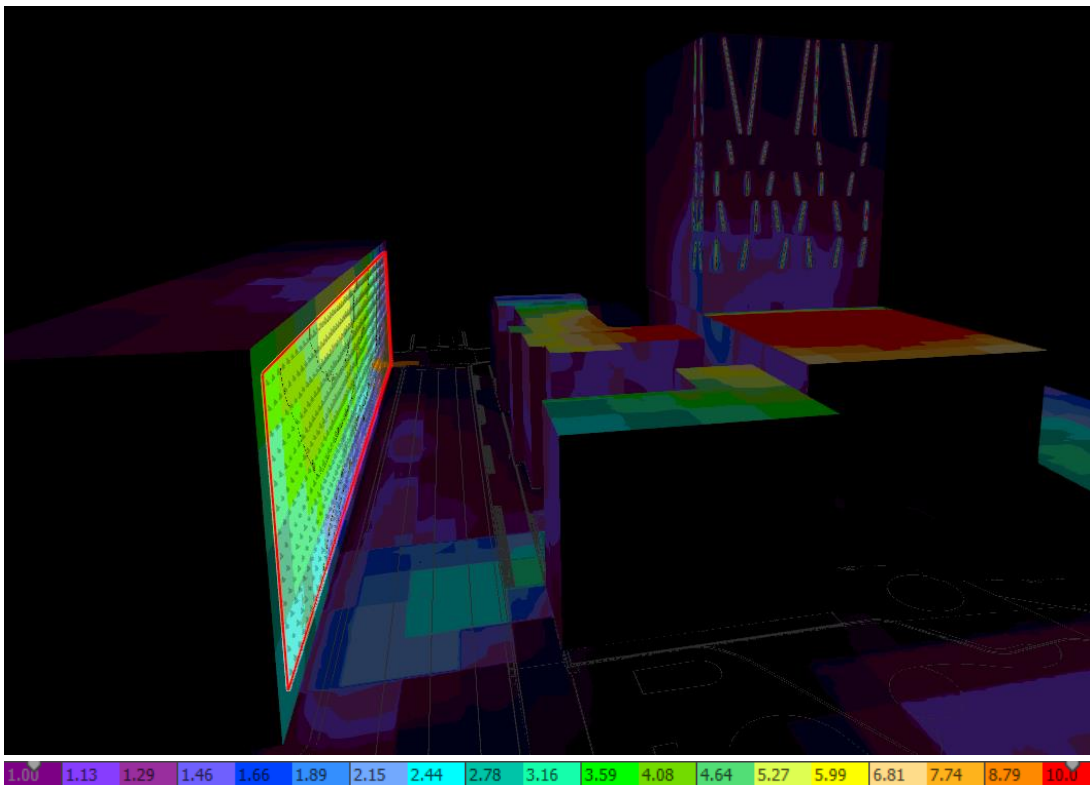
Illuminance	Max	Min	Avg	Compliance
100%	12 lx	.8 lx	6 lx	No
50%	6 lx	.4 lx	3 lx	Yes
25%	3 lx	.2 lx	2 lx	Yes
10%	1 lx	.1 lx	.6 lx	Yes

Simulation results indicated the façade luminaire with <50% are comply with AS4282:1997 recommendation.

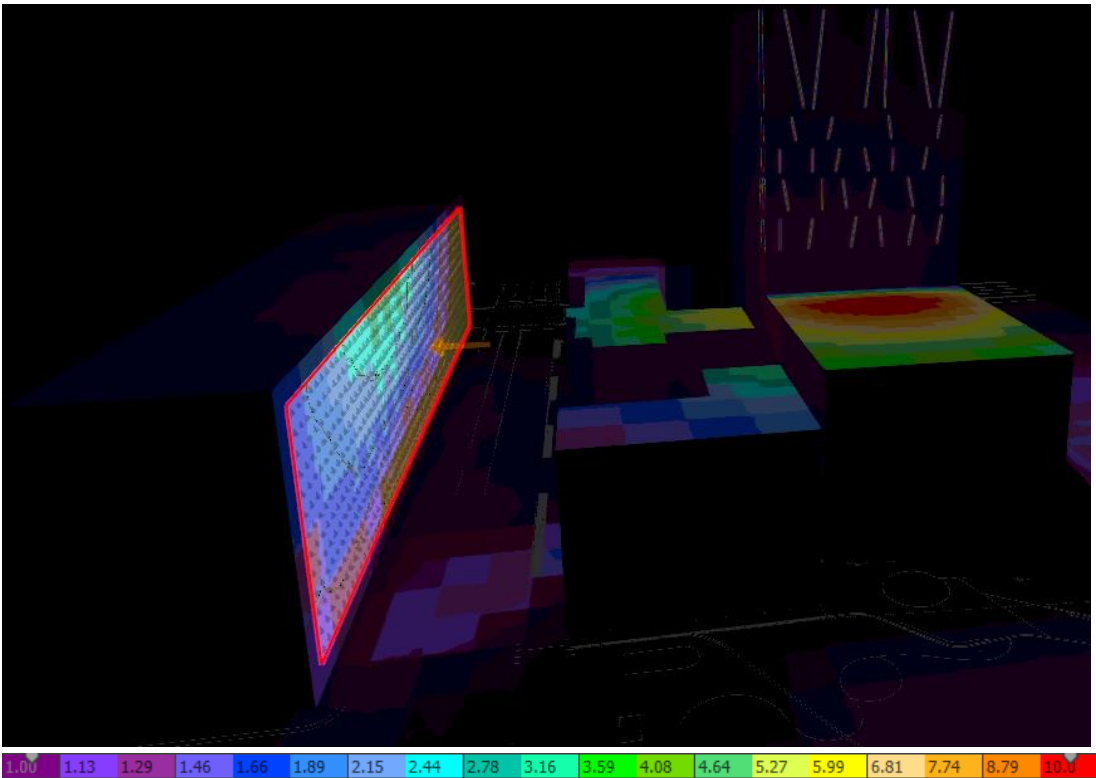
100% Illuminance:



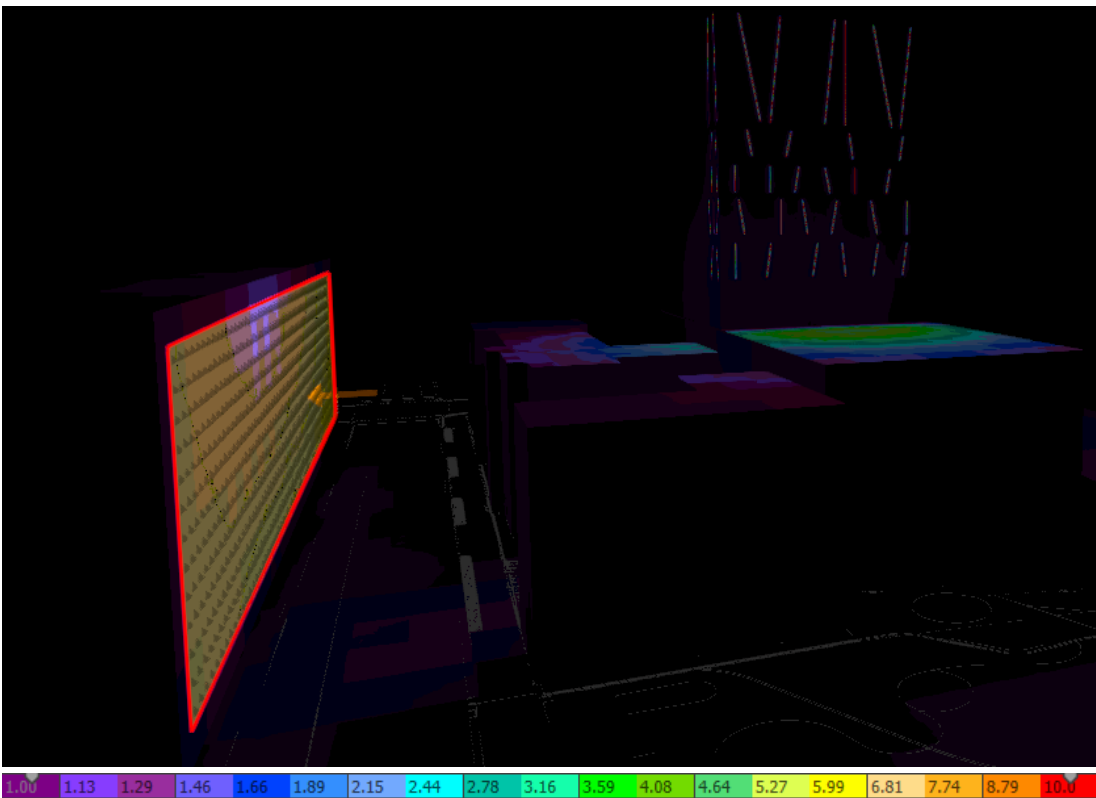
50% Illuminance:



25% Illuminance:



10% Illuminance:



3. Assessment on Site

There are two main lighting effects that have the potential for varying degrees of intrusiveness to residents adjacent to the new building: Spill lighting and Glare.

3.1 Spill Lighting

With all exterior lighting, there is a small percentage of light that will not fall within the target area. The result is wasted 'light spill', which can fall into areas where it is not wanted, such as residences adjacent to the lighting.

There is limited information on the effect of spill light on sleeping patterns and health impairment. A German survey provides the following objective data:

- Of the number surveyed, 2.4% stated they were troubled by spill light.
- Of that percentage, nominally 85% (normally 2% total) complained it caused sleep disturbance.
- Nominally 50% of those affected stated spill light was disturbing, 20% declared it just bearable, and 30% felt unreasonably harassed.

The survey concluded that with an illuminance of more than 3 lux at the window, complaints relating to the interior brightness of the room predominated and from above 5 lux, health impairment may become a factor. No information details whether the windows in question had blinds or similar physical barriers in place, but obviously, these facilities would reduce the effect of spill light into a room.

3.1 Glare

Glare is the brightness of a luminaire when compared with the brightness of the background against which they are seen. For instance, a luminaire looks much brighter (and has higher glare) when viewed against a black sky than when viewed in the surroundings of a brightly lit city street.

There are two forms of glare: Disabling glare and Discomforting glare.

Disabling glare is so intense it prevents adequate vision for accomplishing a task. Discomforting glare can generally be tolerated, but is a nuisance, as it tends to draw the eye towards the light source.

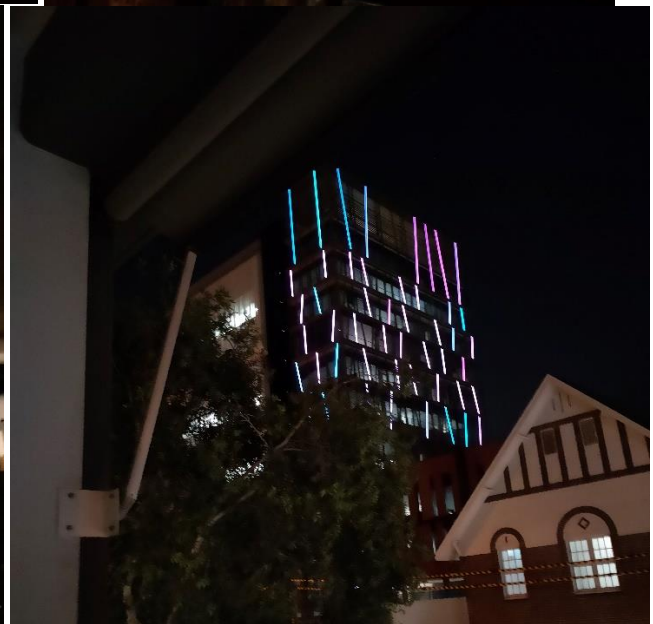
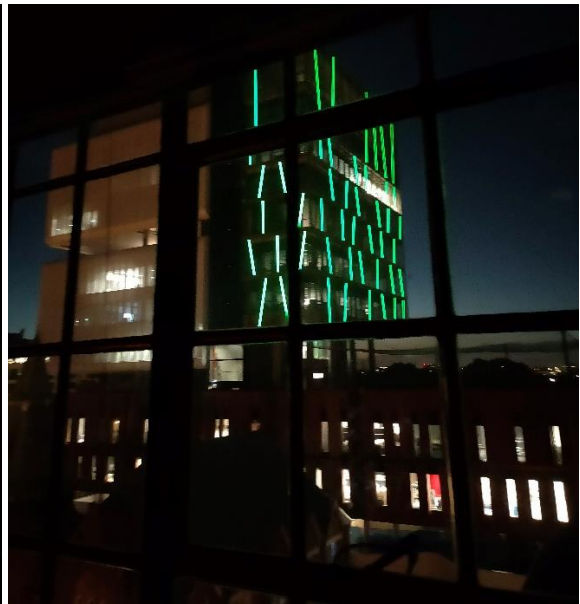
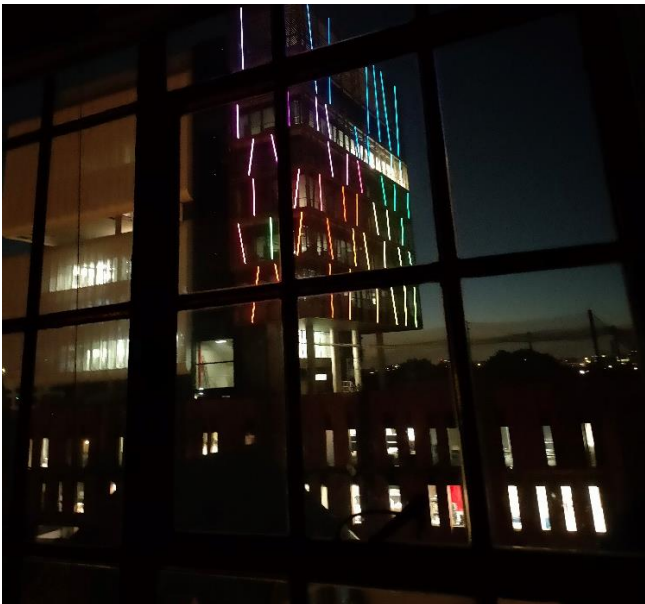
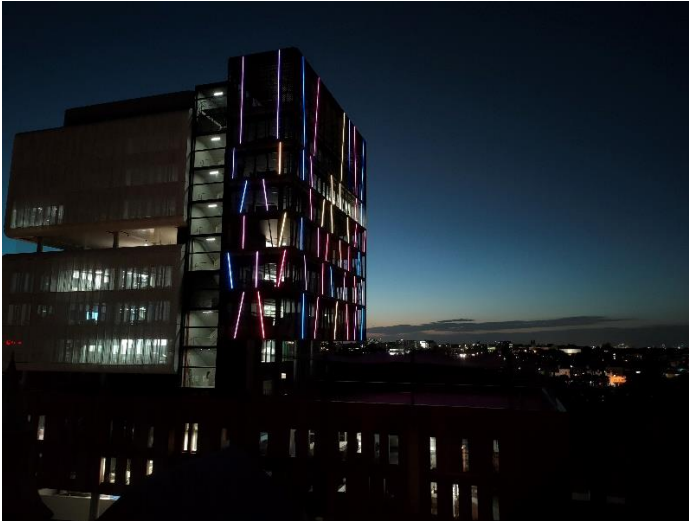
Glare to residential windows, as a result of façade lighting, is treated in response to individual complaints to the local Council and can be controlled by dim the lamp within the luminaires and limit its operating hours. Both these measures reduce the amount of light that is seen by the resident at night.

3.2 Assessment of Lighting Effects

A 1 lux illumination level has been taken as the appropriate cut-off level to determine whether the lighting from the building façade can be deemed obstructive and present a nuisance to nearby residents.

The light level measured on residential building roof top and various resident's windows, balconies with 10% façade lighting illuminance are less than 1lx, which in accordance with the light modelling simulation results.





4. Summary

Based on the assessment criteria of 10 lux, 1.5m into a residential property and German survey recommendation there are no areas where excessive spill light or glare will be prevalent to residential properties when façade lighting illuminance set to 10% during operation hours.



Design with
community in mind

Level 6, Building B
207 Pacific Highway
St Leonards NSW 2065
Tel +61 2 8484 7000

For more information please visit
www.stantec.com

