Consultant Advice

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Project:	**1 Denison Street, North Sydney – Building Services**					**No:**	**G-014 [1.0]**

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Electrical Services – Light Pollution Control of Crown Lighting Design

With regards to the Crown lighting fixture (the linear accent of light surrounding the top of the 1 Denison Street building) and Green Star – Design & As Built v1.1, NDY has produced a calculation to demonstrate design compliance.

AS4282 – Obtrusive Effects of Lighting

In order to comply to this standard, the requirement states that:

- During pre-curfewed hours (6AM to 11PM) the maximum value of light technical parameters at the boundary of nearby residential properties in the vertical plane (taken at the height of the dwelling) does not exceed 25 lx.
- During curfewed hours this maximum value reduces to 4 lx and is to be taken specifically at the windows of habitable rooms of dwellings on nearby residential properties.
- NDY's lighting calculations show that at a spherical distance of 8 meters from the Crown, the lux levels drop below 4 lx and with no neighbouring windows within this distance, the Crown lighting fixture is shown to comply with AS4282.

GreenStar Criteria 27.0

In order to comply to this section, namely "light pollution to neighbouring bodies", the lighting fixture must comply with AS4282:1997 *Control of the Obtrusive Effects of Outdoor Lighting* as shown above. As this is shown to comply, it inherently complies with criteria 27.0 of Green Star – D&AB v1.1.

GreenStar Criteria 27.1

In order to conform to this section, namely "light pollution to night sky", the lighting fixture must be shown to demonstrate a reduction in light pollution using 1 of 2 options:

- 27.1A: Control of upward light output ratio (ULOR); or
- 27.1B: Control of direct illuminance.

NDY has elected to demonstrate criteria 27.1A by directing the luminaire towards the facade which prevents no more than 5% of the emitted light above the horizontal and performing a calculation using the known light distribution of the light fitting. Detailed analysis shows that the facade shall include a small ledge or canopy that provides coverage of less than 35^{o} off the horizontal that controls the direct upward emitted light and can successfully comply to Criteria 27.1. This calculation and sketch is appended to the end of this document.

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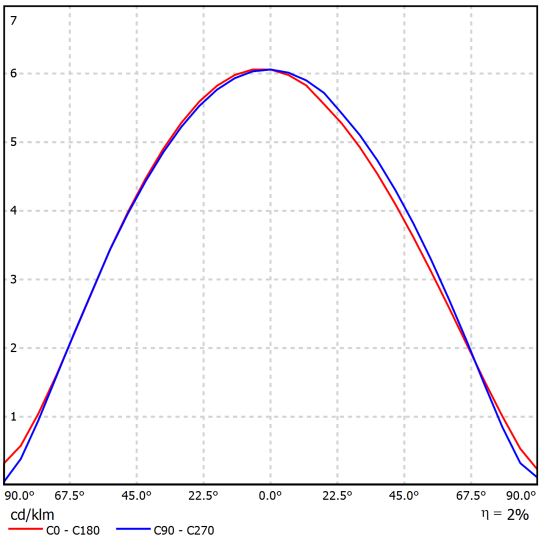
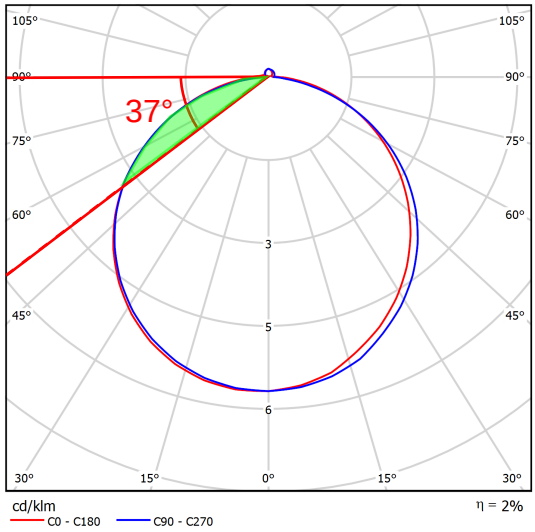
CALCULATION SHEET

LIGHT DISTRIBUTION PLOTS OF CROWN LIGHTING FIXTURE





THE SHADED PART OF THE DISTRIBUTION PLOT ABOVE SHOWS 5% OF THE TOTAL EMITTED LIGHT AND THE CORRESPONDING LIGHT EMISSION ANGLE REQUIRED TO LIMIT THIS.

THE SKETCH BELOW SHOWS THIS ANGLE AND THE MANNER IN WHICH THE UPWARD LIGHT OUTPUT RATIO IS CONTROLLED.