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BUILDING SERVICES ENGINEERS

EXTERNAL LIGHTING REPORT

for

Club Maitland City

14 Arthur Street Rutherford NSW 2320

Project No:
MN14004

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Club Maitland City

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EXTERNAL LIGHTING REPORT

1 INTRODUCTION

This External Lighting report has been produced by Marline Newcastle on behalf of the proponent for the Club Maitland Development in support of the proposed redevelopment and alterations of the site at 14 Arthur Street, Rutherford, NSW 2320.

The purpose of the report is to review the proposed development and to provide concept external lighting recommendations and modelling. The initial design process is also to consider methods to reduce and control the potential spill of obtrusive light onto neighbouring properties. It is expected that these design concepts and recommendations will be developed as part of the ongoing design associated with this development and that compliance with Australian standards will be certified as part of subsequent stages.

1.1 Project Scope

The DA seeks consent for the demolition, design, construction and operation of the proposed Club Maitland Alterations and additions at 14 Arthur Street, Rutherford, NSW 2320..

The proposed works for the DA include:

- Site preparation works including demolition of existing structures and excavation.
- Construction and use of new lower ground floor amenities and Ground floor Function Room and Office space. The development will also include the addition of 2 new undercover bowling greens.
- Provision of lighting to the new covered bowling greens

1.2 Site Description

The Site is an irregular shape with an area. The Site has a northern frontage to Arthur St where there are existing commercial premises; an Eastern Frontage to Woodberry St where there are primarily residential dwellings and a southern frontage to Melbee St which also contains residential dwellings.

Existing development on the site includes the existing club amenities, carparking, and 3 open bowling greens.

1.3 Sensitive Receivers & Surrounding Properties

One of the key aspects of an effective external lighting installation is the strict management and elimination of obtrusive spill lighting into the surrounding community. If not managed correctly, excessive lighting over the boundaries of a site can impact the well-being of nearby 'sensitive receivers' which can include nearby residents, businesses, foot and vehicle traffic, and even wildlife. Obtrusive lighting can affect the surrounding area and its inhabitants in several ways including direct discomfort glare from poorly or carelessly aimed luminaires, and increased night sky brightness from excessive wasted upwards light.

For this project, it is expected that the most at risk sensitive receivers are the existing residents of properties in the vicinity, particularly to the east and south. Due to the proximity of the development to the pre-existing residential area, the control of all external lighting will be critical in ensuring that their existing conditions are maintained. It also is noted that poorly designed or excessive external lighting systems can have impacts well beyond the immediate vicinity of the development.

The control of upwards light will also be critical in ensuring that the night-sky brightness levels in the area are not significantly increased as part of the development.

1.4 External Lighting Overview

The proposed development consists of several external activity areas including the new undercover bowling greens, new entry foyer, and landscaped green boundaries; all of which will occasionally be used at night. A concept external lighting design has been proposed to meet the requirements of AS/NZS 1158.3.1, AS/NZS 4282, and AS/NZS 2560.2.8 while also addressing Crime Prevention Through Environmental Design (CPTED) principles. It is recommended that these initial design recommendations are co-ordinated with all stakeholders and relevant parties throughout the future design of this project to ensure a safe, compliant, and aesthetically pleasing lighting design is provided.

It is noted that this report does not address the provision or modification of street lighting to the existing roadways adjacent to the development as this is outside the scope of this study.

2 Proposed Lighting Levels

The classification of different lighting zones and varying illuminance levels for public spaces and pathways intended for pedestrian use is defined within AS/NZS1158.3.1. This standard outlines a number of different subcategories for public lighting systems and includes criteria for selecting these based on the following criteria: fear of crime, activity level, night time activity level, and the need to enhance prestige.

As part of this design process, initial assumptions have been made about the levels appropriate for this development based on these characteristics. It is strongly recommended that the client/building owner review these assumptions and provide confirmation that they are suitable or submit an alternative as the preferred option.

2.1 Internal Pedestrian Pathways

Lighting is to be provided to the internal pedestrian pathways to ensure sufficient illumination of all users and potential obstacles. This will ensure safe operation of these pathways and limit the risks associated with their use throughout the day. Based on the characteristics shown in the below table from AS/NZS 1158.3.1, it is recommended that a classification of PP4 is applied over these areas.

TABLE 2.2

LIGHTING SUBCATEGORIES FOR PEDESTRIAN AND CYCLIST PATHS

1	2	3	4	5
Type of pathway		Selection criteria[a,b,c]		Applicable lighting subcategory
General description	Basic operating characteristics	Pedestrian/ cycle activity	Fear of crime	
Pedestrian or cycle orientated pathway, e.g. footpaths, including those along local roads[d] and arterial roads[e], walkways, lanes, park paths, cyclist paths	Pedestrian and or cycle traffic only	N/A	High	PP1[c]
		High	Medium	PP2[c]
		Medium	Medium	PP3
		Medium	Low	PP4
		Low	Low	PP5

[a] The selection criteria of Columns 3 to 4 should be separately evaluated. The highest level of any of the selection criteria that is deemed appropriate for the pathway will determine the applicable lighting subcategory.

[b] See Appendix A for guidance on choosing the applicable level of each selection criteria for the environment and purpose of a lighting scheme.

[c] Where there are vertical surfaces of high reflectance (e.g. light coloured walls bordering on an alleyway) alongside the pathway, the next lower lighting subcategory may be selected.

[d] Where the footpath is along a local road and subcategory PP1 or PP2 is selected, the light technical parameters for that subcategory should only apply to the formed footpath.

[e] Footpaths associated with arterial roads are deemed not to require separate lighting provided that—

(a) the road is lit to at least the applicable level of Category V lighting conforming to AS/NZS 1158.1.1; and

(b) the footpath is unshaded, e.g. there are no substantially continuous building awnings, trees (refer to AS/NZS 1158.1.2) and the footpath is contiguous with the roadway.

TABLE 3.4

VALUES OF LIGHT TECHNICAL PARAMETERS FOR PATHWAYS AND CYCLIST PATHS

1	2	3	4	5
Lighting subcategory	Light technical parameters (LTP)			
	Average horizontal illuminance[a,b] $(\bar{E}_h)$ lx	Point horizontal illuminance[a,b,d] (E_{Ph}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b] (E_{Pv}) lx
PP1	10	2	5	1
PP2	7	1	5	0.3
PP3	3	0.5	5	0.1
PP4	1.5	0.25	5	0.05[e]
PP5	0.85	0.14	5	0.02[e]

[a] These values are maintained. See Clause 3.2 pertaining to lumen derating values for non-white light sources.

[b] Conformance is achieved by being greater than or equal to the applicable table value.

[c] Conformance is achieved by being less than or equal to the applicable table value.

[d] Conformance of 50% of E_{ph} shall also be demonstrated over an area of 5 m either side of the pathway—where a verge exists—or up to any structure/fence/property boundary that forms the edge of the pathway, unless deemed otherwise by the relevant authorities (see Clause 3.1.3.5).

[e] For luminaires with mounting heights of 1.5 m or less, the E_{Pv} values need not be applied.

2.2 Obtrusive Lighting

In order to ensure that the public lighting provided to all open areas does not adversely impact the surrounding properties and residents, it is recommended that the lighting design is provided in compliance with AS 4282. Based on the intended commercial use of the development, it is recommended that the area is categorised as having a 'high district brightness' as classified in AS 4282 Table 3.1. This zoning is appropriate for residential areas abutting commercial developments and while still ensuring a high level of control of the potential spill lighting across any boundaries and into any residences.

The classification can be applied to any detailed calculations undertaken during future detailed design iterations.

TABLE 3.1

ENVIRONMENTAL ZONES

Zones	Description	Examples
A0	Intrinsically dark	UNESCO Starlight Reserve. IDA Dark Sky Parks. Major optical observatories No road lighting -unless specifically required by the road controlling authority
A1	Dark	Relatively uninhabited rural areas No road lighting - unless specifically required by the road controlling authority
A2	Low district brightness	Sparsely inhabited rural and semi-rural areas
A3	Medium district brightness	Suburban areas in towns and cities
A4	High district brightness	Town and city centres and other commercial areas Residential areas abutting commercial areas
TV	High district brightness	Vicinity of major sports stadium during TV broadcasts
V	Residences near traffic routes	Refer AS/NZS1158.1.1
R1	Residences near local roads with significant setback	Refer AS/NZS 1158.3.1
R2	Residences near local roads	Refer AS/NZS 1158.3.1
R3	Residences near a roundabout or local area traffic management device	Refer AS/NZS 1158.3.1
RX	Residences near a pedestrian crossing	Refer AS/NZS 1158.4

NOTE: Recreational areas are not considered commercial.

3 Concept External Lighting Designs

3.1 Lighting Design Concept

The Makmax and Marline lighting designs will be designed in accordance with AS2560.2.8 and AS/NZS 1158.3.1 and are proposed to provide an indication of how the new undercover bowling greens and building façade will be illuminated. This will generally consist of suspended LED high-bay luminaires over the greens and a mixture of low-output LED luminaires throughout the surrounding paths. All other external lighting will be provided as low-level pedestrian lighting and/or solely used to highlight specific elements of the new structures. Bollard lighting will generally be of a low-level to minimise the impact on surrounding properties and to avoid unnecessary glare. While not expected to be required as part of the design, if pole-mounted luminaires are required to achieve compliance in select areas, these would be positioned away from boundaries and arranged to ensure compliance with AS 4282 with respect to obtrusive light.

Lighting will be positioned to direct light within the site boundary to reduce the risk of obtrusive lighting into neighbouring properties. Lighting shall be kept to a minimum where practicable but demonstrate compliance with the relevant standards and highlight accident prone areas such as stairs and changes of level.

All external lighting shall be controlled by a photocell and time switches arrangement to suit the end users requirements. Manual override switches will be provided to allow for manual control when required.

3.2 Obtrusive Lighting Prevention

As part of the detailed design process undertaken prior to construction of the development, a detailed study to demonstrate compliance with AS 4282 will be undertaken. This must take into account specific locations and specifications of all external lighting (including decorative building lighting) and the positioning of adjacent residences, roadways, and businesses. In order to control the obtrusive light spill from the development and the potential affects on sensitive viewers, it is recommended that the following measure are considered:

- Detailed design is to be certified as compliant with AS 4282 for a suitable district brightness level
- Low-level luminaires (4m or lower) are to be used in preference to higher mounting locations (4m+)
- Highly controlled optics are recommended to specifically illuminate specific areas in place of wide-angle ‘flood’ type luminaires that incorporate little control of the light distribution.
- Position luminaires away from boundaries or behind physical obstructions which will assist in controlling the spread of light
- Provide backlight shields and glare reduction hoods as a last resort where other methods are not effective or applicable.

It is expected that a careful and deliberate application of the above principles will result in an external lighting system that will control the obtrusive lighting produced and limit any impacts on the surrounding sensitive receivers.

4 Summary

4.1 Lighting Design Summary

Through the careful selection and design of the external lighting for the Club Maitland City alterations and additions project, it is expected that an effective installation can be provided that will comply with all requirements of AS/NZS 1158.3.1, AS 4282, and all other applicable standards and DA conditions. Alignment of the lighting design with the CPTED principles incorporated into the design of the site will also ensure that the lighting system assists in promoting the safe use of the facility. The designs provided within this report are intended to provide a guide for the subsequent detailed design process and assist in refining the masterplan and concept designs.