



Proposed Development
872-874 Beach Road
& 2 Tiri View Place,
Waiake, Auckland

Exterior Lighting Assessment



Proposed Development 872-874 Beach Road & 2 Tiri View Place, Waiake, Auckland

Exterior Lighting Assessment

Prepared By

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Ewen Cafe
Principal Lighting Designer
Managing Director

A handwritten signature in black ink, appearing to be 'Ewen Cafe', is written over a horizontal dotted line.

3D Lighting Design Limited
553 Peak Road Kaukapakapa
RD2 Helensville
Auckland 0875
New Zealand

Reviewed By

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Telephone: +64 21 736 877

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Executive Summary

3DLD has been engaged by LiFi Ltd to provide an exterior lighting design for a proposed residential development at 872-874 Beach Rd and 2 Tiri View Place, Waiake in Auckland. The design is required to comply with the Auckland Unitary Plan (operative) and AS4282-1997 "Control of the obtrusive effects of outdoor lighting". We have assessed the general illuminance across the common area against AS/NZS1158.3.1:2005 "Lighting for roads and public spaces" for this report.

The assessment is to determine compliance with Section E24 "Lighting" of the Auckland Unitary Plan (Operative in part) on spill light and glare within Living Zones. Our results are shown on the attached drawings LC01 to LC04 inclusive.

We have concluded that the proposed exterior lighting design will comply with Section E24 "Lighting" of the Auckland Unitary Plan (Operative in part). The maximum horizontal illuminance within the common area is 16.4 lux measured at pavement level. The maximum vertical illuminance is 0.1 lux measured on the eastern boundary adjacent to the main entry driveway, above the proposed 1800mm fence.

Preamble

2.1 Introduction

This report details the Lighting Design and Calculations prepared for the common exterior area of the proposed development, comprising vehicular driveway, pedestrian footpath, and adjacent car parking bays.

2.2 Background

The proposed development is situated 872-874 Beach Rd and includes 2 Tiri View Place, Waiaki. It comprises the re-zoning of four existing residential lots into a single medium-density residential site. The affected lots include Lots 1, 2 and 3 of DP79490.

The drawings provided show the proposed development to comprise 16 dwellings surrounding a common area, pedestrian footpaths, vehicle driveway and car parking facilities. (image 1)

Our brief was to provide lighting for the common area to facilitate the safe movement of pedestrians and vehicles while ensuring minimum adverse lighting effects to surrounding properties. The client has requested that we base our design on solar-powered lighting equipment from Solar Bollard New Zealand. The proposed lighting design is described in the drawings provided with this report.

The design comprises solar-powered bollards throughout the common area and car parking areas. These luminaires are entirely self-sufficient, requiring no connection to mains power. The luminaires can be programmed to turn off after a period of operation. However, we have assumed that they may potentially operate from dusk to dawn, and so our calculations consider the more stringent limits applied to curfew hours (10.00 pm to 7.00 am)

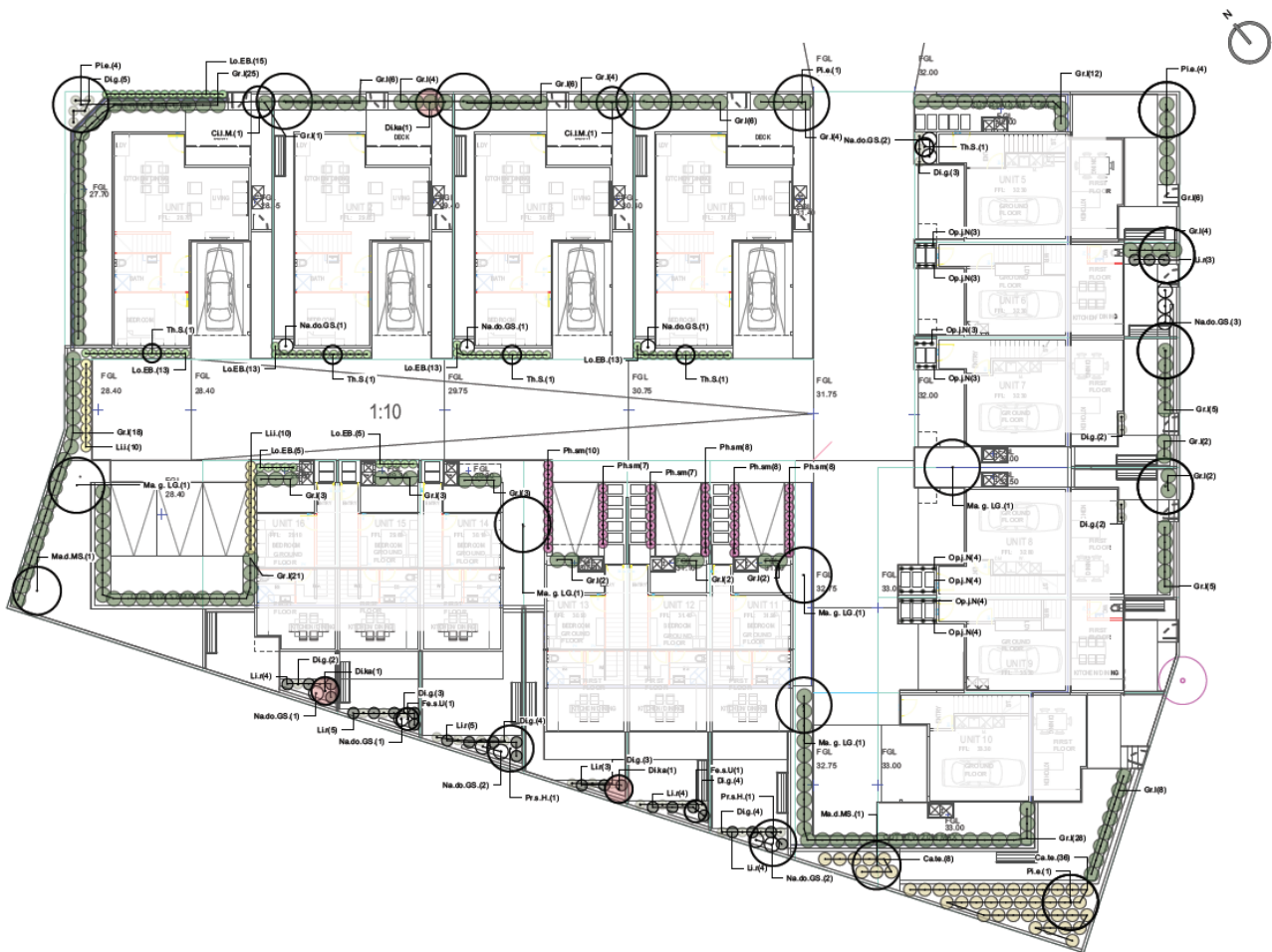


Image 1 - Proposed Site Plan

2.3 Purpose of Report

This report details the modelling, design and calculation methodology undertaken for the proposed development site. It is intended to demonstrate compliance with Auckland Unitary Plan, Section E24 “Lighting” and Lighting Category 3 (medium brightness) to Residential – Terrace Housing and Apartment Zone as described in Table E24.6.1.1.

We have applied control limits per Table E24.6.1.2 “Horizontal and Vertical Illuminance at a boundary” and also Table E24.6.1.3 “Vertical Illuminance at a window” to the design relating to effects from site-wide illuminance. Regarding glare from luminous intensity, Tables E24.6.1.5 (Pre-Curfew) and Table E24.6.1.6 (Curfew) apply.

We note that we do not have specific locations of windows within dwellings adjacent to the site. We have assessed illuminance and luminous intensity at the boundary of the development site. We are applying a more rigorous approach to compliance than required within Section E24 “Lighting” of the Auckland Unitary Plan.

As the common area is privately owned land within site, there are no specific guidelines for illuminance levels described within the Auckland Unitary Plan. However, to demonstrate that the proposed illuminance of the area is sufficient to enable safe movement, we have taken guidance from AS/NZS1158.3.1:2005 “Lighting for roads and public spaces” for this report.

Methodology

To calculate the lighting effects, it was necessary first to construct a 3D computer simulation of the site, buildings, car park and immediate surroundings as per the drawings provided. The model was created using AGi32 v19.15, a specialist lighting design and calculation computer program.

A series of horizontal calculation points were placed at ground level along the footpath, driveway, and parking areas, as well as vertical calculation points along both sides of the entry driveway boundaries where proposed lighting is closest to fence lines.

The vertical calculation points were inserted in a grid formation approximately 1800mm from ground level, allowing for a proposed timber fence up to a height of 10m to capture any upward spill from the proposed installation. (image 2)

All calculations performed using direct illuminance only (no reflectance) based on photometric data with no depreciation factors applied.

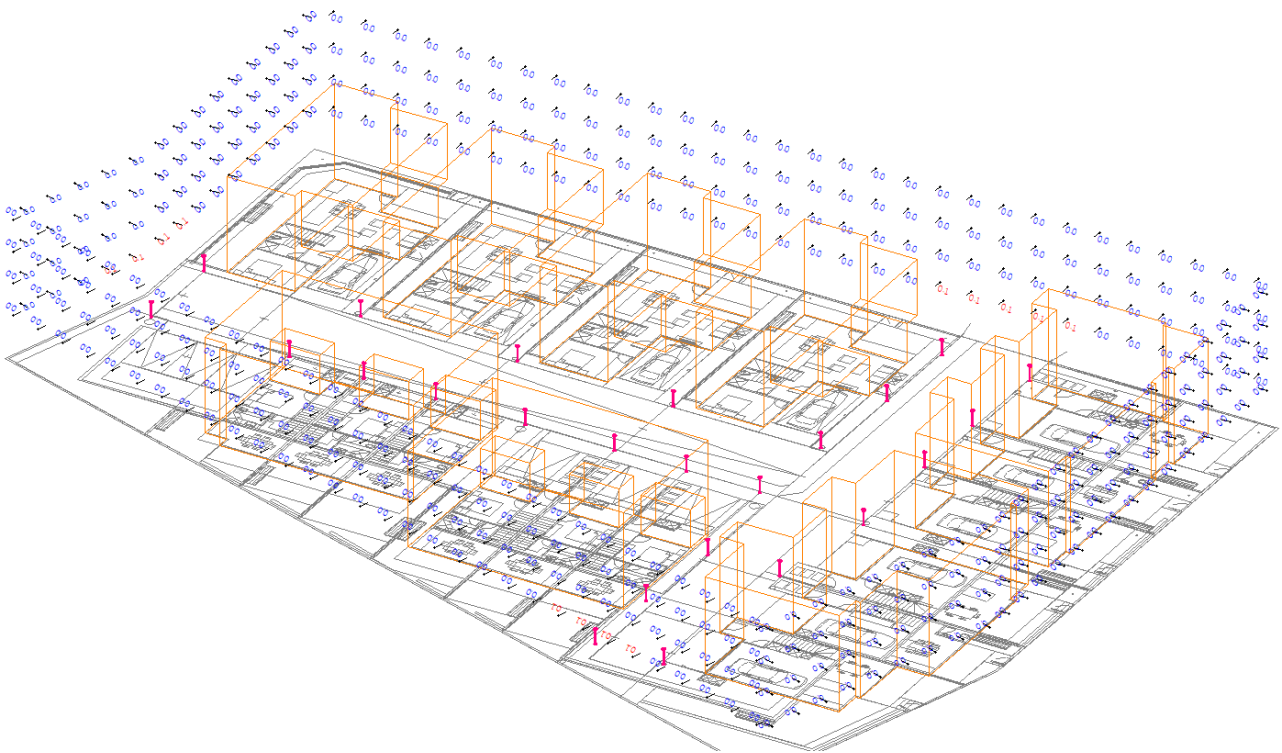


Image 2 - Boundary Calculations

Results

4.1 Calculation results

Our computer calculations indicate that the general (horizontal) illuminance levels tend to be low, which is expected given the low luminous output of the solar bollards. However, these low levels provide sufficient light for the safe movement of people at night while maintaining a comfortable visual aesthetic for all residents.

When assessed against AS/NZS1158.3.1:2005, we find that the driveway area achieves the requirements of lighting category P4; the calculated average illuminance of 2.0 lux at ground level is greater than the 0.85 lux requirement of the standard.

The pedestrian footpaths achieve the horizontal illuminance requirements of lighting category P2. The minimum calculated average illuminance of 5.32 lux at ground level is greater than the 3.5 lux requirement of the standard. Horizontal illuminance calculation results and isolux plot can be found on the attached sheets LC02 - LC03.

Spill light and glare have been assessed against Section E24 "Lighting" of the Auckland Unitary Plan.

The computer calculations show a maximum vertical illuminance of 0.1 lux adjacent to the driveway at the north-eastern residential property boundary and main entry from Tiri View Place. 0.15 lux is lower than the 10 lux Pre-Curfew and 2 lux Curfew limits per Table E24.6.1.3.

Computer simulations also indicate that the maximum calculated luminous intensity in any direction will be 4 candelas. This value is considerably lower than the 10,000 candela Pre-Curfew and 1000 candela Curfew limit provided in Table E24.6.1.5 and E24.6.6, respectively.

4.2 Risks, assumptions, and uncertainties

1. We have not considered any mitigation from landscaping and tree planting. Therefore, the calculation results shown are worst-case.
2. Calculation results are based on the drawings and information provided to us.

Conclusions

Our computer simulations indicate that the predicted illuminance levels within the proposed site are fully compliant with Section E24 "Lighting" of the Auckland Unitary Plan (operative) in terms of spill light and glare, and AS4282-1997 "Control of the obtrusive effects of outdoor lighting."

We can also conclude that although the predicted horizontal illuminance levels are low, they do achieve the intended requirements of AS/NZS1158.3.1:2005 categories P4 and P2. The predicted illuminance should be sufficient to enable safe movement at night around the common areas of the site while providing a comfortable aesthetic for residents.

End of Report



3D Lighting Design
553 Peak Road, Kaukapakapa
RD2 Helensville, Auckland 0875
New Zealand

t: +64 21 736 877
e: ewen@3dlightingdesign.com
w: www.3dlightingdesign.com