National Rehabilitation Hospital

Site Lighting Report

Issue 2 – September 2014

12_D026
National Rehabilitation Hospital

Site Lighting Report
Issue 2 – EIS Submission

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Appendix A - EXTERNAL SITE LIGHTING DRAWING
1.0 EXECUTIVE SUMMARY

This report outlines the design intent and considerations to be taken into account with regards to the site lighting scheme within the redevelopment of the National Rehabilitation Hospital, Dun Laoghaire, Rochestown Ave, Co. Dublin.

The report considers the lighting design as developed by Ethos Engineering in conjunction with Mitchell + Associates Landscape Architects and O’Connell Mahon Architects which will be developed with the following principal considerations:

- Provide adequate illumination to contribute towards the safe use of the site by both vehicles and pedestrians.
- Enhance site security.
- Provide a visually interesting environment.
- Contain the lighting within the site to levels which will not impact on neighbouring surroundings.
- Minimise light pollution and visual glare for both pedestrians and surrounding areas.

The complete external lighting installation will be designed in accordance with the regulations for electrical services as ETCI National Rules for Electrical Installations ET 101 2008 as well as Design Guidelines from CIBSE and CIE regarding Illumination levels and “Obtrusive Light” to neighbouring properties respectively. These design criteria are outlined in Section 2.0.

The predicted performance of the external lighting installations has been assessed in detail using Lighting Simulation software. The Lighting Simulation software used was Relux.

A proposed design comprising of column lighting to the Car Park and entrance roadways is described in Section 3.0. In each case, an indicative example of the type of proposed luminaire (light fitting) and associated lamp specification have been included, with accompanying images, photometric and dimensional data.

Section 4.0 provides analysis of the predicted illumination results for both the overall site (ground) and the neighbouring woodland and surrounding roadways in order to assess design illumination and associated potential light overspill respectively. The results indicate how the design proposal, whilst providing a design Illumination level of 30 Lux to the Car Park, would have negligible impact on its surrounding environment and that the predicted light overspill of 2 – 4 to Lux the surrounding environment which is considerably lower than the recommended maximum level of 10 Lux, in compliance with design criterion for obtrusive light within an suburban environment as stated in CIE - Guide to the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations.
2.0 DESIGN CRITERIA

The design criteria applied to the proposed site lighting installations shall be in accordance with CIBSE Lighting Guide – The External Environment for car park and amenity external spaces and CIE Guide to the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations. These design guidelines respectively state: Design Illumination level of 20 Lux, measured horizontally at Ground level on the site.

Maximum “Obtrusive Light” Illumination level of 10 Lux to neighbouring properties, measured both vertically and horizontally. As recommended by “CIE - Guide to the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations”.

The design criterion for Obtrusive Light outlined above varies by category of Surrounding Light Environment; namely, Natural, Rural, Suburban or Urban. It may be noted that the Suburban category (“Medium district brightness”/“Residential Suburbs”) was selected.

3.0 PROPOSED INSTALLATION

The proposed site lighting installations comprise of two aspects 6 metre high column mounted lighting to Car Park areas and roads and 5 metre high column mounted lantern lighting to garden spaces.

It is proposed to provide 6m high column-type light fittings to Car Park and Road areas in order to achieve an average illumination level of 20 Lux at ground level and 5m high lanterns to be mounted in Garden Areas. The proposed column light fittings are indicatively displayed in the accompanying images fig 1 & 2 below.

The luminaire proposed for the Car Park would be provided with single LED lamp module with a system power consumption of 31 Watts, with a total lumen output of 3,320 lumens. The photometric curve displayed in fig 3 indicates how all light output is directed downwards; i.e. no risk of sky glow.

It is proposed to provide 5m high lantern-type light fittings to garden areas in order to achieve an average illumination level of 10 Lux at ground level. The proposed light fittings are indicatively displayed in the accompanying images fig 2.

The proposed installation will have dimming capabilities for post curfew hours, reducing lighting overspill and energy usage.

It is proposed that low level feature lighting will be provided to external areas, building surroundings and the potential uplighting of site landscaping.
Fig 1 - 3D – Luminance Image of Proposed Installation

Lighting to site roads to be mounted on 6m high columns

Lighting to Car Parks to be mounted on 6 m high columns

Fig 2 - 3D – Luminance Image of Proposed Installation

Lighting to Gardens to be mounted on 5m high columns
It is proposed to provide 6m high column-type light fittings to Car Park and Road areas in order to achieve average illumination level of 20 Lux at ground.

The proposed column light fittings are indicatively displayed in the accompanying image.

The indicative luminaires selected would be provided with 31 Watt LED lamp modules, with a lamp output of 3,320 lumens.

The photometric curve displayed indicates how all light output is directed downwards; i.e. no risk of sky glow.

<table>
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<tr>
<th>Type 1</th>
<th>Sky Glow</th>
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<td><img src="image1.jpg" alt="Type 1 Luminaire" /></td>
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**Fig 3 – Proposed Car Park Luminaire**
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<tr>
<th>Ref</th>
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<tr>
<td>Type 2</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Photometric Curve" /></td>
<td>It is proposed to provide 5m high lantern-type light fittings to garden areas in order to achieve average illumination level of 10 Lux at ground level. The proposed column light fittings are indicatively displayed in the accompanying image. The indicative luminaires selected would be provided with 29 Watt LED lamp modules, with a lamp output of 1,310 lumens. The photometric curve displayed indicates how all light output is directed downwards; i.e. no risk of sky glow.</td>
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Dimensions of Luminaire

![Dimensions of Luminaire](image3.png)

**Fig 4 – Proposed Garden Luminaire**
4.0 SIMULATION RESULTS

Site - Ground Illumination

Figure 5 below indicates the predicted illumination levels at Ground level for the proposed installations. Illumination is indicated using a False-colour scale.

The results indicate: Car Park illumination achieves 20 Lux average at ground level.

The results indicate: Garden illumination achieves 10 Lux average at ground level.

There is minimal light overspill outside the boundary of the site, with negligible impact from new Car Park lighting to the neighbouring properties.

The potential for obtrusive light overspill to neighbouring properties from new column mounted lighting is assessed in further detail in Section 5 below.
5.0 LIGHT OVERSPILL

Figure 6 below indicates the predicted illumination levels horizontally on neighbouring properties is below the 10 Lux, the recommended maximum level, which is in compliance with design criterion for obtrusive light within a suburban environment. The lighting design has given consideration neighbouring residents, with all lighting being directed away from these areas with little or no light overspill.

![Figure 6 – Site Lighting Overspill Results](image)