A607
White Pines Central
RESIDENTIAL LIGHTING ANALYSIS

Planning Stage

11th May 2021

A607-OCSC-XX-XX-RP-E-0001

NOTICE

DOCUMENT CONTROL & HISTORY

OCSC Job No.: A607	Project Code	Originator Code	Zone Code	Level Code	File Type	Role Type	Number Series	Status/ Suitability Code	Revision
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Rev.	Status	Authors	Checked	Authorised	Issue Date
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P04	For Planning	MC	MD	EP	23.09.2020
P03	For Planning	MC	MD	EP	11.09.2020
P02	For Planning	MC	MD	EP	02.07.2020
P01	For Planning	MC	MD	EP	08.06.2020

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1.0 INTRODUCTION

The proposed residential development will provide for 114 No. Build to Rent residential units in a mix of 1, 2 and 3 bed apartment and duplex units, across 6 No. separate blocks;

- Block A is a part 6 part 4 storey apartment block comprising 47 No. 1 and 2 bed units;
- Block B is a 3 storey duplex block comprising 11 No. 1, 2 and 3 bed units;
- Block C1 is 3 storey duplex block comprising 15 No. 1, 2 and 3 bed units;
- Block C2 is a 3 storey duplex block comprising 19 No. 1, 2 and 3 bed units;
- Block D is a 3 storey duplex block comprising 18 No. 2 and 3 bed units; and
- Block E is a 3 storey duplex block comprising 4 No. 2 and 3 bed units.

The proposed development will also consist of the provision of: 110 sqm residential amenity space in the lower ground floor of Block A; waste storage facilities; 98 No. car parking spaces and 198 No. bicycle parking spaces; boundary treatments and street lighting; the provision of Sustainable Urban Drainage systems (SUDs); 1 No. ESB substation; plant and switch rooms and all ancillary works and services necessary to facilitate construction and operation; changes in levels across the site; associated hard and soft landscaping; and all other associated site excavation; and infrastructural and site development works above and below ground. The development will be served by a vehicular access from Stocking Avenue via White Pines South on the western side of the site.

The key objectives for the lighting design are as follows:

- Provide adequate illumination to contribute towards the safe use of all public roads, footpaths and cycle paths by vehicles and bicycles;
- Provide adequate illumination to contribute towards the safe use of all walkways and footpaths by pedestrians;
- Contain the lighting within the site boundary;
- Minimise light pollution and visual glare to residents and neighbouring areas;
- Take account of ecological factors such as local bat populations.
- Provide a visually stimulating environment;
- Enhance security.

The predicted performance of the external lighting installation has been assessed in detail using lighting simulation software. The software used for this study is Lighting Reality Outdoor.

2.0 DESIGN CRITERIA

The design criteria applied to the proposed external lighting installations is in accordance with I.S. EN 13201-2 Road Lighting Performance Requirements, BS 5489-1:2003 Code of practice for the design of road lighting, CIE Guide to the Lighting of Urban Areas, South Dublin County Council Public Lighting Specification. The guidelines in "Bats & Lighting, Guidance Notes for Planners, engineers, architects and developers", issued by Bat Conservation Ireland were also taken into account in the design of lighting.

Additional guidance on light trespass onto residential buildings has been obtained from CIBSE Lighting Guide 4.

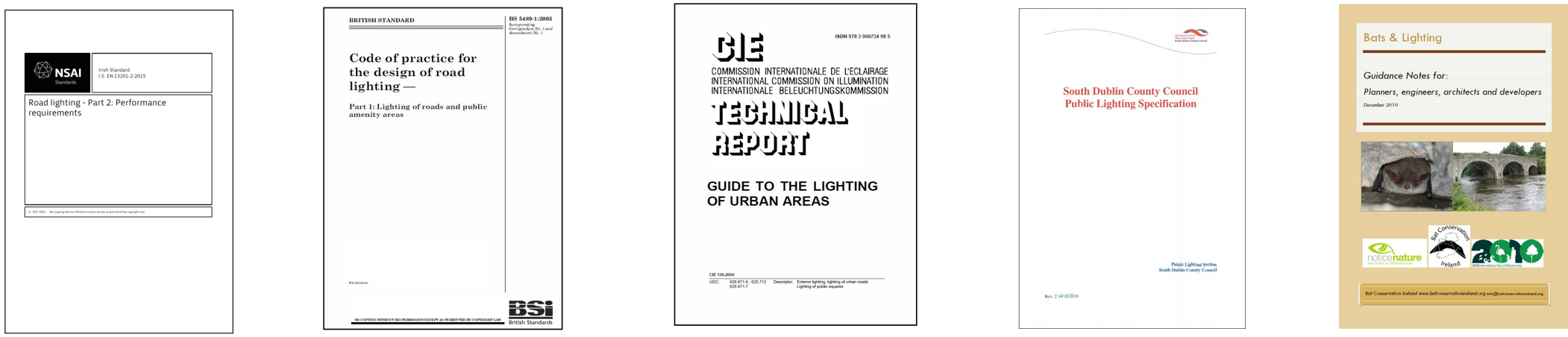


Figure 2.1 - Lighting Design Guides

Listed below are a number of key criteria which have been incorporated into the external lighting design for the scheme:

1. No white light or other lighting with a UV component permitted due to bat habitats.
2. Lighting with a narrow spectrum not permitted to reduce impact on insects.
3. Minimise lux levels around site boundary in keeping with bat protection guidelines.
4. Luminaires are chosen with zero upward light ratio, to minimise light pollution, energy waste and impact on wildlife.
5. An Amber LED (3000K) has been shown to have a reduced impact on Bats due to its narrow spectrum properties.
6. South Dublin County Council public lighting guidance document states all roadways are to be designed to conform to required lux levels of P4 lighting classes (5 lux):
    - Lighting Classification P4 is intended for users of motorised vehicles on traffic routes where traffic speeds are from low to medium, pedestrian footpath / cycle ways
    - To comply with P4 lighting classification the following parameters must be adhered to:
        a) Average Horizontal Illuminance (Ẽ) must be an average of 5 lux

b) Minimum Horizontal Illuminance (Emin) must be a minimum of 1 lux

c) It is recommended that the actual overall uniformity of illuminance (Uo) be as high as reasonably practicable

7. The requirements for accessibility by disabled persons in accordance with Part M of the Second Schedule to the Building Regulations shall be taken into account in determining required illuminance on access routes as noted in any Disability Access Certificate (DAC) which may be granted for the development. The design of the lighting in this report makes assumptions about the areas which may be designated as access routes, and will be subject to change in line with any such DAC.
8. Lighting to be directional on to the roadways and footways only with minimal spillage of light to adjoining habitats. To reduce light spillage from luminaries, lights should not to emit at angles greater than 70^{o} from the vertical plane.
9. Maintain dark zones for foraging bats in areas where lighting is not necessary. However, where lighting is required, this lighting will be placed at a minimum height using the lowest lux value permitted for public health and safety.

	$\bar{E}$	E_{min}
P1 or S1	15.0	3.0
P2 or S2	10.0	2.0
P3 or S3	7.5	1.5
P4 or S4	5.0	1.0
P5 or S5	3.0	0.6
P6 or S6	2.0	0.4

Figure 2.2 - P4 - S4 Lighting Class per EN13201:2015

10. The following table from CIBSE Lighting Guide 4 (2006) has been used in assessing the light trespass onto the vertical faces of the residential buildings in the development.

Environmental zone	Sky glow ULR inst. (max %)	Light trespass (into windows) E_v (lux) max	Source intensity I (kcd) max
E1 Dark landscapes	0	2	2.5
E2 Rural, village, dark urban locations	2.5	5	7.5
E3 Urban locations and small town centres	5	10	10
E4 Town and city centres	15	25	25

Figure 2.3 - CIBSE Lighting Guide Part 4

3.0 PROPOSED DESIGN

3.1 Introduction

The main roads through the development and pedestrian access routes will require illumination.

It is proposed that 6m high tubular roadway light fittings with overhang reach are installed to illuminate the road surface. 6m high lamp posts have been selected due to their characteristics which enable a lower quantity of luminaires to be used and provide an even spread of luminance along the road.

4m high lamp posts are to provide directional light to the pedestrian walkways and amenity areas.

Finally, wall mounted fittings are to be installed to provide lighting to steps, ramps and stairs throughout the development and over entrance doors.

A proposed site lighting layout drawing is enclosed with this report detailing the location and type of fitting to be used.

The desired lighting design may also be achieved by other luminaires and the final lighting installation may use other luminaires, with modified positioning and aiming to achieve the same result. Manufacturers' stated performance characteristics are subject to change. Any changes to be agreed with South Dublin County Council Road Lighting Department.

3.2 Public Road Luminaire

It is proposed to provide 6m high column-type light fittings to the road area. The proposed fitting is a modern decorative LED luminaire 28W LED lamp module with direct light spread. The luminaire is constructed out of die cast aluminium. The luminaire will be installed with a DALI ballast for future use. Fully compliant with EN 60598: CE.

Figure 3.2.1
Luminaire Fitting

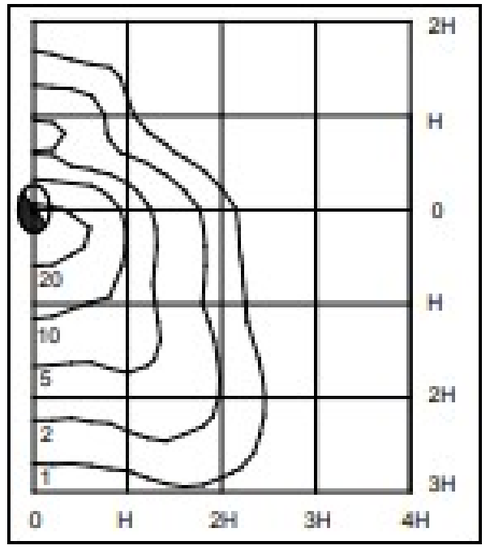


Figure 3.2.2
Luminaire - Photometric Space Height Curve

3.3 Amenity / Pedestrian Area Luminaire

It is proposed to provide 4m high column-type light fittings to the pedestrian walkways / cycle routes and amenity area in order to achieve required Illumination levels including 20 lux on level and gently sloped access routes. The proposed column light fitting is a modern decorative LED luminaire 27W LED lamp module with direct, symmetric light spread. The luminaire will be installed with a DALI ballast for future use. Fully compliant with EN 60598: CE. Where applicable, 100 lux Illumination will be provided on ramps and steps within the walkways.

Figure 3.3.1
Luminaire Fitting

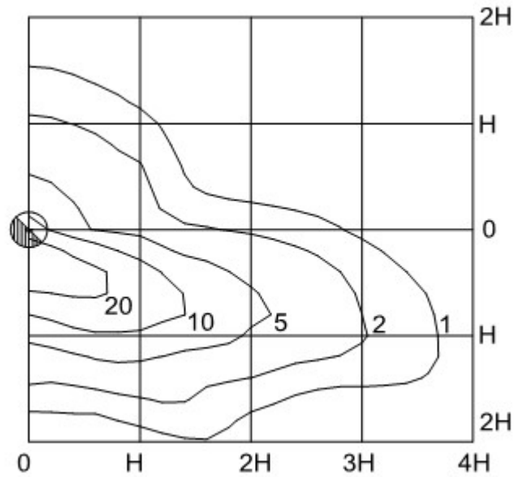


Figure 3.3.2
Luminaire - Photometric Curve

3.4 Wall Mounted Luminaire

It is proposed to provide wall mounted luminaires to provide 100 lux Illumination on ramps and steps within the walkways. The proposed light fitting is a Thorn EyeKon LED round, impact resistant luminaire rated at IP65 for ingress protection and IK10 for vandal resistance. The body is a die-cast aluminium powder coated anthracite colour. The diffuser is polycarbonate with a die-cast aluminium bezel. Complete with 3000K LED.

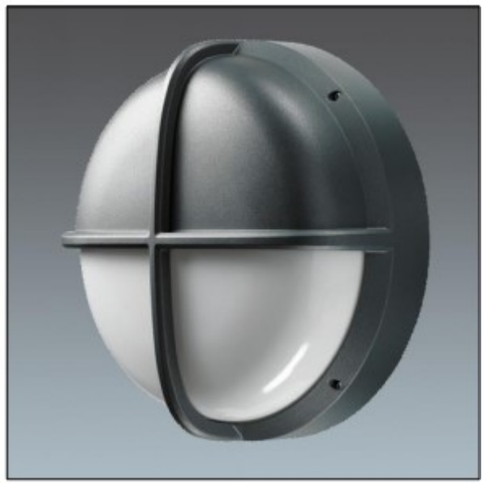


Figure 3.4.1
Luminaire Fitting

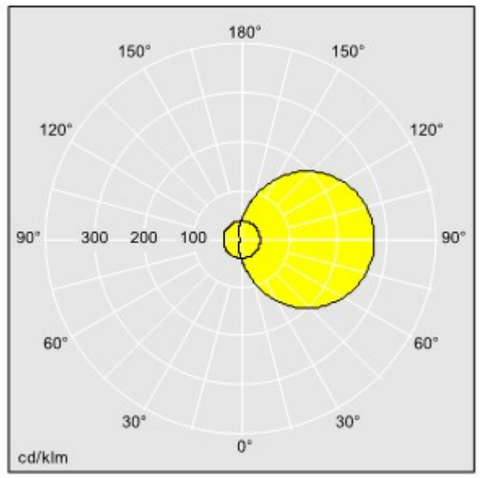


Figure 3.4.2
Luminaire - Photometric Curve

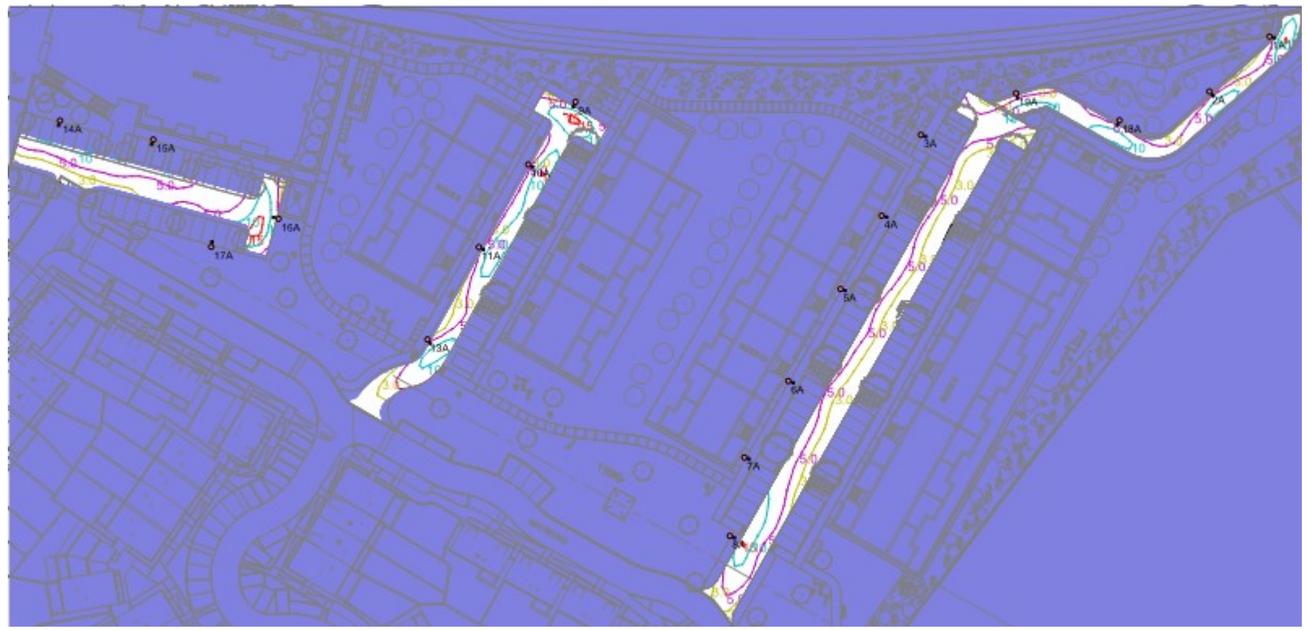
4.0 RESULTS

4.1 Main Road Lighting

Figure 4.1.1 indicates the predicted illumination levels on the main roadway through the development. Details of the proposed lighting layout are shown on the drawing appended to this report.

Results for the main road indicate the following:

- Compliance with P4 S4 class as per I.S. EN 13201:2015



Eav	6.07
Emin	1.01
Emax	17.33
Emin/Emax	0.06
Emin/Eav	0.17

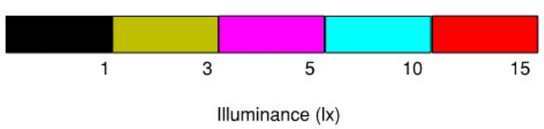
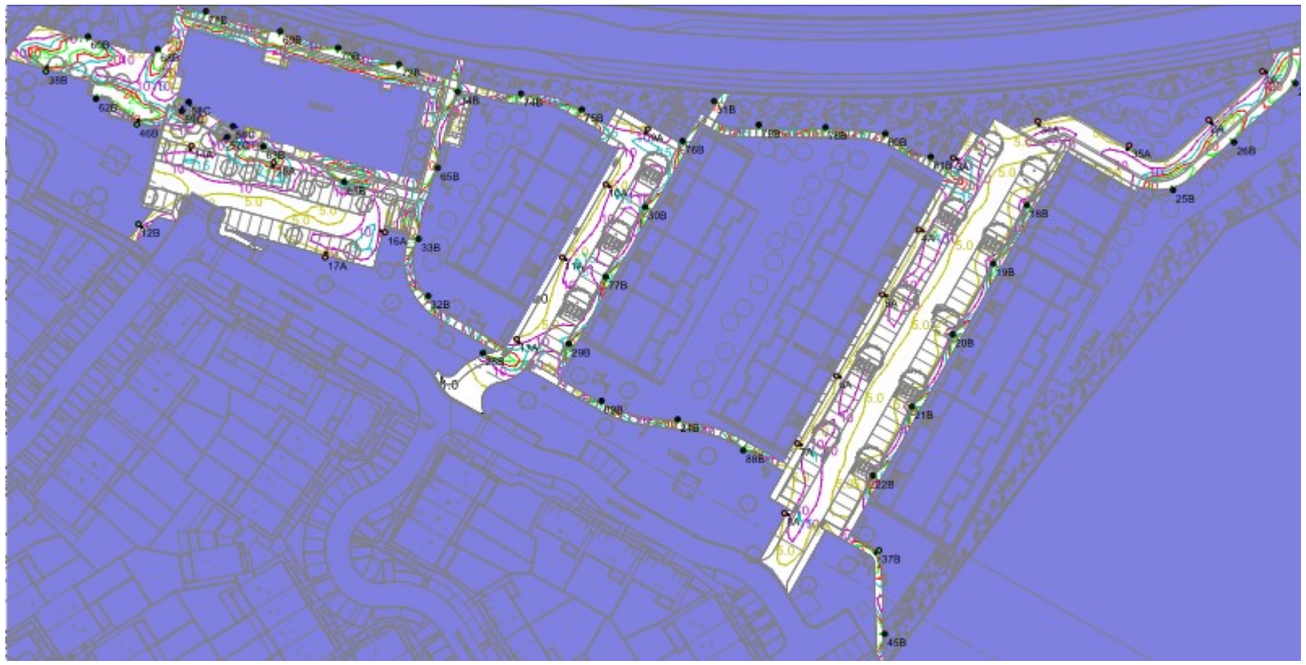


Figure 4.1.1 - Ground Illumination Levels (Lux) for Main Road

4.2 Amenity Areas and Light Spill on Residential Units

Figure 4.2.1 illustrates the calculated illumination levels for the proposed installations around the residential areas and demonstrates the following:

- The light spill on the apartments and duplexes reach a level of up to 5 Lux.
- The light on the front façade of the apartment & duplexes does not exceed the guidelines set forth in table 2.2 CIBSE Lighting Guide 4, which is 10 lux.



Eav	12.25
Emin	1.00
Emax	156.12
Emin/Emax	0.01
Emin/Eav	0.08

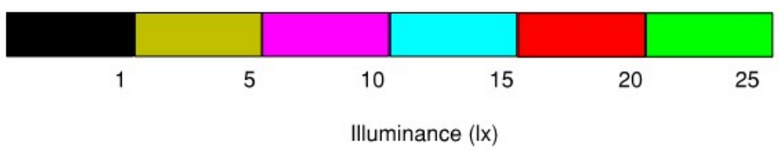


Figure 4.2.1 Ground Illumination Levels (lux) for Development

4.3 Bat Conservation and Lighting Levels

In compliance with Bat Conservation Ireland guidelines the following results were achieved:

- Light spill in areas not requiring illumination, and which are noted as bat migration routes and habitats achieve levels of less than 3 lux.
- There are no lights in close proximity to areas known to contain bats.

5.0 CONCLUSIONS

The main road through the site achieves an average of 6.07 lux, which is within the range of P4 lighting class.

The other amenity walkways throughout the development meet the lighting design requirements, with an average of 12.25 lux. (Subject to amendment to meet requirements of the DAC for the development).

The proposed lighting scheme complies with the recommendations of BCI in relation to protection of bat habitats.