

External Lighting Design Intent Report

DEVOY BARRACKS - NAAS

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DEVOY BARRACKS**NAAS****PLANNING REPORT:
EXTERNAL LIGHTING DESIGN INTENT**

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CONTENTS

	Page No.
1.0 Introduction	2
2.0 Standards & Regulations	2
3.0 Light Pollution Overview	3
4.0 Environmental Classification	3
5.0 Obtrusive Light Levels	4
6.0 External Lighting – Design Classification	6
7.0 External Lighting – Crèche Car Parking	11
8.0 External Lighting – Residential Car Parking	12
8.0 External Lighting – Disability Access Cert	12

1. INTRODUCTION

The development site is located on John Devoy Road, Naas, Co Kildare, known as Devoy Barracks. The proposed development is for the construction of 219 no. residential units, comprising of a mix of terraced houses (42 no. in total), and duplex/ apartment units (177 no. in total) ranging in height from 2 to 5 storeys, a 59-place childcare facility, public and communal open spaces and all associated site works and infrastructure. Vehicular and pedestrian access is proposed via an existing access point on the John Devoy Road along the southern boundary with additional pedestrian and cycle access provided to the east, and future pedestrian and cycle connection opportunities provided to the north, west and east. This report outlines the design approach for the external lighting throughout the proposed development.

2. STANDARDS AND REGULATIONS

As Lighting Designers, the external site lighting scheme shall be based on the following standards as relevant.

- Kildare County Council Lighting Policy & Technical Specification June 2019
- Guide to Obtrusive light, The ILP Guidance Notes for the Reduction of Obtrusive Light GN01:2011
- Building Research Establishment Information Paper - DG 529 Obtrusive Light from Proposed Developments (2013)
- Guidance Notes For The Reduction Of Obtrusive Light' Institution of Lighting Engineers, 2011
- Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations
- National Rules for Electrical Installations, Electro-Technical Council of Ireland 2008 (including recent Amendments)
- BS 5489 (2013) Code of Practice for the Design of Road Lighting – Part 1:
- Lighting Roads and Public Amenity Areas
- IS EN 12464-2, 2014 'Lighting for Work Places. Outdoor work places'
- IS EN 13201 (2015) Road Lighting – Part 2: Performance Requirements,
- CIBSE / SLL Lighting Handbook, 2012.
- S.I. 151 of 2011
- Building Control (Amended) Regulations 2014

3. LIGHT POLLUTION – OVERVIEW

Light pollution is a recognized statutory nuisance. Obtrusive light from floodlighting within the site boundary onto adjacent roads and local wild-life districts shall be minimized and shall take into consideration the following as part of the overall design;

(a) Sky glow (direct upward waste light),

(b) Light trespass (intrusive light and light into windows/windcreens), over illumination, glare (source intensity) and clutter. Refer to Illustration 1.

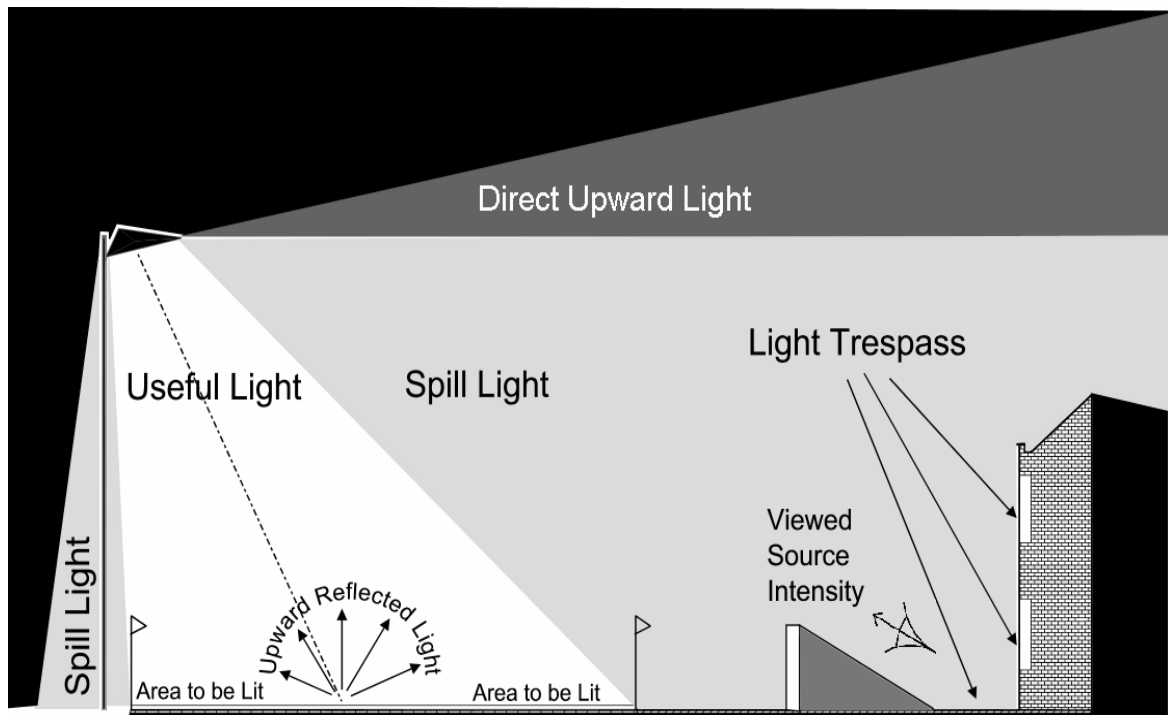


ILLUSTRATION 1

4. ENVIRONMENTAL CLASSIFICATION

Predictive software modeling shall be undertaken to study, identify and reduce potential light pollution from the proposed site to achieve compliance with ILE Guidance Notes, Environmental Zone E3.

Table 1: Environmental zone descriptions in ILP guidance^[13]

Category	Lighting environment	Examples
E0	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Intrinsically dark landscapes	National parks, areas of outstanding national beauty, etc
E2	Low district brightness areas	Rural, small village or relatively dark urban locations
E3	Medium district brightness areas	Small town centres or urban locations
E4	High district brightness areas	Town/city centres with high levels of night-time activity

(BRE, 2013, p.4)

5. OBTRUSIVE LIGHT LEVELS

In accordance with the ILE/ILP Guidance Notes, the Environmental Zone will be designed to Classification E3, i.e. medium district brightness, with a maximum sky glow (URL) of 5%, light trespass (onto windows of adjoining properties) of between 2 to 10 lux (pre and post curfew).

Potential problems from glare and over-illumination shall be evaluated and addressed to ensure that the design intent proposals include for high quality optics coupled with aiming and commissioning to mitigate against potential light spill and sky glow issues, as part of the detailed design process.

Table 2: ILP numerical guidance on obtrusive light

Obtrusive light limitations for exterior lighting installations

Environmental zone	Sky glow URL (max %)	Light trespass into windows E_v (lux)		Source intensity I(kcd)		Building luminance pre-curfew
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average L (cd/m ²)
E0	0	0	0	0	0	0
E1	0	2	1*	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5.0	10	2	10	1.0	10
E4	15.0	25	5	25	2.5	25

(BRE, 2013, p.5)

It may be noted also that illumination spill calculations shall not take into consideration landscaping proposals which are intended to provide visual screening between adjacent properties and areas of illumination. Landscaping screening (trees) will further reduce light trespass below the required levels.

6. EXTERNAL LIGHTING – DESIGN CLASSIFICATION

6.1 Introduction

The proposed site plan for the development has been reviewed with regard to public & external lighting requirements and individual lighting areas or zones have been identified and have been extracted to undergo the progressive assessment as outlined extracted relevant to IS CEN/TR 13201:2014 for light class selection.

The areas identified from within the site plan that will form part of the progressive assessment of light selection, through parts 1&2 of CEN/TR 13201:2014 include the following:

- Main Entrance and interface with roundabout John Devoy Road
- Residential Streets within the development
- Crèche Parking

6.2 Main Entrance and Interface with John Devoy Road

The proposed entry/exit to the development will currently interface with an existing roundabout on John Devoy Road that operates adjacent to the proposed development. In consideration with BS5489 Part 1 this interface shall be considered a lighting conflict area, defined as follows:

- *Conflict areas are typically junctions, intersections, roundabouts and pedestrian crossings, where significant streams of motorized traffic intersect with each other or with other road users such as pedestrians and cyclists. At conflict areas, the visual task is generally more difficult than on straight roads, and a higher luminance or illuminance class may be selected at the conflict area.*

6.2.1 Part 1 Light Class Selection (IS CEN/TR 13201-1:2014)

In consultation with IS CEN/TR 13201-1:2014, this area shall be considered under **Lighting Class C (Conflict Area)** based on the following considerations and assessment;

- Vehicle streams will intersect each other from the entrance/exit of the development onto an existing roundabout on John Devoy Road.

- Entry & Exit from the development engages with an existing area frequented by more motorised traffic/ pedestrians /cyclists.
- Increased potential for collisions between road users/vehicles/pedestrians/cyclists.
- The visual task is increased where users shall be entering into a roundabout.

PARAMETER	OPTIONS	DESCRIPTION	WEIGHTING VALUE (Vw)	(Vw) Selected
Design Speed or speed limit	Very High	$v \geq 100\text{km/h}$	3	0
	High	$70 < v < 100\text{km/h}$	2	
	Moderate	$40 < v < 70\text{km/h}$	0	
	Low	$v \leq 40\text{km/h}$	-1	
Traffic Volume	High		1	0
	Moderate		0	
	Low		-1	
Traffic Composition	Mixed with high percentage of non-motorised		2	1
	mixed		1	
	Motorised Only		0	
Seperation of Carriageway	No		1	1
	Yes		0	
Parked Vehicles	Present		1	0
	Not Present		0	
Ambient Luminosity	High		1	0
	Moderate		0	
	Low		-1	
Navigational Task	Very Difficult		2	1
	Difficult		1	
	Easy		0	
			SUM OF WEIGHTING VALUES (Vws)	3
			$C = 6 - 3$	C3

Parameters for the selection of lighting class C3

6.2.2 Part 2 Performance Requirements (IS EN 13201-2:2015)

Taking the light classification assessment of C3 to compliance with IS CEN/TR 13201-1:2014 Light Class Selection, the following minimum maintained illuminance and uniformity parameters have been determined for the determined conflict area defined at the main entrance to the development and the interface with the roundabout on John Devoy Road;

Class	Horizontal Illuminance	
	$\bar{E}$ [minimum maintained] lx	U_o [minimum]
C0	50	0.4
C1	30	0.4
C2	20	0.4
C3	15	0.4
C4	10	0.4
C5	7.5	0.4

Minimum values for C3 class determined measured in Lux

The Interface at the entry/exit of the development with the existing roundabout at John Devoy Road shall be calculated to a minimum illuminance of 15lx and a minimum uniformity of 0.4, calculated to compliance with IS-EN-13201.3:2015 Road Lighting Calculation of performance.

6.2.3 Glare Restriction and control of obtrusive light

The interface shall be located at the roundabout in the vicinity of existing residential properties and as such consideration shall be given to a suitable luminous intensity class being applied to lighting located within the area.

Suitable consideration shall also be applied with regard to appearance and environmental aspects within the area relevant to the following;

- Ecology
- Nuisance light
- Energy Conservation
- Operational Costing
- Light Pollution

Class	fti [maximum] %
C0	15
C1	15
C2	15
C3	20
C4	20
C5	20

Maximum fti values for C3 class shall be no more than 20%

6.3 Residential Streets within Development

6.3.1 Part 1 Light Class Selection (IS CEN/TR 13201-1:2014)

The residential street throughout servicing the development shall be considered under **Lighting**

Class P (Pedestrians and Pedal Cyclists Area) based on the following considerations;

- It is a general recommendation that P Classes are applied to residential roads that do not allow medium to high driving schemes (IS EN 13201-2:2015)
- Speed of movement is slower and relevant objects to be seen are closer
- The main purpose of lighting for subsidiary roads and areas associated with those roads is to enable pedestrians and cyclists to orientate themselves and detect vehicular and other hazards, and to discourage crime against people and property.

As per the below table the lighting classification has been defined as a **Class P2**

PARAMETER	OPTIONS	DESCRIPTION	WEIGHTING VALUE (Vw)	(Vw) SELECTION
Travel Speed	Low	< 40km/h	1	1
	Very low	Very Low, Walking Speed	0	
Use Intensity	Busy		1	0
	Normal		0	
	Quiet		-1	
Traffic Composition	Pedestrians, Cyclists & Motorised Traffic		2	2
	Pedestrians & Motorised Traffic		1	
	Pedestrians & Cyclists Only		1	
	Pedestrians Only		0	
	Cyclists Only		0	
Parked Vehicles	Present		1	1
	Not Present		0	
Ambient Luminosity	High		1	0
	Moderate		0	
	Low		-1	
Facial Recognition	Necessary		Additional Requirements	Included
	Not Necessary		Additional Requirements	
			Sum of Weighting Values (Vws)	4
			P = 6 - 4	P2

Parameters for the selection of lighting class (P)

6.3.2 Part 2 Light Class Selection (IS CEN/TR 13201-1:2014)

Taking the light classification assessment of **P2** to compliance with IS CEN/TR 13201-1:2014 Light Class Selection, the following minimum maintained illuminance and uniformity parameters have been determined;

Class	Horizontal illuminance		Additional requirement if facial recognition is necessary	
	$\bar{E}^a$ [minimum maintained] lx	E_{min} [maintained] lx	$E_{v,min}$ [maintained] lx	$E_{sc,min}$ [maintained] lx
P1	15,0	3,00	5,0	5,0
P2	10,0	2,00	3,0	2,0
P3	7,50	1,50	2,5	1,5
P4	5,00	1,00	1,5	1,0
P5	3,00	0,60	1,0	0,6
P6	2,00	0,40	0,6	0,2
P7	performance not determined	performance not determined		

^a To provide for uniformity, the actual value of the maintained average illuminance shall not exceed 1,5 times the minimum $\bar{E}$ value indicated for the class.

Lighting levels for the selection of lighting class (P)

6.3.3 Glare Restrictions and Control of Obtrusive Lighting

Suitable consideration shall also be applied with regard to appearance and environmental aspects within the residential road as outlined below;

Maximum f_{TI} values for P classes

Class	f_{TI} [maximum] %
P1	20
P2	25
P3	25
P4	30
P5	30
P6	35
P7	performance not determined

Parameters for the glare restriction for lighting class (P)

- For residential roads, intensity limits shall be used to control direct glare from luminaires as recommend in clause 7.2.1 BS5489-1:2013
- Obtrusive light entering residential windows and views from residential properties.
- Energy Conservation
- Operational Costing
- Light Pollution

7. CRECHE CARPARKING

The proposed external car parking for the Crèche shall be illuminated to compliance with BS5489-1:2013 as per the below assessment.

Maintained lighting levels for outdoor car parks

Type of area and usage	$\bar{E}$ lx	U_o
Light traffic, e.g. parking areas of shops, terraced and apartment houses; cycle parks	5	0.25
Medium traffic, e.g. parking areas of department stores, office buildings, plants, sports and multipurpose building complexes	10	0.25
Heavy traffic, e.g. parking areas of schools, churches, major sports and multipurpose sports and building complexes	20	0.25

8. RESIDENTIAL CARPARKING

The proposed external car parking for the Residents shall be illuminated to compliance with BS5489-1:2013 as per the below assessment.

Maintained lighting levels for outdoor car parks

Type of area and usage	$\bar{E}$ lx	U_o
Light traffic, e.g. parking areas of shops, terraced and apartment houses; cycle parks	5	0.25
Medium traffic, e.g. parking areas of department stores, office buildings, plants, sports and multipurpose building complexes	10	0.25
Heavy traffic, e.g. parking areas of schools, churches, major sports and multipurpose sports and building complexes	20	0.25

9. EXTENAL LIGHTING – DISABILITY ACCESS CERTIFICATE

Where identified in the Disability Access Certificate application, the design of external lighting along designated routes shall specify external illumination levels of 100 lux on ramps or steps (measured at ramp or tread level), and 20 lux on level and gently sloped surfaces in accordance with the Building Control Regulations Technical Guidance Document M, 2010, Section 1.1, Clause g.

This Report was prepared by:

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