

Comhairle Chontae Chill Mhantáin

Wicklow County Council



Public Lighting Guidelines



CONTENTS

1	INTRODUCTION	1
2	PUBLIC LIGHTING TERMINOLOGY	3
2.1	LEDs	3
2.2	METAL HALIDE LAMPS	3
2.3	LOW PRESSURE SODIUM LIGHTS (SOX).....	3
2.4	HIGH PRESSURE SODIUM LAMPS (SON).....	3
2.5	EFFICACY (L90/B10).....	3
2.6	COLOUR RENDERING.....	4
2.7	MAINTENANCE FACTOR	4
2.8	LIGHTING CLASS.....	4
2.9	LUX	5
2.10	UNIFORMITY	6
2.11	CORRELATED COLOUR TEMPERATURE	6
2.12	PUBLIC LIGHTING UNIT.....	6
2.13	MINI-PILLAR	8
2.14	MICRO-PILLAR/CUSTOMER SERVICE PILLAR	9
2.15	DIMMING & TRIMMING	9
2.16	CONSTANT LIGHT OUTPUT	9
2.17	UMR	10
2.18	CENTRAL MANAGEMENT SYSTEMS	10
3	OBJECTIVES OF PUBLIC LIGHTING	11
3.1	LIGHTING RATIONALE	11
3.2	SECURITY.....	11
3.3	PEDESTRIAN SAFETY.....	11
3.4	ROAD SAFETY	11
3.5	SOCIAL BENEFITS.....	11
3.6	ENVIRONMENTAL ZONES	12
4	TYPES OF LIGHTING EQUIPMENT	14
4.1	TYPES OF LAMPS	14
4.2	SWITCHES & CONTROL GEAR.....	17
4.3	COLUMNS.....	18
5	PUBLIC LIGHTING DESIGN CRITERIA FOR NEW SCHEMES OR ADDITIONAL LIGHTING IN PARTLY COMPLETED SCHEMES	23
5.1	GENERAL REQUIREMENTS	24
5.2	LIGHTING REQUIREMENTS	25
5.3	MAINTENANCE FACTOR FOR DESIGN	32
5.4	GENERAL	32
5.5	DIMMING AND TRIMMING	33
5.6	LIGHT SPACING, ARRANGEMENTS AND TILT ANGLE	33
5.7	LIGHTS FIXED TO BUILDINGS	34
5.8	LIGHTING OF STEPS.....	34
5.9	LIGHTING OF PEDESTRIAN BRIDGES	34
5.10	VERIFICATION OF DESIGNS	34
6	INSTALLATION	35
6.1	CONNECTION ARRANGEMENTS.....	35
6.2	INSTALLATION PROCEDURES FOR COLUMNS	35
6.3	DUCTING PROVISION	36
6.4	MANHOLE CHAMBERS.....	37

6.5	CUSTOMER SERVICE PILLARS.....	37
7	ELECTRICAL SUPPLY (METERED & UN-METERED)	39
7.1	GENERAL.....	39
7.2	EARTHING & BONDING	39
7.3	UNMETERED SUPPLIES CERTIFICATE.....	39
7.4	CONNECTION & SUPPLY AGREEMENTS.....	40
8	PLANNING PROCESS INVOLVING PUBLIC LIGHTING	41
8.1	PLANNING APPLICATIONS	41
8.2	TAKING IN CHARGE OF PUBLIC LIGHTING.....	41
9	CONCLUSION	44
	APPENDIX A – MINIMUM DATA REQUIREMENTS	45
	APPENDIX B – DIMMING PROFILES	47
	TRIMMING.....	47
	ONE STEP DIMMING – STANDARD PERIOD.....	48
	ONE STEP DIMMING – EXTENDED PERIOD	49
	MULTI-STEP (2-STEPS) DIMMING	50
	APPENDIX C – PUBLIC LIGHTING DESIGN CHECK LIST.....	51

1 INTRODUCTION

The purpose of this manual is to outline Wicklow County Council policies and to offer guidance on design etc. to ensure the development of a sustainable energy efficient public lighting network. ***Scripts in bold italics reflect specific Wicklow County Council policy.***

Wicklow County Council is seeking to foster coordination and consistency in the design, provision and maintenance of high quality public lighting throughout County Wicklow's urban and rural areas. This policy seeks to avoid unnecessary and wasteful overlighting by ensuring that designs are completed for all new installations by a competent person using all available Lighting Design technology.

Public lighting is a valuable and visible asset with the potential to make a significant contribution to the wider community in terms of accessibility, security and the fostering of commercial activities.

A key cornerstone of Wicklow County Council's environmental policy for a reduction in carbon emissions and energy usage is the gradual introduction of lower energy public lighting units across the county.

Wicklow County Council requires the use of LED lighting on all new general public lighting schemes, inclusive of new housing estates.

All new schemes are to be designed by a competent public lighting design professional, using appropriate software, incorporating the use of low energy, high quality recognised lantern brands, acceptable to the Wicklow County Council's Public Lighting Department and meeting the appropriate standards.

All Street Lighting Schemes must meet the requirements of the following (and any future updates):

- IS CEN TR 13201-1: 2014 Road Lighting – Part 1: Guideline on selection of lighting classes.
- IS EN 13201-2: 2015 Road Lighting – Part 2: Performance requirements.
- IS EN 13201-3: 2015 Road Lighting – Part 3: Calculation of Performance.
- IS EN 13201-4: 2015 Road Lighting – Part 4: Methods of Lighting Performance.
- IS EN 13201-5: 2015 Road Lighting – Part 5: Energy Performance Indicators.
- BS5489:1 2020 Code of Practice for the Design of Road Lighting – Part 1: Lighting of Roads and Public Amenity Areas.
- I.S. 10101:2020 National Rules for Electrical Installations.
- ET211:2003 Code of Practice for Public Lighting Installations in Residential Areas.
- ESB National Code of Practice for the Customer Interface Version No. 5 April 2021.

Wicklow County Council wishes to promote the installation of energy efficient exterior lighting schemes. Measures required to achieve this include the use of lanterns with efficient optics which would minimize light pollution, optimization of scheme layout, use of energy efficient lamps and electronic control gear, capable of factory set dimming, complying with best practice and taking account of the 'Campaign for Dark Skies' issues when and where appropriate.

Therefore all lighting schemes shall incorporate the requirements of, "Guidance Note GN01/21: The Reduction of Obtrusive Light" issued by the Institution of Lighting Professionals¹ and available as a download from its website: www.theilp.org.uk.

The lighting design for all new schemes and modifications to existing developments must include the upgrade of the lighting on junctions from the public road in addition to any lighting being provided within the development. It should also include connectivity of lighting from the development towards the Town/Village nucleus.

In situations where development is on the outskirts of a town/village there is a need to ensure a continuity of illumination between the development and the town/village centre. This can be achieved either by the developer directly extending the existing public lighting network or by the levying of a special contribution which would enable the County Council to undertake the works.

Where suitable, low brightness energy efficient lighting schemes should be considered with a view to enhancing the night-time scene combining improved security with modern shaped lanterns.

The installation of schemes in residential areas shall comply with the Code of Practice for Public Lighting ET211: 2003, ET 207:2003, ET 206:2009, ET 213:2007 and the National Rules for Electrical Installations, (IS 10101: 2020), current at time of issue and shall include the provision of a Customer Service Pillar(s) in line with the requirements of ESB Networks National Code Of Practice For Customer Interface (current edition).

Well maintained road lighting can enhance our communities, create a safe night-time environment and, encourage regeneration and investment, leading to a more inclusive society and at the same time contributing to an improved local economy.

It is hoped that the adoption of the recommendations in these Guidelines will assist in delivering an improved and safer night-time environment on the Wicklow County Council road network.

All queries pertaining to the design and maintenance of exterior lighting installations in County Wicklow should be directed to Wicklow County Council, Public Lighting Section at the contact details advised in Chapter 9 of this manual.

2 PUBLIC LIGHTING TERMINOLOGY

2.1 LEDs

Light Emitting Diodes (LED) emit a white light that provides high levels of scotopic lumens allowing street lights with lower wattages and lower photopic lumens than traditional High/Low Pressure Sodium (SON/SOX) street lights.

2.2 METAL HALIDE LAMPS

These were traditionally used in the lighting of pedestrian crossings. LED equivalents are now available and must be used in new installations.

2.3 LOW PRESSURE SODIUM LIGHTS (SOX)

These lamps, which emit an orange/yellow light with very poor colour rendering. They were historically installed extensively in residential areas (55 Watt) and on Traffic Routes (135 Watt).

2.4 HIGH PRESSURE SODIUM LAMPS (SON)

High pressure sodium lamps were the most commonly used lamp type in street lighting. These lamps were developed in the early 1970's. They are marginally less efficient than SOX lamps but they provide a much better quality of light in terms of colour rendering, making it possible to distinguish different colours though not to the same extent as LEDs.

2.5 EFFICACY (L90/B10)

Efficacy (lm/watt) is a measure of the efficiency of the light in terms of output per energy consumption. The higher the efficacy the lesser the wattage lantern required to achieve a required lumens output. It is calculated by dividing the lumen output by the wattage and multiplying by 90%, the other 10% being required for the internal operation of the luminaire itself.

Wicklow County Council requires that all neutral white lanterns must have a minimum efficacy level of 140lm/w and a minimum of 130lm/w for warm white, certified by a recognised accreditation body and measured within the complete lantern casing.

Related to efficacy is the Power Density Indicator (PDI or D_p) which is expressed in $W.Lux^{-1}.m^2$. The other indicator is Annual Energy Consumption Indicator (AECI or D_e) which is expressed in $Wh.m^{-2}$. The annual electricity consumption of a road lighting installation depends on:

- the period of time for which lighting is provided,
- the lighting class specified by the relevant lighting standard for each lighting period,
- the efficiency of the lighting installation, when providing the necessary lighting for each period,
- the way the lighting management system follows the change in visual needs of road users,
- the parasitic energy consumption of lighting devices during the period when the lighting is not needed.

2.6 COLOUR RENDERING

The colour rendering index, Ra, defines the ability of a light source to identify colours, and is measured on a scale of 1 – 100. On this scale a rendering of 1 is monochromatic light, and a rendering of 100 is natural sunlight. The scale can be thought of as a measure of the quality of light produced by the source. LED's have higher Ra values than traditional lighting.

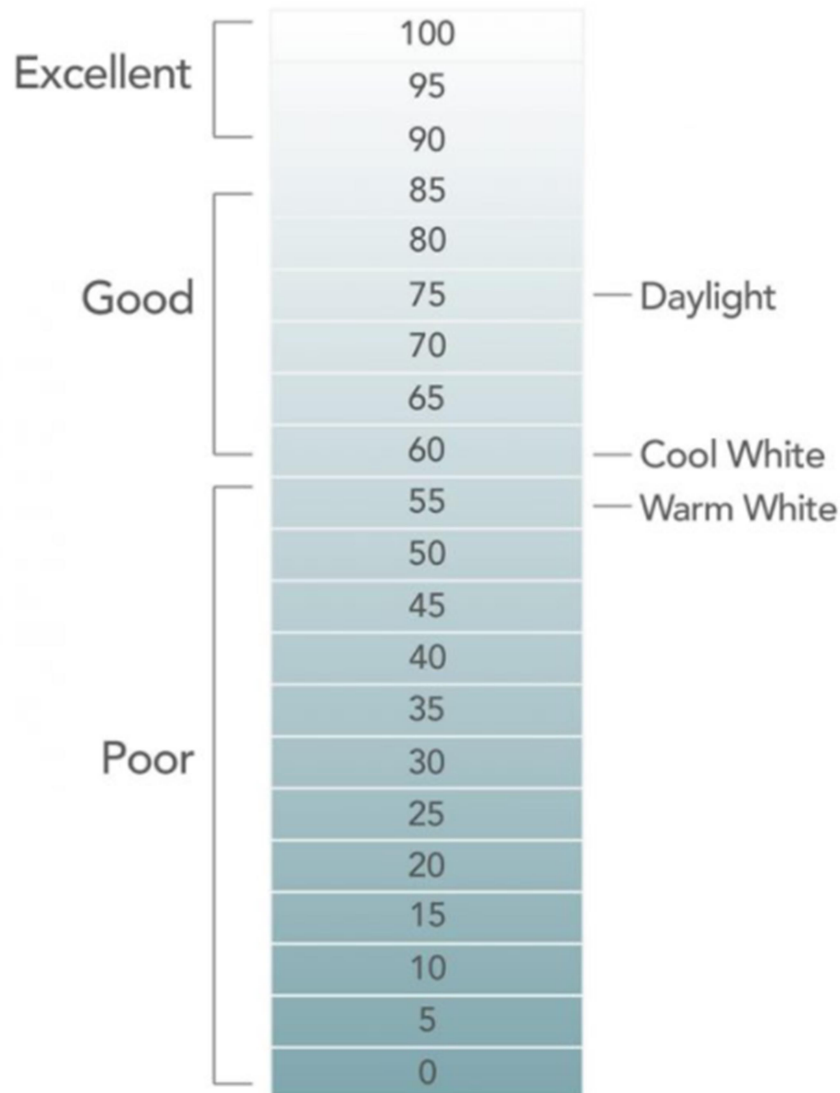


Figure 2-1 Colour Rendering Index

2.7 MAINTENANCE FACTOR

The maintenance factor is a number (positive and less than 1) used in calculations to account for the depreciation in light output over time.

2.8 LIGHTING CLASS

These are defined in IS EN 13201 & BS 5489 for residential (P Class) and traffic route lighting (M & C Class) situations.

2.9 LUX

Illuminance is a measure of how much luminous flux is spread over a given area. Luminous flux (lumens) can be thought of as a measure of the total amount of visible light present, and the illuminance as a measure of the intensity of illumination on a surface.

A given amount of light will illuminate a surface more dimly if it is spread over a larger area, so illuminance (lux) is inversely proportional to area when the luminous flux (lumens) is held constant.

One lux is equal to one lumen per square metre:

$$1 \text{ lux} = 1 \text{ lm/m}^2 = 1 \text{ cd}\cdot\text{sr/m}^2$$

A flux of 1000 lumens, concentrated into an area of one square metre, lights up that square metre with an illuminance of 1000 lux. However, the same 1000 lumens, spread out over ten square metres, produces a dimmer illuminance of only 100 lux.

Illuminance	Surfaces illuminated by:
0.0001 lux	Moonless, overcast night sky (starlight)
0.27–1.0 lux	Full moon on a clear night
1000 lux	Overcast day
10000–25000 lux	Full daylight (not direct sun)
32000–100000 lux	Direct sunlight
7.5 lux avg.	Typical Residential Street Lighting

Table 2.1 Examples of Illuminance



Figure 2-2 Light Meter used to measure LUX levels

2.10 UNIFORMITY

The relationship between the lowest maintained minimum illuminance (lux) value and the average maintained value. Relates to both light intensity and luminance.

2.11 CORRELATED COLOUR TEMPERATURE

Correlated Colour Temperature (CCT) relates to the hue and tone of white that can be expected from a bulb or light fitting. The CCT of daylight is right around 6500K. LEDs can be acquired in various colour temperature ranges such as: cool (5000K), neutral (4000K) and warm white (3000K). The International Dark-Sky Association (IDA), a group whose purpose is to protect the night sky, recommends that LED street lights have a CCT of 3000K or less. These street lights will have a warm white glow that is safer for people and wildlife.

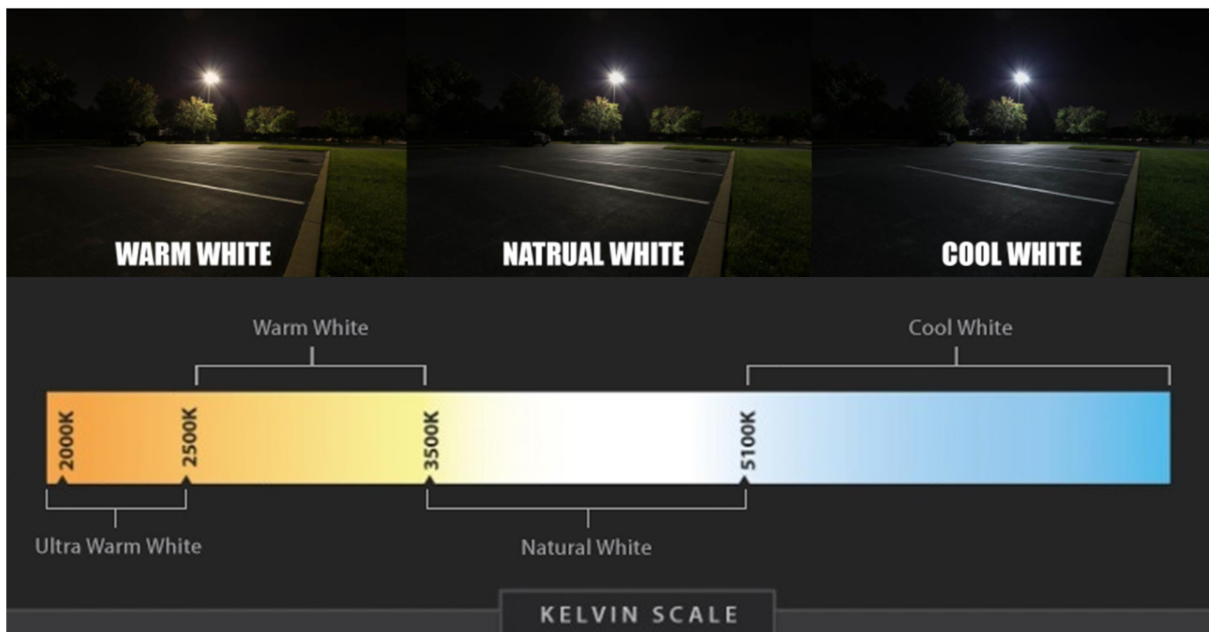


Figure 2-3 CCT Scale

2.12 PUBLIC LIGHTING UNIT

Term used to describe the complete public lighting unit inclusive of: luminaire, bracket and column.

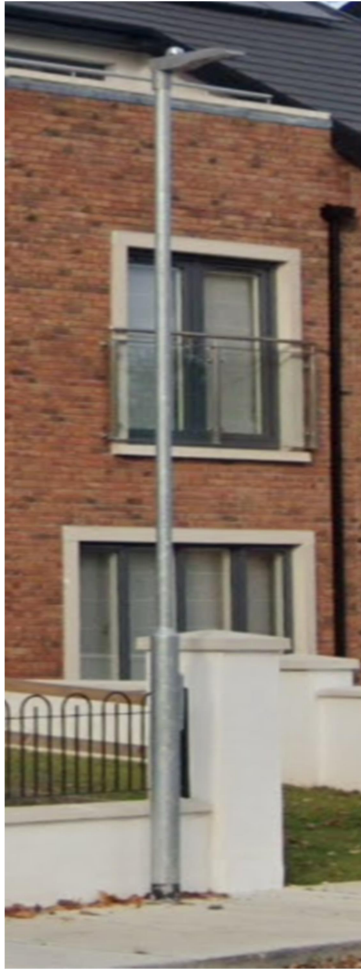


Figure 2-4 Typical LED Public Lighting Unit

2.12.1 Luminaire

Complete (electric) lighting unit and all its related support and (non-network) supply equipment, i.e. pole, bracket, lamp holder, ballast, reflector, control gear, etc. as well as the bulb/lamp.



Figure 2-5 LED Luminaire

2.12.2 Lantern Components

The lantern components in an LED lantern comprise of the heat dissipation housing, the driver (electronic control unit), the lens, LED's and a photocell.

2.12.3 Lantern Fuse

The controlling fuse is located in the column base, or in the case of overhead networks in the Pole mounted Isolation Box.

2.12.4 Circuit Fuse

Every lighting circuit must be protected by an appropriately rated fuse.

2.12.5 Interface Box

This is a piece of electrical apparatus erected on ESB Network poles to segregate ESB Networks and the Local Authority electrical systems. Commonly referred to as a "Killarney Box".



Figure 2-6 Typical Interface Box

2.13 MINI-PILLAR

These are ground mounted electrical distribution enclosures from which ESB Networks supplies emanate to Local Authority micro-pillars.



Figure 2-7 ESB Mini-Pillar

2.14 MICRO-PILLAR/CUSTOMER SERVICE PILLAR

These are ground mounted enclosures which receive electricity supplies for Public Lighting from ESB mini-pillars.



Figure 2-8 ESB Micro-Pillar

2.15 DIMMING & TRIMMING

2.15.1 Dimming

This is the process of reducing the electrical current and consequently the lighting intensity during periods where there is normally little vehicle or pedestrian movement.

2.15.2 Trimming

This is the process of shortening the period for which the lamp is lighting. Modern lights achieve full light output quickly as distinct from the older technologies such as SOX/SON, which took a longer period to reach full output. LED lights generally use 35/18 photocells (turn-on when lux level drops to 35 and turn-off when Lux levels rise to 18. This results in a shorter burn hour annual calendar of 4,095 hrs/annum as against 4,150hrs/annum for the older SON/SOX type lanterns, which used 70/30 photocells.

A number of burn profiles have now been agreed with ESB, UMR and Energy Regulator and represent different tariffs to be charged on unmetered public lighting. These profiles are outlined in Appendix B – Dimming Profiles.

2.16 CONSTANT LIGHT OUTPUT

All light sources experience lumen depreciation - a reduction in light output over time. The Constant Light Output (CLO) functionality compensates for this light loss, ensuring LEDs will always deliver the necessary light level.

By taking into account the lumen depreciation, the driver can be programmed to start at a dimmed level for a new luminaire and gradually increase power over the life of the light source, to maintain a constant light output, saving energy and extending the lifetime of the system.

CLO technology is to be incorporated into lanterns erected in Wicklow County.

2.17 UMR

The Unmetered Registrar (UMR), ESB Networks, Abbeyleix Road, Portlaoise, Co. Laois operates within ESB Networks and is responsible for overseeing the Market and DNO (Distribution Network Operator) licence requirements pertaining to unmetered supplies (UMS).

Unmetered Public Lighting installations of less than 2kW (max usage on a single unmetered connection) are assigned a technical meter point registration number (TMPRN) by the UMR. The TMPRN for a single or collection of luminaires, usually in a common location e.g. one street or avenue, they are generally associated with an individual micro-pillar. TMPRNs are grouped under group meter point reference numbers (GMPRN) in the name of the relevant local authority. Billing takes place at the level of the GMPRN.

The asset owner is obliged to keep UMR's lighting database records for unmetered lights up to date. Public lighting generally uses unmetered tariffs as distinct from metered.

Based on annual burn hours (4,150 dusk to dawn or 2,600 dusk to midnight) the UMR calculates the billable wattage of every unmetered light and forwards this data monthly to the licensed energy suppliers so that the latter can bill their customers appropriately.

Lighting installations of greater than 2kW are required to be metered and are assigned a specific meter point reference number (MPRN) and each MPRN is billed monthly to the account holder.

TMPRNs and MPRNs, when advised by ESB Networks, must be registered with licensed electricity Energy Suppliers.

Certification of completed installations by a contractor registered with ECSSA or RECI must be provided to ESB Networks in order for installations to be energised.

Wicklow County Councils preference is for unmetered tariff(s) and larger developments can achieve this by using multi connection points to keep each connection below 2kW.

2.18 CENTRAL MANAGEMENT SYSTEMS

Central Management Systems (CMS), also known as tele-management, is a tool in remote dynamic street lighting control. Using a CMS, the operator can choose exactly when to switch each individual street light on or off and/or by how much to reduce the lamp power. This allows any number of switching events and/or dimming levels. CMS also provides other benefits such as fault detection. CMS systems can be enabled using wireless systems or mains power. Wicklow County Council currently use CMS systems on a select number of public lighting schemes, however, it is not standard practice.

3 OBJECTIVES OF PUBLIC LIGHTING

3.1 LIGHTING RATIONALE

The main objectives for the lighting of residential areas is to enable pedestrians to orientate themselves, to detect traffic and other hazards, and to discourage crime directed against people or property. Lighting of amenities such as walkways, cycle paths, playgrounds and monuments should be curtailed to dusk to midnight operation as against the normal dusk to dawn regime, unless there is a compelling reason to do otherwise, for environmental and energy conservation reasons.

3.2 SECURITY

An important purpose of lighting in housing estates is to create an environment in which the residents feel safe and secure. In areas where there is a high crime risk, care should be taken that any potentially dark areas are lit. More than one lighting unit at specific high-risk locations should be used so that a simple lamp failure does not leave an area in total darkness. Colour rendering is also of importance in crime detection and should be considered when selecting a light source and colour temperature.

3.3 PEDESTRIAN SAFETY

Oncoming vehicles and bicycles must be easily recognisable by pedestrians and vice-versa. It should be possible for pedestrians to discern the features and intentions of a person who may approach them during periods of darkness.

3.4 ROAD SAFETY

Public lighting on roadways should provide guidance for motorists, but may be insufficient for revealing objects on the road without the use of headlights. Drivers must be able to distinguish pedestrians and oncoming vehicles.

3.5 SOCIAL BENEFITS

Lighting should provide visual guidance for visitors who are not familiar with the area and who are looking for the homes of friends/relatives or commercial or recreational facilities.

If possible, light should not enter the bedrooms of residents and the fitting of cowls or some other measure may be required where a resident complains of light pollution.

The ILP¹ have also brought out a useful guidance document in 2021 on measures to be taken to mitigate light spill.

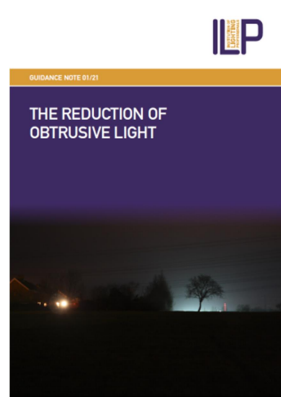


Figure 3-1 Guidance Note GN01:2021 – The Reduction of Obtrusive Light

3.5.1 Obtrusive Light

Whether it keeps you awake through a bedroom window, impedes your view of the night sky or adversely affects the performance of an adjacent lighting installation, obtrusive light is a form of pollution. It may also be a nuisance in law and can be substantially mitigated without detriment to the requirements of the task.

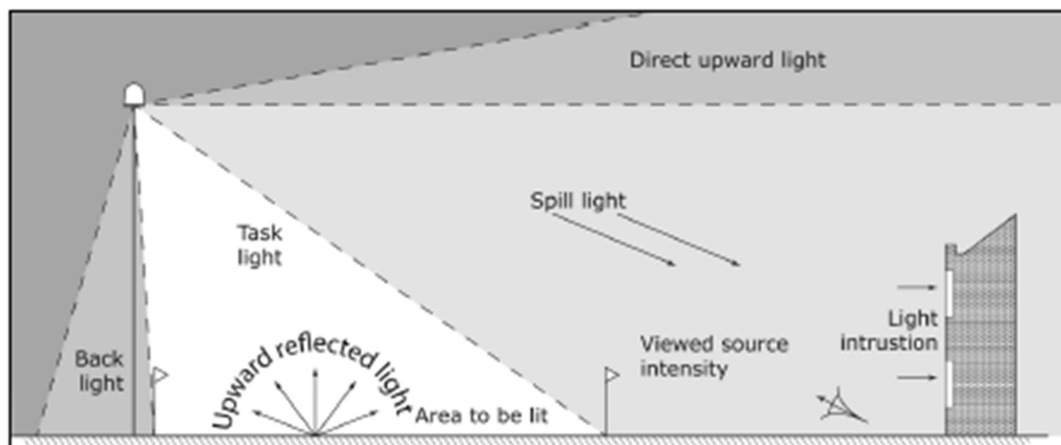


Figure 3-2 Examples of Obtrusive Light

Lighting designers should design to the appropriate lighting class and not "over" light. This is a major cause of obtrusive light and also a waste of energy. There are published standards for most lighting tasks, adherence to which will help minimise upward reflected light.

The spill of light onto buildings opposite can be controlled by lessening the tilt angle or by using a narrow optic which limits the lateral spread.

Generally, LED lanterns should be set in the range 0-5 degrees and the optic type should determine the lateral spread thereafter.

3.6 ENVIRONMENTAL ZONES

DN-LHT-03038 (2018) The Design of Road Lighting for the National Road Network published by TII provides guidance on the luminous intensity of lighting sources dependent upon the environmental zones. To minimise unwanted glare and light spill, the luminous intensity of lighting sources are restricted (Glare (G) ratings, as identified in IS EN 13201-2) and set out against each environmental zone in the table below:

Zone Surrounding		Lighting Environment	Examples	Intensity Classes
E0	Protected	Dark	UNESCO Starlight Reserves, Dark Sky Areas	G6
E1	Natural	Intrinsically Dark	National Parks, Areas of Natural Beauty, etc.	G5 or higher
E2	Rural	Low District Brightness	Village or relatively dark outer suburban locations	G4 or higher
E3	Suburban	Medium District Brightness	Small town centres or suburban locations	G3 or higher
E4	Urban	High District Brightness	Town/city centres with high levels of night-time activity	G2 or higher

Table 3.1 Extract from DN-03038 Luminous Intensity Glass Requirements

Wicklow County Council will generally restrict lighting to environmental zones E2 – E4 inclusive. Proposals for lighting in zone E1 will only be considered on a strictly case by cases basis.

4 TYPES OF LIGHTING EQUIPMENT

The installation of public lighting contains various elements. This chapter is concerned with the parts of the light itself:

- Types of Lamps;
- Typical Lamp Wattages;
- Lanterns;
- Switches & Control Gear;
- Columns.

4.1 TYPES OF LAMPS

Historically, the most common types of lamps installed in residential areas and on traffic routes were Low Pressure Sodium lights (SOX), these were replaced with High Pressure Sodium lights (SON), and to a lesser degree Metal Halide (MH).

Wicklow County Council's policy is now to only use low energy LED lighting on all new schemes/retrofits. Hence, new lights in all developments and on new traffic routes shall be of LED type.

4.1.1 Light Emitting Diode Lamps (LED)

LED lighting is the preferred technology for outdoor lighting based on the achievable energy efficiency compared to current HID technology and reflecting the need to accord with government energy reduction policy.

All new luminaires shall be LEDs and shall comply with I.S. EN 60598-2-3 and IEC 62722-2-1 Luminaire Performance – Part 2-1: Particular requirements for LED luminaires. All new luminaires shall incorporate electronic control gear and a photocell in each lantern as standard.

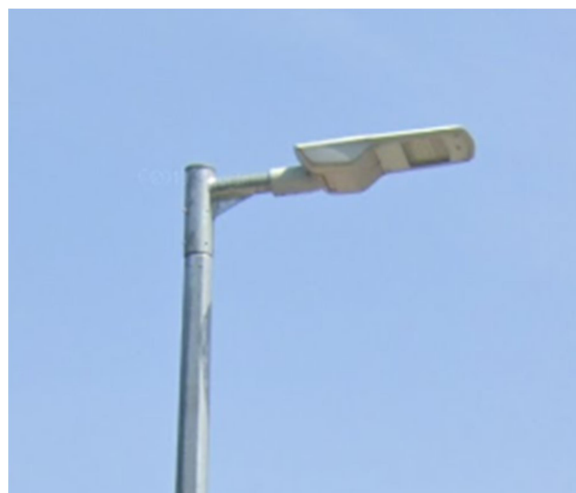


Figure 4-1 Typical LED Light

Colour Rendering (Ra) is of the same quality as for Metal Halide lamps and the lifetime for a LED lamp is projected to be between 50,000 to 100,000 hours or c. 12 years of dusk to dawn lighting.

Wicklow County Council maintenance obligations, aim to keep the number of diverse luminaires to reasonable limits in its inventory. Lanterns shall comply with the appropriate standards: IS EN 60598 and IEC 62722-2-1:2014 and only recognisable brands, for which spare parts will be readily available for many years to come, will be accepted.

4.1.2 High Pressure Sodium Lamps (SON)

High pressure sodium lamps were the most commonly used in street lighting. These lamps were developed in the early 1970's. Whilst they are marginally less efficient than SOX lamps they provided a much better quality of light in terms of colour rendering, making it possible to distinguish different colours though not to the extent with LEDs.

It is Wicklow County Council's intention to phase out and replace all SON lamps.



Figure 4-2 Typical 150W SON Light

4.1.3 Metal Halide Lamps (MH)

Metal Halide lamps have a Ra of 70 compared with a Ra of 20 for SON lamps. Consequently they were specified for urban commercial outdoor locations and for larger sports applications, but not for general use.



Figure 4-3 150W Metal Halide Light

4.1.4 Low Pressure Sodium Lamps (SOX)

These lamps which emitted a yellow/orange light with very poor colour rendering were historically installed extensively in residential areas (55 Watt) and on Traffic Routes (135Watt).

It is Wicklow County Council's intention to phase out and replace all SOX lamps.



Figure 4-4 Typical 55W SOX Light

4.1.5 Typical Lamp Wattages

The equivalent wattage's of the older type lamps are given in the table below. Lamps on the second row were those generally used in housing estates. Lamps on the third row were mainly used for urban routes and the ones on the fourth row for busy traffic routes.

SON/MH (Nominal Wattage)	Unmetered Billed Wattage (SON) (Electromagnetic/ Electronic)	SOX Nominal Wattage	Unmetered Billed Wattage (SOX) (Electromag. / Electronic)	Burn Hours (Dusk/Dawn)/ (Dusk/Midnight)
50	62/56	35		4150/2600
70	85/79	55	80/55	4150/2600
100	117/113	90	115	4150/2600
150	170/166	135	165/150	4150/2600
250	275/270	180	220	4150/2600
400	440			4150/2600

Table 4.1 Indicative Equivalent Wattages of Various Lamps

It is not possible to definitively state the LED equivalent of the above lanterns as the efficacy of LED lights varies considerably by brand and with ever improving technology, the equivalent LED lantern wattages are dropping all of the time.

Wicklow County Council require that a complete lighting design by a competent designer be undertaken for lighting schemes. All designs should conform to the relevant standards applicable at the time of the design.

4.2 SWITCHES & CONTROL GEAR

4.2.1 Photocell

Photocells measure the ambient light and switches on the street light when the ambient light falls below a certain intensity and likewise switch-off when the light level returns to the required level.

The traditional ratio was 70/35 lux for SON lights but LED lights operate on the basis of 35/18 lux as they reach full output capacity instantly.

Photocells should fail in the 'on' position enabling faulty photocells to be easily identified and replaced as the light will remain lit during daylight hours.

Photocells can operate individual lights, groups of lights or a whole scheme of lights. Photocells/timers can also be supplied to provide part night switching from dusk to midnight. This is especially useful to light recreational areas where it is unnecessary to keep these areas lit after midnight.

Photocells should be seven-pin twist lock NEMA socket or equivalent with a photo-electronic switch. Where standard photocells are not feasible, especially for heritage luminaires, Wicklow County Council approval should be sought. These shall provide the same functionality of standard seven-pin photocell.



Figure 4-5 Standard Photocell

Wicklow County Council require individual photocells for each light. Mini-photocells may be problematic and are not preferred. However, if there is no alternative, proposals should be submitted and will be considered on a case by case basis.

4.2.2 Cables & Circuits

An appropriately rated circuit fuse (2-amp or 6-amp HRC fuse) should be provided in the column cut-out. All outgoing circuits from public service lighting pillars should be fused via a 16 or 20-amp HRC cut-out type.



Figure 4-6 Standard Fuse Cut-Out

When the power supply is from underground and where dusk to dawn lighting is provided, an appropriately sized fuse should be provided in the base of each column.

Underground cables must be contained within 50mm (or 100mm for extended runs) red MDPE service duct with appropriate markings and protected by cable marking tape, appropriately installed.

4.3 COLUMNS

Columns, column doors and brackets (including adaptors) shall be designed to comply with all sections of IS EN 40 Specification for Light Columns. They should be designed with a fatigue design life of 30 years.

4.3.1 Types of Columns

- **Galvanised steel**

These can be of the root type mounted in sockets or flange type mounted on concrete foundations, fed through underground ducted cables.

- **Aluminium**

These columns have the advantage of being light and easy to handle, and they give way in the event of an accident. These columns are quite expensive. They are also less prone to corrosion and hence have a place for use in locations where seawater spray is likely to be present

- **Mid/Base Hinged**

Hinged columns should be used in areas of < 3.5m road width which are inaccessible to maintenance vehicles. These allow the upper portion of the column to be lowered by hand to make the lantern accessible. Typical applications are amenity walks or narrow laneways.

- **Passively Safe:**

Passively safe columns are specified in accordance with the requirements of BS 12767:2007. These are designed to yield in a safe manner when struck by a vehicle.

Wicklow County Council's policy on the use of passively safe columns, on new schemes, is in accordance with TII protocol (TII Guidelines DN-LHT-03038) and hence in general, their use is required on roads with a speed limit greater than 80km/h, and/or at traffic calming gateways. TII require passive columns to be fitted with devices which disconnect the power supply immediately, once a passive column is struck.

- **Decorative/Architectural**

These columns should be confined to town centre streetscape areas only and are still required to be manufactured to IS EN 40 series. Prior approval from Wicklow County Council is necessary before the erection of decorative/architectural columns.

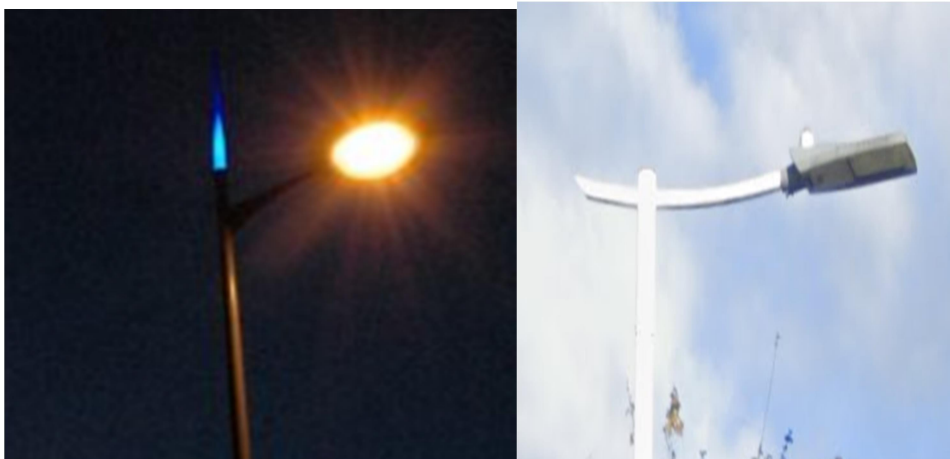


Figure 4-7 Examples of Architectural Lights

- **Cycleways/Walkways**

Columns for cycleways/greenways/nature areas should be different to the norm and sleek and appealing with a slender matching column..



Figure 4-8 Pedestrian Walkway Lighting

- **Heritage Style**

In some instances in Town Centres it may be appropriate to install traditional style lights and columns. Prior approval from Wicklow County Council is necessary before the erection of heritage columns.



Figure 4-9 Heritage Style Lights

Wicklow County Council policy is to use underground ducted supplies and galvanised steel columns on new lighting schemes unless particular circumstances require a different approach.

4.3.2 Column Heights

Column heights should generally conform to the following table:

Location	Column Height (m)
Residential Estates	6
Local & Regional Roads	8 – 10
National Roads	10
Motorways & Dual Carriageways	12

Table 4.2 Typical Column Heights

4.3.3 Fittings on Columns

Lamps can be installed on columns directly post-top or on either an extended upright arm or with an outreach or a combination of an extended outreach bracket. With LED Lights, post-top or vertical extension brackets are preferred, especially on ESB Network poles, as insisted upon by ESB Networks, due to the increased weight of LED lights over SON/SOX.

Outreach arms can be installed at tilt angles of 0, or 5 degrees to the horizontal. Tilt angles of 0 degrees should only be used on very narrow streets, as the light emitted by the lamp does not reach as wide an area as with larger tilt angles. Outreach arms should generally be avoided unless needed to extend the light across wide roads/dual carriageways.

LED lanterns may be more suited to post top mounting and the lantern itself can be tilted to achieve an adequate design.

Wicklow County Council do not allow CCTV or other non-public lighting fixtures to be mounted on public lighting columns.

4.3.4 Column Construction

Columns for public lighting should be manufactured from steel or aluminium alloy and certified to IS EN 40 Series. Columns are generally octagonal with a minimum wall thickness of 3mm. Steel columns and brackets should be hot-dip galvanised. Columns shall be coated outside with a protective coating to at least 150mm above planting depth. Such coating is usually applied to the bottom 1250 mm of the pole, but may be more for higher columns. Where columns are not erected at the same time as cables are laid, great care should be taken that an adequate loop of cable is left at the exact position of the proposed columns.

4.3.5 Rooted/Flanged

Columns should generally be rooted but flanged types can otherwise be specified for particular locations. Base details should be designed in accordance with the column manufacturer recommendation.

4.3.6 Mounting Heights

Typical mounting heights are 6m for residential developments, 8m for Regional and Local Roads, 8m/10m for two-way National routes with 12m and higher for high-speed dual carriageways and motorways, see Table 4.2. In special situations where particular aesthetic or environmental factors apply, the use of other mounting heights might be more appropriate. (ref:-BS 5489-1:2020)

4.3.7 Lateral Offsets

BS 5489-1:2020 provides guidance/standards for lateral offsetting of columns to ensure:

- Columns are unlikely to be struck by wing mirrors of lorries/wide loads etc. and;
- Columns are sufficiently set-back to allow the free passage of all people on any footway.

Wicklow County Council requires lighting to be located in the public realm, typically at the rear of the footpath, where one exists.

Where this is not possible, the minimum offset outlined in Table 2 (of BS 5489-1:2020, section 4.3.3.3 reproduced below), be observed in rural locations where a footpath is unlikely to be installed at any stage in the future. In urban locations where build-outs etc. allow the column to be located in an area which does not interfere with the footway a different location may be appropriate. Under no circumstances must a column be located in the middle of a

footway/cycleway, where it likely to be a hazard for pedestrians/cyclists/vulnerable road users.

Design Speed (km/h)	Minimum horizontal clearance (m)
<= 50	0.8
80	1.0
100	1.5
120	1.5

Table 4.3 Recommended minimum clearances from edge of carriageway to face of column

5 PUBLIC LIGHTING DESIGN CRITERIA FOR NEW SCHEMES OR ADDITIONAL LIGHTING IN PARTLY COMPLETED SCHEMES

The pattern of light emitted from a lantern is generally T-shaped and of greatest intensity directly beneath the lantern. A LED light's footprint varies with the lens type and the appropriate profile should be chosen to suit the application.

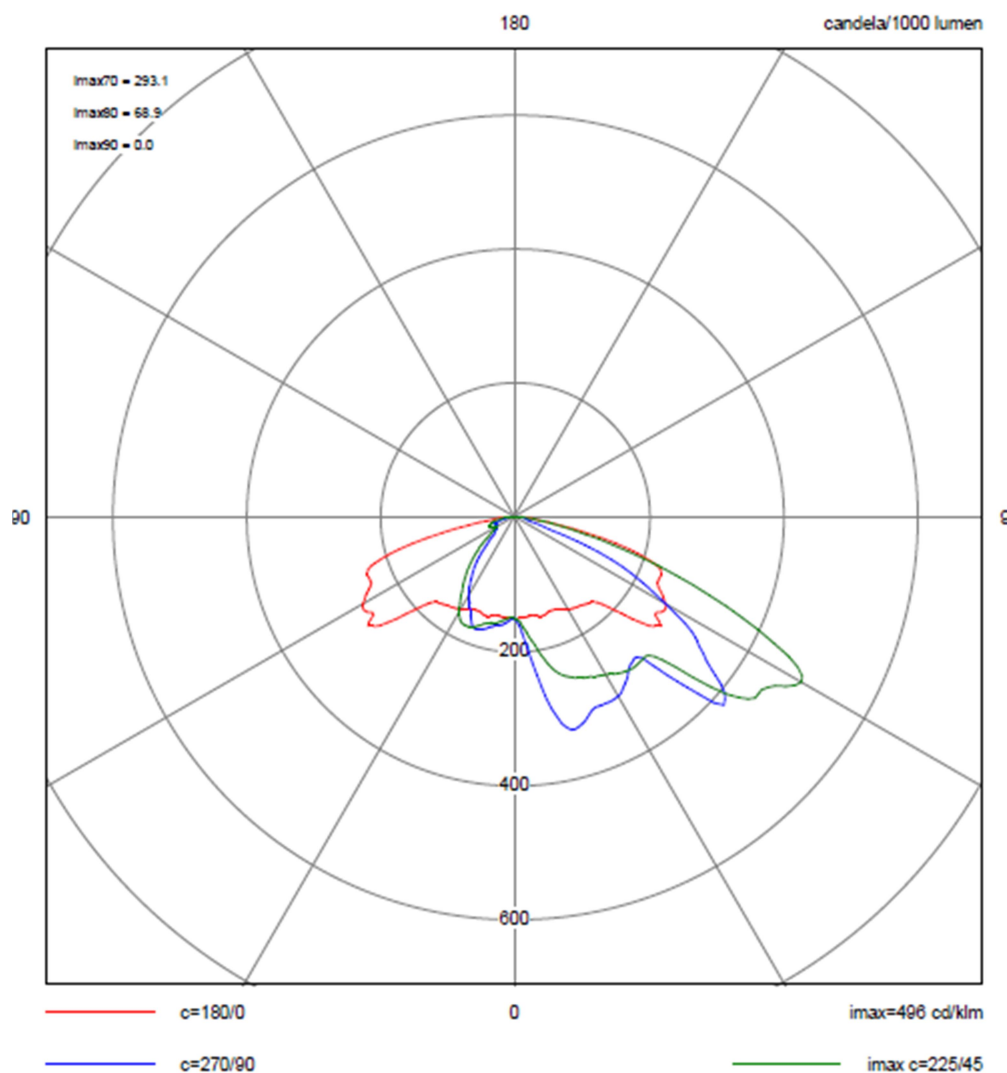


Figure 5-1 Typical Lighting Disperse Pattern

The aim of public lighting design is to achieve uniform light spread over the area to be lit and to ensure that the minimum levels, as defined by the lighting class, are achieved throughout. The intention must be to ensure that lux contours merge satisfactorily along the length of the section to be lit and that at least the minimum lux contour level is achieved towards the extremities. Overlighting, well above the required standard is to be avoided and may be evident when examining a lux drawing where high intensity lighting levels are prolific.

This chapter outlines general lighting requirements for planning applications and details how these requirements may be met. Modern lighting design software enables the Designer to ensure

that the required lighting criteria are achieved in carriageways, footways and open space.

5.1 GENERAL REQUIREMENTS

Wicklow County Council insist that all new designs/retrofits be designed by a competent professional using appropriate software. Currently the preferred design package is “Lighting Reality”. An appropriate report on the design; inclusive of lighting class achieved, lantern types and a lux plan for the scheme should be provided for all designs.

Designs shall be carried out to the appropriate latest BS & EN standards and the extracts following are merely samples for indicative purposes only

The Design process should follow a logical procedure of:

- Determining the Appropriate Lighting Performance Parameters in accordance with PD CEN/TR 13201-1:2014, IS EN 13201-2:2015 and BS 5489-1:2020 standards. The minimum lighting class to be used shall be P4 for P lighting classes.
- Apply the other factors which influence the design such as ‘maintenance factor’, etc. to determine the minimum maintained average & minimum Lux and the appropriate Uniformity required.
- Proceed to locate the columns appropriately and run the design through the software package, adjusting as appropriate until the design parameters are met using a particular lantern or combination of lanterns.
- Plot the lux levels and check that the minimum lighting level is achieved everywhere and that there is an appropriate level of overlapping, to avoid over-design.

In certain retrofit situations, where it is not feasible to install additional poles, there may need to be some relaxation on some of the parameters, such as the acceptance of a reduced level of uniformity; while still achieving a lighting standard at least equivalent to what is existing. The Road Maintenance Office Public Lighting Retrofitting Guidelines should be consulted in relation to the design of retrofit schemes.

5.1.1 Colour Temperature

The colour temperature of LED lights determines whether they are classified as Cold, Neutral or Warm. The default colour temperature has migrated from neutral white to warm white in recent years, in line with other European countries.

Wicklow County Council’s policy on colour temperature is outlined in the table below.

Location	Colour Temperature
National Road Network	As per TII publication DN-LHT-03038, Design of Road Lighting for the National Road Network
Dark Sky Areas, National Parks, within 2.5km radius of Bat Roost locations, or other areas of ecological sensitivity	It shall be considered on a scheme by scheme basis. However, it is recommended to be 2,700K in accordance with ILP Guidance Note 08/18 “Bats and artificial lighting”.
All Other Areas	Warm colour appearance (3,000K) in accordance with BS 5489-1:2020 unless otherwise approved by Wicklow County Council.

Table 5.1 Colour Temperature Requirements

5.1.2 Dimming and Trimming

These are methods used to save energy and carbon generation and should be incorporated in designs where applicable. Considerations range from:

- Road types and classification;
- Road user types;
- Activity levels in the area, especially after midnight, e.g. pubs/nightclubs, 24 hour facilities such as in the vicinity of Hospitals etc.;
- The presence of historical buildings and bridges;
- The need for facial recognition and clear CCTV images;
- Conservation Areas/ dark skies zones;
- Areas where there is a high concentration of residents;
- Risk of crime;
- The need for good illumination for obstacles such as steps, bollards etc.;
- Landscape areas such as parks, gardens, river walkways etc.;

Location	Profile
National Road Networks	As per TII publication DN-LHT-03038, Design of Road Lighting for the National Road Network
Town Centres, main roads	Profile U14 considering reduced activity during the hours 12a.m. and 6a.m. Where there are pubs, nightclubs open until 2a.m., no dimming will be applied for these areas. Where there is a possibility of anti-social behaviour, dimming will not be considered.
Residential Estates and Rural Residential Settlements	Profile U15 to reduce over lighting and light trespass during sleeping hours. In residential estates where there is a possibility of anti-social behaviour, dimming should not be considered.
Carparks	Profile U17 to provide sufficient lighting levels for staff and sufficient illumination to deter criminal activity at night.
Park areas, pedestrian areas	Profile U16 due to low traffic volumes and to deter anti-social behaviour between 12a.m. and 6a.m. If the park is closed, considerations should be given to Profile U23.
Dark Sky Areas, National Parks, within 2.5km radius of Bat Roost locations, or other areas of ecological sensitivity	It shall be considered on a scheme by scheme basis. Refer to ILP Guidance Note 08/18 "Bats and artificial lighting".

Table 5.2 Dimming & Trimming Preferences

5.2 LIGHTING REQUIREMENTS.

All Public Lighting must be designed to the appropriate Class and design parameters set out in the latest revisions of BS 5489 and EN 13201. The generally accepted design class requirements for Public Lighting are set out in the tables below.

Road Class	Description
M	For drivers of motorized vehicles on traffic routes medium to high driving speeds
C	For use in conflict areas on traffic routes where the traffic composition is mainly motorised. Conflict areas occur wherever vehicle streams intersect each other or run into areas frequented by pedestrians, cyclists, or other road users. Areas showing a change in road geometry, such as a reduced number of lanes or a reduced lane or carriageway width, are also regarded as conflict areas
P	For pedestrian traffic and cyclists for use on footways and cycleways, and drivers of motorised vehicles at low speed on residential roads, shoulder or parking lanes, and other road areas lying separately or along a carriageway of a traffic route or a residential road, etc.

Table 5.3 Lighting Classes as per PD CEN/TR 13201-1:2014

PL Design Class	Description
P2	Residential Distributor/ Main Spine road in large estate with relatively large traffic volumes.
P3	Normal sized residential estate road.
P3/P4	Cul-de-sac roads within the estate. Footways/cycleways.
C3	Main St. in a Town Centre
M4	Main St. in a Village

Table 5.4 Wicklow County Council New Scheme Lighting Classes

5.2.1 Lighting Requirements for Housing Developments and Pedestrian Areas

There are six different P Classes defined in BS 5489. The most common are P2, P3 & P4. The typical requirements are set out in Table A5 of BS 5489:2013, an extract from which is given in Table 5.2.1 below.

Road Type	Lighting Class	Maintained Average Illuminance, lx LED	Maintained minimum illuminance, lx LED	Uniformity Emin/Eav
Roads where: <ul style="list-style-type: none"> - Night-time public use likely to be high - Or the crime risk likely to be high - Or the traffic usage is likely to be high 	P2	10.0	2.0	0.2

Roads where: <ul style="list-style-type: none"> - Public use is likely to be moderate - Or the crime risk is average to low - Or normal traffic usage is of a level equivalent to that of a housing estate access road. 	P3	7.5	1.5	0.2
Roads where: <ul style="list-style-type: none"> - Public use is likely to be moderate - Or the crime risk is average to low - Or quiet traffic usage is of a level equivalent to that of a residential road mainly associated with the adjacent properties. 	P4	5.0	1.0	0.2

Table 5.5 Typical Housing Estate lighting Class

Lighting in housing developments in Co. Wicklow should be designed to a minimum P3 standard but P4 standard may be considered for cul-de-sac's or recreational walkways across green areas.

Wicklow County Council recommend warm white light (3000K) be used within Housing Estates.

Within a residential development, the requirement is to light the road, verge and footpath to at least the minimum level, as far as the adjacent boundary line of the properties. Also, to ensure that the access roadway and any walkways across green areas, etc. are adequately lit.

The design is required to be demonstrated, at planning stage or via planning compliance, by the submission of a lux contour drawing, showing contour lines at the maintained average level, the maintained minimum level and thereafter at regular intervals.

The number of optics should be minimised for the particular schemes to assist future maintenance and the specific optic/lantern code should be identifiable on a label within the lantern. The brand type should remain the same throughout a confined development, in so far as practical.

Wicklow County Council policy is to incorporate factory set dimming to the next lower Lighting Class between 24.00hrs. and 06.00hrs in non-town centre locations (and housing estates). Housing estates should generally be dimmed to Profile U15.

Conflict Class Design is only required on traffic routes and does not generally apply to junctions within housing estates, with the possible exception of the junction between the housing estate and the public roadway depending on traffic volumes.

5.2.2 Lighting Classes for Subsidiary Roads with Slow Moving Vehicles, Cyclists and Pedestrians

Lighting classes for low speed subsidiary roads may be to the P-Classes. In luminaire retrofit situations up to the level of Regional Roads, where it is not possible to achieve full uniformity due to existing pole spacing, Wicklow County Council may accept P2 Class for such busier traffic routes. The parameters for this class are outlined below.

Road Type	Lighting Class	Maintained Average Illuminance, lx LED (neutral) LED	Maintained minimum illuminance, lx LED (neutral) LED	Uniformity Emin/Eav
Roads where <ul style="list-style-type: none"> - Night-time public use likely to be high - Or the crime risk likely to be high - Or the traffic usage is likely to be high 	P2	10.0	2.0	0.2

Table 5.6 Lighting Class for Typical Local Tertiary Roads

5.2.3 Lighting Classes for all other Traffic Routes

Lighting classes for all other traffic routes shall be to M/C classes. Typical requirements are set out in BS 5489: 2020 and are selected from a range of 6 no. ME & C Classes by reference to BS EN 13201-1: 2014, a sample of which are outlined in Table 5.7 Lighting Classes for Traffic Routes Table 5.7.

Road Type	Lighting Class	L_{av} in cd/m ² (min maintained)	Maintained Average Illuminance (Lux)	Maintained Minimum Illuminance, lux	Uniformity
Traffic Routes*	M2/C2	1.5	20	8	0.4
	M3/C3	1.0	15	6	0.4
	M4/C4	0.75	10	4	0.4
	M5/C5	0.50	7.5	1.5	0.30
Motorway	M1/C1	2.0	30	12	0.4

Table 5.7 Lighting Classes for Traffic Routes

5.2.4 Traffic Route Lighting on National Roads

Lighting for schemes on National Roads should be designed to TII Publications DN-LHT- 03038 Aug 2018 and shall be subject to TII approval.

5.2.5 Conflict Class Design

Conflict Design is generally required, on traffic routes, at junctions, roundabouts, traffic calming gateways and town centre locations (where pedestrians are likely to be present). Where applicable the conflict class should generally be one class higher than the associated M Class, e.g. design road generally to M3, conflict zones to C2.

5.2.6 Lighting Requirements for Traffic Calming and Pedestrian Crossings

The lighting of traffic calming gateways shall follow the principles outlined TII Guidelines DN-LHT-03038 Aug 2018 (or as revised), which stipulates that traffic calming gateway central islands shall no longer be illuminated with a light within the central island. Instead a light on a passive column shall be located at either side with an optic suitable to illuminate the gateway signs.

All new zebra crossings shall incorporate additional targeted lighting over and above the general street lighting, illuminated to both vertical and horizontal illuminance.

Each location where auxiliary public lighting is proposed, at either a traffic calming gateway or at a pedestrian crossing, shall be designed in accordance with ILP Technical Report 12 (TR12) – Lighting of Pedestrian Crossings, to achieve the standards required for the cross road beam of light, using optics which direct the light to the right/left as appropriate and which meet the standards required by TR 12 namely:

- The average horizontal illuminance on the crossing carpet shall be a minimum of 3.5 times that of the designed average horizontal illuminance of the standard road lighting appropriate to the lighting class chosen for the road.
- The uniformity within the above carpet would achieve a level of 0.6
- The vertical illuminance to be calculated on three vertical grids, each 1.5m high and the width of the crossing mat at a) centre of crossing, b) the kerb edge and c) rear of waiting area. Middle grid and kerb grid to be $2.0 \times E_{av}$ and rear grid to be $1.5 \times E_{av}$.

5.2.7 Lighting Requirements for City and Town Centres

Requirements are set out in S 5489: 2020 and are selected from a range of four C Classes and two S Classes by reference to BS EN 13201-1: 2014. C classes refer to conflict areas such as junctions or roundabouts etc. For security and for visual guidance purposes the full street width building facade to building facade should receive some light: In locations where a wide pedestrian area exists, a separate P Class may be more appropriate to apply to such areas.

Road Type	Lighting Class	Maintained Average Illuminance, I_x	Maintained minimum Point illuminance, I_x	Uniformity
Determined based on factors such as: - Night-time public use is likely to be high	C2 (City/Town Centre with high traffic flows)	20	8	0.4

<ul style="list-style-type: none"> - Or the crime risk is likely to be high - Or the traffic usage is likely to be high - With mixed vehicle and pedestrians on separate footpaths. 	C3 (Town Centre with low flows)	15	6	0.4
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Table 5.8 Typical Town Centre Lighting Class

5.2.8 Lighting Requirements for Public Car Parks

Requirements for the lighting of Car parks are set out in BS 5489-1:2020, which is extrapolated from BS EN 12464-2:2014. The requirements are measured in term of E_{av} and uniformity. In general public car parks serving towns would fall into the middle category of the table below.

Car Park Type	Maintained Average Illuminance I_x	Uniformity U_0
Light Traffic Parking for shops, terraced and apartment houses, amenity car parks etc.	5	0.25
Medium Traffic Parking for department stores, office buildings, sports arenas etc.	10	0.25
Heavy Traffic Parking for schools, churches, major sports and building complexes	20	0.25

Table 5.9 Typical Car Park Lighting Requirements

Dimming of Car parks should be incorporated into the design, unless there are practical reasons (e.g. safety concerns) not to.

5.2.9 Lighting Requirements for Recreational Areas (Town park walks/ playgrounds/ footbridges)

Requirements are set out in BS 5489-1: 2020 but, due of the diverse nature of each particular site, no uniform method of lighting provision is suggested, and an individualised approach needs to be taken for each site. For this reason, only basic guidance is given with regard to the overall lighting provisions related to each area.

Wicklow County Council's current policy is that, unless otherwise justified, trimming shall be applied to recreational areas. If necessary signs should be erected indicating that the lighting will go off at midnight.

Lighting classes for subsidiary roads with mainly slow moving vehicles, cycle paths and pedestrian paths (segregated).	Lighting Class	Maintained Average Illuminance, lx	Maintained minimum Point Illuminance, lx
Recreational Areas	P4	5.0	1.0

Table 5.10 Typical Recreational Area Lighting Classes

5.2.10 Lighting Requirements for Cycleways (e.g. Greenways and off-road walkways)

Requirements are set out in BS 5489-1: 2020, however, Wicklow County Council are reluctant to go below Class P4 for this category giving the hazard presented from fast-moving cyclists conflicting with opposing cyclists and/or slow moving pedestrians (on a shared surface).

Consideration should also be given to designing to an appropriate EV Lighting Class using vertical illuminance when there are particular concerns about crime and personal safety. EV Class aims to illuminate a person's face at a height of 1.5m in relevant viewing orientations.

Lighting classes for subsidiary roads with mainly slow moving vehicles, cycle paths and pedestrians paths (segregated).	Lighting Class	Maintained Average Illuminance, lx	Maintained minimum Point illuminance, lx	Uniformity
Cycleways/walkways	P3	10	2	0.2
Cycleways/walkways	P4	5.0	1.0	0.2

Table 5.11 Typical Cycleway/Off-Road Walkway Lighting Classes

5.2.11 Lighting Requirements for Steps, Stairs, Ramps and Footbridges.

Guidance for the lighting of footbridges, stairs and ramps can be found in BS 5489-1:2020. Special care and attention should be given to the illumination of steps/stairs and ramps. These should be lit from below so that a person descending is not shadowing the light onto the next step. **Light units built into walls or low level bollards are to be avoided, in so far as possible due to maintenance/vandalism issues.** Lighting of a footbridge may be either via columns or built into the railing.

Type	Day (lux)		Night	
	\bar{E} (lux)	E_{min} (lux)	\bar{E} (lux)	E_{min} (lux)
Subways				
• Open	-	-	50	25
• Enclosed	350	150	100	50
Footbridges				
• Open			30	15
• Enclosed	350	150	100	50
Stairways/Ramps				
• Open	-	-	30	15
• Enclosed	350	150	100	50

Table 5.12 Extract from BS 5489-1:2020

5.3 MAINTENANCE FACTOR FOR DESIGN

A maintenance factor based on a cleaning cycle of six years shall be incorporated into the design. In the event that this information is not available from the lamp and/or luminaire manufacturer(s) a maintenance factor of 0.76 shall apply to columns < 6m high and 0.84 to columns > 6m high in an E3/E4 environment. The basis for the selection of the maintenance factor should be indicated.

The lamp flux maintenance factor can be established from the lamp manufacturer's data, and typical luminaire maintenance factors for LED luminaires are given in BS 5489-1: 2020.

Consideration will be given to manufacturer's data regarding maintenance factors for conventional LEDs.

5.4 GENERAL

Design submissions for all new schemes should include an isolux contours on a map to demonstrate that the required Class has been achieved throughout and shall be accompanied by a lighting design report indicating that the minimum lighting class requirements have been achieved. The isolux contours should include the modelling of existing adjacent lights to ensure that both systems mesh together to give continuous lighting to the required standard. A Design report and schedule of proposed lights should also be submitted. The Design report should contain details of the light proposed to be used within the development. The wattage of the light shall be stated as that associated with constant light output over the expected lifetime of the fitting.

Wicklow County Council requires that all neutral white lanterns must have a minimum efficacy level of 140 lm/w and for neutral and a minimum of 130 lm/w for warm white, certified by a recognised accreditation body and measured within the complete lantern

casing.

5.5 DIMMING AND TRIMMING

LED lights lend themselves to trimming as they reach full potential very quickly when compared to conventional lights. A number of burn profiles, incorporating trimming to 35/18, have been agreed between ESB and CCMA/SEAI with further profiles due to be agreed in the future.

These burn profiles allow for dimming to different percentages. Examples are profiles, U14, U15 & U16 which are currently available for use and should be incorporated into the design where appropriate. Each profile involves the dimming of lights between 12midnight and 6a.m. to different extents, (75%, 67% and 50% respectively) to correspond with one lighting class drop per profile change.

Wicklow County Council policy is to incorporate factory set dimming to the next lower Lighting Class between 24.00hrs. and 06.00hrs in non post-midnight activity locations in accordance with the guidance given in Institution of Lighting Engineers (ILP) TR27 and Annex A of BS 5489: 2013.

Examples of locations where post-midnight activity is likely would include: roads/ streets with pubs/night clubs, hospitals, train stations, port facilities, etc..

LED Lighting shall have a 35Lux on/18Lux off dusk to dawn photocell controlled switching regime on roads and 35 lux on to midnight off on amenity walks/playgrounds/monument lighting, etc.

The exception to this rule would be at Zebra Crossings points where 70/35 is preferred on road safety grounds and consideration should be given to using the 70/35 photocell where pedestrians are crossing randomly on streets or at uncontrolled crossing points.

5.6 LIGHT SPACING, ARRANGEMENTS AND TILT ANGLE

5.6.1 Spacing

All lighting should be designed by a competent Public Lighting Designer using specialised software to ensure the required levels of lighting are achieved. The following are indicative of design outputs and should only be used for initial estimates.

- **Straight Roads**

In residential schemes, with a straight 6m wide roadway with a 2m footpath on either side, the minimum standard of illuminance considered acceptable can be provided by the installation of lights at 30-35m spacings with 6m mounting height and either none or 0.5 meter outreach arm.

- **Bends and Junctions**

At bends and junctions, the distance between two adjacent poles should be considerably shorter than the above recommended value for straight roads. In bends, the poles should be located on the outer side of the bend. The sharper the curve, the closer the poles should be to each other.

- **T-Junctions**

It is recommended that a light be placed on the main road, opposite the centreline of the minor road. The distance between the pole at the junction and first pole on the minor road should be less than half the distance between two adjacent poles in places where there is no junction.

5.6.2 Arrangements

Lantern Optics provide options to suit various road widths or pattern requirements to fit numerous scenarios. Typical lighting distribution patterns achievable are outlined below.

- **Single Sided**

In a single sided arrangement, all the lights are located along the same side of the road.

- **Opposite**

The lights are placed opposite each other on both sides of the road, resulting in good longitudinal luminance along the length of the road.

- **Staggered**

The lights are placed alternately on both sides of the road in a zigzag pattern. The spacing between two poles may be increased when this arrangement is used, but the longitudinal luminance along the road will be low.

5.6.3 Tilt Angle

The outreach arm can be installed at tilt angles of either 0 or 5 degrees. A 0 degree tilt will allow the lamp emit light only to a small area of road just below the lamp. A tilt angle of 5 degrees is generally recommended.

Wicklow County Council favour post top rather than outreach on new LED installations.

5.7 LIGHTS FIXED TO BUILDINGS

Public Lights can be fixed to buildings, usually in streets where space is limited. The permission of the building owner and that of ESNB is required before lights can be attached to buildings. A wayleave agreement should be signed by the consenting owner to ensure continuity in the event of future transfer of ownership of the property.

Wicklow County Council generally will not permit lights fitted to buildings.

5.8 LIGHTING OF STEPS

Steps should be illuminated from the bottom up to highlight the step edges, i.e. the lighting columns should be located at the bottom of the steps where possible and practicable. In some cases it may also be necessary to erect columns within landings at intervals on long staircases. It may also be possible to build lighting units into walls but these can be subject to vandalism.

5.9 LIGHTING OF PEDESTRIAN BRIDGES

Overhead lighting from columns designed to fit within the structure of the footbridge are the preferred option but continuous lighting built into the base of the handrail is also an option provided it can be demonstrated to meet appropriate standards.

5.10 VERIFICATION OF DESIGNS

Light measurement to verify the lighting levels achieved should be carried out on new schemes on a sample basis. The ILP Technical Report 28 'Measurement of Road Lighting Performance on Site' is a simplified methodology for assessing the street lighting performance on the streets. This report has been widely accepted as a robust approach for maintenance contracts.

6 INSTALLATION

6.1 CONNECTION ARRANGEMENTS

6.1.1 Overhead Mains Cable

Where mains cables are carried overhead on ESB Networks Ltd. wood or steel poles – it has been normal practice to provide street lighting from lanterns mounted on brackets fixed on these poles. As these brackets are always close to live ESB networks, only duly qualified persons, authorised by the Local Authority are permitted to install or work on this type of installation. An interface box is required for new or replacement lanterns or brackets erected on ESB Network poles. Please reference ESB Requirements for Work on Public Lighting on ESB's Networks 2020. ESB discourage the erection of new lighting assets on its network poles therefore,

Wicklow County Council prefer a ducted underground supply feeding stand-alone public lighting columns for new installations.

6.1.2 Underground Mains Cable

Underground mains cables are to be laid in accordance with ET211: 2003 Code of Practice for Public Lighting Installations in Residential Areas. A separate underground cable must be used exclusively for public lighting supply. This cable shall be installed in a duct (generally 50mm – 100mm red duct) in accordance with the requirements of I.S. 10101:2020 National Rules for Electrical Installations.

It is essential that public lighting columns be erected at the same time or very shortly after the cable is laid. Where columns are not erected at the same time as cables are laid, great care should be taken that an adequate loop of cable is left at the exact positions of the proposed columns and does not constitute a tripping hazard.

At this stage, the cable is particularly susceptible to damage by machinery and builders' equipment. It is strongly recommended therefore, that the loops be clearly marked and enclosed in a short concrete pipe or other similar protection which will draw attention to the presence of the cable.

It is advisable to liaise with ESB Networks at the earliest opportunity with regards to agreeing suitable electricity supply points.

6.2 INSTALLATION PROCEDURES FOR COLUMNS

6.2.1 Foundations for columns

Columns should be erected in the following ways:

- **Rooted**

A concrete or corrugated PVC pipe of approximately 300mm diameter is installed in a foundation excavation and then surrounded by concrete prior to the erection of columns. The root depth and extent of concrete surround is dictated by the column height and ground conditions and should be specified by the column manufacturer.

- **Flanged**

A concrete base is laid and a flange type column is used. Holding down J- bolts are incorporated into an in-situ concrete base and a flange type column is subsequently erected and secured by nuts. The size of the base varies with size of column and should be specified by the column

manufacturer.

Wicklow County Council favour rooted columns, unless there is a specific reason for utilising flanged.

The set-back of lighting columns should be sufficient to allow the free passage of all people on any footway. Columns should never be located within likely pedestrian/cycle pathways.

Landscape designs need to take cognizance of public lighting layout and vice versa. Trees/shrubs/hedges should not be planted in locations where they are likely to interfere with the required spread of light from public lights and with access for maintenance, over time.

Tree planting should, preferably, be located at the opposite side of the road to the lights and the expected upper/lower level of the foliage (determined by choice of tree type) should be such as would not interfere with the expected light distribution pattern, either laterally or longitudinally. Trees should never be planted longitudinally, within 6m of a lighting column, on the same side of the road.

Columns should have a double locked framed door and should be galvanised. Doors should face oncoming traffic perpendicular to the road edge.

6.3 DUCTING PROVISION

Excavation and backfilling of roads/verges etc. for ducting shall be carried out in accordance with “Guidelines for Managing Openings in Public Roads” (DTTAS, April 2017 or latest version). Openings in public roads in the charge of the Council require a road opening licence from the local authority.

6.3.1 Standards of Ducting

Ducting should be made of PVC to IS135 Class B having a minimum 50mm diameter for public lighting cable and 50mm/100mm diameter for ESB network supply distribution cable to the lighting micro-pillar, please refer to I.S. 10101:2020.

Ducting shall be red coloured and have the words “Street Lighting” stamped on it in 9mm high lettering at 1m intervals, with the lettering labels facing upwards in the trench. Warning tape must always be used.

6.3.2 Ducting in Verges/Footpaths

Ducting should be laid in a bed and surround of Clause 503 material at a minimum depth of cover as specified in “Guidelines for Managing Openings in Public Roads”. Warning marker tape shall be laid in the trench at an appropriate level above the duct. Ducts should be installed complete with 6mm diameter polypropylene rope for subsequent pulling of supply cable. The ESB require that a 6mm diameter rope be provided to draw-in their connecting cable to lighting pillars from supply distribution points.

6.3.3 Ducts under Roads

Ducts laid in roads should be adequately protected by a cover of cement bound material as outlined in “Guidelines for Managing Openings in Public Roads”. Road crossing ducts should generally be 100mm diameter and may require a junction box either side for future replacement of cables. The duct ends shall be protected from ingress of rubble or other material. Cross road

ducts should extend a minimum of 300mm into the grass margin beyond the edge of the hard shoulder or kerb and should end in a chamber either side of the road.

6.3.4 Ducting Surround

The compacted thickness of CI 503 material above and below the duct should be a minimum of 50mm. The remainder of the trench should be backfilled to ground level using imported compacted crushed stone or as specified in the “Guidelines for Managing Openings in Public Roads” and any road opening license special conditions.

6.3.5 Ducting Arrangements

Wicklow County Council favours ducting to be laid column to column and, micro-pillar to column. It should be noted that extensive lengths of cable should be avoided due to voltage drop. The design should cater for a number of lights that may be lit without significant voltage drop.

Schemes in significant conflict zones should be designed such that if a circuit fails, every second light will still be working. This is achieved by laying a 100mm duct independent of the lights and teeing off to every second light with a cable from alternate circuits. Such an arrangement is favoured for Town Centre locations and on new National Route schemes.

Ducting setback in relation to road edge will vary depending on the setback of foundation blocks and/or rooted lighting columns. In general, the ducting should either run directly from column to column or alternatively 500mm in front of the block/column positions, with a minimum 150mm between centre of duct and front face of foundation block or root type column.

Cables should be fed from supply ducts to foundation block duct opening or cable slots of root column, both in and out, to project into column at least 300mm above top of cable slot. In the case of flange plate columns, a 90 degree bend should be fixed within the foundation block and should be sufficiently long to project 100mm above top of block.

In residential schemes, direct coupling from column to column in a 50mm duct is preferred to by-pass ducting with tees.

All duct runs should be marked with electrical marking tape at a level of 350mm below finished ground level or as outlined in the “Guidelines for Managing Openings in Public Roads”.

6.4 MANHOLE CHAMBERS

At T-junctions or sharp changes in direction, chambers will be required. Chambers should be constructed when cabling is to be teed from bypass ducting/cable runs. A proliferation of chambers is not desirable due to future maintenance requirements and the incorrect cover strength usage.

6.5 CUSTOMER SERVICE PILLARS

Customer Service Pillars (Exterior Lighting Micro-pillars) shall be installed in all new installations, a minimum of 2m apart from ESB mini-pillars or other supply source.

In all cases it is not acceptable to utilise the same chamber to service both an ESB Networks (DSO) Mini-Pillar and Customer Service Pillar (Micro-pillar).

If this is found to be the case ESB Networks will refuse to connect the Customer Service Pillar and Wicklow County Council will not be in a position to take a development/scheme in charge.

Separate lighting pillars are also required when the public lighting is installed in conjunction with an unmetered pedestrian crossing/traffic signals.

7 ELECTRICAL SUPPLY (METERED & UN-METERED)

7.1 GENERAL

The electrical supply for public lighting shall incorporate an un-metered supply for schemes with an energy demand of less than 2kVA or a metered supply point in an approved galvanised steel cabinet as appropriate.

Wicklow County Council require that all supplies in housing estates are unmetered by ensuring that sufficient micro-pillars are installed throughout the development to ensure that no particular supply will exceed 2,000 watts.

The connection from the ESB mini-pillar to the meter cabinet shall be provided through a continuous length of red coloured polythene ducting (100mm diameter) at a depth of 600mm for connection to Single Phase Pillars, and 125mm. duct for connection to 3 Phase pillars. The details on Customer Service Pillar's may be found in The National Code of Practice for Customer Interface at: www.esb.ie/esbnetworks.

The Developer shall bear the cost of the new electrical power supply connection and shall pay for all outstanding energy bills up to the date the scheme is taken in charge. For the avoidance of doubt, new electricity supply connections are to be applied for in the name of the Developer and not Wicklow County Council.

7.1.1 Un-Metered – Schemes less than 2 KVA

- a) Red coloured duct (100mm diameter), with smooth interior wall, polythene ducting shall be installed to cater for supplies to any micro-pillars specified from the un-metered supply cabinet;
- b) Red coloured 50mm duct, with smooth interior wall, polythene ducting shall be installed to cater for connections to each of the columns.

7.1.2 Metered Supplies – Schemes greater than 2 KVA

- a) Red coloured duct (100mm diameter), with smooth interior wall, polythene ducting shall be installed to cater for supplies to metered supply cabinet;
- b) Red coloured 100mm duct, with smooth interior wall, polythene ducting shall be installed to cater for supplies to micro-pillars from the metered supply cabinet.

In the case of metered supplies, it is recommended that location of the meter cabinet be selected to cater for all further up-grades to lighting, traffic signals and signs etc. in the area with details to be agreed with ESB Networks. The metering pillar shall be located in a public area, adjacent to a footpath & at a level which is not liable to be affected by flooding.

7.2 EARTHING & BONDING

Earthing and bonding shall be in accordance with the requirements of the National Rules for Electrical Installations ET 101:2008 or as revised.

7.3 UNMETERED SUPPLIES CERTIFICATE

Wicklow County Council is required to submit an accurate inventory to the UMR for lighting

under its control. The format of the inventory data required for each light is outlined in Appendix A, Figure 1.

On validation of the inventory, the DNO (ESB Networks) will issue an Unmetered Supplies Certificate (UMSC), which must be made available to the prospective Electricity Supplier. Currently, all unmetered loads can be considered for inclusion on the Unmetered Supplies Certificate provided the equipment has a predictable load and operating hours, and is less than 2,000 watts.

UMR will require metering for equipment with an installed load greater than 2000 w. This is particularly relevant for equipment fed via highway power supplies from a feeder pillar. These types of supply should be discussed with the DNO (ESB Networks) before the inventory is submitted and at the time application is being made for new supplies.

7.4 CONNECTION & SUPPLY AGREEMENTS

7.4.1 Connection Agreement

All customers are required to enter into a connection agreement with the Distribution Network Operator (ESB). This agreement sets out the terms and conditions under which a supply is taken from the ESB network. The major part of the connection agreement will deal with the validation of the load connected to the network. It is essential that the inventory fairly represent the customer's connected load, as it may be subject to audit by the UMR.

7.4.2 Supply Agreement

The customer must enter into a Supply Contract with a supplier of their choosing for the provision of electrical energy. This shall remain in the name of the Developer until the scheme is formally taken in charge.

8 PLANNING PROCESS INVOLVING PUBLIC LIGHTING

8.1 PLANNING APPLICATIONS

Street lighting designs should be submitted to Wicklow County Council for approval via the planning application procedure. This may either be in the application process itself or conditioned following a successful application.

Wicklow County Council require that public lighting be designed by a competent public lighting designer proficient in the use of public lighting design software. Lighting Reality is the preferred software but designs to other software packages will also be accepted.

A planning application/compliance submission should comprise the following requirements at a minimum:

- **Exterior Lighting Design Report**

This should state the design class and associated parameters and should demonstrate how these parameters have been achieved. It should also provide details of the proposed lantern(s) and column types etc.

If different elements of the development are to be designed to different classes (e.g. P3 within an estate and M3 on the exterior adjoining road), then a separate report should be forwarded for each element indicating that the appropriate class standards have been achieved. (The use of a grid system to combine two separate designs within one report would also be acceptable).

- **Lighting Layout**

A minimum of two drawings to a scale of 1:500 or 1:1000, on a scheme layout background should be submitted. One of these drawings should show a plot of lux contours for the proposed lighting to the required lighting class. Where elements of a development are designed to separate classes, the lux drawings should be combined in a single layout drawing. The lux contours should be such to demonstrate that the minimum design lux level (E_{min}) has been achieved in all locations where lighting is required and should also show the lux contours at 1.5,3,5,10,15,20 lux etc. The second layout must include:

- Ducting;
- Lighting column location and reference number (including existing lighting where applicable);
- Supply circuits;
- Customer supply pillars;
- Schedule of lanterns to be installed;
- Schedule of columns to be installed, including information such as manufacturer, height, type, etc.

8.2 TAKING IN CHARGE OF PUBLIC LIGHTING

The taking in charge of a lighting scheme is the procedure whereby the Developer shall satisfy Wicklow County Council and the DSO (ESB Networks) that the scheme conforms to the ETCI National Rules for Electrical Installations and the Developer shall also satisfy Wicklow County Council that the layout and levels of lighting conforms to the CEN Code of Practice and BS standards.

The Electrical Contractor shall provide a Completion Certificate for the exterior lighting scheme.

The customer copy of the electrical certificate shall be retained and submitted to Wicklow County Council at the taking-in-charge stage.

The taking in charge procedure of Wicklow County Council is administered by the Planning, Development & Environment Directorate of Wicklow County Council, and all submissions shall be made via the development management process. The taking in charge of Public Lighting in estates is usually completed in conjunction with the full Taking in Charge of an estate or a completed phase. However, in certain limited circumstances Wicklow County Council may consider taking the lights in charge in advance of full takeover.

Wicklow County Council requires that the Exterior Lighting Scheme be maintained, operational and in the same condition as it was when the snagging list was completed up until the date that the estate is formally taken in charge by the elected members of Wicklow County Council.

Wicklow County Council will also require that each column and customer service pillar installed shall have a label attached with a numbering scheme agreed with the Developer at planning/compliance stage.

This is to allow for maintenance coordination, column/luminaire identification and recording of the individual column in Wicklow County Council's Exterior Lighting Asset Management Database.

The readiness of the Public Lighting, for takeover is determined by a 'taking in charge survey' carried out by the Council's Public Lighting maintenance contractor and/or Public Lighting Engineer.

The Applicant is required to submit the following documentation to the development management department as part of the taking in charge process:

- **Copy of ECTI Completion Certificate;**
- **Copy of Electrical Connection Agreement**

Showing MPRNs and the number of lights and wattages associated with each TMRPN;

- **Inventory Data**

For each lantern as detailed in Appendix A – Minimum Data Requirements;

- **As-built Lighting Layout**

Drawing (including landscaping) at a scale of 1:500 or 1:1000 incorporating the following details:

- Ducting layouts;
- Lighting column locations and reference numbers;
- Supply circuits;
- ESB micro-pillar location(s);
- Schedule of lanterns installed;
- Schedule of columns installed including information such as manufacturer, height, type, etc.

A Developer wishing to have an exterior lighting scheme taken in charge for energy and maintenance shall complete the necessary form and submit it to Wicklow County Council, Planning & Development Directorate, along with the above referenced documentation. The taking in charge request form for the public lighting element is available via the Planning & Development Directorate or can be found on the Wicklow County Council website.

On receipt of the necessary documentation, Wicklow County Council will either instruct the applicant to engage Wicklow County Council's Public Lighting Maintenance Contractor to undertake an inspection of an exterior lighting scheme or, in limited circumstances, will arrange this inspection itself. All costs incurred as part of such an inspection are to be borne by the applicant. On foot of such inspection, a Report is issued to Wicklow County Council by the Maintenance Contractor.

In addition, the site will be visited by the Public Lighting Engineer to review non-electrical/structural aspects, such as the appropriateness of the spacings, and to check whether lights and micro-pillars are located on public ground. The PL Engineer will also compare the actual layout against the Planning Drawings to ensure compliance.

Any snags required to be completed to bring the installation to an acceptable standard will be communicated to the applicant and the process will be repeated until a satisfactory conclusion has been achieved.

When the Developer confirms that the snagging list has been completed a further inspection(s) will be undertaken and the process will be repeated until a satisfactory conclusion has been achieved.

When The Public Lighting Engineer confirms that the exterior lighting scheme is in a suitable condition to be taken in charge, The Council's Planning Directorate shall inform the Developer by means of a formal letter indicating the date on which Wicklow County Council shall assume responsibility for the public lighting within the development or part thereof.

Wicklow County Council will assume responsibility for the payment of the Energy bill from a date post the taking in charge, which allows time for the transfer of the account to be administered. It will not be responsible for any arrears on the bill in advance of that date.

9 CONCLUSION

Wicklow County Council and their Public Lighting Section wish to work with developers and their lighting design specialists to help deliver high quality, energy efficient, exterior lighting installations which meet the relevant standards and which improve the general ambience of the county and help to reduce energy and carbon consumption.

Wicklow County Council reserves the right to ensure that exterior lighting schemes are designed and installed to the required Standards/Codes of Practice before agreeing that the scheme may be taken in charge.

Wicklow County Council,
Public Lighting Department,
Transportation, Water & Emergency Services
County Buildings,
Station Road,
Wicklow Town,
Co. Wicklow.
A67 FW96

Phone: 0404 20100

Email: publiclighting@wicklowcoco.ie

APPENDIX A – MINIMUM DATA REQUIREMENTS

Wicklow County Council minimum data requirements per light		
Data item (extracted from SEAI Attributes, Nov 2015)	Data inserted by Applicant	Explanation
1) Street name/address		Name of Housing estate / Street name and address
2) Road No. if on public Rd.		e.g. L 1234
4) Village, Town or District		e.g. Mallow
6) Unit Owner		Name of payer of Energy Bills
7) TII Lighting Unit		Yes/No. (Yes if on a national Route)
10) Unit Number		Tag Number on light
11) Unit Type		This is the type of structure used to mount the luminaire, e.g. column / wall mounted
12) Unit Co-ordinate northing		ITM (Irish Transverse Mercator) format
12) Unit Co-ordinate easting		ITM (Irish Transverse Mercator) format
16) Column Cross-Section		Style and shape of the column. Generally octagonal tapered.
17) Col Height		above ground level, generally 5m, 6m, 8m, 10m or 12m.
18) Column Material type		e.g. steel/aluminium/cast iron/wood.
18) Column base type		e.g. Rooted or flanged
21) Column installation date		To the nearest year
23) Bracket Material		e.g. steel, aluminium, cast iron
24) Bracket Type		integral/demountable
25) Bracket Dimensions		e.g. pole to, xm up and ym out.
26) Number Brackets		usually single but some cols have 2 or more
27) Bracket Tilt		e.g. 0, 5, 10, 15 degrees tilt.
28) Luminaire Height		Height of luminaire above ground, e.g. Col ht + bracket height. (or Can be measures
29) Number Luminaires		Usually only one but a high mast could have up to 12
30) Luminaire Installation date		As accurate as is available but to nearest year will suffice
31) Luminaire manufacturer		e.g. Philips, Thorn, Cree, Urbis etc.
32) Luminaire model		e.g. Luma 2, Civiteq etc.
35) Luminaire warranty expiry date		
36) Colour Temp		e.g. warm white/neutral white and actual kelvin setting if available.
38) Lumen output		e.g. 5,000 lumens
39) Lamp Type		e.g. LED, SON, SOX etc.
40) Wattage		nominal lamp wattage
42 & 43 Lighting Control & Location		e.g. photocell/time clock and individual/grouped
56) Interface Box		applies to lights on ESB poles / wall mounted mainly.
60) Passive safe column		Yes/No
62) Passive safe disconnection type		Electronic/mechanical/fuse
74) ESB Pole		Is light on an ESB pole Yes/No
75) Alert Pole		Applies to ESB poles
76) Over/Under		Is bracket an over/under conductor type
90) Lighting standard design		Design Class, e.g. P3 with S/P, M3, C4
96) Billable wattage		Applies to unmetered. Same as 40) if LED
99) Switching Regime		e.g. 35/18 or 70/30
101) co-ords of supply point E		of micro-pillar or connection point

102) co-ords of supply point N		<i>of micro-pillar or connection point</i>
103) Metered /Unmetered		
104) Current GMPRN		
105,106) TMPRN /MPRN		

APPENDIX B – DIMMING PROFILES

The UMR, unmetered registry, changed the references on dimming profiles/burn profiles, to those outlined in the table below. When applying for a new connection it is important to include the actual burn hour calendar reference and not just to state D2D on the application form.

Standard Profile	Burning Hour Calendar	Description
10	24H	Public Lighting Load Profile 10 - 24 Hour
11	D2D	Public Lighting Load Profile 11 - Dusk/Dawn
12	D2M	Public Lighting Load Profile 12 - Dusk/Midnight
13	U13	Public Lighting Load Profile 13 - Dusk/Dawn with Extra Trimming
14	U14	Public Lighting Load Profile 14
	U14A	Public Lighting Load Profile 14 - Hours not dimmed
	U14B	Public Lighting Load Profile 14 - Hours dimmed to 75% (between midnight and 06.00 hrs)
15	U15	Public Lighting Load Profile 15
	U15A	Public Lighting Load Profile 15 - Hours not dimmed
	U15B	Public Lighting Load Profile 15 - Hours dimmed to 67% (between midnight and 06.00 hrs)
16	U16	Public Lighting Load Profile 16
	U16A	Public Lighting Load Profile 16 - Hours not dimmed
	U16B	Public Lighting Load Profile 16 - Hours dimmed to 50% (between midnight and 06.00 hrs)
17	U17	Public Lighting Load Profile 17
	U17A	Public Lighting Load Profile 17 - Hours not dimmed
	U17B	Public Lighting Load Profile 17 - Hours dimmed to 75% (from 21:00 through to 07:00 next day)
18	U18	Public Lighting Load Profile 18
	U18A	Public Lighting Load Profile 18 - Hours not dimmed
	U18B	Public Lighting Load Profile 18 - Hours dimmed to 67% (from 21:00 through to 07:00 next day)
19	U19	Public Lighting Load Profile 19
	U19A	Public Lighting Load Profile 19 - Hours not dimmed
	U19B	Public Lighting Load Profile 19 - Hours dimmed to 50% (from 21:00 through to 07:00 next day)
20	U20	Public Lighting Load Profile 20
	U20A	Public Lighting Load Profile 20 - Hours not dimmed
	U20B	Public Lighting Load Profile 20 - Hours dimmed to 75% (from 20:00 to 22:00)
	U20C	Public Lighting Load Profile 20 - Hours dimmed to 50% (from 22:00 until 07:00 next day)
21	U21	Public Lighting Load Profile 21
	U21A	Public Lighting Load Profile 21 - Hours not dimmed
	U21B	Public Lighting Load Profile 21 - Hours dimmed to 67% (from 20:00 to 22:00)
	U21C	Public Lighting Load Profile 21 - Hours dimmed to 50% (from 22:00 until 07:00 next day)
22	U22	Public Lighting Load Profile 22
	U22A	Public Lighting Load Profile 22 - Hours not dimmed
	U22B	Public Lighting Load Profile 22 - Hours dimmed to 64% (from 20:00 to 22:00)
	U22C	Public Lighting Load Profile 22 - Hours dimmed to 47% (from 22:00 until 07:00 next day)
23	U23	Public Lighting Load Profile 23
	U23A	Public Lighting Load Profile 23 - Hours not dimmed
	U23B	Public Lighting Load Profile 23 - Hours dimmed to 64% (from 20:00 to 22:00)
	U23C	Public Lighting Load Profile 23 - Hours dimmed to 36% (from 22:00 until 07:00 next day)

TRIMMING

Trimming is achieved through the use of 35/18 photocells associated with LED lights which reach their full potential immediately as against SON/SOX lights which took a while to reach working temperature. They used 70/35 photocells. Burn hours for the older lights was therefore recognised as 4150 hrs/year, whereas burn hours for LED lights on 35/18 is now deemed by ESNB to be 4095 hrs per year, thereby recognising the small % energy savings accruing from the use of 35/18 photocells with LED's. Note that the UMR insist that all lights within an MPRN must be LED to avail of energy savings to the lower 4095 hrs/year.

ONE STEP DIMMING – STANDARD PERIOD

Whilst the same time periods have been applied to the three profiles (2A, 2B, 2C) i.e. 12 midnight to 6am, the dimming percentage will very much depend on the change between lighting classes. The percentage reductions to be applied should always ensure that the lighting class parameters identified in BS EN 13201 can be achieved.

Lighting Classes refer to different lighting levels and other performance criteria. They are applied for different scenarios that cover the lighting for traffic routes, subsidiary roads (e.g. residential type) and city and town centres. These lighting classes are referred to as ME, M, S, P and CE and are defined in BS EN 13201-2.

PROFILE U14



PROFILE U15



PROFILE U16



ONE STEP DIMMING – EXTENDED PERIOD

While burn profiles U14, U15, and U16 are acknowledged as those that would be most prevalent across all local authorities, it is recognised that some local authorities will seek to introduce an extended period of dimming that could commence earlier in the evening and extend later in the morning as illustrated in the figure below.

PROFILE U17



PROFILE U18



PROFILE U19



MULTI-STEP (2-STEPS) DIMMING

Multiple levels of dimming can also be applied during the hours of darkness to facilitate a stepped approach to dimming the lighting during the evening. The agreed profiles are shown in figure below:

PROFILE U20



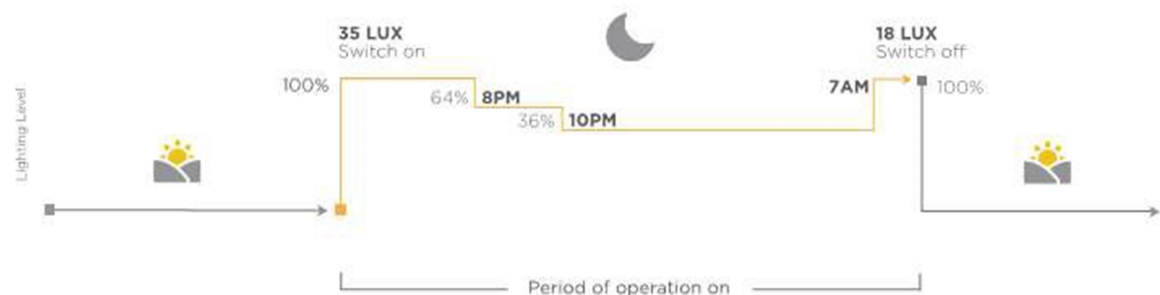
PROFILE U21



PROFILE U22



PROFILE U23



APPENDIX C – PUBLIC LIGHTING DESIGN CHECK LIST

No.	Description	Yes	No	N/A
1.	Has a design being carried out in accordance with the relevant standards?			
2.	Has the design being submitted to Wicklow County Council? <ul style="list-style-type: none"> • <i>Design Lighting Levels clearly indicated in submission</i> • <i>Public Lighting Layout Drawings in accordance with Chapter 8 of these Guidelines.</i> • <i>Lantern Details in submission</i> • <i>Electrical Design/Circuit Drawings</i> • <i>Electronic File of design</i> 			
3.	Has Wicklow County Council appraised the design?			
4.	Has Wicklow County Council given their consent to the design?			
5.	Have you applied and paid for the connection(s) to ESB network (NC4 Application)?			
6.	Has the work(s) being completed?			
7.	Has the Contractor submitted the completion certificates (RECI/ECSSA Certs) to the relevant authorities?			
8.	Has a request being submitted to the Planning Authority to have the public lighting taken in charge by Wicklow County Council?			
9.	Has the following information being submitted as part of the taking in charge process: <ul style="list-style-type: none"> • <i>Has the As-Built Drawing been prepared and submitted?</i> • <i>Has a copy of the RECI/ECSSA certs being submitted?</i> • <i>Have the Appendix A – Minimum Data Requirements been completed and submitted?</i> 			

End of Document