

Dumfries and Galloway Council
LOCAL DEVELOPMENT PLAN 2

Dark Skies Friendly Lighting

Supplementary Guidance - February 2020



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1. Introduction

1.1 This Supplementary Guidance (SG) provides guidance on good lighting practice within the Galloway Forest Dark Sky Park (DSP) and across Dumfries and Galloway. It provides further details on the implementation of LDP2 Policy ED11: Dark Skies and aims to ensure that external lighting is designed and installed correctly in order to protect the quality of the dark sky in the DSP and across the region.

1.2 It sets out the type and level of technical information that should be submitted to Dumfries and Galloway Council to enable a proper assessment of the potential impact of lighting associated with development proposals. Example conditions relating to the control of lighting are also included in the SG which may be attached to planning permissions where considered appropriate.

1.3 In some circumstances, external lighting will not require planning permission and those installing external lighting should seek confirmation from the Council whether this is the case. Even if planning permission is not required, or if existing fixtures are simply being replaced, those installing the lights are strongly encouraged to read this guidance and adopt Dark Sky friendly lighting practice. Replacement of existing lights or the installation of new ones offers an opportunity to introduce good lighting practice which will enhance the night environment and reduce energy wastage.

1.4 The guidance reflects the policy advice given in Scottish Planning Policy and the support given to the DSP in National Planning Framework 3. The SG has been prepared in collaboration with the Forestry Commission, along with South and East Ayrshire Councils (as parts of the DSP fall within their remit).

1.5 Dumfries and Galloway Council will monitor the effectiveness of the SG and review its content at regular intervals to ensure that it remains relevant and compliant with Scottish Government policy and advice and any relevant strategies adopted by the Council.

Local Development Plan 2 Policy

ED11: Dark Skies

a) Galloway Forest Dark Sky Park

The Council supports the designation of the Galloway Forest Dark Sky Park, and will assess proposals for development on their merits, securing levels of lighting that are appropriate to the nature of the development, contribute to sustainable development, and do not adversely affect the objectives of the Dark Sky Park designation.

b) Dark Skies

Supplementary guidance provides guidance on the adoption of good lighting principles and practice for Dumfries and Galloway, including those relating particularly to the Galloway Forest Dark Sky Park.

2. Why is it important to adopt good lighting practice?

2.1 The positive benefits to be gained from lighting can include safety of movement, security of property, extension of working practices, and other activities, commercial advertising and enhancement of important buildings. Generally, lighting in itself is not a problem – it only becomes so if it is excessive, poorly designed, badly installed or inadequately maintained.

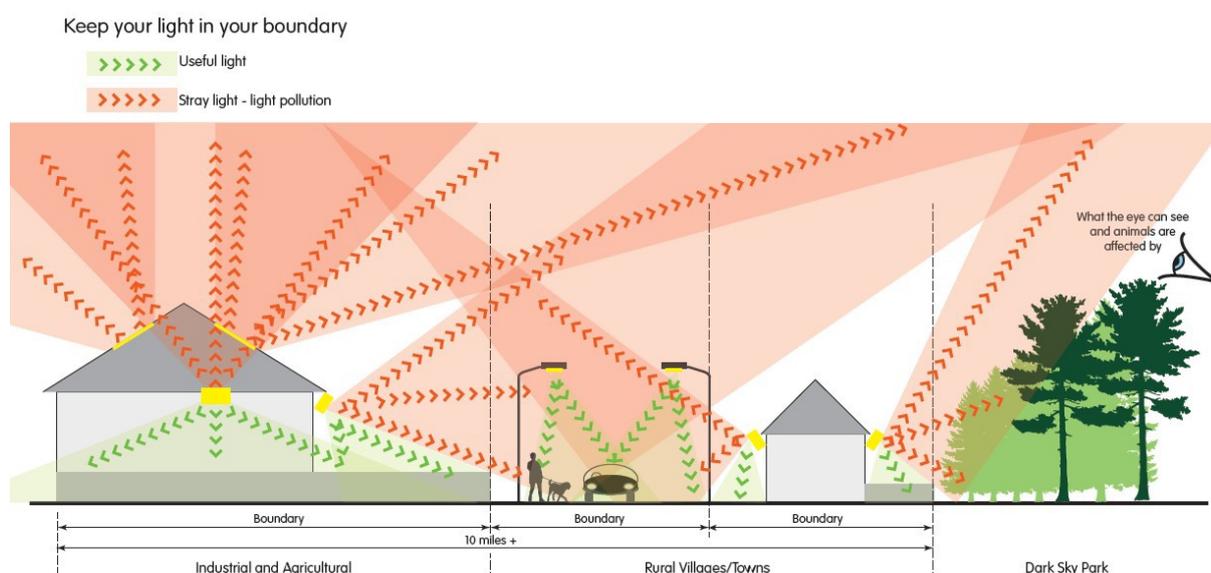
2.2 Studies have also found that human health and ecosystems can be adversely affected by excessive artificial lighting. The Council aims to balance the need for any lighting proposal against the negative effect it may have on the environment due to obtrusive light.

2.3 Dumfries and Galloway is fortunate in containing a large part of the Galloway Forest Dark Sky Park, one of only a handful of Gold Tier Dark Sky Parks in the world, designated because of the exceptional quality of the night sky in this area. The DSP is therefore an important and unique natural resource that should be protected.

2.4 DSP status helps attract tourists to the region, particularly in winter, helping to extend the region's visitor appeal beyond the summer months. A report in 2013/14 indicates that the Park has made a direct contribution of over £500,000 a year in additional income to the local economy. There remains a considerable opportunity to further boost DSP related tourism so sustainable and sympathetic development is encouraged to provide facilities for tourists and strengthen and expand rural businesses.

2.5 The rest of the region also has relatively low levels of obtrusive light and this guidance wishes to emphasise that, even outwith the designated DSP area, it is still important to preserve the current levels of darkness and reduce obtrusive light as much as possible. Additionally, lighting and the power it uses is a significant contributor to the carbon emissions we create. Lighting which is dark sky-friendly will not only prevent light pollution but could also reduce energy wastage, offering significant cost savings to businesses and individuals. The Scottish Government encourages reduction of energy use and promotes more energy efficient lighting to reduce overall carbon emissions. A reduction in light usage and an emphasis on using the correct type of lighting for a particular task will help reduce light emissions and help south-west Scotland contribute to targets for reducing carbon emissions.

3. Diagram Indicating the Effects of Poorly Managed Lighting



4. Initial Checklist for External Lighting

This guidance aims to ensure the best lighting solution for the purpose required and to prevent unnecessary light spillage. The following points should be considered when choosing or designing external lighting or replacing existing external lighting:

1. Is the proposed lighting necessary at this location? Could the development proceed without external lighting? Are there alternative measures which may be less intrusive?
2. Will there be any upward light pollution from the proposed light?
3. Can the proposed light be turned off when not required?
4. Is the proposed wattage / lumens¹ the minimum required to serve its intended purpose?
5. Is the proposed lighting in the correct location and height to light the required area?
6. Does the lighting impact on other properties or user groups?

For those proposals where planning permission is not required, individuals and businesses are also encouraged to consider the impact of new and replacement lighting on the wider night time environment and implement lighting proposals that adhere to the good lighting practice set out in this guidance.

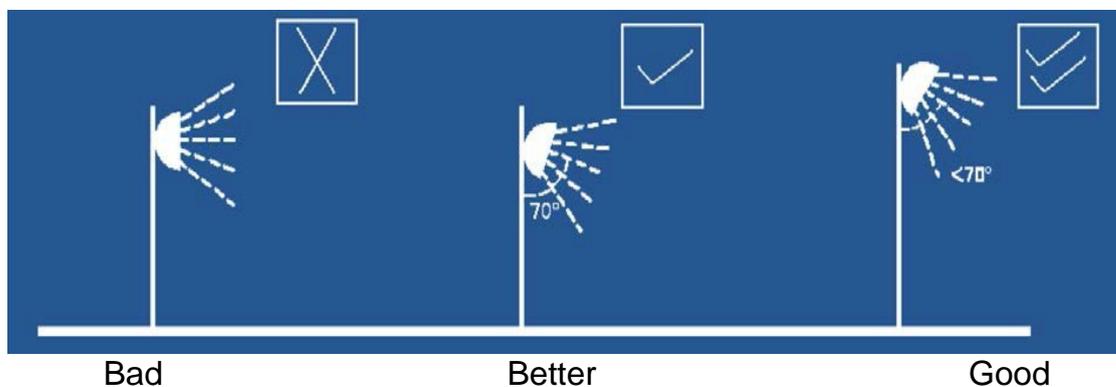
¹(lumens - denoted by lm - are a measure of the total amount of visible light, to the human eye, from a light source; the higher the lumen rating, the "brighter" the light will appear)

5. Good Lighting Practice Guidance

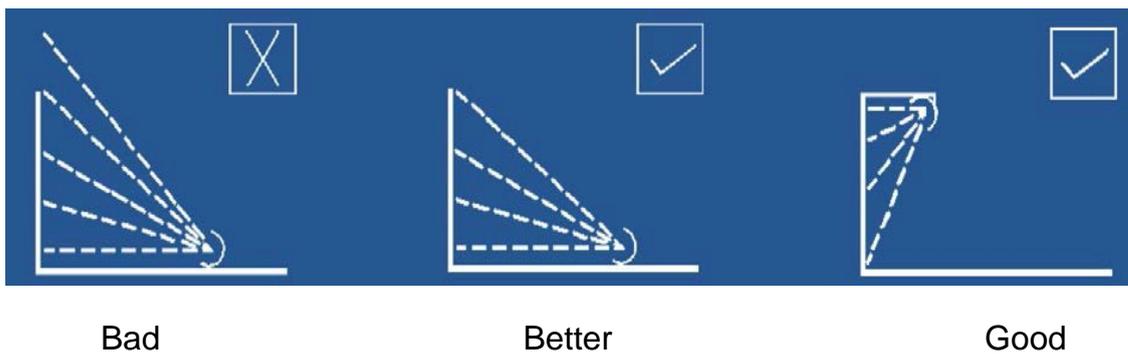
When selecting external lighting and preparing information to accompany a planning application, the following key requirements should be taken into account:

- Light Angle – this is the angle at which the light is distributed or emitted. You should ensure that the intensity and direction of light does not disturb others. This may be done by ensuring that beams are not pointed directly at windows of other houses. The angle used for any light fitting can also make the difference between an appropriately lit object / space and insensitive lighting, which illuminates a wider than necessary space causing light pollution and energy wastage. Light spread can be reduced by fitting shields and hoods to ensure only the required area is lit.

Luminaire aiming angles



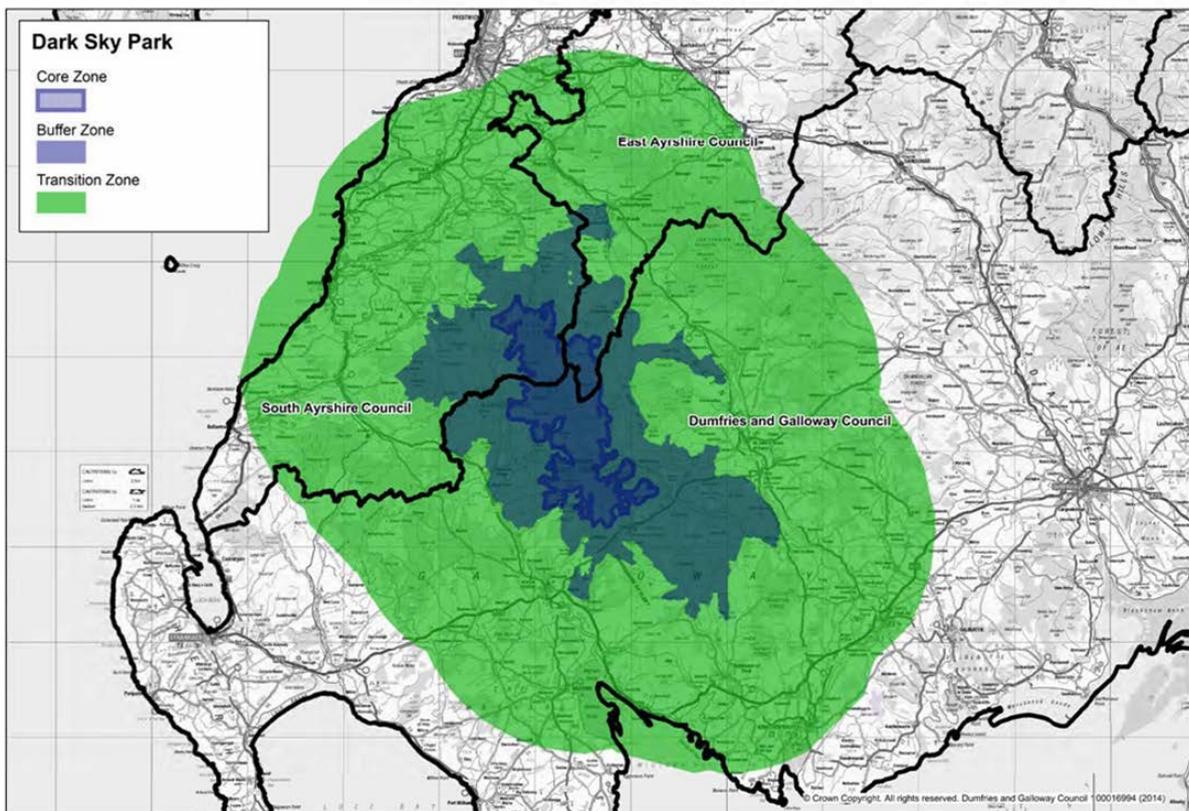
Façade illumination



- Light cover - only flat glass covers should be used to prevent the light spreading over a wider angle than is necessary and installed horizontal for source lumens;
- Location of light fitting - the height and position of the light fitting on a building or post in relation to the space the lighting is trying to illuminate is critical to ensure no light spillage;

- Lighting proposed should be the most efficient taking into account cost, energy use and colour rendering;
- Security lights fitted with passive infra- red detectors (PIRs) and/or timing devices should be adjusted so that they minimise nuisance to neighbours and are set so that they are not triggered by traffic or pedestrians passing outside your property.
- It should be recognised that light from buildings in the rural setting - no matter how low the wattage - can be seen for many miles even with fully cut off fittings. If lights need to be on for significant periods, the use of additional shielding may be required.
- Additional good practice guidance can be found in Appendix 2 which makes reference to a more detailed 20 point checklist which can be found in a guide prepared by the Scottish Government.

6. Dark Sky Park and Transition Zone



Dark Sky Park

6.1 The DSP itself comprises a Core and Buffer area and includes land mostly within the Galloway Forest Park, as well as Craigengillan Estate which contains the Scottish Dark Sky Park Observatory. The Park covers an extensive 75,743 hectares and straddles three local authority areas (Dumfries and Galloway, East and South

Ayrshire). It has few properties or businesses within its boundaries and, therefore, any light within the area (depending on the topography) can be particularly conspicuous.

6.2 Development within the DSP will only be approved if any lighting proposals associated with them are designed to have no adverse impact on the overall night sky and natural environment and comply with the lighting guidance set out in this SG.

6.3 All development proposals which fall within the boundaries of the DSP and which may have potential adverse impacts upon its status may be required to include the following information to enable a proper assessment of their planning application:-

- Justification for lighting;
- Layout Plan with beam orientation indication for each elevation (if applicable);
- Lighting type - details of light fitting and casing (including details of any cowling to prevent spillage of light above the horizontal);
- Mounting Height;
- Light Angle;
- Hours of lighting operation.

6.4 In some instances additional information may be sought by the Council to assist assessment. Where appropriate, when planning permission is approved for development within the DSP, conditions may be imposed to ensure that lighting does not have unacceptably adverse impacts upon the DSP. Example conditions can be found in Appendix 1a.

Transition Zone

6.5 Outwith the DSP, a Transition Zone has been identified within a radius of 10 miles of the Park's boundary. Lighting within this zone can directly impact on the quality of the dark sky within the Park. Therefore it is desirable that all external business and domestic lighting being installed within this zone is dark sky friendly. With the correct lighting, even relatively large developments should not have a detrimental effect on the night sky but with poorly designed lighting, even the smallest house could have a significant impact across a wide area.

6.6 Within the Transition Zone, new external lighting should be Dark Sky-friendly where possible, in order to help safeguard and enhance the quality of the adjacent DSP. With the correct lighting, even proposals which are very close to the Park boundary may have no impact on the quality of the night sky but with poorly designed lighting, even development several miles from the edges could have a significant impact. An example of the Advisory Note which will be attached to planning permissions within the DSP Transition Zone can be found in Appendix 1b.

6.7 For those proposals where planning permission is not required, whether in the DSP or Transition Zone, individuals and businesses are encouraged to consider the impact of new and replacement lighting on the DSP and the wider night time environment and implement lighting proposals that adhere to good lighting practice as set out below.

7. Detailed considerations for new and replacement lighting outside the Dark Sky Park and Transition Zone

7.1 Table 1 below along with the tables and illustrations in Appendix 2 provide a series of recommendations for lighting practice inside the DSP, Transition Zone and the rest of the region. These guidelines will be taken into account for any lighting installation that forms part of a planning application and should also be followed for lighting which does not require planning permission. The lighting zones referred to cover the entire UK and have been developed by the Institution of Lighting Professionals (ILP), which is the recognised body for lighting in the UK. The zones relevant to Dumfries and Galloway have been defined as follows:

Table 1: Light control zones as suggested by the ILP (2011)

| Zone | Night-time Environment | Typical Examples |
|-----------------------|--|---|
| E0 | Designated Dark Sky Park – Core Zone | This area is presently unique to the Galloway Forest Dark Sky Park (DSP) and relates to the very core of the Park where there are no lights |
| E1 | Intrinsically dark – Dark Sky Park Buffer and Transition Zones | Predominantly rural, lightly populated areas which already have a good night time dark habitat (which should not be diminished). Includes some smaller settlements without street lighting. |
| E2 | Low district brightness | Rural towns and villages, where there is recognition that light is required for day to day business and life. E2 zone ends where the street lighting ends and E1 begins. |
| E3 | Medium district brightness | Urban locations - Dumfries, Stranraer |
| E4¹ | High district brightness | Urban centres with high levels of night time activity (e.g. centre of Dumfries) |

The table in appendix 2 lists a number of lighting guidelines for these zones:

¹ In Dumfries and Galloway, only the centre of Dumfries is classed as E4; as the aim is to reduce levels of obtrusive light in the region, over time this zone should either reduce in size, or at least not increase any further.

Appendix 1a Example conditions to be attached to relevant planning permission

Condition relating to general development: That no development in respect of this planning permission shall take place unless details of any proposed external lighting to be installed within the application site have been submitted to and approved in writing by the planning authority. Such lighting shall be compliant with the lighting advice as contained in the Dark Skies Friendly Lighting Supplementary Guidance. Thereafter, all the external lighting shall be installed in full accordance with such details as may be so approved. Should any external light or lights within the application site be shown to cause unacceptable light levels or spillage, the planning authority shall be allowed to require the said light or lights to be either removed, relocated or realigned as appropriate, for the lifetime of the development.

Reason: In order to ensure that external light(s) do not adversely impact upon the interests of the Dark Sky Park and to safeguard this national tourism asset.

Condition relating to Wind turbines / Meteorological Masts: That no development in respect of this planning permission shall take place unless and until precise details of aviation lighting to be installed on the mast have been submitted to and approved in writing by the Council as planning authority (in consultation with the Ministry of Defence). The said lighting shall be 25 candela equivalent brightness infra-red lighting at the highest practicable point. The mast hereby granted planning permission shall not be erected or brought into operation unless the required aviation lighting as so approved has been installed on the mast. Thereafter, the said lighting shall thereafter be retained in situ for the lifetime of the development in an effective operational condition.

Reason: In order to ensure that external light(s) do not adversely impact upon the interests of the Dark Sky Park, whilst safeguarding aviation interests and public safety.

Appendix 1b: Example advisory note for relevant planning permissions in the DSP transition Zone

Advisory Note Dark Sky Park Friendly Lighting It is recommended your development is designed in accordance with relevant advice contained in the Dark Skies Friendly Lighting Supplementary Guidance.

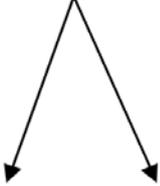
Appendix 2: Detailed Considerations for New and Replacement Lighting

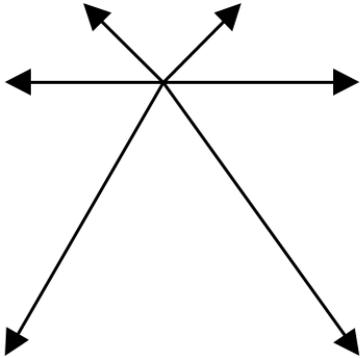
| Location / ILP Designation Type of Development | E0: Dark Sky Park core | E1: DSP Buffer | E1: DSP Transition Zone | E2: outwith DSP Buffer and Transition Zone Rural Towns & Villages e.g. Castle Douglas Newton Stewart, New Galloway, Thornhill, Annan | E3 Urban locations - Dumfries & Stranraer / E4 Centre of Dumfries |
|--|------------------------------------|--|--|--|--|
| Agricultural buildings / historic buildings / art structures | No lights | <ul style="list-style-type: none"> • Fully cut off lights (fully cut off the lamp and reflector is positioned well up in the fitting, the glass protection is completely flat and installed with glass horizontal) • Additional shielding PIR systems or on/off switches • Always switch off after work complete • Follow Good Design Practice 20 Point Checklist (see Appendix 1) • No up lighting of buildings or structures • After 22:00hrs switch off • No sky beams • Farms should not use unshielded dusk to dawn sodium lights or halogen lights | <ul style="list-style-type: none"> • Fully cut off lights • Additional shielding • PIR systems or on/off switches • Always switch off after work complete • Follow Good Design Practice 20 Point Checklist (see Appendix 1) • No up lighting of buildings or structures • After 22:00hrs: max 3,500 lumens or switch off / reduce light illumination even further • No sky beams | <ul style="list-style-type: none"> • Fully cut off lights • PIR systems or on/off switches • Always switch off after work complete • Follow Good Design Practice 20 Point Checklist (see Appendix 1) • No up lighting of buildings or structures • After 23:00hrs: max 3,500 lumens or switch off / reduce light illumination even further • No sky beams | |

| | | | | | |
|---|------------------|---|--|---|---|
| <p>New dwelling houses and extensions to dwelling houses</p> | <p>No lights</p> | <ul style="list-style-type: none"> • After 22:00hrs switch off or reduce illumination • Lights to be on PIR/switched off when you are not outside, like lights inside the house • No up lighting of buildings or structures • See diagrams in SG for guidance on acceptable illumination. | <ul style="list-style-type: none"> • After 22:00hrs switch off or reduction in light illumination • Lights to be on PIR/switched off when you are not outside, like lights inside the house • No up lighting of buildings or structures • See diagrams in SG for guidance on acceptable illumination | <ul style="list-style-type: none"> • After 23:00hrs switch off or reduction in light illumination • Lights to be on PIR/switched off when you are not outside, like lights inside the house • No up lighting of buildings or structures • See diagrams in SG for guidance on acceptable illumination. | <ul style="list-style-type: none"> • No up-lighting of buildings • Have lights on PIR/ switched off when you are not outside • See diagrams in SG for guidance on acceptable illumination. |
|---|------------------|---|--|---|---|

| | | | | | |
|---|----------------------------|---|---|---|---|
| Business & Sport development | No lights | <ul style="list-style-type: none"> • Follow Good Design Practice 20 Point Checklist (see Appendix 1) • Fully cut off lights with additional shielding. • PIR systems or on/off switches. • Switched off after work complete. • After 22:00hrs: max 3,500 lumens • No up lighting of buildings or structures • No sky beams • Use infrared if security is an issue | <ul style="list-style-type: none"> • Follow Good Design Practice 20 Point Checklist (see Appendix 1) • Fully cut off lights with additional shielding. • PIR systems or on/off switches. • Switched off after work complete. • After 22:00hrs: max 3,500 lumens • No up lighting of buildings or structures • No sky beams • Use infrared if security is an issue | <ul style="list-style-type: none"> • Follow Good Design Practice 20 Point Checklist (see Appendix 1) • Fully cut off lights. • PIR systems or on/off switches. • Preferably no all-night lighting in villages • Switched off after work complete. • No up lighting of buildings or structures • After 23:00hrs: max 3,500 lumens • Designated industrial areas (e.g. Castle Douglas-sized towns) can have 70W lights on all night if full cut off. Only use higher wattages to meet published standards when work is being done outside • No sky beams • Use infrared if security is an issue | <ul style="list-style-type: none"> • Follow Good Design Practice 20 Point Checklist (see Appendix 1) • Only use required wattage to meet recognised standards. Consider infrared in preference to all night lighting only in areas where necessary and PIR in all others • No uplighting or sky beams. |
| Wind farm development, turbines and anemometer masts | Maximum of infrared lights | <ul style="list-style-type: none"> • Maximum of infrared lights | <ul style="list-style-type: none"> • Preferable for maximum of infrared lights to be used | <ul style="list-style-type: none"> • Preferable for maximum of infrared lights to be used | |

Regardless of the zone, the lights that are chosen and how they are installed is of critical importance:

| | | |
|---|---|---|
|  | <p>This floodlight has a double asymmetric light distribution which is less commonly used but is the preferred option in all cases. If installed pointing directly downward (zero degrees of upward tilt) then there will be no upward light at all and the light is forced down and outwards across the area that requires lighting. The glass cover is completely flat with no ridging or curve. The light fall when installed at zero degrees upward tilt is as illustrated.</p> | <p>Light fall: Perfect</p>  |
|  | <p>A fully cut-off light fitting making a downward cone of light with no stray light. This fitting illuminates a doorway only. This light fitting does not have additional shielding and therefore viewed light may be seen from a distance if in a rural setting but may not be problematic if the light source is less than 1,000 lumens. Front facing shields are available if needed.</p> | <p>Light fall: Perfect</p>  |
|  | <p>This floodlight has a bi-symmetric light distribution and is commonly purchased from DIY stores. The light from this type of fixture, if not installed correctly, can be extremely intrusive. This type of light fitting should be installed pointing directly downward. Any tilt above zero degrees will result in intrusive light heading unnecessarily into the sky. The usefulness of this flood light is extremely limited. The</p> | <p>Light fall: Ok</p>  |

| | | |
|---|--|--|
| | <p>light fall when installed at zero degrees upward tilt is as illustrated.</p> | |
|  | <p>Many rural properties such as steadings, milking sheds, yards and even houses have flood lights such as this and they often give off a bright orange light. The reflector unit held within the light fitting is bi-symmetric and should be installed facing directly downward. However, the unit also has a curved glass panel on the front to aid with light spread which means even pointing directly downward it will still have an upward stray light content. This is not supportive of the Dark Sky Park.</p> <p>The flood light shown on the left hand side is wrongly installed with a 60 degree upward tilt which is not supportive of the Dark Sky Park. The light fall when installed at zero degrees upward tilt is as illustrated.</p> | <p>Light fall: Poor</p>  |

Appendix 3: Useful Links

Scottish Government links: www.scotland.gov.uk/Publications/2007/03/14164512/0

“Controlling Light pollution and Reducing Lighting energy consumption” (this contains the 20 point check list)

Institution of Lighting Professionals web links on a variety of lighting topics: <https://www.theilp.org.uk/resources/free-resources/>

The British Astronomical Association’s Campaign for Dark Skies Lighting Guidance: http://www.britastro.org/dark-skies/pdfs/CfDS_guidelines.pdf

Information on Galloway Forest Dark Sky Park: Forestry Commission Scotland website www.forestry.gov.uk/darkskygalloway

The Campaign for Dark Skies has produced a lighting guide which can be downloaded at www.britastro.org/dark-skies/guidelines.html

Dark Sky Scotland www.darkskyscotland.org.uk

Campaign for Dark Skies www.britastro.org/dark-skies

International Dark-Sky Association www.darksky.org