Protecting Dark Skies in the Nidderdale Area of Outstanding Natural Beauty

Draft Supplementary Planning Document (SPD)

February 2023

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Protecting Dark Skies in Nidderdale AONB SPD

1 Introduction

1.1 The purpose of this Supplementary Planning Document (SPD) is to provide help and guidance for projects involving external lighting in the AONB. It contains information on dark skies and light pollution and provides practical advice about the design of lighting schemes and the choice of appropriate lighting technology so that everyone can play a part in reducing light pollution and protecting the AONB's dark skies.

1.2 The map shows the boundary of the AONB in North Yorkshire. The interactive map on the AONB's website contains mapping at a larger scale to help with pinpointing specific locations (hyperlink to interactive map)

1.1 Policy Context

1.3 Policy GS6 (Nidderdale Area of Outstanding Natural Beauty) of the adopted Harrogate District Local Plan includes a requirement that 'Within the areas designated as Dark Skies, development proposals should ensure that lighting is directed and designed so as to reduce obtrusiveness and protect sensitive habitats'.

1.4 Policy GS6 in the adopted Local Plan refers to International Dark Sky Reserve Status that has been awarded to the Yorkshire Dales National Park Authority based on an assessment of the night sky that met the threshold for Reserve Status determined by the International Dark Sky Association. The darkest night skies over Nidderdale AONB also meet the Association's threshold but the AONB does not currently have Reserve status.

1.5 The National Planning Policy Framework requires that development proposals limit the impact of light pollution on local amenity, intrinsically dark landscapes and nature conservation. The Planning Practice Guidance: Light Pollution highlights the need to consider where, when and how much light shines and possible ecological impacts. This is particularly important within the AONB and is reflected in the commitments in the AONB Management Plan.

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2 Understanding Light Pollution

2.1 Artificial lighting during the hours of darkness has progressively transformed the way people live and work since the early 1800s. Lighting of both private and public spaces is now both welcome and indispensible but has had negative consequences too. Indiscriminate use of lighting has the capacity to disrupt wildlife adversely affect human health and erode tranquillity as well as wasting energy and contributing to climate change.

2.2 There are three categories of light pollution:

Categories of light pollution

- Skyglow - An orange glow around towns and cities that spreads widely beyond the edge of urban areas. It is caused by the illumination of airborne dust and water particles and is generated by reflective surfaces and badly directed light. White skyglow is increasing due to the dominance of LED lighting. Unshielded white or blue light leads to more skyglow than orange tones.
- Glare - The uncomfortable brightness of a light source when viewed against a contrasting darker background. It can be especially intrusive in rural areas where lighting is dispersed across a larger area forming isolated points in an otherwise dark space.
- Light intrusion - Light spilling beyond the boundary of a building or other structure. This type of light pollution often results in householder complaints but it can also affect adjacent wildlife habitats.

2.3 Understanding the properties of light and the terms used to describe light can be helpful in specifying choice of light fittings:

Terms used to describe light

- Lumens - Total amount of light radiated by a lamp. 500 lumens is sufficient for most domestic applications.
- Candela - The intensity of light pointing in a given direction. The intensity of light can be a significant cause of glare.
- Lux - The brightness of surfaces illuminated by a light fitting. High lux values mean that illumination is greater and the light will appear brighter.

2.4 The effect of light pollution also obscures views of the night sky. As Lord Rees, the Astronomer Royal, has said ‘All generations and cultures have looked up and wondered at the stars but sadly this part of our shared environment has been degraded. Unless they live in remote rural areas, young people may grow up without ever seeing a truly dark starry sky – and that’s a real deprivation’. The Campaign to Protect Rural England has calculated that dark skies completely free of light pollution now exist over only 22% of England. But for those fortunate to live in an Area of Outstanding Natural Beauty or a National Park the chances of seeing the night sky in all its glory are much higher: 53% of England’s remaining dark skies are in designated landscapes. Protecting what remains in these areas is therefore a high priority.

2.5 The Nidderdale Area of Outstanding Natural Beauty is no exception. The results of a survey by astronomers commissioned by the AONB in spring 2022 showed that the night skies in the north west of the designated area especially, including Upper Nidderdale and moorland near Masham are some of the least affected by light pollution in England. Even elsewhere in the AONB light pollution is at a much lower level compared to areas outside the designated area boundary.

2.1 Light Pollution and Wildlife

2.6 Research evidence shows that artificial light can be very disruptive for wildlife at a time when biodiversity is at a crisis point. It disturbs animals' perception of the transition from daytime to night-time, disrupting their sleep-wake cycle. It results in reduced foraging or hunting periods for nocturnal species that are active during the hours of darkness and it can also affects plants whose flowering and dormancy periods are linked to day length. Its effects on bat species are well-documented, delaying or preventing emergence from roosts while slower-flying bat species avoid lit areas for foraging resulting in reduced feeding success. Further detail on these impacts is available in the Royal Commission on Environmental Pollution report Artificial Light in the Environment.

2.7 The Institute of Lighting Professionals and the Bat Conservation Trust have published guidance on lighting: Bats and Artificial Lighting at Night which can be found at www.theilp.org.uk

2.8 Studies have demonstrated that night-flying insect mortality is increased by artificial light caused by exhaustion and increased predation. Artificial light affects other invertebrate species too disrupting mating, feeding and hatching behaviours. The effects on birds have also been well-publicised. It affects migratory species whose fight paths are distorted by artificial light with disoriented birds colliding with buildings in urban areas, while it disrupts reproductive cycles and foraging behaviours in other species. Any development must comply with Local Plan Policy NE3: Protecting the Natural Environment. Further advice should be sought from Natural England where light pollution from development may impact on a protected site or a protected species.

3 Dark Skies in Nidderdale AONB

3.1 Dark Sky mapping of the AONB was carried out using data from www.lightpollutionmap.info and a survey of dark skies during March 2022 by consultants using hand held Unihedron SQM-L Sky Quality Meters (SQMs) that measure the amount of light picked up by the device [1]. Desktop research indicates that the north western half of the AONB has the darkest skies and is confirmed by SQM readings in excess of the 21.2 benchmark for Dark Sky Reserve status set by the International Dark Sky Association. This figure compares to readings of 22 for so-called pristine skies. SQM readings to the east returned results of between 20 and 20.5, still much darker than urban areas with typical readings of 17 to 19 SQM. www.lightpollutionmap.info data indicates that dark skies in the area to the south of the AONB are adversely affected by urban areas close by.

3.2 The map at Fig.1 identifies three darkness zones in the AONB classified using criteria developed by the International Dark Skies Association:

- Zone E0 in the north and west of the AONB has the darkest skies. It includes small villages like Lofthouse in Upper Nidderdale, Gollinglith Foot in Colsterdale and Belford on the edge of Dallowgill Moor.
- Zone E1 is a transitional area between the darkest zone E0 and parts of the AONB that are affected by urban areas on lower ground in the east.
- Zone E2 comprises the southern part of the AONB closest to the Wharfedale towns where night skies are affected by Skyglow associated with the Leeds and Bradford connurbation.

1 The device measures light in magnitudes per square arc-second

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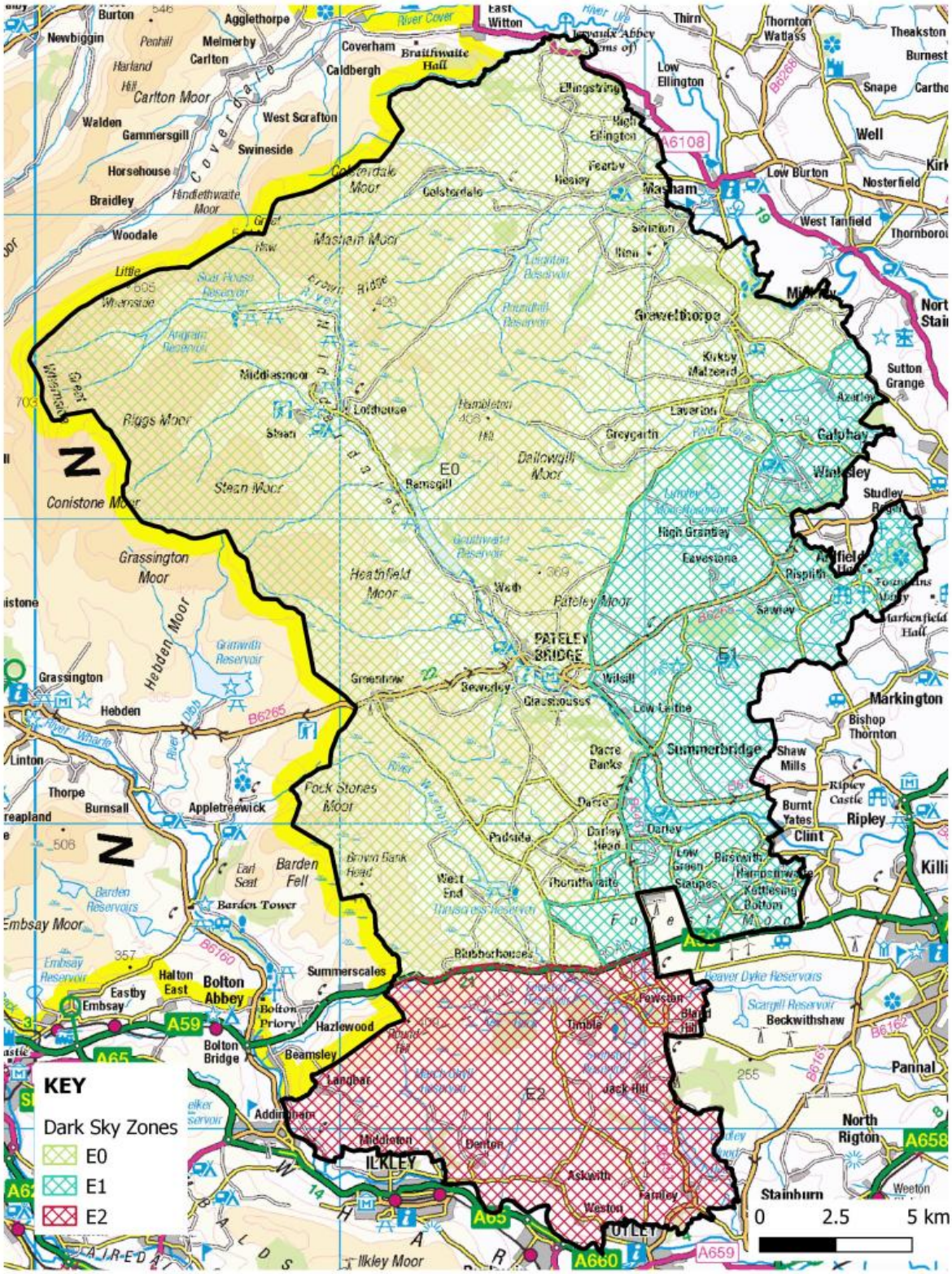

Dark Sky Zones in the AONB

4 AONB Dark Sky Zone Requirements

4.1 All development in the Nidderdale AONB should comply with the following guidance:

Zone E0

- All new external lights should comply with Lighting Design Standards set out in this SPD.
- All applications for new development that involve external lighting should include a lighting plan.
- Applications for major development must include a lighting plan prepared by a lighting professional in accordance with relevant guidelines published by the Institute for Lighting Professionals (ILP) summarised in the next section of the SPD.
- All new outside lights should be fully shielded and have an output of less than 500 lumens.
- Internal lighting design for new buildings and modifications to existing internal lighting should avoid light intrusion caused by light spill from large areas of glazing in particular.

Zone E1

- All new external lights should comply with Lighting Design Standards set out in the next section of the SPD.
- Applications for major development must include a lighting plan prepared by a lighting professional in accordance with relevant ILP guidelines.
- Bulbs in external lights should be 500 lumens or less and fully shielded if greater than 1000 lumens.
- Applications for major development must include a lighting plan prepared by a lighting professional in accordance with relevant guidelines published by the Institute for Lighting Professionals (ILP) summarised in the next section of the SPD.

Zone E2

- External lights should be positioned to avoid light spill beyond property boundaries.
- All new external lights should have an output of less than 1000 lumens.
- Lights with an output of more than 1800 lumens should be fully shielded.
- Applications for major development must include a lighting plan prepared by a lighting professional in accordance with relevant guidelines published by the Institute for Lighting Professionals (ILP) summarised in the next section of the SPD.

4.2 The AONB can provide advice on modifying existing external lights to meet the Lighting Design Standards and to avoid light spill and in Zone E0 may be able to offer financial support to help residents protect dark skies from light pollution.

5 Lighting Design Standards

External lighting control systems

All external lighting should be fitted with a Lighting Control System (LCS) to ensure lights are automatically switched off when they are not required, so that external lighting is not on continuously during hours of darkness. Examples of LCSs include relays, timers, occupancy and motion sensors, photocells and light control switches or touchscreens. LCSs can also be used to control curtains and blinds that should be used at all times during the hours of darkness. Crude dusk to dawn sensors should be avoided.

Brightness

External lighting should be fitted with LEDs (Light Emitting Diode) that emit the same amount of light compared to a filament lightbulb. Light output (brightness) is measured in lumens. Bulbs used for external fittings should ideally be 500 lumens or less, and fully shielded in Zone E1.

Colour

White light has varying colour tones measured by the Kelvin scale (K). LEDs with a Kevin scale rating of more than 3000 emit a piercing blue-white light that can cause excessive glare when seen against the otherwise dark background characteristic of most of the AONB. Glare can be avoided by using bulbs with a rating of 3000K.

Positioning

All external lights should be positioned so that the light shines downwards. No light should be allowed to shine above the horizontal plane and light fittings with integral shields or cowls should be used to prevent light spill.

6 Lighting Scheme Design

6.1 External lighting specifications will vary according to the site or building and its function. The starting point should always be to consider if external lighting is required at all. Where it is necessary, this section of the Document contains more specific advice for types of development that often involve external lighting:

Domestic lighting schemes

Floodlights installed for security reasons often cause light spill and glare. They are often very powerful and installed without an adequate Lighting Control System. They frequently result in 'wasted light' illuminating large areas around the lighting target, use more energy than necessary and can generate householder complaints. In fact research shows they can sometimes have the opposite effect of creating contrasting dark spots where people can hide unseen while badly installed lights can also be triggered by wildlife. According to crime prevention organisations other systems including CCTV can be a more effective deterrent. Less intrusive lighting solutions based on an accurate assessment of lighting requirements and designed using the latest technology with advanced control systems are always preferable.

Bulkhead or porch lights are often a good alternative to security floodlights. Fixed underneath a canopy or roof above the entrance with a low-power 600–900 lumens (9/11w) compact fluorescent or LED lamp can reduce glare and light spill

The use of 'up and down' lights should be avoided. They may not adequately illuminate the target area, they invariably result in wasted upward light and contribute to light pollution

Where strictly necessary low intensity widely spaced down-lighters, either ground-mounted or fixed to low bollards can be used to illuminate paths leading to entrances for reasons of safety. A simple audit of existing external lighting and the effects of light spill from internal lighting installations in the immediate vicinity is a useful guide to the design of new domestic lighting schemes. The cumulative impact of small-scale change can be significant and adding more lighting, especially where existing installations are intrusive, can detract from our enjoyment of the night sky.

Domestic lighting should keep within these limits:

- The output of a single light or cumulative number of lights illuminating one task area of less than 1,500 lumens
- The total light out of the property should be less than 4,500 lumens
- A surface illuminance over 5 lux is excessive

Architectural lighting

Buildings are sometimes lit to highlight distinctive design features during the hours of darkness. Architectural lighting is inappropriate in zone E0. Outside E0 external lighting plans for this purpose should be designed in accordance with the Standards. Architectural lighting schemes will be likely to require planning permission and a Lighting Control Systems would be essential.

Historic buildings

External lighting of historic buildings to showcase their heritage value is generally inappropriate in the AONB other than in very exceptional cases outside the darkest zone E0 and where buildings are Listed as Grade2 or above. External lighting schemes will require Listed Building consent. Historic England published guidance on external lighting schemes in September 2021.

Commercial development (including farm buildings)

External lighting of commercial premises including livestock and other farm buildings is necessary for both safety and economic reasons. However evidence from survey work carried out for the AONB suggests that light spill and glare associated with commercial installations is the most obvious source of light pollution in the darkest zones of the AONB often caused by light spill from roof lights and high powered light fittings mounted on poles or high up on buildings. The AONB can provide advice on modifying existing external lights to meet the Lighting Design Standards and to avoid light spill beyond the building and in Zone E0 may be able to offer financial support to help modify existing installations. All applications for new commercial buildings in the AONB must include a lighting plan.

Caravan and camping sites

Care should be taken to ensure lighting of service buildings and reception areas does not result in light spill. Passive Infrared (PIR) sensors can help control lighting necessary for service buildings that need to be accessible throughout the hours of darkness while low intensity down-lighters, either ground-mounted or fixed to low bollards can be used to illuminate paths. Providing visitors with the opportunity to rent or borrow simple star gazing kits including binoculars, a telescope and a comfortable viewing chair will help raise awareness of the importance of protecting the AONB's dark skies.

Sports Facilities

Some external sports facilities may require artificial lighting if they are designed to be used during the winter months. Inappropriate floodlighting can cause significant light pollution, although carefully designed modern lighting installations can avoid such problems. Sports England published guidance on Artificial Sports Lighting in 2012. All applications for new external sports facilities in the AONB must include a lighting plan.

6.2 The Institute for Lighting Professionals published detailed advice on how to reduce light pollution in 2021. 'The Reduction of Obtrusive Light' is free to download from www.theilp.org.uk

6.1 Highways and Street Lighting

6.3 Where new street and highway lighting is absolutely necessary, proposals should be designed to minimise light spill in accordance with the guidelines in the SPD and relevant design guidance published by North Yorkshire County Council.

7 Dark Skies and Planning Permission

7.1 Minor external lighting installations on most domestic buildings are classified as Permitted Development and do not require planning permission.

7.2 However lighting should be covered in applications for planning permission involving:

- Non-domestic developments;
- Development containing larger scale domestic lighting proposals such as those involving design and installation by specialist lighting engineers or large areas of glazing that may result in light spill;
- Leisure developments with floodlighting e.g. sports fields and public tennis courts.
- Lighting proposals that affect the character or fabric of a listed building will require Listed Building Consent.
- Illuminated Advertisements;
- Architectural 'mood' lighting;
- Lighting of car parks.

7.3 The Planning Authority may ask for a lighting assessment for major development in the AONB. A detailed plan should be prepared by a lighting engineer using guidelines prepared by the Institute for Lighting Professionals (PLG 04 www.theilp.org.uk). As a minimum, the plan should include:

- A description of the need for lighting
- An explanation of how the plan complies with relevant standards e.g. Guidance on Obtrusive Lighting published by the ILP
- An analysis of baseline conditions
- Position of all proposed lighting
- Installation details e.g. angle and height
- Technical specifications including isolux power, lumen output and colour temperature
- Viewpoint analysis

- The result of modelling showing illuminance levels in the areas affected by the lighting scheme
- Description of measures such as illuminance limits and buffers to mitigate harm to wildlife habitats and notable species, especially bats, identified in ecological surveys.

7.4 To minimize the harmful effects of light pollution, always start with the Institute of Lighting Professionals (ILP) Good Lighting Practice summary in the beginning 'the provision of the right light, at the right time, in the right place, controlled by the right system.'

7.5 As well as planning policy, guidance on lighting scheme design is published by the ILP and good practice standards are published by the British Standards Institute. Legislation affecting external lighting includes Statutory Nuisance Provisions in the Environmental Protection Act 1990 that empowers local councils to issue an 'abatement notice' if a lighting installation 'unreasonably and substantially interfere[s] with the use or enjoyment of a home or other premises, injures health or be likely to injure health'.

8 Further Information

8.1 Further information can be found from the following organisations:

- Nidderdale AONB www.nidderdaleaonb.org.uk
- North Yorkshire Council www.northyorks.gov.uk
- British Standards Institute knowledge.bsigroup.com
- Institute of Lighting Professionals www.theilp.org.uk
- International Dark Sky Association www.darksky.org
- Historic England www.historicengland.org.uk
- Sport England (Artificial Sports Design Guidance)www.sportengland.org
- Bat Conservation Trust and Institute for Lighting Professionals (Bats & Artificial Lighting) www.bats.org.uk or www.theilp.org.uk
- Royal Commission on Environmental Pollution report Artificial Light in the Environment www.gov.uk/government/publications/artificial-light-in-the-environment
- Planning Practice Guidance: Light Pollution www.gov.uk/guidance/light-pollution