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LOWER CHATTS FARM

LIGHTING STRATEGY

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ILP INSTITUTION OF LIGHTING PROFESSIONALS

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Designs for Lighting (DFL) is a business built on successfully collaborating with our clients. We have over 20 years proven experience in our industry, listening to the challenges our clients face, developing the best solutions and being innovators in our specialism. Our role is to find the most effective and sustainable outcome to enhance and support your projects. We proudly work with recognised industry bodies to promote and shape the future of the industry and ensure our staff are trained to exceed the required competency levels of our industries. Above all, we ensure each project delivers against our values.



Quality



Knowledgeable



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Clear Advice

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EXECUTIVE SUMMARY

This Lighting Strategy is provided to discharge planning condition 8 relevant to Application Number 2026/62/90034/E for the:

> *"Change of use and alterations to barn to form dwelling at Lower Chatts Farm, 155 Cliff Hollins Lane, East Bierley, BD12 7ET."* (hereafter referred to as the Approved Development)

Condition 8 relevant to Application Number 2026/62/90034/E states:

> *"8. No works are to commence unless a detailed lighting scheme, developed in accordance with established guidance (e.g. Bat Conservation Trust and Institute of Lighting Professionals (2023) Bats and Artificial Lighting at Night), has been drafted and agreed with the council. The Sensitive Lighting Strategy will demonstrate that the proposed lighting will not impact upon ecological networks and/or sensitive features. Thereafter the agreed lighting scheme shall be implemented, subject to any variations approved in writing by the planning authority. All external lighting shall be installed strictly in accordance with the specifications and locations set out within the Lighting Strategy*
>
> *Reason: In the interests of biodiversity and in accordance with Policy LP30 and chapter 15 of the National Planning Policy Framework."*

To ensure the condition is satisfied this Lighting Strategy will provide a surrounding boundary of Ecology Grids (PSER 001 - PSER 004) this will ensure compliance with GN08:2023. Grids are set at 1.5m above ground level and are 5m in height.

1. INTRODUCTION

1.1. General

1.1.1. This Lighting Strategy has been written by DFL (Designs for Lighting Ltd[1]), a lighting design consultancy specialising in Lighting Impact Assessments, obtrusive light mitigation, and detailed lighting design.

1.1.2. The Lighting Strategy is intended to set out a minimally obtrusive approach to the lighting, whilst ensuring it is necessary and considers the sensitivity of nearby ecological receptors.

1.1.3. Lighting associated with the Proposed Development will comply with relevant Institution of Lighting Professionals (ILP) guidance to ensure obtrusive light is minimised in accordance with best practice.

1.1.4. This report outlines the following:

- Relevant obtrusive light policies in direct relation to the Proposed Development;
- Relevant National and Local Policies;
- Why the Proposed Development requires artificial lighting; and
- Details as to how lighting will be implemented for the Proposed Development.

1.1.5. Through careful design and mitigation, this Lighting Strategy ensures the lighting installation at the Proposed Development will be in accordance with Guidance and Local Policy.

1 https://www.dfl-uk.com/about/

2. LEGISLATIVE FRAMEWORKS AND NATIONAL POLICIES

2.1. Environmental Protection Act 1990 / Clean Neighbourhoods and Environment Act 2005

2.1.1. Since 2005, artificial light has been incorporated as a potential statutory nuisance. An amendment to section 79 of the Environmental Protection Act 1990, contained within the Clean Neighbourhoods and Environment Act 2005 states: [2]

"The following matters constitute "statutory nuisances" for the purposes of this Part, that is to say— [....]

[....] artificial 3light emitted from premises so as to be prejudicial to health or a nuisance;

[....]and it shall be the duty of every local authority to cause its area to be inspected from time to time to detect any statutory nuisances which ought to be dealt with under section 80 and, where a complaint of a statutory nuisance is made to it by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint".

2.2. National Planning Policy Framework 2026

2.2.1. The National Planning Policy Framework (NPPF) sets out the government's planning policies for England and how they are expected to be applied and provides a framework for local plans. With regard to light pollution, the NPPF was updated in August 2026 and states that the following elements are to be considered:

*"**P1: Planning for clean and safe places***

1. To support efforts to avoid and mitigate risks from natural and man-made hazards, minimise levels of pollution and create clean, liveable and safe places for people to live, work and visit, development plans should:

a. Allocate land for development where, taking into account the potential for mitigation: [....]

[....]iii. Development proposals will not cause unacceptable levels of pollution, either alone or in combination with other pollution sources, taking into account communities which may be particularly vulnerable to its effects, such as children and older people, as well as habitats and species which may be vulnerable to pollution"

*"**DP3: Key principles for well-designed places***

2. To create well-designed places, development proposals should also reflect relevant aspects of the following principles, as appropriate to the nature of the development and its location45:

2 https://www.legislation.gov.uk/ukpga/1990/43/part/III/crossheading/statutory-nuisances-england-and-wales Section 79, paragraph 1,
3 2005 Section 102 relating to section 79, Indent reference (fb)

f. Public Space: include spaces that are safe, secure, inclusive, and accessible for all ages and abilities, including for groups such as women and girls; and which facilitate and encourage social interaction, play and healthy lifestyles (for example by providing high quality, clear and legible pedestrian and cycle routes, a variety of recreational spaces and places to meet, integrating lighting and making building entrances and windows face onto streets and other public spaces to provide natural surveillance"

*"**P3: Living conditions and pollution***

2. Within this context development proposals should:

a. Provide healthy living conditions for occupiers and users in terms of adequate access to light and avoiding exposure to levels of air, noise, artificial light or other sources of pollution which could have an unacceptable adverse effect on health and the quality of life. Where necessary suitable mitigation measures should be incorporated to secure acceptable living conditions;

b. Not give rise to, or contribute to, an unacceptable level of access to daylight and sunlight for neighbouring residents and occupiers, or unacceptable levels of air, noise, artificial light, water, soil or other forms of pollution on or beyond the site. Adverse impacts of this nature should be avoided where possible, or else mitigated to an acceptable degree. Where possible, opportunities should be taken to reduce pollution affecting the wider area (such as through traffic and travel management or improved external lighting);

c. Sustain and contribute to compliance with relevant limit values or national objectives and targets for air pollutants including PM2.5. Development proposals should take account of Air Quality Management Areas and be consistent with the objectives of relevant Air Quality Action Plans, Clean Air Plans and Local Air Quality Strategies;

d. Mitigate and reduce to a minimum potential adverse impacts resulting from noise, not result in levels of noise exposure which would have a significant observed adverse effect, and maintain the character of tranquil areas (those areas that have remained relatively undisturbed by noise from human sources and are prized for their recreational and amenity value for this reason);

e. Limit any adverse impact from artificial light on local amenity, intrinsically dark landscapes (those areas entirely, or largely, uninterrupted by artificial light) and nature; and f. Assess and mitigate impacts where the development could have an unacceptable adverse effect on water quality, especially in relation to sensitive water bodies such as chalk streams."

2.3. Planning Practice Guidance

2.3.1. Guidance for assessing the effects of proposed artificial lighting is outlined in the planning practice guidance (PPG). The guidance states:[4]

"Does an existing lighting installation make the proposed location for a development unsuitable, or suitable only with appropriate mitigation? For example, this might be because:

- *the artificial light has a significant effect on the locality; and/or*
- *users of the Proposed Development (e.g., a hospital) may be particularly sensitive to light intrusion from the existing light source.*

Where necessary, development proposed in the vicinity of existing activities may need to put suitable mitigation measures in place to avoid those activities having a significant adverse effect on residents or users of the proposed scheme, reflecting the agent of change principle. Additional guidance on applying this principle is set out in the planning practice guidance on noise.

- *Will a new development, or a proposed change to an existing site, be likely to materially alter light levels in the environment around the site and/or have the potential to adversely affect the use or enjoyment of nearby buildings or open spaces?*
- *Will the impact of new lighting conflict with the needs of specialist facilities requiring low levels of surrounding light (such as observatories, airports and general aviation facilities)? Impacts on other activities that rely on low levels of light such as astronomy may also be a consideration but will need to be considered in terms of both their severity and alongside the wider benefits of the development.*
- *Is the development in or near a protected area of dark sky or an intrinsically dark landscape where new lighting would be conspicuously out of keeping with local nocturnal light levels, making it desirable to minimise or avoid new lighting?*
- *Would new lighting have any safety impacts, for example in creating a hazard for road users?*
- *Is a proposal likely to have a significant impact on a protected site or species? This could be a particular concern where forms of artificial light with a potentially high impact on wildlife and ecosystems (e.g. white or ultraviolet light) are being proposed close to protected sites, sensitive wildlife receptors or areas, including where the light is likely to shine on water where bats feed.*
- *Does the Proposed Development include smooth, reflective building materials, including large horizontal expanses of glass, particularly near water bodies? (As it may change natural light, creating polarised light pollution that can affect wildlife behaviour.)"*

4 https://www.gov.uk/guidance/light-pollution, Paragraph 002 Ref ID: 31-002-20191101 revision 01 11 2019

3. LOCAL POLICIES

3.1. Kirklees Council, Kirklees Local Plan

3.1.1. The relevant Local Planning Authority (LPA) for the Proposed Development is the Kirklees Council with policies detailed within the Kirklees Local Plan, Adopted 27 February 2019 applying to the lighting associated with the Proposed Development.

The applicable policies are:

"13.1 Biodiversity & geodiversity

Policy LP30:

Biodiversity & Geodiversity

The council will seek to protect and enhance the biodiversity and geodiversity of Kirklees, including the range of international, national and locally designated wildlife and geological sites, Habitats and Species of Principal Importance and the Kirklees Wildlife Habitat Network.

South Pennine Moors

Proposals which may directly or indirectly compromise achieving the conservation objectives of a designated or candidate European protected site will not be permitted unless the proposal meets the conditions specified in Article 6 (3) - (4) of the Habitats Directive.

Statutory Designated Sites

Statutory designated sites, including the South Pennine Moors Special Protection Area (SPA) and Special Area for Conservation (SAC) and Sites of Special Scientific Interest, are already highly protected through existing laws and legislation. In accordance with legislation, the Council will seek to ensure that harmful impacts to these areas as a result of development proposals are avoided.

Development proposed within or outside a designated Site of Special Scientific Interest, likely to have an adverse effect on the site's special nature conservation features, will not normally be permitted. Exceptionally development will be allowed where the benefits of the development clearly outweigh the impacts on the site's special conservation features and measures are provided to mitigate harmful impacts.

The Dark Peak Nature Improvement Area

Proposals that contribute to the aims and objectives of the Dark Peak Nature Improvement Area will in principle be supported, subject to other policies in this plan. Development likely to have an adverse impact on the aims and objectives of the NIA will not be permitted. Local Designated Sites & Important Local Ecological Features Proposals having a direct or indirect adverse effect on a Local Wildlife Site or Local Geological Site, Ancient Woodland, Veteran Tree or other important tree, will not be permitted unless the benefits of the development can be clearly shown to outweigh the need to safeguard the local conservation value of the site or feature and there is no alternative means to deliver the proposal. In all cases, full compensatory measures would be required and secured in the long term.

Habitats and Species of Principal Importance

Proposals will be required to protect Habitats and Species of Principal Importance unless the benefits of the development clearly outweigh the importance of the biodiversity interest, in which case long term compensatory measures will need to be secured. Biodiversity and Development proposals will be required to:

(i) result in no significant loss or harm to biodiversity in Kirklees through avoidance, adequate mitigation or, as a last resort, compensatory measures secured through the establishment of a legally binding agreement;

(ii) minimise impact on biodiversity and provide net biodiversity gains through good design by incorporating biodiversity enhancements and habitat creation where opportunities exist;

(iii) safeguard and enhance the function and connectivity of the Kirklees Wildlife Habitat Network at a local and wider landscape-scale unless the loss of the site and its functional role within the network can be fully maintained or compensated for in the long term;

(iv) establish additional ecological links to the Kirklees Wildlife Habitat Network where opportunities exist; and

(iv) incorporate biodiversity enhancement measures to reflect the priority habitats and species identified for the relevant Kirklees Biodiversity Opportunity Zone."

4. GUIDANCE

4.1. GN01:2026 Guidance Notes for the Reduction of Obtrusive Light (Institution of Lighting Professionals)

4.1.1. The Lighting Strategy has been developed in accordance with industry guidance aimed at minimising the risk of obtrusive light, which often results from poorly designed or installed external lighting. It draws specifically on the most relevant sections of GN01:2026, which provides best practice recommendations for reducing obtrusive light across a wide range of outdoor lighting applications.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Intrinsically dark	Astronomical Observable dark skies, UNESCO starlight reserves, IDA Dark Sky Parks.
E1	Natural	Dark	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres or suburban locations.
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity.

Table 1: Environmental Zone Descriptions

Environmental Zones	Sky Glow ULR[5] (Max %)	Light Trespass (Into Windows) E_v (lux)		Building Luminance Average, Pre-curfew
		Pre-Curfew	Post-Curfew[6]	Average L (cd/m^2)
E0	0	0	0	0
E1	0	2	< 0.1	0
E2	2.5	5	1	5
E3	5	10	2	10
E4	15	25	5	25

Table 2: Obtrusive Light Criteria

5 ULR (Upward Light Ratio) is the maximum permitted percentage of luminaire flux that goes directly into the sky.
6 Curfew refers to a time when the local planning authority has agreed that the lighting installation should be switched off; this typically refers to 23h00 – 07h00

4.2. GN08:2023 Bats and Artificial Lighting in the UK (Bat Conservation Trust and Institution of Lighting Professionals)

4.2.1. This document is aimed at lighting professionals, lighting designers, planning officers, developers, bat workers/ecologists and anyone specifying lighting. It is intended to raise awareness of the impacts of artificial lighting on bats, and mitigation is suggested for various scenarios. However, it is not meant to replace site-specific ecological and lighting assessments.

4.2.2. Based on the information provided the following limitations are recommended:

- Horizontal light levels are not exceeding 0.2 lux[7]
- Vertical light levels are not achieve greater than 0.4 lux between 1.5mtrs and 6.5 mtrs above ground level[8]
- Correlated Colour Temperature (CCT) will be equal to or less than 2700K[9]

4.2.3. Where standardised mitigation is to be used, the Bat Conservation Trust Guidance (BCT), Landscape and urban design for bats and biodiversity[10] is consulted using the following methods in conjunction with ILP guidance (GN08).

- Minimum light for safety is to be used (as per British Standards or relevant guidance documents)
- Flat cut-off lanterns are to be proposed
- The most appropriate narrow spectrum light will be used avoiding blue wavelengths (less than 2700K)
- Pedestrian lighting in close proximity will be targeted below 3 Lux
- Increased lantern spacing
- Lighting of only high risk stretches of roads allowing headlights to provide necessary illumination at other times
- Limiting the times of use to provide dark periods
- Use of temporary close-boarded fencing until vegetation matures shielding sensitive areas from lighting
- Deployment of hop-over at crown height, hop over vegetation, hop over vegetation and walls and viaduct bridges

4.2.4. Whilst lighting will be designed to comply with the GN08:2023 criteria for creation of a dark corridor (horizontal of 0.2 lux and vertical of 0.4 lux) any break in a foraging route will either be reconnected, diverted or mitigated where possible.

7 GN08:2023 Paragraph 4.54 page38.
8 GN08:2023 paragraph 4.56 page 39 for 1.5m height, 6.5m height based on the underside of an established tree canopy.
9 GN08:2023 paragraph 4.29 page 29, BCT Bats and Lighting, Overview of current evidence and Mitigation paragraph 3.1.1 page 22.
10 BCT Landscape and Urban design for bats and biodiversity page 28 and page 29.

5. DESKTOP STUDY

5.1. Site Description and Context

5.1.1. A desktop assessment was completed to understand the Approved Site and its position within the current lit environment.

5.1.2. The Approved Site is located to the south of Bradford on a country lane which links the towns of Oakenshaw and East Bierley. The Approved Development is surrounded by arable land to the north, west and east, with operational farming buildings to the southwest and south.

5.1.3. The Approved Site is Lower Chatts Farm, 155 Cliff Hollins Lane, East Bierley, BD12 7ET An indicative boundary of the site and proposed layout can be seen in **Figure 1.**

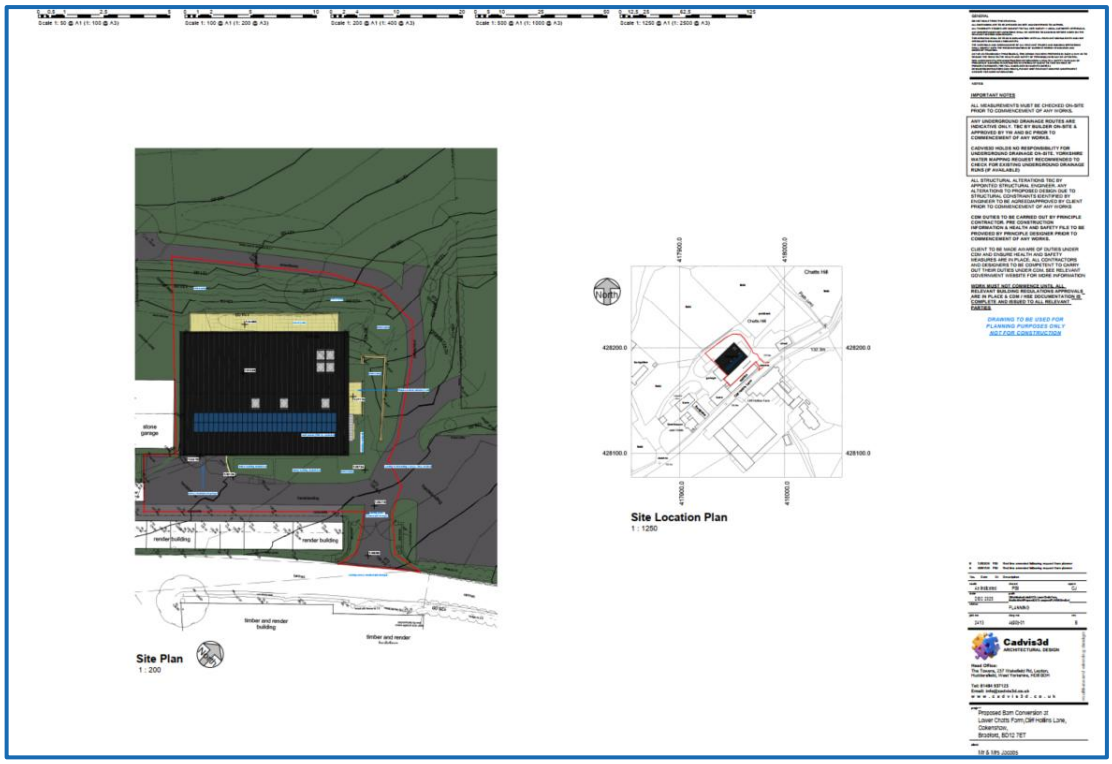


Figure 1: The Approved Site Location and Boundary

5.1.4. The Approved Development is for:

"Change of use and alterations to barn to form dwelling at Lower Chatts Farm, 155 Cliff Hollins Lane, East Bierley, BD12 7ET."."

5.1.5. The Site Layout Plan is shown in **Figure 2**.

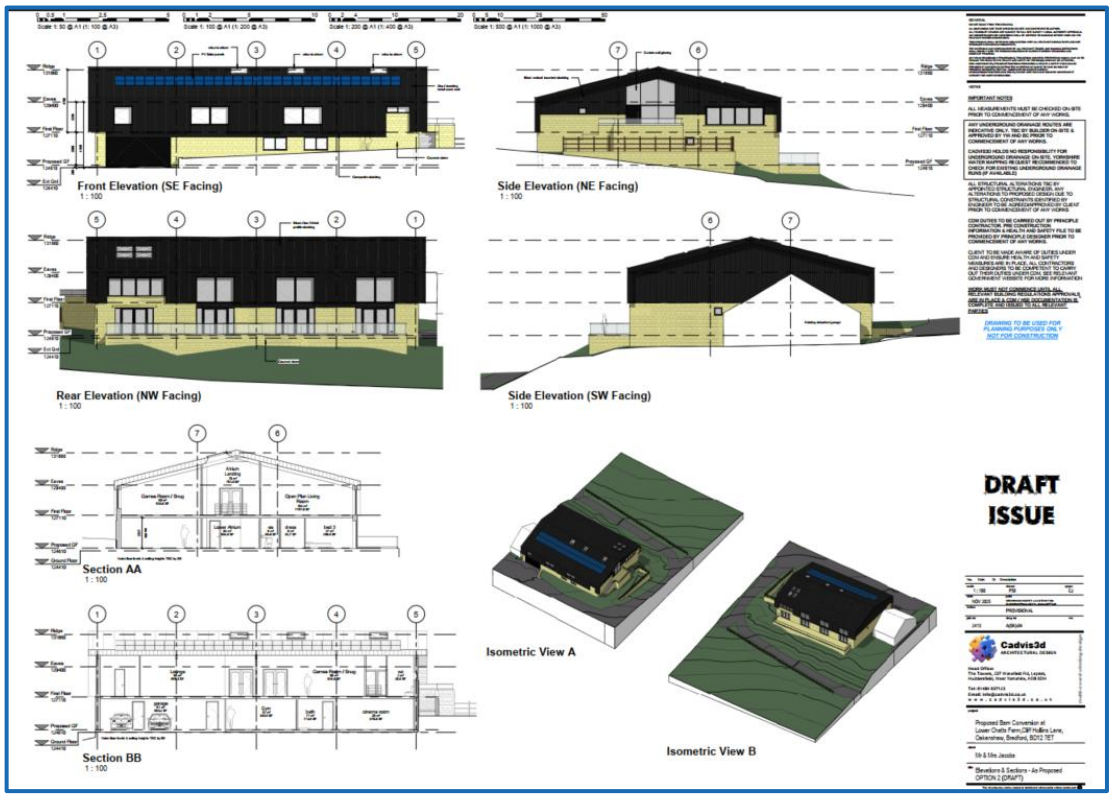


Figure 2: Proposed Development Site Layout Plan

5.2. Designated Sensitive Site

5.2.1. The area is within 2 km[11] proximity of a designated Special Area of Conservation (SAC), Sites of Special Scientific Interest (SSSI) and National Landscape (Formally AONBs). These are shown in **Figure 3** and referred to as:

- Ancient Woodlands – Chatts Wood – 0.3km from Approved Site.
- Ancient Woodlands – Great and Little Hunsworth Woods – 0.6km from Approved Site.

5.2.2. The Sensitive Sites identified are to the south of the Approved Site and have a number of farm buildings between them and the Approved Site.

5.2.3. The Light Spill Diagram (**Appendix 1 – Light Spill Diagram**) will show the impact of the lighting without the surrounding buildings to ensure these areas will not be impacted.

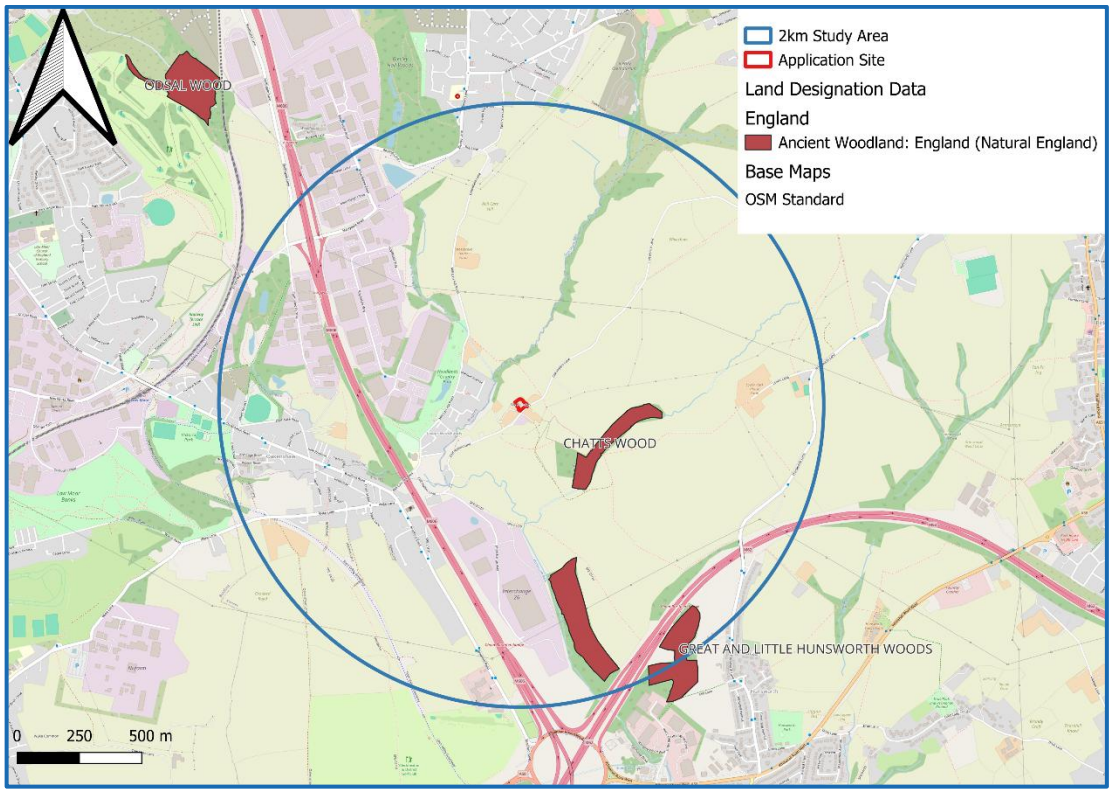


Figure 3: Site Designation

11 Based on empirical thresholds from visual impact studies, tall slender structures in open landscapes are typically prominent up to about 2 km, still relatively prominent between 2 and 5 km, and beyond this distance their prominence declines significantly, based on statements within Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes study (U.S.BLM-sponsored)

5.3. Existing lighting

5.3.1. The Approved Site has a mix of open land and farm buildings to the north, east and west. The south of the Approved Site is adjacent to Cliff Hollins Lane which has lighting mounted at 6m on telegraph poles. See Figure 4.



Figure 4: View of the Lighting on Cliff Hollins Lane

5.4. Environmental Zone Classification

5.4.1. Based on the evidence of the existing lighting (seen in **Section 5.3**) and the description of the surrounding environment (seen in **Section 5.1**) are similar to those expected within an E2 zone.

5.4.2. The Environmental Zone criteria detailed within **Table 1**and **Table 2** informs the basis of the Lighting Strategy. The Approved Site is considered to be located within an E2 Environmental Zone.

Zone	Surrounding	Examples	Limitations		Sky Glow ULR (Max)
			Pre-curfew	Post-curfew	
E2	Rural	Sparsely inhabited rural areas,Village or relatively dark outer suburban locations	5	1	2.5%

Table 3: Limitations of Identified Environmental Zone

6. IDENTIFIED RECEPTORS

6.1. Ecological

6.1.1. It has been assumed based on the available topographic view, that the entire surround of the Approved Site is likely to be ecologically sensitive. The visual location of these areas can be seen in **Appendix 3 – Sensitive Receptors**.

6.1.2. A description of the potential ecological receptors can be seen in **Table 4**.

Receptor Type	Receptor No. (Appendix 3 – Sensitive Receptors)	Description
Ecology	PSER 001	Open land to the west of the Approved Site
Ecology	PSER 002	Open land to the north of the Approved Site
Ecology	PSER 003	Open land to the east of the Approved Site
Ecology	PSER 004	Area adjacent to Cliff Hollins Lane

Table 4: Potentially Sensitive Ecological Receptors (PSER)

7. LIGHTING STRATEGY

7.1. Summary

7.1.1. The Approved Development will require lighting for wayfinding at limited times during the hours of darkness. Lighting will be fit for purpose and sensitive to nearby human and ecological receptors.

7.1.2. The following criteria seek to ensure that the lighting is not outside of the obtrusive light limits for the Environmental Zone in which the Approved Site is located: is sensitive to the area and off appropriate levels to provide wayfinding lighting levels. Luminaires will distribute light downwards only to reduce the potential for light spill onto the boundaries surrounding the buildings and upwards towards the sky.

7.1.3. Amenity lighting for the Approved Development will be applied sensitively to account for the receptors identified bounding the Approved Site and within the Approved Development.

7.1.4. Luminaires will be used with integral LEDs and only where the luminaire photometry is available from the manufacturer. This is to ensure the photometric footprint of the luminaires can be modelled to ensure the potential effects of light spill are minimised or mitigated.

7.1.5. All lighting, unless otherwise stated, is to emit a warm white colour temperature light (2700 Kelvin or less) to reduce the potential for adverse effects onto potentially sensitive receptors.

7.1.6. Lighting in unadopted areas will be required in the following task areas:

- Hardstanding Road
- Amenity Lighting

7.2. Hardstanding Road

7.2.1. The Hardstanding Road will be illuminated in accordance for wayfinding purposes. The lowest possible lighting levels are proposed within this Lighting Strategy.

Equipment Specification	
Application Area	Hardstanding Road
Correlated Colour Temperature (Kelvin)	≤2700
Lumen Output (lm)	≤785
Height (m)	≤1
Mounting Arrangement	Bollard fixing (Root or Flange)
Luminaire Tilt (°)	0
Upward Light Output Ratio (%) **E2 < 2.5%**	0
Luminaire Manufacturer	DW Windsor
Luminaire family	Pharola DS
Example Luminaire Image	
Controls[12]	Lighting controlled via remote PIR

Table 5: Luminaire Performance Requirements

12 Dimming: when dimming is applied it is announced as a percentage still in use of the total percentage output (dimmed too, not dimmed by).

7.3. Amenity Lighting

7.3.1. The Hardstanding Road will be illuminated in accordance for wayfinding purposes. The lowest possible lighting levels are proposed within this Lighting Strategy.

Equipment Specification	
Application Area	Amenity Lighting
Correlated Colour Temperature (Kelvin)	≤2700
Lumen Output (lm)	≤204
Height (m)	≤2m above ground level
Mounting Arrangement	Wall Mounted
Luminaire Tilt (°)	0
Upward Light Output Ratio (%) **E2 < 2.5%**	0
Luminaire Manufacturer	Ligman
Luminaire family	Gino 2
Example Luminaire Image	
Controls[13]	Lighting controlled via remote PIR

Table 6: Luminaire Performance Requirements

13 Dimming: when dimming is applied it is announced as a percentage still in use of the total percentage output (dimmed too, not dimmed by).

8. SUMMARY OF RESULTS

8.1. Overview

8.1.1. The Light Spill Diagram shown in **Appendix 1 – Light Spill Diagram** and **Appendix 2 – Vertical Light Spill Diagram**, demonstrates that the Light Spill Levels associated with the proposed lighting would comply with the obtrusive light guidance set out in ILP GN01:2026, at sensitive receptors.

8.1.2. To ensure the worst-case scenario has been modelled, the highest potential light levels have been modelled / presented in the light spill diagram, with the project maintenance factors set at MF = 1.0[14]. This demonstrates the light levels at their highest (initial light levels at the start of luminaire life).

8.2. Summary of Results

8.2.1. The proposed lighting within the task area(s) is compliant to the relevant policies, standards and guidance.

8.2.2. Where ecological receptors are potentially sensitive to vertical light spill, a vertical illumination grid has been modelled, as shown in **Appendix 2 – Vertical Light Spill Diagram**. The light levels based on the modelling do not exceed 0.4 Lux, keeping the light levels within the guidance given within GN08:2023.

8.2.3. In line with section 4.56 of GN08:2023, the vertical grids will be mounted at a height of 1.5 metres above the ground level to simulate the likely flight path of a light sensitive bat.

Receptor No	GN08:2023 requirements	Maximum vertical Illuminance (Lux)	Notes
PSER 001	0.40 Lux	0.28	
PSER 002	0.40 Lux	0.01	
PSER 003	0.40 Lux	0.07	
PSER 004	0.40 Lux	0.29	

Table 7: PSER Results Table, Maximum Illuminance

[14] https://www.dfl-uk.com/knowledge-hub/faqs/

8.3. Mitigation and Enhancements

8.3.1. Careful design ensures the lighting has been minimised onto sensitive receptors in accordance with standards and guidance.

8.3.2. Where applicable, shields are proposed in particularly sensitive areas to further minimise spill.

8.3.3. Through the use of the control methods detailed in **Section 7**, the amount of light in the affected Application Area is to be restricted to the amount of time required for amenity and safety purposes only.

8.3.4. The detailed design is to be completed by a competent person or persons in accordance with the details within this Lighting Strategy.

8.3.5. Additional mitigation and enhancement is detailed in **Table 8**.

Mitigation/Enhancement	Method	Note
Restricting the Upward Light Output Ratio	All luminaires will have an Upward Light Output Ratio of 0% and will be certified by Darksky.org.	Whole Approved Development
Restricting Luminaire Tilt	All luminaires will be installed with a 0° as standard.	Whole Approved Development
Installation of Back Light Shielding	Manufacturers often provide "back light optics" where back light mitigation is integrated on the lenses of the luminaires. This is the preferred option as it provides the greatest degree of control. Where this is not available, traditional back light shields can be used.	Proposed bollards can come completed with backlight shield option. To be applied to all bollards at the Approved Development.
Using the lowest possible Correlated Colour Temperature	Throughout the Approved Development the standard Correlated Colour Temperature used will be ≤2700K.	Whole Approved Development
Using the lowest applicable lighting levels for tasks and areas	All areas and tasks will be lit using the lowest applicable lighting levels while maintaining a reasonable level for wayfinding purposes.	Whole Approved Development

	This will ensure a standard and recognised levels of light are provided for all areas of the Approved Development, while ensuring no area is overlit.	
Using the minimum practical mounting height	All luminaires will be mounted at the minimum practical mounting height for the area or task. This will reduce the visibility of the luminaires in the landscape, by allowing surrounding trees and buildings to act as blocking features to direct views of luminaires.	Whole Approved Development
Using appropriate optics for the areas being illuminated	The luminaire optic used will be specific to the area being lit. This will ensure the task and area is lit to a standard level of light, while also allowing the lux contours to be shaped to the specific areas. This will help reduce light spill out of area and either over lighting or under lighting area. This will also prevent the need to tilt luminaires and will reduce light spill and upward light.	Whole Approved Development
Only using Luminaires where Photometry is Available from the Manufacturer	Luminaires will be used with integral LEDs and only where the luminaire photometry is available from the manufacturer. This is to ensure the photometric footprint of the luminaires can be modelled to ensure the potential effects of light spill are minimised or mitigated.	Whole Approved Development

Table 8: Mitigation and Enhancements

9. CONCLUSION

9.1. General

9.1.1. Lighting associated with the Approved Development shall be designed in accordance with the Lighting Strategy for the Approved Site outlined in **Section 7**.

9.1.2. This Lighting Strategy has been written in accordance with the relevant industry guidance and local policies to ensure it is unlikely to give rise to obtrusive light with the potential to affect human, environmental and ecological receptors.

9.1.3. Planning condition 8 from Application Number 2026/62/90034/E has been considered throughout this Lighting Strategy.

9.1.4. Condition 8 from the Application Number 2026/62/90034 states:

> *"8. No works are to commence unless a detailed lighting scheme, developed in accordance with established guidance (e.g. Bat Conservation Trust and Institute of Lighting Professionals (2023) Bats and Artificial Lighting at Night), has been drafted and agreed with the council. The Sensitive Lighting Strategy will demonstrate that the proposed lighting will not impact upon ecological networks and/or sensitive features. Thereafter the agreed lighting scheme shall be implemented, subject to any variations approved in writing by the planning authority. All external lighting shall be installed strictly in accordance with the specifications and locations set out within the Lighting Strategy*
>
> *Reason: In the interests of biodiversity and in accordance with Policy LP30 and chapter 15 of the National Planning Policy Framework."*

9.1.5. As per **Appendix 1 – Light Spill Diagram, Appendix 2 – Vertical Light Spill Diagram** and **Table 7** the vertical illuminance level reaching the boundaries identified as sensitive for ecology will not experience illuminance levels above the ILP GN08:2023 0.4 Lux recommended limit.

9.1.6. Through the application of this Lighting Strategy sensitive receptors will not be adversely affected by obtrusive light, as shown in **Appendix 1 – Light Spill Diagram** and **Appendix 2 – Vertical Light Spill Diagram**. This approach therefore enables the discharging of Planning Condition 8.

9.1.7. Through careful design and mitigation, this Lighting Strategy ensures the lighting installation at the Approved Development will be in accordance with Guidance and Local Policy (Policy LP 30 from Kirklees Local Plan).

APPENDIX 1 – LIGHT SPILL DIAGRAM

See accompanying document 4718-DFL-ELG-XX-LD-EO-13001

APPENDIX 2 – VERTICAL LIGHT SPILL DIAGRAM

See accompanying document 4718-DFL-ELG-XX-CA-EO-13001

APPENDIX 3 – SENSITIVE RECEPTORS

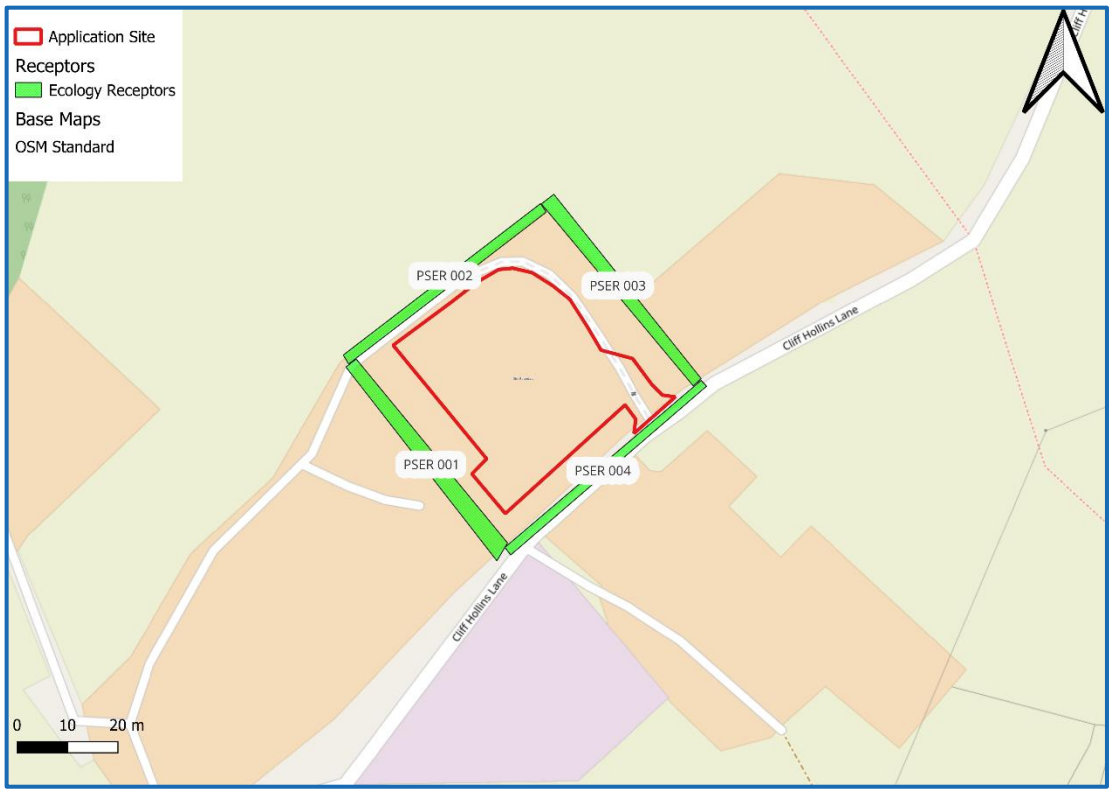


Figure 5: Sensitive Receptors

TECHNICAL DESCRIPTIONS, DEFINITIONS AND ABBREVIATIONS

PHAR: is an abbreviation for a potential human amenity receptor, a location where an observer could have the potential to be affected by the proposed lighting to be installed *Abbreviation used by DFL LI and P.*

PSER: is an abbreviation for an area identified as or treated as a location that may host a potentially sensitive ecological receptor. This is generally used where light sensitive bats have the potential to live, forage or use as a flight path, other ecologically sensitive receptors such as (but not limited to) the Great Crested Newt may also be identified by this term. *Abbreviation used by DFL LI and P.*

PSR: is an abbreviation for an area where an individual maybe susceptible to light brightness (Light intensity) which may have the potential to cause a hazardous situation. *Abbreviation used by DFL LI and P.*

Obtrusive Light: refers to excessive or bothersome artificial light that goes where it shouldn't, causing discomfort and disruption. *Spill light which because of quantitative, directional or spectral attributes in a given context gives rise to annoyance, discomfort, distraction or reduction in the ability to see essential information.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Sky glow: When lights are directed upwards or light is scattered by particles in the air, like dust or water droplets, it creates a glow that makes it hard to see stars. *The increase in diffuse illuminance of the night sky above that produced by natural sources such as the moon and visible star.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Vertical Illuminance: is how much light lands on upright surfaces like walls. It's measured in lux or footcandles and matters for places where the view from a vertical angle is important. *Lighting of vertical surfaces such as walls, windows, statues, sculptures and people's faces*. CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Correlated colour temperature (CCT): the appearance of light emitted by a light source measured in Kelvin (K), Lower CCT values such as 2700K represent warmer, more yellowish light, *similar to the light from older incandescent lamps. (Tcp)The temperature of the Planckian radiator whose perceived colour most closely resembles that of a given stimulus at the same brightness and under specified viewing conditions, measured in absolute temperature on the kelvin (K) scale.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Lux: measures the brightness of light as perceived by the human eye at a specific point on a surface. *The SI derived unit of illuminance, measuring luminous flux per unit area (1 lux =1 lumen/m2).* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Lumens: measure how bright a light appears to our eyes. The SI derived unit of luminous flux; a measure of the total quantity of visible light emitted by a source or received by a surface (unit: lumen). CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Glare: refers to an excess of bright light that makes you uncomfortable or hinders your vision. It happens when there's a big difference between a bright light and the rest of the surroundings. *Glare: condition of vision in which there is discomfort or a reduction in the ability to see details or objects, caused by an unsuitable distribution or range of luminance, or by extreme contrasts.* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.1.8

Luminous intensity: is light brightness or how intense the light source is. light intensity is how intense a light source is emitted or received in a particular direction, this is measured candelas and is termed as luminous intensity *Iv <of a source, in a given direction> quotient of the luminous flux, dΦv, leaving the source and propagated in the element of solid angle dΩ containing the given direction, by the element of solid angle (unit: cd =lm · sr -1.* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.2.

Candela: is a measurement for the brightness of a light source, taking into account the direction in which the light is emitted. *Base unit of luminous intensity in the International System of Units (SI); the luminous power per unit solid angle emitted by a point light source in a particular direction.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Uniformity (Uo): is an explanation for the even distribution of light across an area or surface. The overall uniformity shall be calculated as the ratio of the lowest luminance, occurring at any grid point in the field of calculation, to the average luminance. BS EN 13201-3-2015, Calculation of Performance Section 8.3.

Luminance: is how bright a surface appears to our eyes. It considers the light coming from or reflected by an object. Lv <in a given direction, at a given point of a real or imaginary surface> quantity defined by the formula (unit: cd · m-2 = lm · m-2 · sr-1) BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.3.

Illuminance is how much light lands on a surface per square meter. It's measured in lux. More lux means a brighter area. Ev (unit: lx = lm · m-2) 1. <at a point of a surface> quotient of the luminous flux dΦv incident on an element of the surface containing the point, by the area dA of that element 2. <at a point of a surface> equivalent definition: integral, taken over the hemisphere visible from the given point, of the expression. BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.10.

Luminaire: a light fixture, this is also sometimes referred to as a lantern or a light fitting, is a product that produces artificial light. *apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.3.3

ULOR: upward light output ratio or ULOR refers to the amount of light the light fixture will produce upwards as a percentage of its total light output. *RULO <of a luminaire> ratio of the upward luminous flux of the luminaire, measured under specified practical conditions with its own lamp(s) and equipment, to the sum of the individual luminous fluxes of the same lamp(s) when operated outside the luminaire with the same equipment, under specified conditions* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.3.12.

Maintenance factor (MF): is an allowance for how well the lights keep working overtime. It considers things like dirt on the light fittings and “wear and tear”. *DEPRECATED: light loss factor ratio of illuminance produced by the lighting installation after a certain period to the illuminance produced by the installation when new Note 1 to entry: The term depreciation factor has been formerly used to designate the reciprocal of the above ratio. Note 2 to entry: The maintenance factor takes into account light losses caused by dirt accumulation on luminaires and room surfaces (in interiors) or other relevant surfaces (in exteriors, where appropriate), and the decrease of the luminous flux of lamps*. BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.5.18.

Tilt: is how much the luminaire is lifted based on the fitting facing flat to the ground.

Outreach: how far away the fitting is from the column/wall its mounted on to the light source.

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