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· LIGHTING DESIGN · ELECTRICAL · SMART CITIES ·
ENERGY REDUCTION · LIGHTING IMPACT

LAND SOUTH OF SACHEVERELL WAY, GROBY

LIGHTING IMPACT ASSESMENT

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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.

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1. INTRODUCTION

1.1. Executive Summary

1.1.1. This Lighting Impact Assessment 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. This document will assess the impact of lighting applied to the Proposed Development and its potential effects on the surrounding environment.

1.1.3. The Application Site, Land South of Sacheverell Way, Groby is currently in use as arable farmland.

1.1.4. The Lighting Strategy within this document proposes good practice and outlines a suitable approach for the application of lighting to the Proposed Development for the purpose of safety, security, wayfinding and amenity. 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 human, environmental and ecological receptors.

1.1.5. 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.

1.1.6. It has been determined that the Application Site is considered to be within a relatively dark outer suburban location (E2).

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

Lighting applied to the Application Site will results in a likely residual effects (after construction) of Neutral/Not significant . No further actions are required as the sensitive application of lighting to the Application Site results in a neutral outcome.

[1] https://www.dfl-uk.com

2. METHOD OF ASSESSMENT AND SIGNIFICANCE CRITERIA

2.1. Methodology

2.1.1. The assessment has been carried out in accordance with the published guidance documents from the ILP and Highways standards. These quantify impacts to surroundings, the levels of direct upward light, light intrusion, viewed source intensity and glare regarded as acceptable for varying environmental zones.

2.1.2. The Lighting Impact Assessment is based on a desktop assessment. The methodology employed for this assessment is appropriate to the location of the site. It comprises of, a desk-top study of the legislative policy and guidance context; consultation with the design team; a desktop study in which the baseline conditions were estimated based on industry guidance; confirmation of the general expected light levels for the relevant Environmental Zone in which the site is located; evaluation of the likely effects of the approved lighting using appropriate assessment criteria; indicative layout and associated light spill modelling.

2.1.3. The methodology takes guidance from the Institution of Lighting Professionals PLG 04 document "Guidance on Undertaking Environmental Lighting Impact Assessments" and the Highways standard DMRB V11(LA104) model of assessing impact.

2.1.4. The Matrix in Table 3.8.1 of the DMRB V11 has been compared to the residual effects descriptions in PLG04 and given a comparative description, this has been done to line up the relevant outcomes in the DMRB V11 matrix (**Table 4**) to the Residual Effects table from PLG04 (**Table 5**). This sets out industry best practice for conducting the assessment.

2.1.5. Significance of an effect should only be reported after an assessment of the design and mitigation measures (the residual effect).

2.2. Study Area

2.2.1. The desktop study area was determined by assessing the Application Site boundaries and the potential receptors that could be affected by a change in the base line lighting levels. The impacts and effects of artificial lighting installed within the Application Site were then evaluated in line with the criteria shown in **Tables 1 - 3**.

2.2.2. The desktop study involved research into relevant legislation, policy and guidance relating to obtrusive light. It also involved studying of ordnance survey maps, plans and aerial photography views to identify likely receptor locations.

2.2.3. The study area is detailed in **Section 7**.

2.3. Classification of Environmental Zone

2.3.1. To understand the restrictions needed to keep the implementation of lighting to a minimum we use what is classified as an environmental zone, this is rated from E0 to E4, an environmental zone is given its designation based on the context of the surrounding environment as defined by the ILP in GN01/2021 (see **Section 6**).

2.4. Potential Effects from Artificial Light

2.4.1. The potential effects on human receptors and the surrounding environment are evaluated based on their adherence to the limitations outlined in the relevant ILP guidance. This guidance, GN01/2021, outlines restrictions on such things as light intrusion, luminous source intensity, upward light spill (or sky glow). The tables outlining the restricts are in **Section 6** (Guidance).

2.4.2. As the needs of ecology differ from those of a human amenity or human safety receptor a separate set of guidance, GN08/2023, is used to evaluate the effects of lighting on the most light sensitive ecology receptors (Bats). An explanation of the implementation and restrictions to protect light sensitive ecology such as bats is outlined in **Section 6**.

2.5. Significance Criteria

2.5.1. The significance of an effect from artificial lighting has been based upon the sensitivity of the receptor and the magnitude of impact at that receptor due to the revised conditions.

- The sensitivity of the receptor has been classified as High, Medium, or Low according to the descriptions provided in **Table 1**.
- The magnitude of impact is determined as being High, Medium, Low , Negligible, Adverse or Beneficial, descriptions for each are provided in **Table 2.**
- The scale of impact is derived through a matrix (**Table 4**), matching the sensitivity of the receptor, with the magnitude of the impact to calculate the significant criteria and residual effects value.
- The residual effects values are then matched to the significancy of effects or residual effects (**Table 5**)

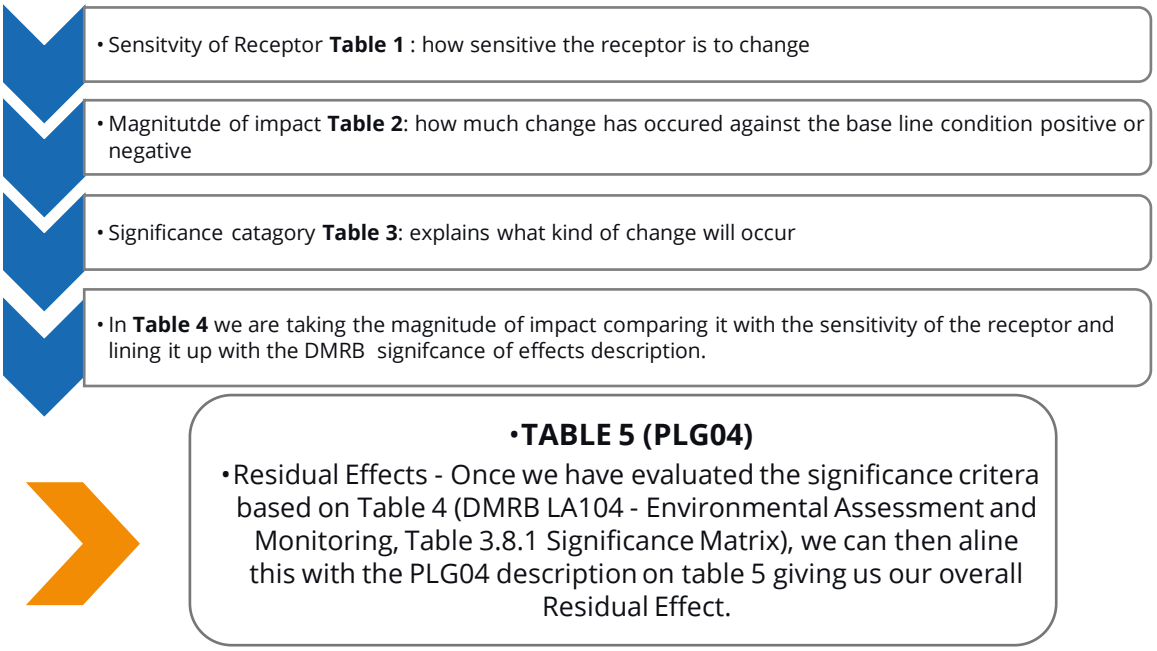

Figure 1: Effects outcome explanation

Sensitivity	Description of Criteria	
High	The environment is fragile, and an impact is likely to leave it in an altered state from which recovery would be difficult or impossible.	
	Human Amenity (PHAR)	receptors which are sensitive to a change in lighting such that the quality of life would be affected (i.e. lighting is designated a statutory nuisance)
	Human Safety (PSR)	receptors where a change in the lighting has the potential to either dramatically improve or reduce safety (for pedestrians, drivers or workers).
	Ecological (PSER)	where a change in the lighting affects the habitats, breeding or feeding of fauna (e.g. protected habitats or other special areas) or growth patterns of fauna / crops.
Medium	The environment has a degree of adaptability and resilience and is likely to accommodate the changes caused by an impact, although there may still be some residual modification as a result.	
	Human Amenity (PHAR)	receptors which are sensitive to a change in lighting however not such that the quality of life would be affected
	Human Safety (PSR)	receptors where a change in the lighting has the potential to either improve or reduce safety (for pedestrians, drivers or workers).
	Ecological (PSER)	where a change in the lighting affects the movement or feeding patterns of fauna but the receptor can adapt
Low	The environment is adaptable and is resilient to change. Nearly all impacts can be absorbed within it without modifying the baseline conditions.	
	Human Amenity (PHAR)	receptors which would not noticeably be aware of a change in lighting. (i.e. in areas of medium to high luminance) .
	Human Safety (PSR)	receptors where a change in the lighting has limited potential to affect safety (for pedestrians, drivers or workers).
	Ecological (PSER)	The environment is adaptable and is resilient to change. Nearly all impacts can be absorbed within it without modifying the baseline conditions.
Negligible	Receptor has little or no night-time activity	

Table 1: Criteria for receptor Sensitivity

Magnitude of impact		Definition of Impact
Major	Adverse	A large change compared to the natural variations in background levels. A clear breach of limits and standards. For example, levels of obtrusive light in the form of sky glow, light trespass or glare towards a receptor which exceeds the limits set within the ILP guidance for a higher Environmental Zone might classify as a high magnitude of change.
	Beneficial	A large change compared to the natural variations in background levels. A clear and obvious decrease in light applied to the Application when compared to the existing baseline. For example, the removal of a large obtrusive light source for one that results in a surrounding compliant with the relevant standards and guidance.
Moderate	Adverse	Change which is noticeable and may be a breach of limits and standards. In terms of the limits set in the ILP guidance this might equate to exceeding the limit but within the limits set for the next Environmental Zone.
	Beneficial	Change that results in a slight improvement on the existing baseline. This may bring a site that is in minor breach of guidance but the new application results in a surrounding that is compliant or closer to compliant.
Minor	Adverse	Change which, when compared to background levels, is only just noticeable but does increase the surrounding light levels
	Beneficial	Change which, when compared to background levels, is only just noticeable but does decrease the light impacting the surrounding environment.
Negligible		Localised change which, when compared to background levels, is only just noticeable but does not increase the surrounding light levels
No Change		No observable impact and within guidance levels.

Table 2: Criteria for Magnitude of Impact (+/- = Baseline – Proposed Design)

Significance category	Typical description
Very Large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table 3: Definitions of significance categories (Magnitude of change x receptor sensitivity,)

Significance of Effect Matrix		Magnitude of Impact				
		No Change	**Negligible**	**Minor**	**Moderate**	**Major**
Sensitivity of Receptor	**Very High**	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or very large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Table 4 Significance of Effect Matrix (Score +/- based on Magnitude of Impact)

Residual Effects		
DMRB Descriptions	**PLG04 Description**	**Description**
Very large **Large or very large**	Major (beneficial)	Substantial reduction in obtrusive light at sensitive receptors and/or users of the site such that large scale improvements to visual amenity, human safety or health is delivered. Significantly improves ecological habitats
Moderate or Large **Moderate** **Slight or Moderate**	Moderate (beneficial)	Moderate reduction in obtrusive light at sensitive receptors and/or users of the site such that noticeable improvements to visual amenity, human safety or health are delivered. Improves ecological habitats
Slight	Minor (beneficial)	Minor reduction in obtrusive light at sensitive receptors and/or users of the site such that perceptible improvements to visual amenity, human safety or health is delivered; perceptible improvement to ecological habitats.
Neutral or Slight **Neutral**	Neutral/ Not significant	No appreciable effect on sensitive receptors. Effects are reversible.
Slight	Minor (adverse)	Minor increase in obtrusive light at sensitive receptors and / or users of the site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Effects are reversible or temporary.
Moderate or Large **Moderate** **Slight or Moderate**	Moderate (adverse)	Moderate increase in obtrusive light at sensitive receptors and / or users of the site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Requires monitoring and local remedial work. For example, lighting which is visible and causes nuisance to a sensitive receptor outside the site.
Very large **Large or very large**	Major (adverse)	Major increase in obtrusive light at sensitive receptors and / or users of the site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Requires extensive remedial works. For example, a floodlighting installation which directs light into the eyes of oncoming motorists causing disability glare and potential reduction in visual performance leading to an increased risk of collision.

Table 5 Residual Effect Description

3. LEGISLATIVE FRAMEWORKS AND NATIONAL POLICIES

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

3.1.1. 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:

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

[....] artificial light 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".

3.2. National Planning Policy Framework 2024 (Amended 2025)

3.2.1. 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 February 2025 and states that the following elements are to be considered:

"198. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

3.3. Planning Practice Guidance

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

"The following questions indicate matters that may need to be considered in relation to managing the effects of light pollution:

- *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.)"*

Paragraph 002 Ref ID: 31-002-20191101 revision 01 11 2019

4. LOCAL POLICIES

4.1. Hinckley and Bosworth Borough Council, Local Plan 2006-2026 – Site Allocations and Development Management Policies .

4.1.1. The relevant Local Planning Authority (LPA) for the Proposed Development is Hinckley Borough Council, with policies detailed within the Local Plan 2006-2026 – Site Allocations and Development Management Policies, adopted December 2019 applying to the lighting associated with the Proposed Development.

The applicable policies are:

DM6 Enhancement of Biodiversity and Geological Interest

"Development proposals must demonstrate how they conserve and enhance features of nature conservation and geological value including proposals for their long term future management.

Major developments in particular must include measures to deliver biodiversity gains through opportunities to restore, enhance and create valuable habitats, ecological networks and ecosystem services.

Proposals where the primary objective is to conserve or enhance biodiversity or geological interest will be permitted where they comply with other relevant policies in the plan.

On site features should be retained, buffered and managed favourably to maintain their ecological value, connectivity and functionality in the long-term. The removal or damage of such features shall only be acceptable where it can be demonstrated the proposal will result in no net loss of biodiversity and where the integrity of local ecological networks can be secured.

If the harm cannot be prevented, adequately mitigated against or appropriate compensation measures provided, planning permission will be refused.

In addition to the above, where specific identified sites are to be affected the following will be taken into account:"

DM7 Preventing Pollution and Flooding

"Adverse impacts from pollution and flooding will be prevented by ensuring that development proposals demonstrate that: (...)

c) All reasonable steps are taken through design, siting and technological solutions to ensure the abatement of obtrusive light to avoid sky glow, glare and light intrusion; (...)

Light Pollution

"13.51 Light pollution (also known as obtrusive light) is caused by excessive artificial light being directed into the night sky. Outdoor lighting can cause intrusive and unnecessary light pollution in urban, suburban and rural areas, although it is in the countryside that light pollution is most noticeable. Excessive artificial light at night is visually intrusive impacting on local amenity, intrinsically dark landscapes, nature conservation and can cause physiological

problems, in addition to it being a significant waste of energy. It is therefore vital to ensure appropriate controls on external lighting to avoid or mitigate against these adverse effects.

13.52 The Guidance Notes for the Reduction of Obtrusive Light (2011) highlight the elements of obtrusive light which cause the greatest impact. These are defined as:

• Sky Glow, which is the brightening of the night sky;

• Glare, the uncomfortable brightness of a light source when viewed against a darker background; and

• Light Intrusion, the spilling of light beyond the boundary of the area being lit.

13.53 The Light Zone Map illustrates the environmental zones for exterior lighting control to which this policy relates. It illustrates four zones to which differing levels of light would be acceptable. These zones correspond to those identified in the Guidance Notes for the Reduction of Obtrusive Light (2011). The recommended light levels identified for each zone within the guidance both pre curfew (before 23:00 Hrs) and post curfew should be followed and applied as part of this policy.

13.54 The reduction of light pollution should not compromise crime prevention and public safety and alternative technological solutions should be explored to ensure these elements are not compromised whilst also mitigating against obtrusive light."

4.2. Leicestershire County Council, Leicestershire Highway Design Guide 2024

4.2.1. Adoptable Lighting associated with the Proposed Development will be designed and installed in accordance with Leicestershire County Council's adoptable specification for Street Lighting, as per policy document:

Leicestershire Highway Design Guide 2024

5. BRITISH STANDARDS

5.1. BS 5489-1:2020 - Lighting of Roads and Public Amenity Areas - Code of practice.

5.1.1. This standard gives recommendations on the general principles of road lighting, its aesthetics and technical aspects and provides guidance on operational maintenance. It also provides guidance on means of minimizing energy consumption and limiting the impacts on the environment and adjacent properties.

5.2. BS EN 13201-2:2015 - Road lighting. Performance requirements.

5.2.1. This British and European standard defines the performance requirements specified as lighting classes for road lighting aiming at the visual needs of the road users, as well as the consideration of the environmental aspects of the road lighting to be applied.

6. GUIDANCE

6.1. Guidance Notes for the Reduction of Obtrusive Light (Institution of Lighting Professionals GN01/2021)

6.1.1. The Lighting Strategy is informed by industry guidance notes which aim to reduce the potential for obtrusive light to occur, which is typically caused by poorly designed and installed exterior artificial lighting. The Lighting Strategy is informed by the most relevant sections of GN01/2021 that has recently been published to reduce the potential for obtrusive light from a wide range of exterior lighting applications.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA Dark Sky Parks.
E1	Natural	Intrinsically dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, etc.
E2	Rural	Low district brightness (SQM ~ 15 to 20)	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 6: Environmental Zone Descriptions

Environmental Zones	Sky Glow ULR2 (Max %)	Light Trespass (Into Windows) Ev (lux)		Building Luminance Average, Pre-curfew
		Pre- Curfew	Post-Curfew[3]	Average L (cd/m2)
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 7: Obtrusive Light Criteria

[2] ULR (Upward Light Ratio) is the maximum permitted percentage of luminaire flux that goes directly into the sky

[3] 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

6.2. GN08/2023 Bats and Artificial Lighting in the UK – Bat Conservation Trust and Institution of Lighting Professionals.

6.2.1. 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, which states the following

"It is acknowledged that, especially for vertical calculation planes, very low levels of light (<0.5 lux) may occur even at considerable distances from the source if there is little intervening attenuation. It is therefore very difficult to demonstrate 'complete darkness' or a 'complete absence of illumination' on vertical planes where some form of lighting is proposed on site despite efforts to reduce them as far as possible and where horizontal plane illuminance levels are zero. Consequently, where 'complete darkness' on a feature or buffer is required, it may be appropriate to consider this to be where illuminance is below 0.2 lux on the horizontal plane and below 0.4 lux on the vertical plane. These figures are still lower than what may be expected on a moonlit night and are in line with research findings for the illuminance found at hedgerows used by lesser horseshoe bats, a species well known for its light adverse behaviour (Stone, 2012)."

"A warm white light source (2700Kelvin or lower) should be adopted to reduce blue light component."

"A buffer zone subdivided to into smaller zones of increasing illuminance limit further away from the Supporting Habitat would ensure light levels (illuminance - measured in lux) do not exceed certain defined limits. This has the effect of a gradual decrease in lighting from the developed zone, rather than a distinct cut-off, which may provide useable area for the project which also limits lighting impacts on less sensitive species, or less well-used habitat." (see ***Figure 2****)."*

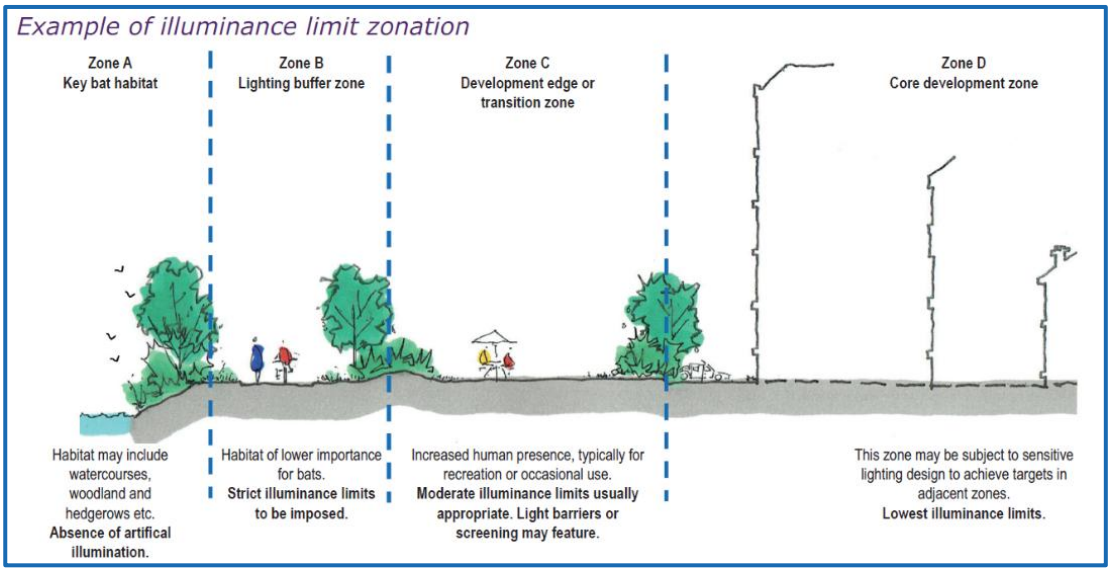

Figure 2: Example of lighting zonation near sensitive boundaries and known ecological habitat

7. DESKTOP STUDY

7.1. Site Description and Context

7.1.1. The Application Site is Land South of Sacheverell Way, Groby. The main body of the site is currently in agricultural use with boundaries comprising of hedgerows and treelines. The south-west boundary of the site is occupied by grassland and mature trees. An indicative boundary of the site and proposed layout can be seen in **Figure 3**.

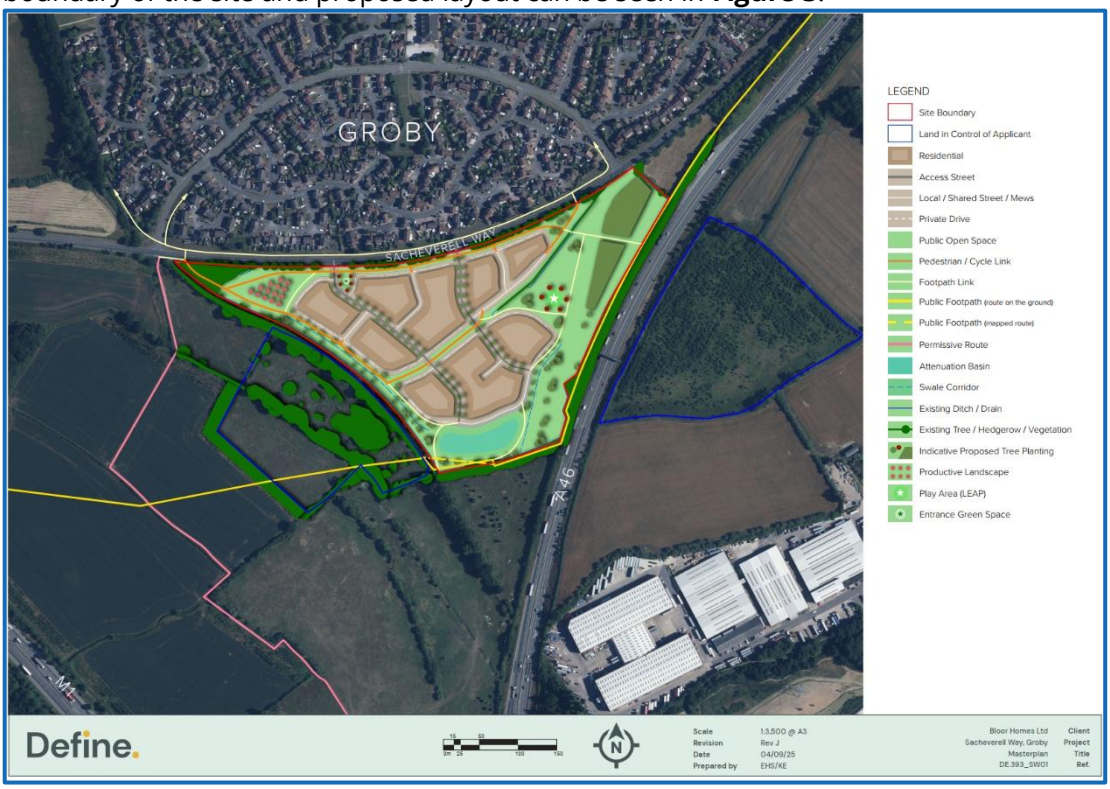

Figure 3: The Application Site location and boundary

7.1.2. The Proposed Development comprises multiple mixed use residential developments along with the generally associated infrastructure required for the Application Site, Whilst the application is submitted in outline form, the following Illustrative Layout has been prepared to provide an indication of the built form (though this will ultimately be negotiated at the reserved matters phase). It has been utilised for the purposes of this assessment to allow for initial modelling to be undertaken but should be considered with those caveats in mind. The Site Layout Plan is shown in **Figure 4**.

Figure 4: Proposed Development Site layout plan

7.1.3. A desktop assessment was completed to understand its position within the current lit environment.

7.2. Designations

7.2.1. The area is not within a designated SAC, SSSI or AONB or within 2 km of one.

7.3. Baseline lighting

7.3.1. Road access to the Application Site is from Sacheverell Way on the northern boundary. Sacheverell Way is illuminated by LED luminaires post top mounted at approximately 8m. They are in a single sided formation in the grass verge between the roadway and footway on the opposite side of the road to the Application Site. There are 2 columns on the same side as the Proposed Development opposite the junctions at either end of Laundon Way. Laundon Way itself it lit by LED lanterns mounted at approximately 6m, as are the residential estate roads; Lime Avenue, Victoria Drive, Castle Rise, Louise Avenue, Tudor Grove, Windsor Avenue, Beech Avenue, Willow Drive, Ash Court and Kings Way.

7.3.2. The section of the A46 adjacent to the eastern boundary of the site is unlit, as is the closest section of the M1 located to the west. The Industrial Park to the south-east of the site situated at the end of The Mill Lane is extensively lit by security floodlighting (see **Figure 5**).

Figure 5: The Mill Lane Industrial Park floodlighting

7.4. CPRE Night Blight Mapping[4]

7.4.1. To inform our understanding of the nighttime environment, we look to use the CPRE Nightblight map to better appreciate the current baseline light levels. The CPRE Night Blight Mapping confirms the skyward radiance within the vicinity of the Application Site is between 4 - 8 Nano Watts/cm²/sr. As shown in **Figure 6**, the likely levels of skyglow within the vicinity of the Application Site are similar to those expected within an E3 zone, however based on the description of the surrounding environment and location of the Application Site the context of the area would define the Application Site as E2 Environmental zone.

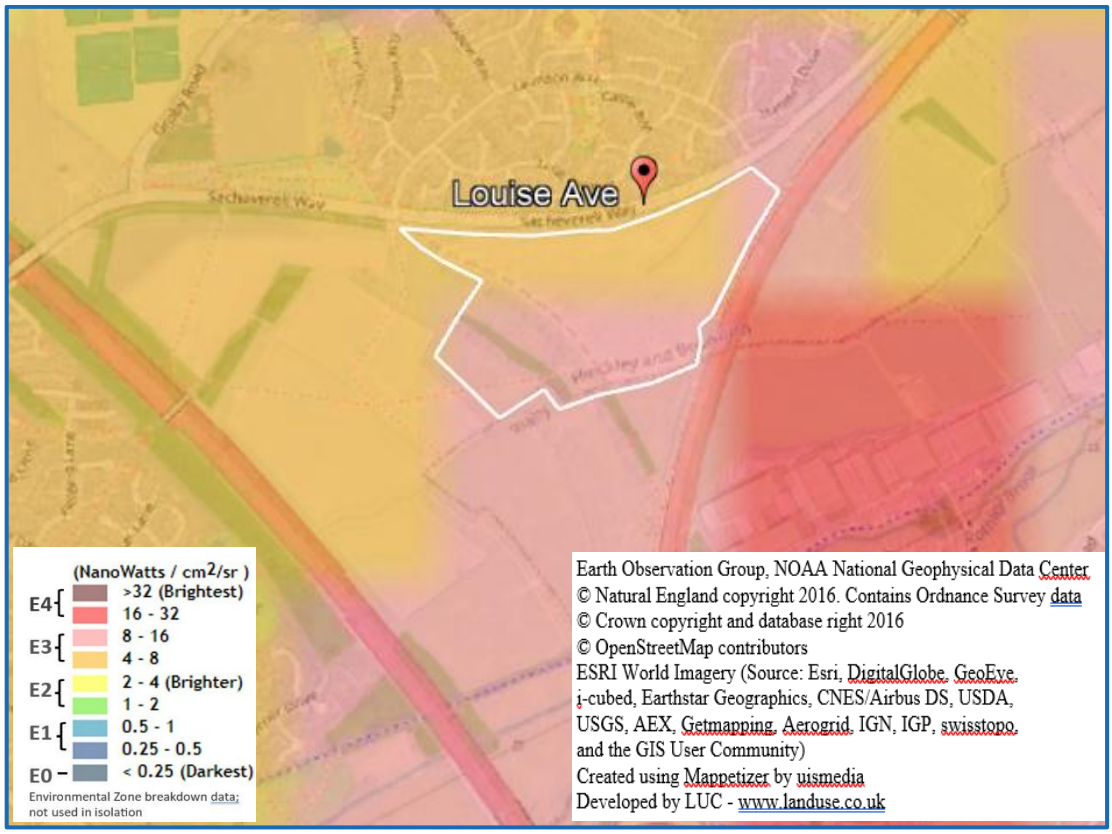

Figure 6: Surrounding areas/roads

[4] NightBlight Map is a visual representation of light pollution as a view from above the earth's atmosphere and indicates upward light spill based on sky glow.

7.5. Environmental Zone Classification

7.5.1. The Environmental Zone criteria detailed within **Table 6** and **Table 7** informs us of the likely existing upward light, the CPRE map shows that the upward light spill is relatively high, the levels would be more in line with those found in an **E3** Environmental Zone, however based on the location and the description of the surrounding environment the class is more suited to a **E2** zoning classification (see **Table 8**).

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

Table 8: Limitations of identified environmental zone

8. IDENTIFIED RECEPTORS

8.1. Ecological

8.1.1. It has been assumed based on the available topographic view, that the areas to south, western and southwestern extent are likely to be ecologically sensitive. The visual location of these areas can be seen in **Appendix 3**.

8.1.2. A description of the Potentially Sensitive Ecological Receptors (PSER), as well as their likely sensitivity to light based on the desktop assessment of the surrounding environment, can be seen in **Table 9.**

Receptor Type	Receptor No. (Appendix 3)	Description	Sensitivity
Ecology	PSER 001	Southern boundary of the Application Site.	High
Ecology	PSER 002	Western, southwestern extent of the Application Site.	High

Table 9: Potentially Sensitive Ecological Receptors (PSER)

8.2. Human Amenity

8.2.1. To the north of the site, Potential Human Amenity Receptors (PHAR) have been identified as shown in **Appendix 3**. Therefore, this lighting strategy has been written in accordance with GN01/2021 (Table 2 - Obtrusive Light Criteria).

8.2.2. A description of the Potential Human Amenity Receptors (PHAR) and their likely sensitivity to light can be seen in **Table 10**.

Receptor Type	Receptor No. (Appendix 3)	Description	Sensitivity
Human Amenity	PHAR 001	The rears of residential properties located on estate north of Sacheverell Way	Medium

Table 10: Potential Human Amenity Receptors (PHAR)

9. LIGHTING STRATEGY

9.1. Summary

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

9.1.2. Lighting will be of an appropriate specification and designed in accordance with British Standards.

9.1.3. Amenity lighting for the Proposed Development will be applied sensitively to account for the receptors identified bounding the Application Site and within the Proposed Development.

9.1.4. 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.

9.1.5. The following criteria seeks to ensure that the lighting is not outside of the obtrusive light limits for the Environmental Zone in which the Application Site is located, is sensitive to the area, and provides a recognised standard level of lighting for all adoptable areas requiring illumination. Luminaires will distribute light downwards only to reduce the potential for light spill onto the boundaries surrounding the buildings and upwards towards the sky.

9.1.6. 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.

9.1.7. Lighting in adopted areas will be required in the following application areas:

- Roadways

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

- Property Fronts and Rears

9.2. Roadways

9.2.1. The Roadways will be illuminated in accordance with BS 5489-1:2020 and BS EN 13201-2:2015 for amenity and safety purposes. The lowest possible lighting levels are proposed within this Lighting Strategy.

9.2.2. Performance requirements for the Roadways are outlined in **Figure 7.**

9.2.3. Following a risk assessment, the lighting class will remain as recommended in BS 5489-1:2020.

Table A.5 — *Lighting classes for subsidiary roads*

Traffic flow	Lighting class		
	E1 to E4[A)]	E1 to E2[A)]	E3 to E4[A)]
	Pedestrian and cyclists only	Speed limit $v \leq 30$ mph	Speed limit $v \leq 30$ mph
Busy [B)]	P5	P4	P3
Normal [C)]	P5	P5	P4
Quiet [D)]	P6	P5	P4

NOTE 1 Table A.5 assumes no parked vehicles; see risk assessment in A.3.3.2.

NOTE 2 An EV lighting class using vertical illuminance, from BS EN 13201-2:2015, Table 6, can be specified in addition to the general lighting class when there are particular concerns about crime and personal safety. EV is calculated at the typical height of a human face (1.5 m) and in relevant viewing orientations.

NOTE 3 To ensure adequate uniformity, the actual value of the maintained average illuminance is not to exceed 1.5 times the value indicated for the class.

NOTE 4 The actual overall uniformity of illuminance, U_o, needs to be as high as reasonably practicable (see 7.2.6).

NOTE 5 The ambient luminance descriptions E1 to E4 refer to the environmental zone as defined in ILP GN01 [N2].

NOTE 6 The illuminance classes are suggested minimum levels. A risk assessment needs to be carried out to ensure that the light levels are adequate, particularly for pedestrians and cyclists.

Figure 7: Performance requirements

9.3. Property Frontages and Rears

9.3.1. The Property Frontages and Rears will be illuminated for safety, security and wayfinding purposes and not in accordance with any British Standard. The lowest possible lighting levels are proposed within this Lighting Strategy.

9.3.2. Luminaire performance requirements are outlined in **Appendix 4.**

10. POTENTIAL EFFECTS (WITHOUT MITIGATION)

10.1. Potential Effects from Construction Artificial Lighting

10.1.1. Glare from inappropriately oriented floodlighting associated with the construction phase has limited potential to affect nearby potentially sensitive receptors during winter months, when flood lighting of construction operations has the potential to be required for short durations after sunset.

10.1.2. Obtrusive light can arise from poorly designed lighting, that generally consists of the installation of a limited number of luminaires that are being used to light a wide area. Due to this, the lighting is normally installed with tilt angles that are too great, or that provide an inappropriate lighting distribution, because there is a need to spread the light as far as possible, lighting the intended area, as well as surfaces where the lighting was not intended. This also has the effect of producing high levels of vertical illuminance.

10.1.3. Poorly designed lighting can contribute the following obtrusive light components:

- Light spill onto windows: this is typical of wall mounted or pole mounted luminaires with high tilt angles;
- Upward light causing sky glow: this is typical of up-lighting;
- Glare: due to high light source intensity from floodlights, or luminaires used for highway lighting; and
- Intrusive light affecting ecology: caused by excessive height and tilt.

10.1.4. The potential effects from the lighting without further mitigation are likely to be temporary in nature and of Minor adverse significance, based on the above components of obtrusive light, all of which could occur unless mitigation measures are implemented.

10.2. Potential Effects from Operational Artificial Lighting

10.2.1. As a result of the exterior lighting detailed above (i.e., without mitigation), there is a potential for obtrusive light to occur if it is not installed in accordance with the lighting design.

10.2.2. As detailed in the potential effects section for the construction phase of the development process, Obtrusive light can arise as a consequence of poorly designed lighting, however should this occur during the operational stage the effects would be permanent in nature as opposed to temporary.

10.2.3. The potential effects from the lighting without further mitigation are likely to be permanent in nature and of Minor adverse significance, based on the above components of obtrusive light, all of which could occur unless mitigation measures outlined in **Section 11** and **15** are implemented. However, as noted in the following sections, the proposed lighting incorporates recommended mitigation measures, hence ensuring that the majority of impacts are negligible.

11. SCOPE OF MITIGATION (BY DESIGN)

11.1. Mitigation Construction phase

11.1.1. Construction lighting will be provided in compliance with the guidance within BS EN 12464-2: 2014; which defines appropriate lighting levels for outdoor work tasks. The levels required will vary depending upon the task being undertaken and will be assessed on a task-by-task basis. Construction lighting will not significantly exceed the relevant lighting standard for the task being undertaken in order to limit the visibility of construction lighting within the landscape.

11.1.2. Construction lighting will be maintained at a low level and focussed into the site, onto the task being undertaken. Where possible, construction lighting is to be provided by handheld sources or headtorches, ensuring the lowest possible amount of light is used for the task at hand.

11.1.3. Where this is not possible, construction lighting will be mounted an appropriate distance from the task being performed to ensure the required minimum illuminance levels and uniformity is achieved without the need to tilt the luminaires. Additionally, luminaires will be fitted with baffles or shields where necessary to ensure that light spill is not directed towards potentially sensitive receptors.

11.1.4. Construction tasks will predominantly be undertaken during the hours of daylight and as such, there is a limited requirement for construction lighting throughout the construction phase of the Proposed Development. Construction tasks are not anticipated to be undertaken for significant periods during the hours of darkness.

11.1.5. To limit the visibility of construction lighting within the landscape, it will be switched off when not in use. Task lighting for construction tasks is to be controlled by timed switches, ensuring that task lighting is only provided when needed and does not operate outside the hours of use.

11.1.6. Security lighting to the construction compound will be provided by luminaires fixed to site infrastructure, such as cabins or scaffolding poles, will be oriented downwards only and will be focussed into the site only to reduce the levels of light spill leaving the site.

11.1.7. Security lighting will be controlled via photosensor and Passive Infra-red Motion Sensor (PIR), ensuring that lighting is only operational during the hours of darkness and when required.

11.1.8. Detailed construction lighting requirements will be provided in the CEMP accompanying the application. Through the implementation of the CEMP, potentially impacts associated with construction lighting will be minimised.

11.1.9. This information is also detailed within the Lighting Strategy (**Section 9** and **Appendix 4**).

11.2. Mitigation by Design Operational phase

11.2.1. The potential effects of artificial lighting have been effectively mitigated through the lighting proposals, that have been prepared by a suitably competent lighting professional. The design executes good lighting design and choice of suitable lighting equipment to ensure the area is illuminated appropriately, without giving rise to obtrusive light that would breach the recommended limits for the Environmental Zone (**E2**). The following paragraphs detail good lighting practices that have been incorporated into the lighting design:

11.2.2. The Proposed lighting will:

- Include high quality luminaires throughout the design to ensure that light is focussed downwards onto the ground or other surfaces in the horizontal plane, minimising the potential for direct upward light, glare, light spill and light trespass. Luminaires of this type will be optically efficient, thus reducing the amount of light spilled onto the vertical plane, thereby reducing the potential for obtrusive light.
- Include luminaires with good optical control and the ability to install shields, reduce the potential for adverse levels of both horizontal and vertical spill light.
- Include luminaires within the detailed design that will ensure the peak beam angle of all lights directed towards any potential observer is not more than 70 degrees when the luminaire is installed with a tilt angle of 0 degrees. This applies mainly to column mounted roadway and footpath luminaires.

12. SUMMARY OF RESULTS

12.1. Overview

12.1.1. The Light Spill Diagram shown in **Appendix 1** and **2** demonstrates that the Light Spill Levels associated with the proposed lighting would comply with the obtrusive light guidance set out in ILP GN01/2021, at sensitive receptors.

12.1.2. 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[5]. This demonstrates the light levels at their highest (initial light levels at the start of luminaire life).

12.2. Summary of Results

12.2.1. The layout used at the stage of modelling is for indicative purposes and maybe subject to change.

12.2.2. Whilst the results are based on an Application Site layout that is indicative, the outcome would still likely be similar if not the same as that modelled should the Lighting Strategy be adhered to.

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

12.2.4. 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.

12.2.5. Where ecological receptors are potentially sensitive to vertical light spill, a vertical illumination grid has been modelled, as shown in **Appendix 2**. The light levels based on the modelling do not exceed 0.40 Lux, keeping the light levels within the guidance given within GN08/2023.

12.2.6. The results of the maximum light levels modelled onto the areas identified as potentially ecologically sensitive can be seen in **Table 11**.

Receptor No	GN08/2023 requirements	Maximum vertical Illuminance (Lux)	Pass/fail
PSER 001	0.40	0.01	Pass
PSER 002	0.40	0.00	Pass
	0.40	0.07	Pass
	0.40	0.00	Pass
	0.40	0.00	Pass

Table 11: PSER results table, maximum illuminance.

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

12.2.7. Where human receptors are potentially sensitive to vertical light spill, a vertical illumination grid has been modelled, as shown in **Appendix 2**. The light levels based on the modelling do not exceed 1 Lux, keeping the light levels within the guidance given within GN01/2021 for an area identified as an E2 environment.

12.2.8. The results of the maximum light levels modelled onto the potential windows can be seen in **Table 12**.

Receptor No	GN01/2021 requirements		Maximum vertical Illuminance (Lux)	Pass/fail
	Pre-curfew	Post Curfew		
PHAR 001	5 Lux	1 Lux	0.00	Pass
	5 Lux	1 Lux	0.18	Pass
	5 Lux	1 Lux	0.10	Pass
	5 Lux	1 Lux	0.01	Pass
	5 Lux	1 Lux	0.00	Pass

Table 12: PHAR results table, maximum illuminance

13. RESIDUAL EFFECTS ASSESSMENT

13.1. Construction phase

13.1.1. Glare from inappropriately oriented floodlighting associated with the construction phase has limited potential to affect nearby potentially sensitive receptors during winter months, when flood lighting of construction operations has the potential to be required for short durations after sunset.

13.1.2. It is likely that isolated instances of skyglow over the construction site would occur for short periods of time where tasks require specific lighting levels for safety. This would mainly occur between sunset and the end of the construction day.

13.1.3. Lighting associated with the construction phase of the project has minimal potential to impact residential and ecological receptors through obtrusive light, as the majority of site preparation and construction tasks are unlikely to take place during the hours of darkness. Where preparation and construction tasks take place in the late afternoon of winter months, lighting for limited periods may be necessary for safety purposes, depending upon the tasks being undertaken.

13.1.4. Poorly designed construction phase lighting can contribute the following obtrusive light components:

- Light spill onto windows: this is typical of luminaires installed with high tilt angles;
- Upward light causing sky glow: this is typical of up-lighting and luminaires installed with high tilt angles;
- Glare: due to high light source intensity from floodlights, or luminaires installed so the light source is directly visible; and
- Intrusive light affecting ecology: caused by excessive height, tilt, and the use of illuminance levels significantly above what is required for the task.

13.1.5. The potential effects from construction phase lighting without mitigation are likely to be temporary and reversable in nature and of **Minor adverse** significance, based on the above components of obtrusive light, all of which could occur unless mitigation measures outlined in **Section 11** are implemented.

13.2. Post installation Effects.

13.2.1. The effects associated with the lighting design will be minimised by the application of the mitigation measures outlined above in combination with the application of the developed lighting design.

13.2.2. Lighting applied to the Application Site will results in a likely residual effects (after construction) of **Neutral/Not significant** . No further actions are required as the sensitive application of lighting to the Application Site results in a neutral outcome.

13.2.3. Although lighting is required for the Proposed Development, and will be noticeable from the residential receptors identified, it is unlikely to be obtrusive through limiting the luminaire tilt angles, colour temperature, and the use of luminaires designed to emit peak beam angles below 70°. The visibility alone of lighting is not considered an obtrusive light component, and the levels of lighting proposed are neither excessive nor are they uncommon for the Environmental Zone in which the Application Site is situated **(E2)**. The residential receptors identified have been considered as having **Medium** sensitivity to changes in lighting, due to the already relatively high levels of district brightness (**Figure 3**).

13.2.4. The magnitude of impact with regards to the residual effects of artificial lighting associated with the Proposed development is considered **Neutral/Not significant** in line with **Table 6.** This is because the proposed lighting is highly unlikely to breach the relevant **(E2)**. Environmental Zone limits outlined in **Table 8**, or breach standards and guidance. Modelled illuminance levels shown in **Appendix 1** and **Appendix 2** demonstrate that the light spill levels outside the site boundary will be below the maximum recommended limits for an **(E2)**. Environmental Zone at the identified receptor positions.

13.2.5. Furthermore, the Proposed Development has been designed to ensure that obtrusive light in the form of glare is minimised in line with obtrusive light guidance and criteria outlined within the British Standard.

13.2.6. By using luminaires that target light towards the ground, with peak beam angles below 70°, exterior lighting associated with the development is unlikely to have a noticeable impact upon local levels of sky glow.

13.2.7. Residual effects associated with the artificial external lighting for the Proposed Development are outlined in **Table 13** and **Table 14.**

Receptor	Sensitivity	Magnitude of Impact	Scale of effect	Residual Effect
PSER 001	High	No Change	Neutral	**Neutral/Not significant**
PSER 002	High	No Change	Neutral	**Neutral/Not significant**

Table 13 scale of effects assessment – Ecological receptors

13.2.8. The overall residual effect on potential sensitive ecological receptors is **Neutral/Not significant**.

Receptor	Sensitivity	Magnitude of Impact	Scale of effect	Residual Effect
PHAR 001	Medium	No Change	Neutral	**Neutral/Not significant**

MTable 14: Scale of effects assessment – Human receptors

13.2.9. The overall residual effect on potential human amenity receptors is **Neutral/Not significant**.

14. SUMMARY OF RESULTS

14.1. General

14.1.1. Following the implementation of mitigation measures as outlined in **Section 11**, the residual effects are assessed to be **Neutral/Not significant** because the general level of light upon the Application Site, whilst the level of light would increase from the baseline, it is not likely to be obtrusive in nature. Furthermore, the lighting would be implemented in line with relevant British Standards and guidance through the implementation of the lighting design.

14.1.2. The overall impact of the lighting on the Application Site can be judged based on the proposed lightings compliance to the relevant standard or guidance.

Surrounding elements	Limitation	Compliance	Further action required
Sky glow ULOR	E2 < 2.5%	Compliant	No
Impact on Ecology (GN08/2023)	Vertical Illuminance ≤0.4 Lux, Horizontal Illuminance ≤ 0.2 Lux	Compliant	No
Light Intrusion (GN01/2021)	E2, 5/1 Lux	Compliant	No

Table 15: Overall Compliance

15. SCOPE OF MITIGATION (FURTHER REQUIREMENTS)

15.1. Post results mitigation and enhancements

15.1.1. Due the careful implementation of lighting as outlined within the Lighting Strategy, no further mitigation than that implemented during the design process is required.

15.1.2. As addition enhancement it is suggested that all street lanterns are to be installed with a built-in rear spill shield.

16. CONCLUSION

16.1. Assumptions and Limitations

16.1.1. The detailed design will be completed by a qualified and competent designer along with any restrictions, limitations or strategies imposed on the Application Site.

16.1.2. The installation is to be overseen and undertaken by a competent person or people in accordance with any requirements that have been imposed on the Application Site.

16.1.3. Any mitigation required is implemented.

16.2. General

16.2.1. Lighting associated with the Proposed Development shall be designed in accordance with the Lighting Strategy for the Application Site outlined in **Section 9.**

16.2.2. The lighting strategy has been written in accordance with the relevant British Standards, 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.

16.2.3. Through the application of this lighting strategy sensitive receptors will not be adversely affected by obtrusive light, as shown in **Appendix 1** and **Appendix 2**.

16.2.4. To evaluate the residual effects of the site as a whole, the worst-case outcome of the ecology receptors and human receptors is compared and view as a singular outcome, see **Table 16.**

Receptor Type	Scale effect	Residual Effects/ Compliance
Human Receptors	Neutral	Neutral/Not significant
Ecology receptors	Neutral	Neutral/Not significant
Overall Site		**Neutral/Not significant**

Table 16: Application Site table of overall residual effects

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

16.2.6. Lighting applied to the Application Site will results in a likely residual effects (after construction) of **Neutral/Not significant**. No further actions are required as the sensitive application of lighting to the Application Site results in a neutral outcome.

APPENDIX 1 – LIGHT SPILL DIAGRAM

See accompanying document 3544-DFL-ELG-XX-LD-EO-13001-S3

APPENDIX 2 – VERTICAL LIGHT SPILL DIAGRAM

See accompanying document 3544-DFL-ELG-XX-CA-EO-13001-S3

APPENDIX 3 – SENSITIVE RECEPTORS

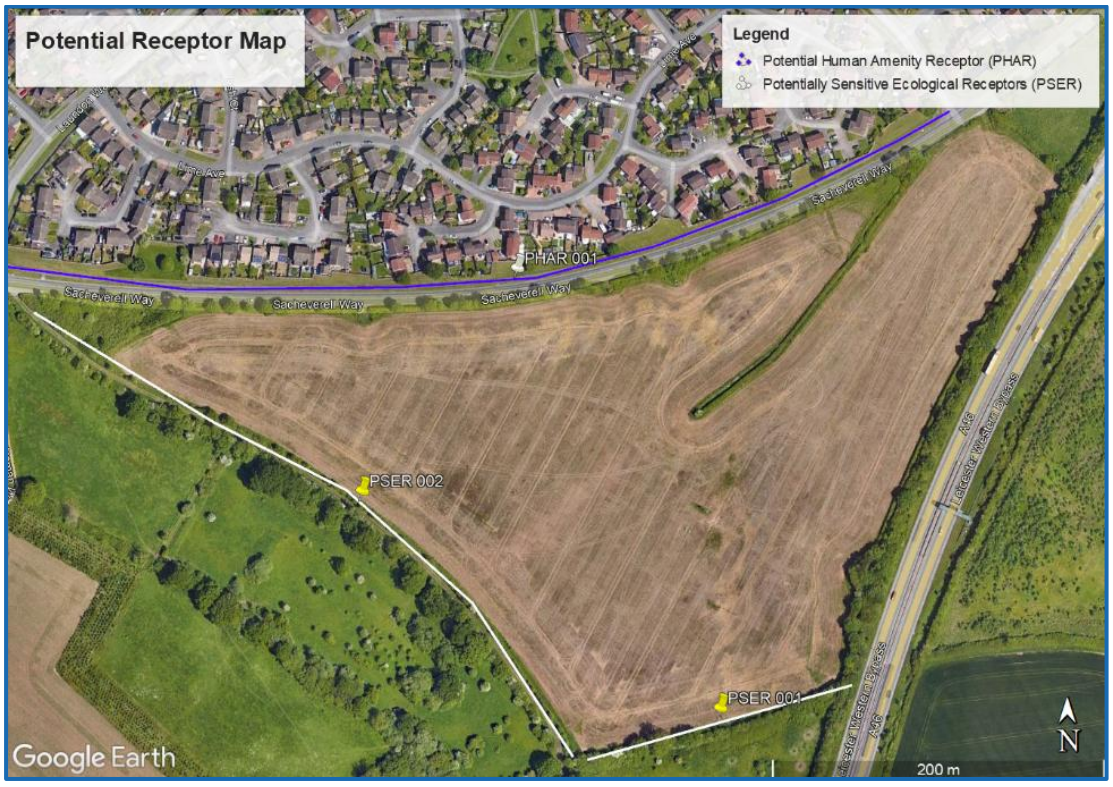

Figure 8: Sensitive receptors

APPENDIX 4 – EQUIPMENT SPECIFICATION

1.1. Luminaire and control specification

1.1.1. Performance requirements are outlined in **Table 1.1, Table 1.2** and **Table 1.3.**

Equipment Specification	
Application Area	Roads
Correlated Colour Temperature (Kelvin)	≤ 2700K
Luminaire Manufacturer	Urbis Schréder (Or Similar Approved)
Luminaire Model	Ampera Evo (Or Similar Approved)
Light Source	LED ≤ 1680 lumens
Reference	Type C
Height	≤ 6 metres
Mounting Arrangement	Column post top mounted
Luminaire Tilt	0%
Upward Light Output Ratio **E2 < 2.5%**	0%
Example Luminaire Image	
Controls[6]	On via Photocell, regime in accordance with the Leicestershire council requirements.

Table 1.1: Luminaire performance requirements

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

Equipment Specification	
Application Area	Property Frontages
Correlated Colour Temperature (Kelvin)	≤ 2700K[7]
Luminaire Manufacturer	Ligman (Or Similar Approved)
Luminaire Model	JET Downlight only (Or Similar Approved)
Light Source	LED ≤370 lumen
Reference	Type A
Height	≤ 2 metres
Mounting Arrangement	Wall mounted
Luminaire Tilt	0%
Upward Light Output Ratio **E2 < 2.5%**	0%
Example Luminaire Image	
Controls	Motion detector on for 1 minutes when motion is detected.

Table 1.2: Luminaire performance requirements

[7] Special order item

Equipment Specification	
Application Area	Property Rears
Correlated Colour Temperature (Kelvin)	≤ 2700K[8]
Luminaire Manufacturer	Ligman (Or Similar Approved)
Luminaire Model	LEEDS Downlight only T4 Optic (Or Similar Approved)
Light Source	LED ≤1380 lumen
Reference	Type B
Height	≤ 2 metres
Mounting Arrangement	Wall mounted
Luminaire Tilt	0%
Upward Light Output Ratio **E2 < 2.5%**	0%
Example Luminaire Image	
Controls	Motion detector on for 1 minutes when motion is detected.

Table 1.3: Luminaire performance requirements

[8] Special order item

TECHNICAL DECRIPTIONS, 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 LIandP.*

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 LIandP.*

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 LIandP.*

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.

This isn't the end...

We don't just have the solution for what you need today. We also have the solutions you might need for the future. We have dedicated teams that deliver.

- **Lighting Impact and Planning** teams that focus on delivering the most effective and sensitive lighting solutions to support planning.
- **Residential** teams that cover all aspects of new development and redevelopment spanning private, section 38 and section 278 design packages.
- **Public Realm** teams that are experts in enhancing night-time public spaces to create inviting spaces and opportunity for local economies to thrive during the hours of darkness.
- **Electrical** teams – we don't just put a light in the ground, we can help you get power to it as well! Additionally, we also offer design services for EV charging. As this market rapidly expands, make sure you have the experts managing the load, otherwise your EV charging solutions might not live up to expectations.
- **Strategic Infrastructure** teams that offer Lighting and Electrical expertise for complex transport networks and interchanges.
- **Consultancy Services** teams that help when you know what you want but you need someone to help you turn the idea into a project.

Finally, as innovators, you might be facing something bespoke or niche. Don't worry – we might have the answer you need. Feel free to get in touch!

THE POWER TO MAKE LIGHT WORK

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