

# LIGHTING IMPACT ASSESMENT

PROJECT: LAND SOUTH OF DEARNE VALLEY PARKWAY,  
GOLDTHORPE

DECEMBER 2023

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## CONTENTS

1	Introduction .....	4
1.1	General.....	4
2	Legislative and Policy Framework .....	6
2.1	National Policy and Legislation .....	6
2.2	Local Policy .....	7
3	Standards and Guidance .....	8
3.1	British Standards .....	8
3.2	Guidance Notes for the Reduction of Obtrusive Light (GN01:2021).....	9
3.3	Institution of Lighting Professionals (ILP) PLG 04 “Guidance on Undertaking Environmental Lighting Impact Assessments”, 2013 .....	9
3.4	GN08/23 Bats and Artificial Lighting in the UK – Bat Conservation Trust and Institution of Lighting Professionals. ....	9
3.5	CIBSE International Handbook 2009 .....	10
4	Assessment Methodology and Significance Criteria.....	10
4.1	Methodology.....	10
4.2	Study Area.....	10
4.3	Potential Effects from Artificial Light.....	10
4.4	Classification of Environmental Zones .....	11
4.5	Obtrusive Light Limitations .....	12
4.6	Significance Criteria .....	13
4.7	Assumptions and Limitations .....	15
5	Baseline Conditions .....	16
5.1	Application Site Description and Context.....	16
5.2	Existing Lighting .....	16
5.3	Baseline Lighting Survey.....	17
5.5	Sensitive Receptors .....	18
6	Lighting Requirements .....	20
6.1	Task Lighting .....	20
7	Potential Effects .....	20
7.1	Potential Effects of Artificial Lighting (without mitigation) .....	20
8	Scope of Mitigation .....	21
8.1	Construction Phase .....	21
8.2	Operational Phase.....	21
9	Residual Effects Assessment .....	22
9.1	Brief .....	22
10	Conclusions.....	26
10.1	Introduction.....	26
10.2	Baseline Conditions .....	26
10.3	Potential Significant Effects (Without Mitigation) .....	26
10.4	Mitigation and Enhancement.....	26
10.5	Residual Effects .....	26
	Appendix 1 – Lighting Spill Diagram .....	27
	Appendix 2 – Potentially Sensitive Receptor Positions .....	28
	Appendix 3 – Lighting Strategy .....	32

1	Lighting Strategy .....	32
1.1	Brief .....	32
1.2	Roundabout.....	33
1.3	Access Roads .....	34
1.4	Car Parks .....	35
1.5	Lorry Parks .....	36
1.6	Entrance/ Gatehouse .....	39
1.7	Lorry Turning Point.....	42
	Appendix 4 – Baseline Survey Results .....	45
1.1	Baseline Survey .....	45
	Appendix 5 – Goldthorpe SSSI Map .....	50

# 1 Introduction

## 1.1 General

- 1.1.1 This Lighting Impact Assessment has been written by Designs for Lighting Ltd, a lighting design consultancy with experience and knowledge in Lighting Impact Assessments, obtrusive light mitigation, and detailed lighting design.
- 1.1.2 The objective of the Lighting Impact Assessment report is to provide an independent report on the suitability of the Proposed Lighting in accordance with guidance outlined in the Institution of Lighting Professionals (ILP) document, Professional's lighting guidance (PLG) 04 (2013) 'Guidance of undertaking Environmental Lighting Impact Assessment.
- 1.1.3 The Application Site is the Land South of Dearne Valley, Goldthorpe. adjacent the A635, south of Billingley Green. The Application Site is predominantly agricultural land in proximity to the industrial and residential properties.
- 1.1.4 The Proposed Development consists of 4 industrial plots, 4 parking areas, lorry loading bays, lorry parking areas and associated infrastructure. The masterplan for the Proposed Development is presented in **Figure 1** and plans submitted with the planning application.
- 1.1.5 Full details regarding the Application Site and Proposed Development description can be found in information accompanying the planning application.
- 1.1.6 The Proposed Development will require lighting for the purposes of safety, security and amenity during the hours of darkness. Lighting associated with the Proposed Development will be applied sensitively to ensure that the potential for obtrusive light is suitably minimised in compliance with the predetermined obtrusive light limits within the Environmental Zone in which the Application Site is located. This can be achieved through the implementation of a carefully planned and implemented lighting design strategy informed by relevant standards and guidance.



Figure 1 – Proposed Application Site Extent (outlined in red)

## 2 Legislative and Policy Framework

### 2.1 National Policy and Legislation

#### 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:

*“Artificial light emitted from premises so as to be prejudicial to health and nuisance constitutes a ‘Statutory 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”.*

#### National Planning Policy Framework 2023

- 2.1.2 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 September 2023 and states that the following elements are to be considered:

*“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:*

- a) 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;*
- b) 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*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”*

#### Planning Practice Guidance

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

- *“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.)”*

## 2.2 Local Policy

2.2.1 The relevant local authority to the Application Site is Barnsley Metropolitan Borough Council, with the most relevant planning guidance being the Barnsley Local Plan (adopted January 2019).

2.2.2 The most relevant policies to the site found within the Barnsley Local Plan Policy Poll1: Pollution Control and Protection and Section 6.9 Living conditions.

2.2.3 The most relevant policy to the application site found within Policy Poll1 is as follows

### Policy Poll1 Pollution Control Protection

*“Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air, surface water and groundwater, noise, smell, dust, vibration, light or other pollution which would unacceptably affect or cause a nuisance to the natural and built environment or to people.*

*We will not allow development of new housing or other environmentally sensitive development where existing air pollution, noise, smell, dust, vibration, light or other pollution levels are unacceptable and there is no reasonable prospect that these can be mitigated against.*

*Developers will be expected to minimise the effects of any possible pollution and provide mitigation measures where appropriate.”*

- 2.2.4 The most relevant policy to the Application Site found within The Barnsley Local Plan Section 6.9 Living Conditions, is as follows

### Section 6.9

*“We will assess impact on living conditions and residential amenity in relation to:*

*Noise, smell, dust, vibration, light, air, surface water, groundwater or other pollution and disturbance from any proposed activity, including traffic related noise and the comings and goings of visitors to premises particularly when late evening activity is involved.*

*Planning conditions will be used to control the construction process;  
Overlooking and privacy;*

*Outlook from dwellings including consideration of whether structures in close proximity to windows are considered visually over dominant.*

*However, consideration does not extend to the protection of a person's particular view from a property as this is not a material planning consideration;*

*Daylight/sunlight and overshadowing; and Landscaping and boundary treatments.”*

## 3 Standards and Guidance

### 3.1 British Standards

- 3.1.1 The applicable British Standards for lighting that relate to the Proposed Development are:

- **BS5489-1: 2021** – *Lighting of Roads and Public Amenity Areas - Code of practice.* – This guidance is applicable to the internal roads that help to facilitate movement of vehicular and pedestrian traffic about the development.
- **BS EN 13201 - 2: 2015** - *Road lighting. Performance requirements* is applicable to the selection of lighting classes across the roads and pedestrian areas throughout the development.
- **BS EN 12464-2:2014** – *Light and Lighting – Lighting of work-places Part 2: Outdoor Work-Places* – *This provides guidance to the external work-place environment such as but not restricted to car parking, turning points, fuel stations.*

### 3.2 Guidance Notes for the Reduction of Obtrusive Light (GN01:2021)

- 3.2.1 The Lighting Impact Assessment has been informed by industry guidance notes which aim to reduce the potential for obtrusive light to occur, caused by poorly designed and installed exterior artificial lighting. The Lighting Impact Assessment is informed by the most relevant sections of GN01/21 that has recently been published to reduce the potential for obtrusive light from a wide range of exterior lighting applications. Notably, the updated guidance has been specifically aimed at systems of flood lighting, due to the specified orientation of the luminaires that may cause glare from light source intensity some sections relating to luminaire source intensity are not applicable to this Lighting Impact Assessment.

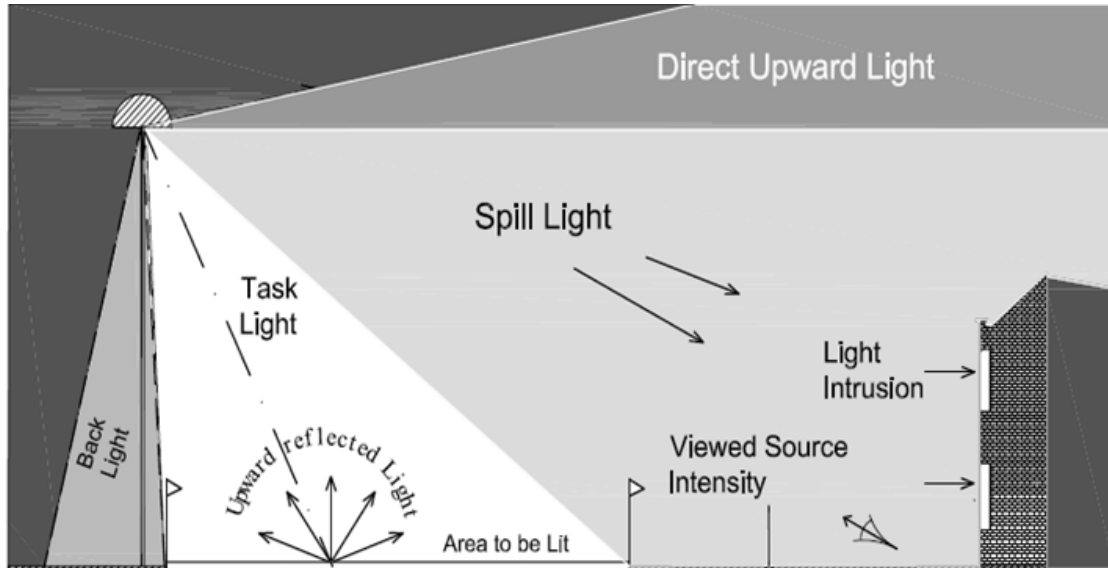


Figure 1 Obtrusive light diagram

### 3.3 Institution of Lighting Professionals (ILP) PLG 04 “Guidance on Undertaking Environmental Lighting Impact Assessments”, 2013

- 3.3.1 PLG 04 is used to ensure that the Lighting Impact Assessment is correctly carried out:

*“...this document is designed to provide an explanation of, and guidance on, the process for producing a Lighting Assessment...to remove or minimise environmental problems”.*

### 3.4 GN08/23 Bats and Artificial Lighting in the UK – Bat Conservation Trust and Institution of Lighting Professionals.

- 3.4.1 The guidance for artificial lighting and bats was updated in Autumn 2018, the guidance 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).”

### 3.5 CIBSE International Handbook 2009

- 3.5.1 Guidance to lighting of the docking areas within the Application Site has been informed by the CIBSE SSL International Handbook 2009 section.

*“Many industrial premises have a loading bay (Figure 17.3). The two key points to remember about a loading bay is that there should be no glare to the driver backing up to the loading bay and when backed up the vehicle may cause shadows over the working area. Luminaires on a loading bay are exposed to the weather so they should have the appropriate IP rating (see Table 4.10). For loading bays with a canopy height less than 6 m, a suitable approach is to use pairs of luminaires fitted with fluorescent lamps, one mounted either side of the bay door. Where the canopy is more than 6 m high, luminaires using high intensity discharge lamps can be used instead of fluorescent lamps provided care is taken to avoid glare to the driver. An alternative mounting position for such luminaires is at the front of the canopy aimed towards the bay door. To enable workers to see inside a vehicle it can be helpful to place a low wattage floodlight above the loading bay door. These luminaires should not be switched on until after the vehicle has been backed up. Care should be taken to minimise glare to workers leaving the vehicle.”*

## 4 Assessment Methodology and Significance Criteria

### 4.1 Methodology

- 4.1.1 The assessment has been carried out in accordance with the published guidance documents from the ILP. These documents quantify the levels of direct upward light, light intrusion, viewed source intensity and glare regarded as acceptable for varying Environmental Zones.
- 4.1.2 The methodology takes guidance from the Institution of Lighting Professionals PLG 04 document “Guidance on Undertaking Environmental Lighting Impact Assessments”. This sets out industry best practice for conducting the assessment.
- 4.1.3 The methodology employed for this assessment is appropriate to the location of the site. It comprises a desk-top study of the legislative, policy and guidance context; consultation with the design team; a desk-top survey and on site survey in which the baseline conditions were reviewed based on industry guidance; confirmation of the general expected light levels for the relevant Environmental Zones in which the site is located; evaluation of the likely effects of the Proposed lighting using appropriate assessment criteria; and the preparation of a Lighting Strategy to define likely lighting conditions within the Proposed Development and form a basis for the assessment.

### 4.2 Study Area

- 4.2.1 The desktop study area was determined by assessing the potential receptors that could be affected by a change in artificial lighting in line with the criteria outlined in **Section 4.6**. This included nearby existing residential development, roadways and any identified ecology.

### 4.3 Potential Effects from Artificial Light

- 4.3.1 The following potential effects can arise from inappropriately designed artificial lighting:

#### **Effects from light intrusion from exterior lighting on residents (through windows)**

- 4.3.2 Light intrusion (or light spill) is the term for the spilling of light beyond the boundary of the area being lit. The ILP Guidance Notes places a limit on the amount of vertical Illuminance which falls upon the centre of a dwelling window. The suggested maximum values quoted are relative to the amount of light measured as a baseline without the presence of the obtrusive light source.

#### **Effects from viewed source intensity on residents and sightseers**

- 4.3.3 Table 4 within ILP GN01/21 advises limits on luminaire intensity or viewed source intensity from luminaires to an observer. The greatest effects are usually encountered from poorly aimed floodlights or security lighting, or from lighting which is located too close to properties.

#### **Effects from upward light (or sky glow)**

- 4.3.4 Light emitted above the horizontal either directly from luminaires or indirectly as reflected light from surfaces such as the landscape or buildings, has the potential to cause sky glow. The ILP

“Guidance Notes for the Reduction of Obtrusive Light” places limits on the percentage of direct upward light emitted from the luminaires in their installed attitude, which is dependent upon the Environmental Zone in which the site lies.

- 4.3.5 Indirect upward light is subject to surface reflectance properties. It is not easily quantifiable but is unlikely to be as significant as direct upward light from luminaires.

**Effects from disability glare on transport users**

- 4.3.6 The lighting is designed to be installed such that glare is minimised in accordance with the ILP guidance notes.

**Effects from light on bats roosts and insects**

- 4.3.7 Light falling on a roost access point will at least delay some species of bats from emerging and this shortens the amount of time available to them for foraging. As the main peak of nocturnal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed.
- 4.3.8 In addition to the above, artificial lighting can also affect the feeding behaviour of bats. There are two aspects to this - one is the attraction that light from certain types of lamps has to a range of insects; the other is the presence of lit conditions which causes bats to exhibit their light adverse behaviour, and thus reduces the size of the area they can feed in.

**4.4 Classification of Environmental Zones**

- 4.4.1 The ILP Guidance Notes Guide quantify the levels of Obtrusive light regarded as acceptable for varying Environmental Zones Environmental Zones E0 to E4.
- 4.4.2 The site is described as exhibiting ‘Medium district brightness’ (as set out in **Section 5.2**). The Application Site is located between an **E2** Environmental Zone to the north and an **E1** Environmental Zone to the south. As per the guidance outlined within GN01:2021 which states, *“Where an area to be lit lies close to the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone”*, the Application Site will be classified as an **E1** Environmental Zone.

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 1 Environmental Zones**

*Notes:*

1. Where an area to be lit lies on the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone.
2. Rural zones under protected designations should use a higher standard of policy.
3. Zone E0 must always be surrounded by an E1 Zone.
4. Zoning should be agreed with the local planning authority and due to local requirements a more stringent zone classification may be applied to protect special/specific areas.
5. SQM (Sky Quality Measurements) referenced by the International Dark-Sky Association (IDA), the criteria for E0 being revised in mid-2019 but not retrospective.
6. Astronomical observable dark skies will offer clearer views of the Milky Way and of other objects such as the Andromeda galaxy and the Orion Nebula.
7. Although values of SQM 20 to 20.5 may not offer clear views of astronomical dark sky objects such as the Milky Way, these skies will have their own relative intrinsic value in the UK.

## 4.5 Obtrusive Light Limitations

- 4.5.1 In the absence of suitable statutory guidance, the ILP “Guidance Notes for the Reduction of Obtrusive Light” GN01:2021 is typically used, in order to provide suitable assessment criteria against which to assess the likely effects of artificial lighting.
- 4.5.2 The relevant criteria of upward light, light intrusion and direct source intensity are discussed below and **Table 2** sets limits for each criterion.

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

**Table 2 Obtrusive light criteria relating to each Environmental Zones**

*Note:*\* If the installation is for public (road) lighting then this may be up to 1 lx.

## 4.6 Significance Criteria

- 4.6.1 The significance of an effect from artificial lighting has been based upon the sensitivity of the receptor and the magnitude of change at that receptor due to the revised conditions.
- 4.6.2 The sensitivity of the receptor has been classified as High, Medium, or Low according to the descriptions provided in **Table 3**.
- 4.6.3 The magnitude of impact is determined as being High, Medium, Low or Negligible and descriptions for each are provided in **Table 4**.
- 4.6.4 The scale of effect is derived through a matrix (**Table 5**), matching the sensitivity of the receptor, with the magnitude of the impact.
- 4.6.5 The descriptions that have been adopted for each effect are summarised in **Table 6**, with effects identified as either beneficial or adverse.

Sensitivity	Description of Criteria
<b>High</b>	<p>The environment is fragile, and an impact is likely to leave it in an altered state from which recovery would be difficult or impossible.</p> <p>Human (Amenity) – 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)</p> <p>Human (Safety) - receptors where a change in the lighting has the potential to either dramatically improve or reduce safety (for pedestrians, drivers or workers).</p> <p>Ecological – 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.</p>
<b>Medium</b>	<p>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.</p> <p>Human (Amenity) – receptors which are sensitive to a change in lighting however not such that the quality of life would be affected.</p> <p>Human (Safety) - receptors where a change in the lighting has the potential to either improve or reduce safety (for pedestrians, drivers or workers).</p> <p>Ecological – where a change in the lighting affects the movement or feeding patterns of fauna but the receptor can adapt.</p>
<b>Low</b>	<p>The environment is adaptable and is resilient to change. Nearly all impacts can be absorbed within it without modifying the baseline conditions.</p> <p>Human (Amenity) – receptors which would not noticeably be aware of a change in lighting. (i.e., in areas of medium to high luminance)</p> <p>Human (Safety) - receptors where a change in the lighting has limited potential to affect safety (for pedestrians, drivers or workers).</p> <p>Ecological – area with limited wildlife.</p>
<b>Negligible</b>	Receptor has little or no night-time activity

**Table 3 Criteria for receptor Sensitivity**

Magnitude of Impact	Description of Criteria
<b>High</b>	A large change compared to the natural variations in background levels. A clear breach of limits and standards may occur. 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 Zones might classify as a high magnitude of change.
<b>Medium</b>	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 Zones.
<b>Low</b>	Change which, when compared to background levels, is only just noticeable.
<b>Negligible</b>	Change is not noticeable.

Table 4 Criteria for Magnitude of Impact

Magnitude of Impact	Sensitivity of Receptor			
	High	Medium	Low	Negligible
<b>High</b>	Major	Major	Moderate	Negligible
<b>Medium</b>	Major	Moderate	Minor to Moderate	Negligible
<b>Low</b>	Moderate	Minor to Moderate	Negligible	Negligible
<b>Negligible</b>	Negligible	Negligible	Negligible	Negligible

Table 5 Scale of Effect Matrix

Likely Effect	Description
<b>Major beneficial</b>	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
<b>Moderate beneficial</b>	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
<b>Minor beneficial</b>	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.
<b>Neutral/Not significant</b>	No appreciable effect on sensitive receptors. Effects are reversible.
<b>Minor adverse</b>	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.
<b>Moderate adverse</b>	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.
<b>Major adverse</b>	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 6 Likely Effects Description

#### 4.7 Assumptions and Limitations

- 4.7.1 This assessment assumes that equipment specified within the design will be installed by a suitably competent contractor.
- 4.7.2 This assessment assumes that the designing and installation of artificial lighting associated with the Proposed Development will be undertaken by suitably qualified and experienced designers and contractors, who are capable of carrying out such works, and that the detailed lighting design follows the Lighting Strategy provided in **Appendix 3**.

## 5 Baseline Conditions

### 5.1 Application Site Description and Context

- 5.1.1 The Application Site is located on the boarder of the built form of Goldthorpe, Barnsley, adjacent to the A635 Doncaster Road west of the Aldi Regional Distribution Centre. Further afield to the north is Billingley Village, to the east Goldthorpe Industrial Estate and to the south, southwest and southeast of the Application Site is the built form of Dearne Valley. To the west and northwest is predominantly Greenland.

### 5.2 Existing Lighting

- 5.2.1 As discussed in **Section 4**, this section has been informed by a desktop study and a baseline lighting survey.
- 5.2.2 The Application Site is currently unlit , however during the baseline lighting survey of the Application Site it was found that light spill from the surrounding development is having an effect on the Application Site. The baseline lighting survey is discussed in detailed in **Section 5.3**.
- 5.2.3 The surrounding area and landscape are illuminated by lighting from the Goldthorpe Industrial Estate and Aldi (RDC) site to the east of the Application Site (as seen in **Appendix 4**). Additionally, lighting associated with nearby schools, community centres, and residential dwellings has also been identified, and is either both visible from and is affecting the Application Site, or is only visible from the Application Site.

- 5.2.4 CPRE night blight mapping <sup>1</sup> indicates medium to High levels (2-32 Nano Watts/ cm<sup>2</sup>/sr) of skyward radiance within and in the immediate surrounds of the Application Site - increasing to the east and reducing to the west. Night blight mapping for the area is shown in **Figure 3**.

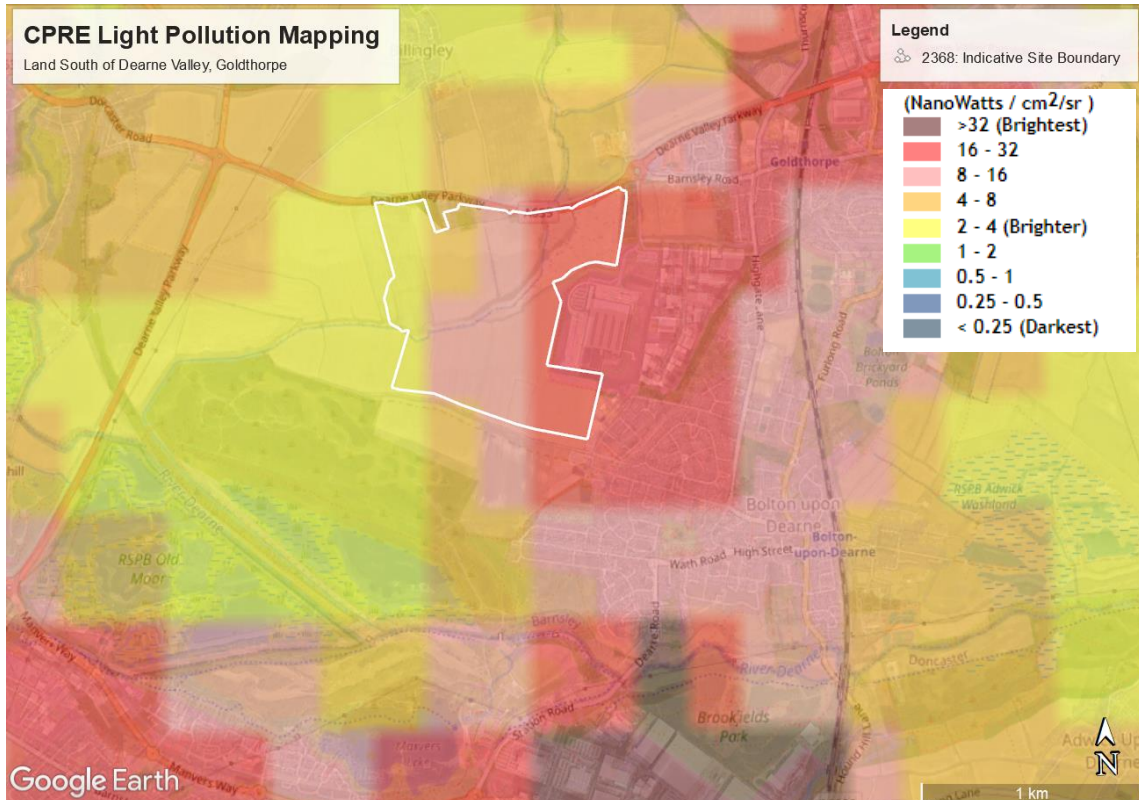


Figure 3 CPRE Light Pollution Mapping (Application Extent Marked in White)

- 5.2.5 Whist lighting surrounding the Application Site is that typically associated with an **E3** Environmental Zone (**Figure 3**), to the west of the Application Site, a more natural environment is present and in accordance with ILP guidance where a development lies on or near the boundary of two Environmental Zones the requirements of the stricter Environmental Zone will apply. As such, **E2** Environmental Zone criteria will apply to the Proposed Development.

### 5.3 Baseline Lighting Survey

- 5.3.1 A baseline survey was undertaken on the 20<sup>th</sup> of March 2023 to assess and report the ambient light levels within and surrounding the Application Site, the details of this survey are outlined within **Appendix 4**.
- 5.3.2 During the survey it was apparent that the well-designed street lighting surrounding the Application Site posed little to no impact on the surrounding environment, however the visual appearance of light on the horizon was apparent as presented within figures 2.1 and 2.2 in **Appendix 4**
- 5.3.3 Whilst light levels to the east of the Application Site were greater than those found to the north and west of the Application Site, the light spill from the commercial and industrial properties to the east were still in line with the light levels expected to be found within a typical E3 Environmental Zone, the highest of these being 1.8 Lux found at point 31 (see **Appendix 3** table 2.1).
- 5.3.4 For further details of the site survey undertaken refer to **Appendix 4**.

<sup>1</sup> <https://nightblight.cpre.org.uk/maps/>

## 5.5 Sensitive Receptors

- 5.5.1 Existing human amenity and ecology receptors have been identified as part of the desktop assessment of the Application Site. These are comprised of existing residential properties and businesses that may be sensitive to changes in lighting, at the receptor locations shown in **Appendix 2**.
- 5.5.2 Bats were identified during the ecological surveys as using the car dyke for foraging purposes, areas of potential roosts were outlined within the Preliminary ecological survey by Middleton Bell Ecology (Document Reference MBE/ECO/2020/09). The trees identified as potential roosts were of low to medium potential.
- 5.5.3 Larks were identified (Goldthorpe ES10 Bird Survey and Defra Metric Briefing Note) to the west boundary of the Application Site and will be treated as a highly sensitive receptor
- 5.5.4 **Table 7** sets out the identified sensitive receptor locations and their sensitivities to lighting, and there locations are shown in **Appendix 2**.
- 5.5.5 Residential receptors will have slightly different perspectives towards the site, depending on whether their views of the lighting are obstructed or unobstructed by trees and other foliage, buildings , or topographical features. Receptors with obstructed views, are unlikely to find the lighting as noticeable as residents with unobstructed views which may have light sources within the receptors field of view, which are associated with the Proposed Development.
- 5.5.6 Residential receptors with unobstructed views are likely to experience a slightly higher magnitude of change from the lighting. The magnitude of change will be further affected by the variation in distance between the potentially sensitive receptor and the Proposed Development, and by changes in elevation between the potentially sensitive receptor and the Proposed Development.

Receptor Type	Reference	Description	Sensitivity
Human (Amenity)	1	Residential dwellings – Billingley, Flat Lane	Medium
Human (Amenity)	2	Residential dwellings – Billingley, Back Lane	Medium
Human (Amenity)	3	Residential dwellings – Billingley Christmas Tree Farm	Medium
Human (Amenity)	4	Residential dwellings – Billingley Green Lane / north	Medium
Human (Amenity)	5	Residential dwellings – Dwelling odd A635	Medium
Human (Amenity)	6	Residential Dwellings off Hollygrove round about	Medium
Human (Amenity)	7	Residential Dwellings off Holly Grove roundabout	Medium
Human (Amenity)	8	Residential Dwellings – Goldthorpe, Holly Grove	Medium
Human (Amenity)	9	Residential Dwellings – Goldthorpe, Mullbery Close	Medium
Human (Amenity)	10	Residential Dwellings – Goldthorpe, Barnsley Road / north	Medium

Receptor Type	Reference	Description	Sensitivity
Human (Amenity)	11	Residential Dwellings – Goldthorpe, Barnsley Road / south	Medium
Human (Amenity)	12	Residential Dwellings – Goldthorpe, Willaim Street	Medium
Human (Amenity)	13	Residential Dwellings – Goldthorpe, George Street	Medium
Human (Amenity)	14	Residential Dwellings – Goldthorpe, Highgate Court	Medium
Human (Amenity)	15	Residential Dwellings – Goldthorpe, Edward Road	Medium
Human (Amenity)	16	Residential Dwellings – Goldthorpe, Edward Carr	Medium
Human (Amenity)	17	Residential Dwellings – Goldthorpe, Billingley View	Medium
Human (Amenity)	18	Residential Dwellings – Goldthorpe, Carr Head Lane	Medium
Human (Amenity)	19	Residential Dwellings – Goldthorpe, Commonwealth View	Medium
Human (Amenity)	20	Residential Dwellings – Goldthorpe, Caernarvon Crescent	Medium
Human (Amenity)	21	Residential Dwellings – Goldthorpe, Vancouver Drive	Medium
Human (Amenity)	22	Residential Dwellings – Goldthorpe, Vancouver Drive	Medium
Human (Amenity)	23	Residential Dwellings – Goldthorpe, Ingsfield Lane	Medium
Human (Amenity)	24	Residential Dwellings – Goldthorpe, Broadwater	Medium
Ecology	25	Car Dyke Hedge Row northern extent	High
		Car Dyke Hedge Row southern extent	High
		Car Dyke Hedge Row Central road north access to Application Site	High
		Car Dyke Hedge Row Central road south access to Application Site	High
Ecology	26	Car Dyke northern most roost potential	Medium

Receptor Type	Reference	Description	Sensitivity
Ecology	27	Car Dyke southern most roost potential	Medium
Ecology	28	Grassland to the east of the Application Site	High
Ecology	29	SSSI to the south and southeast (outlined in Appendix 5)	High

Table 7 Summary of Receptor Locations and Sensitivity.

## 6 Lighting Requirements

### 6.1 Task Lighting

- 6.1.1 Lighting will be required during the hours of use of the Proposed Development to facilitate the safe use of the Application Site during the hours of darkness.
- 6.1.2 Lighting to the loading bay entrance for the purpose of safety and wayfinding has been applied and would be permanent in nature.
- 6.1.3 Lighting will be required throughout the Proposed Development for the purposes of safety, security, and amenity during the hours of darkness. Areas where lighting is proposed are as follows:
- Car Parking Areas,
  - Paths within the Application Site,
  - Roads within the Application Site,
  - Lorry Parking bays, and;
  - Entrances/Gatehouses.

## 7 Potential Effects

### 7.1 Potential Effects of Artificial Lighting (without mitigation)

- 7.1.1 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 Strategy (**Appendix 3**).
- 7.1.2 It is likely that instances of skyglow over the Application Site would occur where tasks requiring specific lighting levels for safety and task requirements of the Proposed Development will be in action should the outline mitigation not be implemented.
- 7.1.3 Lighting directed in areas, as well as surfaces where the lighting was not intended will produce unnecessary light spill. This also has the potential effect of producing high levels of vertical illuminance at great distance from the installed lighting should the incorrect optics be used, the area over lit or luminaires be tilted inappropriately.
- 7.1.4 Obtrusive light can arise from poorly designed lighting, which may arise from inappropriate tilt angles on luminaires installed within the Application Site. This has the effect of producing high levels of vertical illuminance at great distance from the installed lighting, and results in glare and other forms of obtrusive light.
- 7.1.5 Poorly designed lighting can contribute the following obtrusive light components:
- Light spill onto windows: this is typical of wall 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.
- 7.1.6 The potential effects from lighting without mitigation are likely to be permanent in nature and of **Major Adverse** significance, based on the above components of obtrusive light, all of which could occur unless mitigation measures outlined in **Section 8** are implemented.

## 8 Scope of Mitigation

### 8.1 Construction Phase

- 8.1.1 Where required, construction lighting will be provided in compliance with British Standards (BS EN 12464-2:2014). 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.
- 8.1.2 Construction lighting will be maintained at a low level and focussed into the Application 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 required. Where this is not possible, construction lighting will be mounted an appropriate distance from the task and to control potential light spill baffles and shields will be used..
- 8.1.3 Construction tasks will predominantly be undertaken during the hours of daylight. Construction tasks are not anticipated to be undertaken for significant periods during the hours of darkness.
- 8.1.4 To limit the visibility of construction lighting within the landscape it will be switched off when not in use.
- 8.1.5 To reduce any potential effects on ecology, all construction lighting both for tasks and for security will be limited to a maximum CCT of 3000K.

### 8.2 Operational Phase

- 8.2.1 Lighting associated with the operational phase of the Proposed Development has the potential to cause obtrusive light to fall on the identified potentially sensitive receptors (without mitigation).
- 8.2.2 To support the residual effects assessment, a Lighting Strategy document has been prepared for the Proposed Development(**Appendix 3**).
- 8.2.3 To reduce the potential impact of lighting associated with the Proposed Development, all lighting will be designed in accordance with British Standards, relevant guidance documents and best industry practice.
- 8.2.4 The potential negative effects of artificial lighting can be effectively mitigated through good lighting design, the choice of suitable lighting equipment and the lighting design being carried out by a suitably qualified and competent lighting professionals.
- 8.2.5 Due to the nature of the Proposed Development lighting will be required throughout the night and will be present from dusk till dawn.
- 8.2.6 To reduce any potential effects on ecology, all lighting both task and security will use a CCT of 3000K or less where possible.
- 8.2.7 Lighting for the Proposed Development will:
- Use the lowest practicable mounting heights, to ensure that lighting is minimally obtrusive within the landscape and is maintained at a low level.
  - Use a 0 degree tilt angle from the horizontal reducing the chance of upward light spill and pointing the light in the direction of the area in use only.
  - Be fitted with a means of dimming luminaires, such that light levels are reduced during off peak hours.
  - Be fitting with an appropriate light shield where a luminaire may give rise to potential light spill from within the Application Site.

## 9 Residual Effects Assessment

### 9.1 Brief

- 9.1.1 The effects associated with the Proposed Development would be diminished by the application of the mitigation measures outlined above, and detailed within the Lighting Strategy (**Appendix 3**).
- 9.1.2 Whilst the ambient lighting levels within the Application Site will increase, it is unlikely that potentially sensitive human receptors with views of the Proposed Development would not be subjected to an increase in obtrusive light, due to the mitigation measures, distance from the Application Site, trees, hedges and foliage and compliance with lighting standards.
- 9.1.3 Although lighting is required for the development and will be noticeable from the residential receptors identified, it is unlikely to be obtrusive in nature, this is achieved through limiting the direction of the light source, luminaire positioning, tilt angles and colour temperature (CCT). 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.
- 9.1.4 The magnitude of change with regard to artificial lighting associated with potentially sensitive receptors considered **negligible** in line with **Table 8**. This is because the proposed lighting is highly unlikely to breach the relevant **E2** Environmental Zone limits outlined in **Table 2** onto nearby potentially sensitive human receptors.

Receptor Number (Appendix 1 & Appendix 2)	Pre-curfew limit (Lux)	Post-Curfew limit (lux)	Vertical Illuminance (Maximum)
01	5.00	1.00	0.00
02	5.00	1.00	0.00
03	5.00	1.00	0.00
04	5.00	1.00	0.00
05	5.00	1.00	0.00
06	5.00	1.00	0.01
07	5.00	1.00	0.00
08	5.00	1.00	0.00
09	5.00	1.00	0.00
10	5.00	1.00	0.00
11	5.00	1.00	0.00
12	5.00	1.00	0.00
13	5.00	1.00	0.00
14	5.00	1.00	0.00
15	5.00	1.00	0.00
16	5.00	1.00	0.00
17	5.00	1.00	0.02
18	5.00	1.00	0.00
19	5.00	1.00	0.00

Receptor Number (Appendix 1 & Appendix 2)	Pre-curfew limit (Lux)	Post-Curfew limit (lux)	Vertical Illuminance (Maximum)
20	5.00	1.00	0.00
21	5.00	1.00	0.00
22	5.00	1.00	0.00
23	5.00	1.00	0.00
24	5.00	1.00	0.00
25	0.40	N/A	0.42
			0.36
			1.21
			0.60
26	0.40	N/A	0.21
27	0.40	N/A	0.15
28	0.40	N/A	0.18
29	0.40	N/A	0.01

**Table 8 Intrusive light levels report**

- 9.1.5 In most instances the Ecological receptors will be unaffected by lighting implemented within the Application Site, however there are a few instances where light levels exceed those outlined within GN08/23, these instances will be reduced by the installation of back light shields and the use of optics designed to direct light away from areas it is not required. This will be addressed at the detailed design phase, with the roads being illuminated in accordance with the adoptable standards.

9.1.6 Residual effects associated with the artificial external lighting for the development are outlined in **Table 9**

Receptor Number	Receptor Type	Sensitivity of Receptor	Impact Magnitude	Nature of Impact (Permanent / Temporary)	Likely Effect
1	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
2	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
3	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
4	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
5	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
6	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
7	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
8	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
9	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
10	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
11	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
12	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
13	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
14	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
15	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
16	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
17	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
18	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
19	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
20	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant

Receptor Number	Receptor Type	Sensitivity of Receptor	Impact Magnitude	Nature of Impact (Permanent / Temporary)	Likely Effect
21	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
22	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
23	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
24	Human (Amenity)	Medium	Negligible	Permanent	Neutral/Not significant
25	Ecology	High	Minor	Permanent	Minor Adverse
26	Ecology	Medium	Negligible	Permanent	Neutral/Not significant
27	Ecology	Medium	Negligible	Permanent	Neutral/Not significant
28	Ecology	High	Negligible	Permanent	Neutral/Not significant
29	Ecology	High	Negligible	Permanent	Neutral/Not significant

**Table 9 Residual effects assessment**

- 9.1.7 Following the implementation of mitigation measures as outlined in **Table 11** the residual effects on human amenity receptors will be **Neutral/Not significant**. Most ecological receptors will not be impacted but light within the Application Site, however due to the requirement for lighting on the access road running over the foraging route lighting will be required and have a minor impact to that section, additional ecological mitigation will be required to protect the local ecological receptors.

## 10 Conclusions

### 10.1 Introduction

- 10.1.1 This Lighting Impact Assessment considers the effects of lighting to be implemented as part of the Proposed Development.
- 10.1.2 It assesses the potential effects from obtrusive light associated with the implementation of task and amenity lighting to the Proposed Development.

### 10.2 Baseline Conditions

- 10.2.1 The area to the west of the Application Site is a predominantly rural environment, however the Application Site is also bound by residential developments to the north and northeast of the Proposed Development, and commercial and residential developments to the east of the Application Site. There is also green land to the south and west of the Proposed Development. This has led to the area being assessed as an **E2** Environmental Zone.
- 10.2.2 A comprehensive desktop assessment was undertaken to determine likely baseline conditions. The area is typically rural and aligns with an **E2** Environmental Zone as described in ILP GN01:2021. District brightness associated with natural environments is described as low, however, CPRE night blight mapping indicating medium levels of radiance into the night sky in the vicinity of the Application Site, this is likely due to the commercial and residential developments to the north and east of the Proposed Development.
- 10.2.3 During a baseline survey vertical and horizontal light levels external to Application Site were measured. During a desktop assessment based on the guidance given within GN01:2021 and the results from the CPRE night blight mapping data, the Application Site was identified as a **E3** environmental zone, however due to the natural environment to the south and southwest of the Application Site for the purpose of this assessment the environment has been treated as a **E2** Environmental Zone.

### 10.3 Potential Significant Effects (Without Mitigation)

- 10.3.1 The requirement for artificial lighting means that there could be some potential effects caused by some parts of the lighting installation, including light spill, direct source luminance or glare (onto receptor views) and sky glow or upward light. Without mitigation, the potential effects are likely to be **Minor Adverse** in the worst-case, as poor-quality light sources could be installed and lighting levels could be non-compliant with British Standards or guidance documents. To avoid this, mitigation measures are implemented.

### 10.4 Mitigation and Enhancement

- 10.4.1 The mitigation measures deployed through the implementation of the Lighting Strategy are outlined in **Appendix 3** and **Section 8** and will ensure that artificial lighting is not obtrusive onto the identified receptors.

### 10.5 Residual Effects

- 10.5.1 The potential effects onto the identified human amenity receptors are likely to be **Negligible** as a result of the implementation of mitigation measures outlined in **Section 8** as well as adherence to the Lighting Strategy outlined in **Appendix 3**.
- 10.5.2 The potential effect onto the identified ecological receptors will be Negligible in most instances with the exception of receptors 25 which has a section that will result in a potential **minor adverse** effect.
- 10.5.3 In conclusion, lighting levels associated with the development will be appropriate for the Environmental Zones in which they are set, and lighting will be designed to minimise obtrusive light. As such, there are unlikely to be significant permanent residual effects from artificial lighting installed as part of the development.

## Appendix 1 – Lighting Spill Diagram

See separate files: 2368-DFL-ELG-XX-RP-EO-13001-S3; 2368-DFL-ELG-XX-RP-EO-13002-S3; 2368-DFL-ELG-XX-RP-EO-13003-S3 and 2368-DFL-ELG-XX-RP-EO-13004-S3

Appendix 2 – Potentially Sensitive Receptor Positions

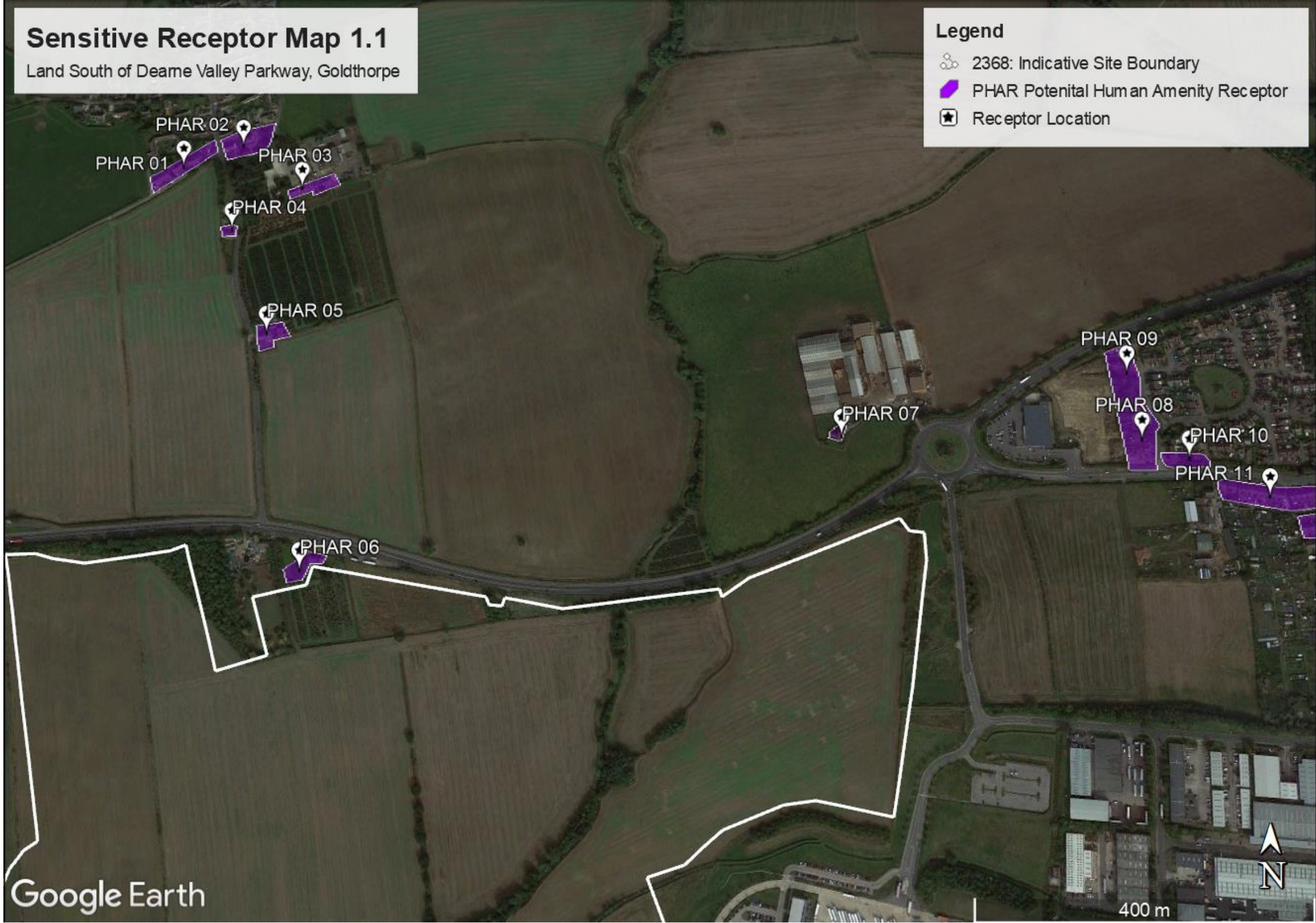


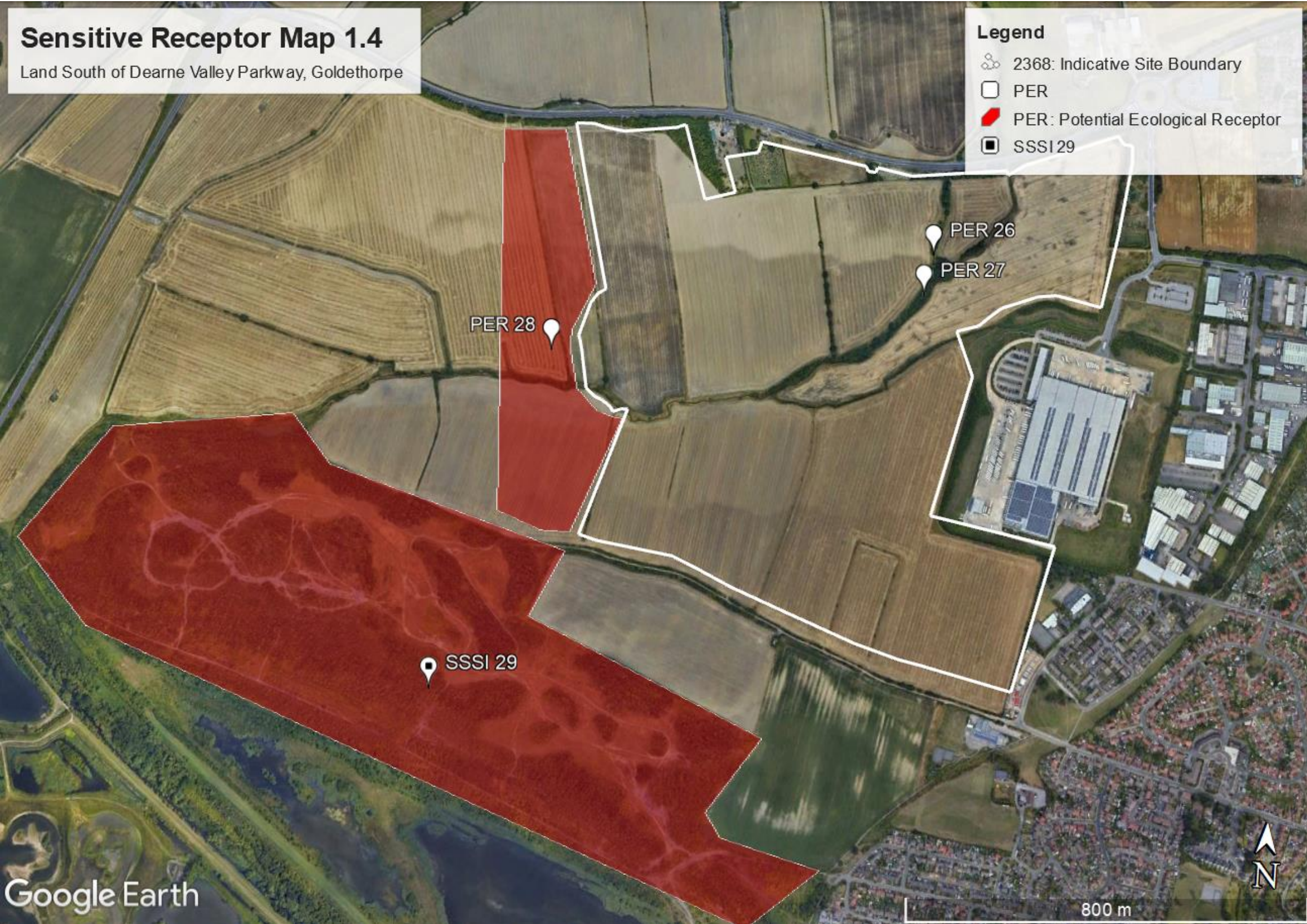
Figure 1.1: Potentially Sensitive Human Receptor Map part 1



Figure 1.2: Potentially Sensitive Human Receptor Map part 2



Figure 1.3: Potentially Sensitive Ecological Receptor Map Figure



1.4: Potentially Sensitive Ecological Receptor Map

## Appendix 3 – Lighting Strategy

### 1 Lighting Strategy

#### 1.1 Brief

- 1.1.1 The Proposed Development will require lighting for safety, amenity and the proper function of the Proposed Development at limited times during the hours of darkness. Lighting will be fit for purpose and sensitive to nearby human and ecological receptors.
- 1.1.2 The Application Site is broadly set within an **E1** Environmental Zone, to the west of Goldthorpe, Barnsley.
- 1.1.3 Lighting of amenity areas is vital for providing a safe and hospitable living environment. Lighting will be limited to wayfinding and amenity purposes.
- 1.1.4 Wall mounted luminaires are to be mounted no greater than a height of 12 meters to reduce the chance of illuminating the building above this point.
- 1.1.5 Where possible the column heights have been designed to be in line with the local specification to reduce visual change to the landscape.
- 1.1.6 Due to the required tasks BS EN 12464-2:2014 has been used to inform the light levels within this strategy, additional guidance from the CIBSE has been observed to apply light for safety purposes in a manner that is still sensitive to the environment .
- 1.1.7 Where practicable, luminaires will be used with integral LED's 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.
- 1.1.8 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 areas requiring illumination.
- 1.1.9 Adoptable Specification has been modelled to assess the impact on the local environment and outlined within the lighting strategy, however, local protocol stipulates that all S38 and S278 applications are to be design and installed by the local council, the design has been undertaken in accordance with advice from the Barnsley Council member in charge of the S38 and S278 implementation.,
- 1.1.10 All lighting unless otherwise stated is to emit a warm white colour temperature light (3000 Kelvin or less) to reduce the potential for adverse effects on potentially sensitive receptors.
- 1.1.11 Lighting will be required in the following application areas:
- Roundabout (adoptable specification)
  - Access Road (adoptable specification)
  - Car Parks
  - Lorry Parks
  - Entrance/Gatehouse
  - Lorry Turning Points

## 1.2 Roundabout

- 1.2.1 Lighting will be provided to the roundabout to the north of the Application Site as part of the consented scheme incorporating the roundabout, this is to be completed by the local authority in accordance with the local adoptable specification.
- 1.2.2 Luminaires will distribute light downwards only, to reduce the potential for light spill onto the boundaries surrounding the building and upwards towards the sky.
- 1.2.3 Luminaire performance parameters for indicative luminaires used for modelling purposes are outlined in **Table 1.1**.

<u>Equipment Specification</u>	<u>Description</u>
<b>Location</b>	Round about
<b>Correlated Colour Temperature (Kelvin)</b>	3000K (in accordance with adoptable specification)
<b>Luminaire Manufacturer</b>	Urbis Schröder (or similar approved)
<b>Luminaire Model</b>	Axia (Or similar approved)
<b>Light Source</b>	LED (Light Emitting Diode)
<b>Height</b>	8.0m (Maximum)
<b>Mounting Arrangement</b>	Root Mounted
<b>Luminaire Tilt</b>	0 degrees from horizontal
<b>Upward Light Output Ratio (ULOR)</b>	0% (Fully Shielded)
<b>Example Luminaire Image</b>	
<b><u>Design Guidance</u></b>	
<b>Lighting Class</b>	C Class (C2 Modelled)
<b>Lighting Design Criteria</b>	BS EN 13201-2:2015 & BS EN 5489-1:2020
<b>Controls</b>	Dusk-Dawn:

Table 1.1: Performance and installation requirements

### 1.3 Access Roads

- 1.3.1 Lighting will be provided to the access roads within the Application Site, as consented and in accordance with the local adoptable specification.
- 1.3.2 Luminaires will distribute light downwards only, to reduce the potential for light spill onto the boundaries surrounding the building and upwards towards the sky.
- 1.3.3 Luminaire performance parameters for indicative luminaires used for modelling purposes are outlined in **Table 1.2**.


<u>Equipment Specification</u>	<u>Description</u>
Location	Round about
Correlated Colour Temperature (Kelvin)	3000K (in accordance with adoptable specification)
Luminaire Manufacturer	Urbis Schröder (or similar approved)
Luminaire Model	Axia (Or similar approved)
Light Source	LED (Light Emitting Diode)
Height	8.0m (Maximum)
Mounting Arrangement	Root Mounted
Luminaire Tilt	0 degrees from horizontal
Upward Light Output Ratio (ULOR)	0% (Fully Shielded)
Example Luminaire Image	
<u>Design Guidance</u>	
Lighting Class	P-Class (P3 Modelled)
Lighting Design Criteria	BS EN 13201-2:2015 & BS EN 5489-1:2020
Controls	Dusk-Dawn:

Table 1.2: Performance and installation requirements

## 1.4 Car Parks

- 1.4.1 Lighting will be provided to the Car Parks within the Application Site, for the purpose of wayfinding and Safety.
- 1.4.2 Luminaires will distribute light downwards only, to reduce the potential for light spill onto the boundaries surrounding the building and upwards towards the sky.
- 1.4.3 Luminaire performance parameters for the car parks within the Application Site is outlined in **Table 1.3**.

<u>Equipment Specification</u>	<u>Description</u>
<b>Location</b>	Car Park
<b>Correlated Colour Temperature (Kelvin)</b>	2700K (in accordance with adoptable specification)
<b>Luminaire Manufacturer</b>	Cree (or similar approved)
<b>Luminaire Model</b>	Energy Due (Or similar approved)
<b>Light Source</b>	LED (Light Emitting Diode)
<b>Height</b>	8.0m (Maximum)
<b>Mounting Arrangement</b>	Root Mounted
<b>Luminaire Tilt</b>	0 degrees from horizontal
<b>Upward Light Output Ratio (ULOR)</b>	0% (Fully Shielded)
<b>Example Luminaire Image</b>	
<b><u>Design Guidance</u></b>	
<b>Lighting Class</b>	Table 5.9.2 10 Lux 0.25
<b>Lighting Design Criteria</b>	BS EN 12464-2:2014 & BS EN 5489-1:2020 Any Luminaire with the rear backing the Application Site is to have a rear light shield fitted.
<b>Controls</b>	Dusk-Dawn: on 38 Lux; off 18 Lux

Table 1.3: Performance and installation requirements

### 1.5 Lorry Parks

- 1.5.1 Lighting will be provided to the Lorry Parks within the Application Site, for the purpose of wayfinding, Amenity and Safety.
- 1.5.2 Luminaires will distribute light downwards only, to reduce the potential for light spill onto the boundaries surrounding the building and upwards towards the sky.
- 1.5.3 Luminaires are to be installed by both wall mounting and root mounted columns where applicable. In instances where the car park is parallel or adjacent to the Lorry Park area, a “back to back” bracket can be used to reduce the amount of columns installed.
- 1.5.4 Luminaire performance parameters for the Lorry Park areas within the Application Site are outlined in **Table 1.4**, **Table 1.5**. and **Table 1.6**.

<u>Equipment Specification</u>	<u>Description</u>
<b>Location</b>	Lorry Park
<b>Correlated Colour Temperature (Kelvin)</b>	3000K ( Maximum )
<b>Luminaire Manufacturer</b>	Cree (or similar approved)
<b>Luminaire Model</b>	Energy Tre (Or similar approved)
<b>Light Source</b>	LED (Light Emitting Diode)
<b>Height</b>	10.0m (Maximum)
<b>Mounting Arrangement</b>	Root Mounted
<b>Luminaire Tilt</b>	0 degrees from horizontal
<b>Upward Light Output Ratio (ULOR)</b>	0% (Fully Shielded)
<b>Example Luminaire Image</b>	
<b><u>Design Guidance</u></b>	
<b>Lighting Class</b>	Table 5.9.3 20 Lux 0.25Uo
<b>Lighting Design Criteria</b>	BS EN 12464-2:2014 & BS EN 5489-1:2020 Any Luminaire with the rear backing the Application Site is to have a rear light shield fitted.
<b>Controls</b>	Dusk-Dawn: on 38 Lux; off 18 Lux

Table 1.4: Performance and installation requirements

<u>Equipment Specification</u>	<u>Description</u>
<b>Location</b>	Lorry Park
<b>Correlated Colour Temperature (Kelvin)</b>	3000K (Maximum)
<b>Luminaire Manufacturer</b>	DW Windsor (or similar approved)
<b>Luminaire Model</b>	Sabre C2 High output (Or similar approved)
<b>Light Source</b>	LED (Light Emitting Diode)
<b>Height</b>	12.0m (Maximum)
<b>Mounting Arrangement</b>	Wall Mounted
<b>Luminaire Tilt</b>	0 degrees from horizontal
<b>Upward Light Output Ratio (ULOR)</b>	0% (Fully Shielded)
<b>Example Luminaire Image</b>	
<b><u>Design Guidance</u></b>	
<b>Lighting Class</b>	Table 5.9.3 20 Lux 0.25 Uo
<b>Lighting Design Criteria</b>	BS EN 12464-2:2014 & BS EN 5489-1:2020 Any Luminaire with the rear backing the Application Site is to have a rear light shield fitted.
<b>Controls</b>	Dusk-Dawn: on 38 Lux; off 18 Lux

Table 1.5: Performance and installation requirements

<u>Equipment Specification</u>	<u>Description</u>
<b>Location</b>	Lorry Park (Docking Bays)
<b>Correlated Colour Temperature (Kelvin)</b>	3000K (Maximum)
<b>Luminaire Manufacturer</b>	DW Windsor (or similar approved)
<b>Luminaire Model</b>	Sabre C2 Low output (Or similar approved)
<b>Light Source</b>	LED (Light Emitting Diode)
<b>Height</b>	4.0m (Maximum)
<b>Mounting Arrangement</b>	Wall Mounted
<b>Luminaire Tilt</b>	0 degrees from horizontal
<b>Upward Light Output Ratio (ULOR)</b>	0% (Fully Shielded)
<b>Example Luminaire Image</b>	
<b><u>Design Guidance</u></b>	
<b>Lighting Class</b>	Section 17.3.4
<b>Lighting Design Criteria</b>	CIBSE International Handbook Any Luminaire with the rear backing the Application Site is to have a rear light shield fitted.
<b>Controls</b>	Dusk-Dawn: on 38 Lux; off 18 Lux

Table 1.6: Performance and installation requirements

## 1.6 Entrance/ Gatehouse

- 1.6.1 Lighting is to be provided to the Entrance/Gatehouses within the Application Site for the purposes of safety and security, This is to include the approach leading up to the gateway which will be privately maintained and not of adoptable specification.
- 1.6.2 Luminaires will distribute light downwards only, to reduce the potential for light spill onto the boundaries surrounding the building and upwards towards the sky.
- 1.6.3 Luminaires are to be installed by both wall mounting and roof mounted
- 1.6.4 Luminaire performance parameters for the entrance/gatehouses within the Application Site are outlined in **Table 1.7**, **Table 1.8** and **Table 1.9**.

<u>Equipment Specification</u>	<u>Description</u>
<b>Location</b>	Entrance/ Gatehouse
<b>Correlated Colour Temperature (Kelvin)</b>	3000K (Maximum)
<b>Luminaire Manufacturer</b>	DW Windsor (or similar approved)
<b>Luminaire Model</b>	Sabre C2 High output (Or similar approved)
<b>Light Source</b>	LED (Light Emitting Diode)
<b>Height</b>	5.0m (Maximum)
<b>Mounting Arrangement</b>	Wall Mounted
<b>Luminaire Tilt</b>	0 degrees from horizontal
<b>Upward Light Output Ratio (ULOR)</b>	0% (Fully Shielded)
<b>Example Luminaire Image</b>	
<b><u>Design Guidance</u></b>	
<b>Lighting Class</b>	Table 5.7.3 100 Lux 0.50 Uo
<b>Lighting Design Criteria</b>	BS EN 12464-2:2014 & BS EN 5489-1:2020 Any Luminaire with the rear backing the Application Site is to have a rear light shield fitted.
<b>Controls</b>	Dusk-Dawn: on 38 Lux; off 18 Lux

**Table 1.7: Performance and installation requirements**

<u>Equipment Specification</u>	<u>Description</u>
<b>Location</b>	Entrance/ Gatehouse
<b>Correlated Colour Temperature (Kelvin)</b>	3000K (Maximum)
<b>Luminaire Manufacturer</b>	DW Windsor (or similar approved)
<b>Luminaire Model</b>	Sabre C2 Low output (Or similar approved)
<b>Light Source</b>	LED (Light Emitting Diode)
<b>Height</b>	4.0m (Maximum)
<b>Mounting Arrangement</b>	Wall Mounted
<b>Luminaire Tilt</b>	0 degrees from horizontal
<b>Upward Light Output Ratio (ULOR)</b>	0% (Fully Shielded)
<b>Example Luminaire Image</b>	
<b><u>Design Guidance</u></b>	
<b>Lighting Class</b>	Table 5.7.3 100 Lux 0.5 Uo
<b>Lighting Design Criteria</b>	BS EN 12464-2:2014 & BS EN 5489-1:2020 Any Luminaire with the rear backing the Application Site is to have a rear light shield fitted.
<b>Controls</b>	Dusk-Dawn: on 38 Lux; off 18 Lux

Table 1.8: Performance and installation requirements

<u>Equipment Specification</u>	<u>Description</u>
<b>Location</b>	Entrance/ Gatehouse (Approach)
<b>Correlated Colour Temperature (Kelvin)</b>	3000K ( Maximum )
<b>Luminaire Manufacturer</b>	Cree (or similar approved)
<b>Luminaire Model</b>	Energy Tre (Or similar approved)
<b>Light Source</b>	LED (Light Emitting Diode)
<b>Height</b>	10.0m (Maximum)
<b>Mounting Arrangement</b>	Root Mounted
<b>Luminaire Tilt</b>	0 degrees from horizontal
<b>Upward Light Output Ratio (ULOR)</b>	0% (Fully Shielded)
<b>Example Luminaire Image</b>	
<b><u>Design Guidance</u></b>	
<b>Lighting Class</b>	Table 5.1.3 20 Lux 0.40Uo
<b>Lighting Design Criteria</b>	BS EN 12464-2:2014 & BS EN 5489-1:2020 Any Luminaire with the rear backing the Application Site is to have a rear light shield fitted.
<b>Controls</b>	Dusk-Dawn: on 38 Lux; off 18 Lux

Table 1.9: Performance and installation requirements

**1.7 Lorry Turning Point**

- 1.7.1 Lighting will be provided to the Lorry turning points within the Proposed Developments Lorry Parks, the calculation is to be completed in unison to the regulations BS EN 12464-2:2014 Table 5.9.3, lighting in this area is applied for the purpose of Safety.
- 1.7.2 Luminaires will distribute light downwards only, to reduce the potential for light spill onto the boundaries surrounding the building and upwards towards the sky.
- 1.7.3 Luminaires are to be installed by both wall mounting and root mounted columns where applicable.
- 1.7.4 Luminaire performance parameters for the Lorry Park areas within the Application Site are outlined in **Table 1.10**, **Table 1.11**. and **Table 1.12**.

<u>Equipment Specification</u>	<u>Description</u>
<b>Location</b>	Entrance/ Gatehouse
<b>Correlated Colour Temperature (Kelvin)</b>	3000K (Maximum)
<b>Luminaire Manufacturer</b>	DW Windsor (or similar approved)
<b>Luminaire Model</b>	Sabre C2 High output (Or similar approved)
<b>Light Source</b>	LED (Light Emitting Diode)
<b>Height</b>	10.0m (Maximum)
<b>Mounting Arrangement</b>	Wall Mounted
<b>Luminaire Tilt</b>	0 degrees from horizontal
<b>Upward Light Output Ratio (ULOR)</b>	0% (Fully Shielded)
<b>Example Luminaire Image</b>	
<b><u>Design Guidance</u></b>	
<b>Lighting Class</b>	Table 5.1.4 50 Lux 0.40Uo
<b>Lighting Design Criteria</b>	BS EN 12464-2:2014 & BS EN 5489-1:2020 Any Luminaire with the rear backing the Application Site is to have a rear light shield fitted.
<b>Controls</b>	Dusk-Dawn: on 38 Lux; off 18 Lux

**Table 1.10: Performance and installation requirements**

<u>Equipment Specification</u>	<u>Description</u>
<b>Location</b>	Entrance/ Gatehouse
<b>Correlated Colour Temperature (Kelvin)</b>	3000K (Maximum)
<b>Luminaire Manufacturer</b>	DW Windsor (or similar approved)
<b>Luminaire Model</b>	Sabre C2 Low output (Or similar approved)
<b>Light Source</b>	LED (Light Emitting Diode)
<b>Height</b>	12.0m (Maximum)
<b>Mounting Arrangement</b>	Wall Mounted
<b>Luminaire Tilt</b>	0 degrees from horizontal
<b>Upward Light Output Ratio (ULOR)</b>	0% (Fully Shielded)
<b>Example Luminaire Image</b>	
<b><u>Design Guidance</u></b>	
<b>Lighting Class</b>	Table 5.1.4 50 Lux 0.40 Uo
<b>Lighting Design Criteria</b>	BS EN 12464-2:2014 & BS EN 5489-1:2020 Any Luminaire with the rear backing the Application Site is to have a rear light shield fitted.
<b>Controls</b>	Dusk-Dawn: on 38 Lux; off 18 Lux

Table 1.11: Performance and installation requirements

<u>Equipment Specification</u>	<u>Description</u>
<b>Location</b>	Entrance/ Gatehouse (Approach)
<b>Correlated Colour Temperature (Kelvin)</b>	3000K ( Maximum )
<b>Luminaire Manufacturer</b>	Cree (or similar approved)
<b>Luminaire Model</b>	Energy Tre (Or similar approved)
<b>Light Source</b>	LED (Light Emitting Diode)
<b>Height</b>	10.0m (Maximum)
<b>Mounting Arrangement</b>	Root Mounted
<b>Luminaire Tilt</b>	0 degrees from horizontal
<b>Upward Light Output Ratio (ULOR)</b>	0% (Fully Shielded)
<b>Example Luminaire Image</b>	
<b><u>Design Guidance</u></b>	
<b>Lighting Class</b>	Table 5.1.4 50 Lux 0.40 Uo
<b>Lighting Design Criteria</b>	BS EN 12464-2:2014 & BS EN 5489-1:2020 Any Luminaire with the rear backing the Application Site is to have a rear light shield fitted.
<b>Controls</b>	Dusk-Dawn: on 38 Lux; off 18 Lux

Table 1.12: Performance and installation requirements

## Appendix 4 – Baseline Survey Results

### 1.1 Baseline Survey

1.1.1 In this Appendix, Figure 1.1 below shows the locations for the measurements taken of the baseline survey.

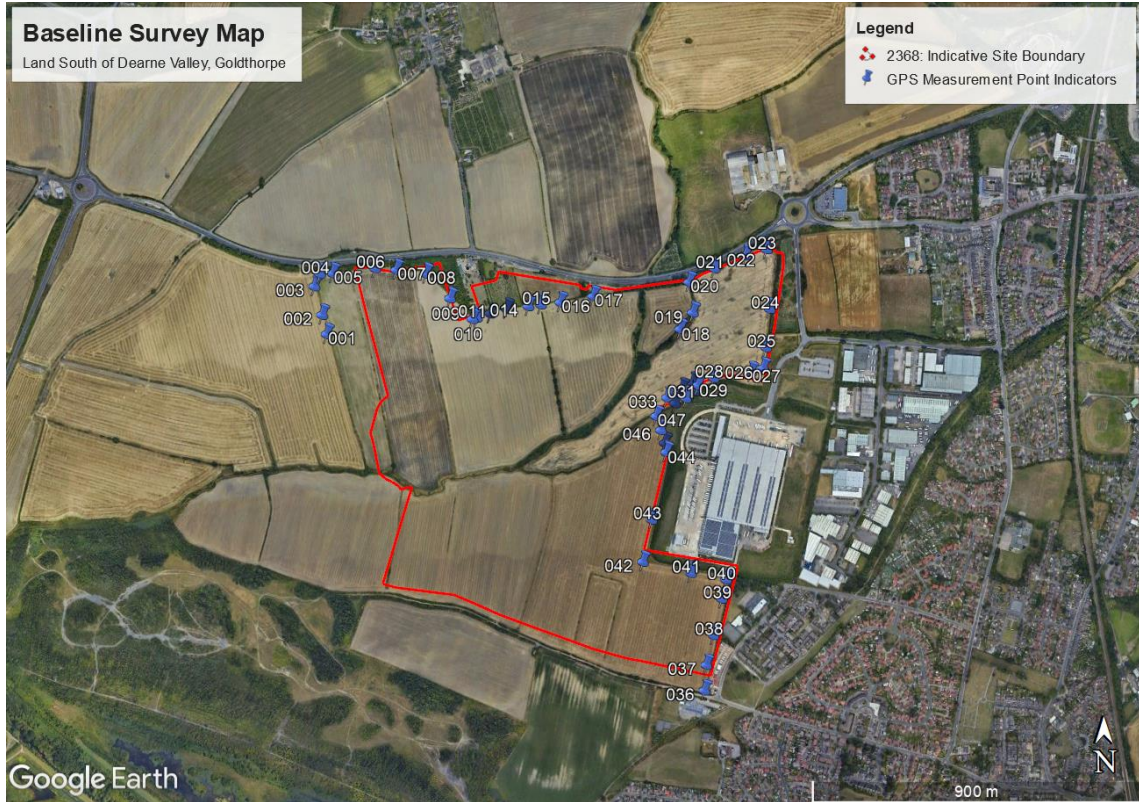


Figure 1.1: Baseline survey map

- 1.1.2 During the Baseline survey the measurements were taken (as displayed in **Table 2.1**), the baseline survey light levels were measured between the hours of 21:00 to 00.00 hours on the 20<sup>th</sup> of March 2023, the weather conditions were recorded to be partially cloudy with isolated showers.
- 1.1.3 Photographs of areas with significant light spill on the horizon were taken and detailed within the figures below.

Loc	Horizontal	North (Vertical)	East (Vertical)	South (Vertical)	West (Vertical)
1	0.08	0.06	0.07	0.08	0.07
2	0.08	0.07	0.09	0.09	0.09
3	0.09	0.06	0.09	0.08	0.07
4	0.07	0.03	0.07	0.09	0.07
5	0.02	0.02	0.06	0.06	0.06
6	0.07	0.02	0.07	0.07	0.07
7	0.06	0.03	0.07	0.08	0.07
8	0.09	0.04	0.04	0.07	0.07
9	0.09	0.05	0.05	0.09	0.09
10	0.1	0.04	0.09	0.12	0.08
11	0.09	0.07	0.08	0.11	0.09
12	0.09	0.05	0.11	0.12	0.08
13	0.09	0.04	0.11	0.11	0.08
14	0.09	0.05	0.1	0.11	0.11
15	0.07	0.04	0.08	0.09	0.07
16	0.08	0.03	0.09	0.09	0.08
17	0.11	0.11	0.1	0.1	0.08
18	0.10	0.11	0.11	0.2	0.04
19	0.10	0.05	0.11	0.23	0.12
20	0.43	0.67	0.37	0.23	0.13
21	0.53	1.92	0.5	0.26	1.14
22	0.99	1.18	0.24	0.29	0.5
23	0.11	0.1	0.07	0.19	0.18
24	0.13	0.07	0.07	0.28	0.18
25	0.15	0.10	0.14	0.4	0.1
26	0.21	0.11	0.28	0.72	0.08
27	0.12	0.11	0.24	0.83	0.53
28	0.11	0.1	0.12	0.09	0.08
29	0.21	0.1	0.35	0.61	0.12
30	0.35	0.09	0.41	1	0.03
31	0.27	0.1	1.8	0.92	0.09
32	0.15	0.16	1.01	0.34	0.1
33	0.22	0.28	0.79	0.15	0.15
34	0.23	0.14	1.01	0.48	0.07
35	0.2	0.08	0.49	0.33	0.06
36	0.15	0.10	0.18	0.59	0.11
37	0.14	0.13	0.13	0.15	0.12

<b>38</b>	0.11	0.12	0.07	0.13	0.11
<b>39</b>	0.12	0.09	0.06	0.11	0.09
<b>40</b>	0.11	0.06	0.05	0.09	0.07
<b>41</b>	0.12	0.09	0.09	0.11	0.08
<b>42</b>	0.11	0.11	0.1	0.1	0.08
<b>43</b>	0.1	0.07	0.08	0.07	0.07
<b>44</b>	0.08	0.06	0.06	0.06	0.07
<b>45</b>	0.1	0.08	0.34	0.09	0.07
<b>46</b>	0.11	0.23	0.83	0.09	0.07
<b>47</b>	0.09	0.10	0.64	0.09	0.08

**Table 2.1: Baseline survey results**



**Figure 1.1: ALDI RDC Visual 1 looking out to the east boundary of the Application Site**



Figure 1.2: ALDI RDC Visual 2 looking out to the east boundary of the Application Site



Figure 1.3: ALDI RDC Visual 3 looking out to the east boundary of the Application Site



Figure 2.1: Landscape setting to the west and southwest boundary of the Application Site



Figure 2.2: Landscape setting to the southeast boundary of the Application Site

### Appendix 5 – Goldthorpe SSSI Map

Indicative location of Application Site circled in red

