

16. Lighting

16.1. Introduction

- 16.1.1. This chapter of the ES has been written by Designs for Lighting Ltd (DFL), a lighting design consultancy specialising in Lighting Impact Assessments, obtrusive light mitigation, and detailed lighting design.
- 16.1.2. This Chapter assesses the potential environmental effects of the external artificial lighting proposed to support the construction and operation of the Proposed Development the Site which is for up to 420 residential dwellings and associated open space and infrastructure.
- 16.1.3. This Chapter should be read alongside the following Technical Appendices:
- **Appendix 16.1** – Lighting Strategy
 - **Appendix 16.2** – Lighting Baseline Assessment
 - **Appendix 16.3** – Lighting Receptor Locations

16.2. Assessment Approach

Methodology

- 16.2.1. 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.
- 16.2.2. The methodology employed for this Lighting Impact Assessment is appropriate to the location of the Site.
- 16.2.3. It comprises a review of the legislative, policy and guidance context, consultation with the design team and relevant stakeholders, a desktop study and Site survey in which the baseline conditions were established including an assessment of the Environmental Zone and an assessment of the effects of proposed lighting on the identified receptors.
- 16.2.4. 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.

Guidance

- Institution of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light (GN01:2021)ⁱ
- Bat Conservation Trust and Institution of Lighting Professionals – Bats and Artificial Lighting in the UK (GN08:2023)ⁱⁱ
- Institution of Lighting Professionals – Guidance on Undertaking Environmental Lighting Impact Assessments (PLG04:2013)ⁱⁱⁱ

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- LA 104 Environmental Assessment and Monitoring (Design Manual for Roads and Bridges (DMRB))^{iv}
- Institution of Lighting Professionals – Night-time Photography (GN10:2019)^v

Study Area

- 16.2.5. The study area of lighting effects extends 2km from the centre of the Site.
- 16.2.6. This has been used because it captures all receptors that could be impacted by the effect of lighting within the Proposed Development, and it also provides a reasonable area for the lighting baseline to be assessed. Beyond this area, it is assessed that there will be negligible lighting effects on any receptors as the illuminance from a source decreases, as the inverse square of the distance from the source.
- 16.2.7. The study area is shown in **Appendix 16.3**.

Classification of Environmental Zone

- 16.2.8. To understand the restrictions needed to keep the implementation of lighting to a minimum we use what is classified as an environmental zone. These zones are rated from EO to E4 and are given their designation based on the context of the surrounding environment as defined within ILP in GN01:2021 and shown in **Table 16.1**. The criteria for minimising obtrusive light for each environmental zone is detailed in **Table 16.2**.
- 16.2.9. To determine the environmental zone applicable to the Site, both desktop sources and lighting baseline surveys have been used (The assessment of Environmental Zone is in **Appendix 16.2**).

Table 16.1: Environmental Zone Descriptions

Zones	Surrounding	Lighting Environment	Examples
EO	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.
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Table 16.2: Obtrusive Light Criteria for Different Environmental Zones

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

Lighting Survey Methodology

- 16.2.10. The methodology used for the baseline lighting survey followed guidance that is detailed within the ILP guidance GNO8:2023, GNO10:2018 and PLG04:2013.
- 16.2.11. The baseline lighting survey consisted of illuminance recordings within the Site, as well as contextual photography that was taken both within and surrounding the Site.
- 16.2.12. This was undertaken in order to build an understanding of the existing lit conditions of the Site, what lighting is present in the surrounding area, and the baseline at the identified receptors where they were accessible.
- 16.2.13. Illuminance measurements were taken in the horizontal plane with the illuminance meter being placed on the ground above the measurement point, and in the vertical plane at approximately 1.5m in height facing north, east, south, and west. This totaled 5 illuminance readings per measurement location.
- 16.2.14. Measurements were taken using a Konica Minolta T-10A illuminance meter (serial number: 20012020) which had a current calibration certificate at the time of the survey (**Appendix 16.2**).
- 16.2.15. Night-time photography was recorded using the guidance in ILP document GNO10:2019. This was done at locations across the Site and in key locations outside the Site.
- 16.2.16. A DSLR camera was used, and this was mounted on a tripod.

¹ 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

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Assessment of Significance

- 16.2.17. 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.
- 16.2.18. The sensitivity of the receptor has been classified as Very High, High, Medium, Low, or Negligible according to the descriptions provided in **Table 16.3**.
- 16.2.19. The magnitude of change is determined as being Major, Moderate, Minor, Negligible, or No Change. Descriptions for each are provided in **Table 16.4**.
- 16.2.20. The significance of effect is derived through a matrix by comparing the sensitivity of the receptor with the magnitude of change (**Table 16.5**). This then provides the residual effect, the descriptions of which are detailed in **Table 16.6**.

Table 16.3: Criteria for Receptor Sensitivity

Sensitivity	Description of Criteria
Very High	Very high importance and rarity, international scale and very limited potential for substitution. The environment is fragile, and an impact is likely to leave it in an altered state from which recovery would likely be impossible.
High	High importance and rarity, national scale, and limited potential for substitution. The environment is fragile, and an impact is likely to leave it in an altered state from which recovery would be difficult or impossible.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution. 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.
Low	Low or medium importance and rarity, local scale. The environment is adaptable and is resilient to change. Nearly all impacts can be absorbed within it without modifying the baseline conditions.
Negligible	Very low importance and rarity, local scale. Receptor has little or no night-time activity.

Table 16.4: Criteria for Magnitude of Change (+/- = Baseline and Proposed Design)

Magnitude of Change		Definition of Change
Major	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Moderate	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No Change		No Change from baseline condition, this will be deemed "negligible" when assessed as a magnitude of change.

Table 16.5: Significance of Effect Matrix (Score +/- Based on Magnitude of Impact and Receptor Sensitivity)

Significance of Effect Matrix		Magnitude of Change				
		No Change	Negligible	Minor	Moderate	Major
Sensitivity	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

16.2.21. Effects categorised as Moderate may be considered significant depending on the change taking place. This is decided using reasonable professional judgment based on the lighting baseline and the change occurring (as assessed against obtrusive light guidance).

16.2.22. Effects categorised as large or very large within this chapter are considered significant.

Table 16.6: Definitions of Significance Categories

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.

Significance category	Typical description
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table 16.7: Definitions of Duration of Impacts

Duration	Definition
Short Term	A period of months up to one year
Medium Term	A period of one year, up to five years
Long Term	A period of greater than five years

Potential Effects from Artificial Light

- 16.2.23. 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, GNO1:2021 (**Table 16.1 and Table 16.2**), outlines restrictions on such things as light intrusion, luminous source intensity, upward light spill (or sky glow).
- 16.2.24. As the needs of ecology differ from those of a human amenity or human safety receptor a separate set of guidance, GNO8:2023 (**Table 16.8**), is used to evaluate the effects of lighting on the most light sensitive ecology receptors (bats). This document gives recommendations on the acceptable levels of illuminance that can reach areas of ecological interest.

Table 16.8: Ecology Lighting Guidance

Guidance Parameter	GNO8:2023 Description
Illuminance (Lux) Levels	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).
Lighting Zonation	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

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Guidance Parameter	GN08:2023 Description
	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."

Legislative and Policy Framework

National Planning PolicyEnvironmental Protection Act 1990 / Clean Neighbourhoods and Environment Act 2005

- 16.2.25. 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".

National Planning Policy Framework 2024

- 16.2.26. 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 December 2024 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:

- 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

16.2.27. Guidance for assessing the effects of proposed artificial lighting is outlined in the Planning Practice Guidance (PPG) under the category of "Light Pollution". The PPG states at Paragraph 001 (ID: 31-001-20191101) that *"Artificial lighting needs to be considered when a development may increase levels of lighting, or would be sensitive to prevailing levels of artificial lighting."*

16.2.28. Paragraph 002 (ID: 31-002-20191101) has the heading *"What factors can be considered when assessing whether a development proposal might have implications for light pollution?"*

16.2.29. *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.)"*

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The Local Plan

16.2.30. The relevant Local Authority for the Application Site and the Proposed Development is Broxtowe Borough Council (BBC). BBC has two planning policy documents that are relevant to the Proposed Development, and these are:

- Broxtowe Borough, Gedling Borough, Nottingham City Aligned Core Strategies – Part 1 Local Plan Adopted September 2014
- Broxtowe Borough Council Part 2 Local Plan 2018–2028 Adopted October 2019

Broxtowe Borough, Gedling Borough, Nottingham City Aligned Core Strategies – Part 1 Local Plan Adopted September 2014

16.2.31. No policy makes specific reference to the design of lighting, the effects of lighting or light pollution within the Local Plan Part 1. However, guidance is provided on the design intent of development within Policy 10, specifically at Point 10.3:

“All new development should be designed to:

- a) make a positive contribution to the public realm and sense of place;*
- b) create an attractive, safe, inclusive and healthy environment;*
- c) reinforce valued local characteristics;*
- d) be adaptable to meet changing needs of occupiers and the effects of climate change; and*
- e) reflect the need to reduce the dominance of motor vehicles.*

2. Development will be assessed in terms of its treatment of the following elements:

- a) structure, texture and grain, including street patterns, plot sizes, orientation and positioning of buildings and the layout of spaces;*
- b) permeability and legibility to provide for clear and easy movement through and within new development areas;*
- c) density and mix;*
- d) massing, scale and proportion;*
- e) materials, architectural style and detailing;*
- f) impact on the amenity of nearby residents or occupiers;*
- g) the ground conditions of the site, including that arising from land instability or contamination, together with the mitigation/remediation proposed or required;*
- h) incorporation of features to reduce opportunities for crime and the fear of crime, disorder and anti-social behaviour, and promotion of safer living environments;*

i) the potential impact on important views and vistas, including of townscape, landscape, and other individual landmarks, and the potential to create new views; and

j) setting of heritage assets.

3. All development proposals, and in particular proposals of 10 or more homes, will be expected to perform highly when assessed against best practice guidance and standards for design, sustainability, and place making, as set out in part 2 Local Plans.

4. Development must have regard to the local context including valued landscape/ townscape characteristics, and be designed in a way that conserves locally and nationally important heritage assets and preserves or enhances their settings.

5. Outside of settlements, new development should protect, conserve or where appropriate, enhance landscape character. Proposals will be assessed with reference to the Greater Nottingham Landscape Character Assessment."

Broxtowe Borough Council Part 2 Local Plan 2018–2028 Adopted October 2019

16.2.32. There is one policy within Part 2 of the Local Plan that specifically references lighting schemes, this is Policy 19. Within this policy reference is made to Policy 10.3 of the Aligned Core Strategy (Part 1 of the Local Plan), which states that:

"Part 2 Local Plans will set out standards for design, sustainability and place making."

16.2.33. The relevant sections of Policy 19 are detailed below:

"Policy 19: Pollution, Hazardous Substances and Ground Conditions

Permission will not be granted for development which would result in:

...

b) Lighting schemes unless they are designed to use the minimum amount of lighting necessary to achieve their purposes and to minimise any adverse effects beyond the site, including effects on the amenity of local residents, the darkness of the local area and nature conservation (especially bats and invertebrates); or

...

3. Proposals for development must identify potential nuisance issues arising from the nature of the proposal and address impacts on that development from existing land uses.

Conditions will be applied relating to the restriction or mitigation of pollution effects where appropriate.

16.2.34. Further note is made to the effects of artificial lighting in Paragraph 19.6 of the Local Plan Part2:

"19.6 Light pollution can add to the visual intrusion of a development, cause annoyance, nuisance and loss of amenity for neighbours and detract from the quality of the night sky. It can also be detrimental to highway safety, harmful to wildlife, undermine enjoyment of the countryside and, by using energy unnecessarily, it can contribute to climate change. Appropriate design can address these issues. The lighting implications of proposals will be considered in consultation with the Council's Environmental Health department. All applications should include full details

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of any proposed lighting, which are likely to be the subject of conditions (including hours restrictions) to ensure that adverse effects are minimised."

Saved Local Policies

- 16.2.35. With the Broxtowe Borough, Gedling Borough, Nottingham City Aligned Core Strategies – Part 1 Local Plan Adopted September 2014, there is a saved policy relevant to the lighting of the Proposed Development, this is Policy E33:

"E33 Planning permission will not be granted for lighting schemes unless the applicants demonstrate that they will use the minimum amount of lighting necessary to achieve their purposes and incorporate measures to minimise any adverse effects of light beyond the site."

- 16.2.36. This policy is superseded by Policy 19 within Broxtowe Borough Council Part 2 Local Plan 2018–2028 Adopted October 2019, but is not superseded within Broxtowe Borough, Gedling Borough, Nottingham City Aligned Core Strategies – Part 1 Local Plan Adopted September 2014.

Nottinghamshire County Council Highway Lighting Specification

- 16.2.37. Where lighting is to be adopted by the Local Highway Authority it will follow the lighting specification of Nottinghamshire County Council.
- 16.2.38. Nottinghamshire County Council's Highway Lighting Specification states that the following equipment should be used for adoptable lighting designs:

Table 16.9: Nottinghamshire County Council Highway Lighting Specification – Preferred Equipment

Description	Manufacture	Product Reference
Tubular Steel Column	Fabrikat (Nottingham) Ltd, Hamilton Road, Sutton In Ashfield, Nottinghamshire NG17 5LN	As NCC Spec Drawing No: ESD6/5
Lanterns/Control Gear	Holophane Europe Ltd, Bond Avenue, Bletchley, Milton Keynes MK1 1JG	V-Max Neutral White
Photo-Electric Control	Lucy Zodion Ltd, Station Road, Sowerby Bridge, West Yorkshire, HX6 3AF	Lucy Zodion ZCell (20:20 Lux) 5/7 PIN NEMA Photocell
Cut-out / Isolators	Lucy Zodion Ltd, Station Road, Sowerby Bridge, West Yorkshire, HX6 3AF	Titan (PN) or Trojan (DNO)

Scoping Criteria

- 16.2.39. As discussed in **Chapter 2**, the Proposed Development has not been subjected to a formal scoping process, with the EIA instead following the scope of the ES associated with the separate

and independent Land at Toton North planning application, the scoping request for which having been submitted to BBC on 13th September 2024 and BBC's Scoping Opinion received on 22nd October 2024. A summary of the Scoping Opinion and the formal Scoping Opinion Report is included at **Appendix 2.1**.

16.2.40. With regards to lighting, BBC LPA recommended for the Land at Toton North scheme that lighting be scoped into that ES due to potential impacts on ecology and wildlife. The 'Toton and Chilwell Neighbourhood Forum' also believed that lighting should be scoped into the ES in relation to the Toton North scheme.

16.2.41. In response to the Scoping Opinion received for the Toton North scheme, it was decided that lighting should be scoped into this ES, due to the proximity of that site and the potential for cumulative effects.

Technical Scope

16.2.42. The technical scope for this assessment includes the external lighting within the Proposed Development for both the construction and operation phases. This includes:

- Construction Task Lighting;
- Construction Security Lighting;
- Operational Street Lighting;
- Operational Amenity Lighting; and
- Operational Lighting for Maintenance Tasks.

16.2.43. The effects of the following parameters of light will be assessed:

- Illuminance (Lux): Light Intrusion and Light Spill
- Upward Light (Sky Glow)

Lighting Receptors Identification

16.2.44. Receptors for the effects of lighting are organised into three main categories

- Human Amenity Receptors (PHAR): These are receptors whose amenity and quality of life may be impacted by the effects of lighting. These are typically dwellings, with the focus on bedrooms and living spaces. However, this may also include receptors where the effects of lighting will result in a reduction/improvement of enjoyment of the location.
- Human Safety Receptors (PSR): These are receptors where the effect of lighting may result in a reduction/improvement in the safe undertaking of tasks. These areas are typically workplaces or infrastructure where potentially hazardous tasks take place. For example, Rail Crossing and major roadways.
- Ecology Receptors (PSER): These receptors are always nocturnal species whose habitat may be harmed/improvement with by the effects of lighting and are typically one or several of the many different Bat species endemic to the United Kingdom. It should be

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noted that the only way to assess an improvement on these receptors is to reduce the effects of lighting.

- 16.2.45. Receptors are identified based on their proximity to the Site and whether or not they have views of the Site.
- 16.2.46. Those receptors closest to the Site are selected for the assessment over those further away. This is because the effects of lighting reduce over the distance from the light source, and the closest receptor in a given direction provides a reasonable worst-case for the assessment of all receptors in that direction. However, where a more sensitive receptor is located behind a less sensitive one, both will be assessed. For example, where a PSER is located behind a PHAR and the PHAR does not provide full screening for the PSER.

Temporal Scope

- 16.2.47. The temporal scope for the assessment includes both the construction and operational phases of the Proposed Development.
- 16.2.48. The parameters of light set out above will be assessed for both the construction and operational phases of the Proposed Development.

Limitations to the Assessment

- 16.2.49. This assessment is based on using professional experience and judgment to assess the parameters of the Lighting Strategy (**Appendix 16.1**). The accuracy of the assessment is dependent upon the application of the Lighting Strategy to the detailed design, any lighting installations being installed in accordance with the Lighting Strategy which can be secured through planning condition.

16.3. Baseline Conditions

Site Description and Context

Study Area

- 16.3.1. The study area extends 2km from the centre of the Site and can be seen in **Appendix 16.3**.
- 16.3.2. The Site is allocated for mixed-use development within BBC's Local Plan Part 2. Situated within the administrative area of BBC, the Site is located to the west of the B6003 Stapleford Lane, which leads northwards, and southwards, towards the suburbs of Stapleford, and Toton, respectively.
- 16.3.3. The Site comprises three irregularly shaped and connected field parcels that are in arable agricultural use.
- 16.3.4. The majority of the northern extent of the Site is bound by hedgerow, beyond which are further field parcels in arable agricultural use. The north-eastern extent of the Site is bound by well-established trees and hedgerow, with an electricity transmission substation beyond.
- 16.3.5. A series of electricity pylons and associated overhead lines traverse the Site in an approximate north-east to south-west direction, from the electricity transmission substation.

- 16.3.6. The east of the Site is adjoined by the B6003 Stapleford Lane, beyond which is the Toton East scheme for which a planning application has been submitted by the Applicant (in conjunction with others).
- 16.3.7. To the south, the Site is bound by sporadic hedgerow and tree line, beyond which are gardens and existing residential dwellings associated with the suburb of Toton. The south-western most extent of the Site is adjoined by Toton Fields Local Nature Reserve (LNR).
- 16.3.8. Finally, the west of the Site is bound by the Toton Sidings Local Wildlife Site (LWS), beyond which lies the DB Toton Cargo Railway Terminus.
- 16.3.9. The Site is accessed from Stapleford Lane.
- 16.3.10. Within a 2 km radius surrounding the Site the majority of development is residential and suburban in nature, but this is interspersed with commercial development and infrastructure that includes the DB Toton Cargo Railway Terminus and tram stations. This is typical of well-inhabited rural and urban settlements, small town centres or suburban locations.
- 16.3.11. There is a significant presence of existing lighting in the area surrounding the Site. This includes:
- Street lighting;
 - Lighting associated with infrastructure (highway lighting and tram station lighting); and
 - Lighting used for commercial premises.
- 16.3.12. This existing baseline lighting was recorded during the lighting survey (See **Appendix 16.2**).

Identified Statutory and Non- Statutory Designations

- 16.3.13. The Site is not located within 2km of a National Landscape, a National Park , or a Special Area of Conservation (SAC).
- 16.3.14. The Site is located within 3km of Attenborough Gravel Pits SSSI.
- 16.3.15. There are five LNRs located within 2 km of the Site. These being
- Toton Fields LNR, adjacent to the south-west (Ref: SK496344);
 - Manor Farm, Long Eaton LNR , 1.2km to the south (Ref: SK499341);
 - Stoney Clouds LNR, 1.9km to the north north-west (Ref: SK477376); and
 - Fox Covert LNR (Ref: SK486333).

Table 16.10: Identified Designations

Designation	Name	Ref (if applicable)	Distance to Application Boundary Site
Local Nature Reserve	Toton Fields (Toton Sidings LWS)	SK496344	Immediately adjacent
Local Wildlife Site	Toton Sidings		Immediately adjacent
Local Nature Reserve	Manor Farm, Long Eaton	SK499341	1.2km
Local Nature Reserve	Stoney Clouds	SK477376	1.9km
Local Nature Reserve	Fox Covert	SK486333	1.9km
Local Nature Reserve	King Georges Park	SK506376	2.1km
SSSI	Attenborough Nature Reserve	SK527351	2.5km

- 16.3.16. Only Toton Fields LNR and Toton Sidings LWS have been included as an identified receptor to lighting. The others are not included due to their distance from the Application Site, the significant volume of retained and existing screening between them and the Application Site, and the presence of dwellings and roadways between them and the Application Site.

Identified Lighting Receptors

- 16.3.17. The identified receptors to lighting effects are listed in **Table 16.11**, **Table 16.12**, and **Table 16.13**.

Table 16.11: Human Amenity Receptors (PHAR)

Receptor Number	Receptor Name	Sensitivity
PHAR 001	15 Bessell Lane adjoining Boarding Kennels	Medium
PHAR 002	Dwellings on Carnforth Close & Silverdale	Medium
PHAR 003	Dwelling Rose House, 320 Toton Lane	Medium

Receptor Number	Receptor Name	Sensitivity
PHAR 004	Dwellings on Teesdale Court and Ribblesdale Court	Medium
PHAR 005	Dwelling on Northfield Road and Crescent	Medium
PHAR 006	Dwellings on Katherine Drive and Steven Close	Medium
PHAR 007	Dwellings on Cleve Avenue and Edale Close	Medium
PHAR 008	Dwellings on Spinney Rise, Whitburn Road & Selby Close	Medium
PHAR 009	Dwellings on Hampton Close, Bridgnorth Way & Water Orton Close	Medium

Table 16.12: Human Safety Receptors (PSR)

Receptor Number	Receptor Name	Sensitivity
PSR 001	Drivers on Stapleford Lane B6003	Medium
PSR 002	Drivers on A52 Brian Clough Way	Medium
PSR 003	Railway Line & Toton Freight Yard	Medium

Table 16.13: Ecology Receptor (PSER)

Receptor Number	Receptor Name	Sensitivity
PSER 001	Toton Fields LNR and Toton Sidings LWS	High
PSER 002	All retained hedgerows	High

16.3.18. The locations of the identified receptors to lighting can be seen in **Appendix 16.3**.

Lighting

Baseline Survey Information

Summary of the Survey Findings

- 16.3.19. Full details of the lighting survey that was undertaken to inform the assessment can be found in **Appendix 16.2**, and a summary is provided below.
- 16.3.20. The area surrounding the Site is a broad mixture of commercial uses and suburban settlement interspersed with agricultural land.
- 16.3.21. There is a large amount of existing artificial lighting in the area for commercial, residential and highway network purposes. This existing lighting is visible across the landscape and is affecting the district brightness of the surrounding area.
- 16.3.22. Due to the above, the Site and the surrounding area has been assessed as an E3 Environmental Zone as detailed in **Appendix 16.2**.
- 16.3.23. Artificial lighting is prominent in the landscape. However, the direct effects of this lighting are concentrated close to the lit areas. This is shown by the illuminance results detailed in **Appendix 16.2**.
- 16.3.24. Although there is a large presence of existing lighting surrounding the Site, there are large areas of relative darkness also within the Site.
- 16.3.25. This indicates that although several of the receptors to lighting identified in **Table 16.11** have direct views of existing lighting, they will not be experiencing significant existing direct effects of lighting. There are likely to be minor direct effects on these receptors by the existing lighting directly adjacent to them, but the further the distance from the existing lighting, the lower the lighting effects will be.

16.4. Assessment of Likely Significant Effects

- 16.4.1. The potential effects on the identified receptors are assessed using a qualitative assessment based on the Parameters Plan (**Figure 4.1**), the Lighting Strategy (**Appendix 16.1**) and the lighting baseline assessment (**Appendix 16.2**).

Construction

Magnitude of Change Assessment

- 16.4.2. The magnitude of change resulting from the construction phase of the Proposed Development is assessed qualitatively. This is based on the typical illuminance levels used for construction tasks, the types of luminaires typically used, and the lighting baseline assessment that has been carried out.
- 16.4.3. Details of the construction methodology to be used can be seen in **Chapter 4** and details of the lighting that may be used can be found in the Lighting Strategy (**Appendix 16.1**) for the Proposed Development.

Table 16.14: Construction Phase Magnitude of Change Assessment

Receptor Number	Description of Effect	Breach in Lighting Guidance Criteria	Magnitude of Change	Duration
PHAR 001	This property is approximately 260m north of the Site There is good natural screening on the boundary which will significantly reduce the visibility of lighting and mitigate potential effects. The limiting of the hours of work to those detailed in Chapter 4 will ensure that construction lighting is not required for some of the Spring and Autumn months and will not be required during the summer. Due to the limiting of the hours of use and the mitigation that is detailed within the Lighting Strategy (Appendix 16.1), it is unlikely that light levels at this receptor location will be increased above those levels deemed acceptable for the environmental zone criteria. Therefore, the magnitude of change is assessed as Negligible.	No	Negligible	Medium
PHAR 002	This receptor location is approximately 465m from the Site and has a lit road (A52) between it and the Application Site boundary. There is also a mature tree line between the receptor and the A52. This foliage will provide good screening from the construction	No	Negligible	Medium

Lighting

	lighting and the road light will reduce contrast with any visible construction lighting. Due to the limiting of the hours of use and the mitigation that is detailed within the Lighting Strategy (Appendix 16.1), it is unlikely that light levels at this receptor location will be increased above those levels deemed acceptable for the environmental zone criteria. Therefore, the magnitude of change is assessed as Negligible.			
PHAR 003	This receptor is already well-screened by foliage which protects it from lighting from Stapleford Lane and Toton Park and Ride lighting. It will experience a change in the perception of lighting within the Site. However, this will be partially screened by existing foliage. Due to the limiting of the hours of use and the mitigation that is detailed within the Lighting Strategy (Appendix 16.1), it is unlikely that light levels at this receptor location will be increased above those levels deemed acceptable for the environmental zone criteria. Therefore, the magnitude of change is assessed as Minor.	No	Minor Adverse	Medium
PHAR 004	These receptors are greater than 550 m from the nearest point in the Site.	No	Negligible	Medium

	There is also good natural foliage and other residential buildings screening views of the Application Site. Due to the limiting of the hours of use and the mitigation that is detailed within the Lighting Strategy (Appendix 16.1), it is unlikely that light levels at this receptor location will be increased above those levels deemed acceptable for the environmental zone criteria. Therefore, the magnitude of change is assessed as Negligible.			
PHAR 005	This receptor location is approximately 300m from the Application Site boundary, has an existing lit road between it and the Site, and only has obscured views of the Site due to existing screening by foliage and other residential dwellings. Due to this, it is very unlikely that there will be a breach in the environmental zone lighting limitation at this receptor location. There may be some increased perception of lighting from within the Site, however this is likely to be negligible when compared to this receptors views of existing lighting. As such, the magnitude of change is assessed as Negligible.	No	Negligible	Medium

Lighting

PHAR 006	This receptor location is only 70m from the Site at its closest point. However, there is good screening from foliage and trees as well as the screening from other residential properties in the line of sight. As such it is unlikely that there will be a breach in environmental zone limitations. This receptor location will have some partial views of the Site that are screened by existing foliage. There is also an existing lit road between this receptor and the Application Site, which will reduce contrast with, and the visible effects of, the construction lighting. As such, the magnitude of change at this receptor is assessed as Minor Adverse.	No	Minor Adverse	Medium
PHAR 007	This receptor location is immediately to the south of the Site. This receptor location will have some views of the Site that are screened by existing foliage. Due to the limiting of the hours of use and the mitigation that is detailed within the Lighting Strategy (Appendix 16.1), it is unlikely that light levels at this receptor location will be increased above those levels deemed acceptable for the environmental zone criteria.	No	Minor Adverse	Medium

	As such, the magnitude of change at this receptor is assessed as Minor Adverse .			
PHAR 008	This receptor location is immediately south of the Site and due to the proximity of the Site and the unlit nature of the Site, there will be an increase in the visibility of light during construction. The mitigation and limiting of the hours of work to those detailed in Chapter 4 will ensure that construction lighting is not required for some of the Spring and Autumn month and will not be required during the summer. Therefore, the magnitude of change is assessed as Minor Adverse.	No	Minor Adverse	Medium
PHAR 009	This receptor location is immediately south of the Site and due to the proximity of the Site and the unlit nature of the Site, there will be an increase in the visibility of light during construction. The mitigation and limiting of the hours of work to those detailed in Chapter 4 will ensure that construction lighting is not required for some of the Spring and Autumn month and will not be required during the summer. Therefore, the magnitude of change is not likely to result in a breach in E3 zone criteria and is assessed as Minor Adverse.	No	Minor Adverse	Medium

Lighting

PSR 001	This receptor runs between the Land at Toton East proposed development and the Application Site and is a lit road. There will be some visibility of the lighting within the wider Site during construction, but due to the mitigation embedded into the Lighting Strategy (Appendix 16.1) this is unlikely to result in an increase in glare or other effects on the road users. As such, this magnitude of change is assessed as Minor Adverse.	No	Minor Adverse	Medium
PSR 002	This receptor is lit across its length and as it is an A road is likely lit to M class standard within BS 5489-1:2020. These lighting classes are typically brighter than subsidiary road lighting standards. There will be some visibility of the lighting within the wider Site during construction, but due to the mitigation embedded into the Lighting Strategy (Appendix 16.1) this is unlikely to result in an increase in glare or other effects on the drivers and is not likely to alter the lighting levels on this roadway. As such, this magnitude of change is assessed as Negligible.	No	Negligible	Medium
PSR 003	There is a good buffer of public open space between this receptor and the	No	Negligible	Medium

	Residential part of the Proposed Development There will be some visibility of the lighting within the wider Site during construction, but due to the mitigation embedded into the Lighting Strategy (Appendix 16.1) this is unlikely to result in an increase in glare or other effects on the drivers and is not likely to alter the lighting levels on this roadway. As such, this magnitude of change is assessed as Negligible.			
PSER 001	This LNR and LWS lie immediately to the South of the Application Site; however the illustrative masterplan shows that the part of the Application Site bounding the LNR and LWS is retained as public open space. Where construction activities are taking place adjacent to the boundary, it is unlikely that there will be illuminance levels on the LNR and LWS above the 0.4 Lux recommendation from GN08:2023. As such any intrusion of lighting will be minor and restricted to the boundary of the LNR and LWS. As such, this magnitude of change is assessed as Negligible.	Yes (temporary in small areas)	Negligible	Medium
PSER 002	These receptors are the existing and retained hedge rows within the Site and the	Yes (temporary)	Minor Adverse	Medium

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	nocturnal species (bats) that use these. Where construction activities are taking place adjacent to these hedge rows, it is likely that there will be illuminance levels on these hedge rows above the 0.4 Lux recommendation from GN08:2023. This will not be the case for all hedge rows during the construction phase, as areas of construction will be phased around the Site. It is also noted that construction lighting will not be required throughout the summer and will be limited in its use during spring and autumn due to the limited working hours. This will reduce the time in which the illuminance levels on these hedgerows are above 0.4 Lux and keeps this primarily to time out of peak bat activity. Mitigation is also embedded into the Lighting Strategy (Appendix 16.1) forming part of the Proposed Development, to reduce the effects of lighting on areas deemed as ecologically sensitive. Therefore, although some of the existing hedge rows may experience illuminance levels greater than 0.4 Lux during construction, there will be maintained dark areas for the nocturnal species (bats) to use.	in small areas)		
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	As such, the magnitude of change is assessed as Minor .			
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Lighting

Significance of Effect Assessment

- 16.4.4. The significance of effect is calculated using the matrix in **Table 16.5** by comparing the sensitivity of a receptor with the magnitude of change.

Table 16.15: Construction Phase Significant of Effect Assessment

Receptor Number	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
PHAR 001	Medium	Negligible	Neutral (Not Significant)	Medium
PHAR 002	Medium	Negligible	Neutral (Not Significant)	Medium
PHAR 003	Medium	Minor Adverse	Slight (Not Significant)	Medium
PHAR 004	Medium	Negligible	Neutral (Not Significant)	Medium
PHAR 005	Medium	Negligible	Neutral (Not Significant)	Medium
PHAR 006	Medium	Minor Adverse	Slight (Not Significant)	Medium
PHAR 007	Medium	Minor Adverse	Slight (Not Significant)	Medium
PHAR 008	Medium	Minor Adverse	Slight (Not Significant)	Medium
PHAR 009	Medium	Minor Adverse	Slight (Not Significant)	Medium
PSR 001	Medium	Minor Adverse	Slight (Not Significant)	Medium
PSR 002	Medium	Negligible	Neutral (Not Significant)	Medium
PSR 003	Medium	Negligible	Neutral (Not Significant)	Medium

PSER 001	High	Negligible	Slight (Not Significant)	Medium
PSER 002	High	Minor Adverse	Moderate (Not Significant)	Medium

Operation

Magnitude of Change

- 16.4.5. The magnitude of change resulting from the operation phase of the Proposed Development is assessed qualitatively. This is based on the typical illuminance levels used for the lighting tasks, the types of luminaires typically used, and the lighting baseline assessment that has been carried out.
- 16.4.6. The Lighting Strategy for the Proposed Development is at **Appendix 16.1** and this details the approach taken to lighting of the roads and property exteriors.

Table 16.16: Operational Phase Magnitude of Change Assessment

Receptor Number	Description of Effect	Breach in Lighting Guidance Criteria	Magnitude of Change	Duration
PHAR 001	This property is approximately 260m north of the Site. There is good natural screening on the boundary which will significantly reduce the visibility of lighting and mitigate potential effects. Due to the mitigation that is detailed within the Lighting Strategy (Appendix 16.1), it is unlikely that light levels at this receptor location will be increased above those levels deemed acceptable for the environmental zone criteria. Therefore, the magnitude of change is assessed as Negligible.	No	Negligible	Long
PHAR 002	This receptor location is approximately 465m from the Application Site and has a lit road (A52) between it and the Application Site boundary. There is also a mature tree line between the receptor and	No	Negligible	Long

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	the A52. This foliage will provide good screening from the operational lighting and the road light will reduce contrast with any visible lighting. Therefore, the magnitude of change is assessed as Negligible.			
PHAR 003	This receptor is already well-screened by foliage which protects it from lighting from Stapleford Lane and Toton Park and Ride lighting. It will experience a change in the perception of lighting within the Site. However, this will be partially screened by existing foliage. Therefore, the magnitude of change is assessed as Minor.	No	Minor Adverse	Long
PHAR 004	These receptors are greater than 550 m from the nearest point in the Application Site. There is also good natural foliage and other residential buildings screening views of the Application Site. Therefore, the magnitude of change is assessed as Negligible.	No	Negligible	Long
PHAR 005	This receptor location is approximately 300m from the Application Site boundary, has an existing lit road between it and the Application Site, and only has obscured views of the Application Site due to existing screening by foliage and other residential dwellings. Due to this, it is very unlikely that there will be a breach in the environmental zone lighting limitation at this receptor location. There may be some increased perception of lighting from within the Application Site, however this is likely to be negligible when	No	Negligible	Long

	compared to this receptors views of existing lighting. As such, the magnitude of change is assessed as Negligible.			
PHAR 006	This receptor location is only 70m from the Site at its closest point. However, there is good screening from foliage and trees as well as the screening from other residential properties in the line of sight. As such it is unlikely that there will be a breach in environmental zone limitations. This receptor location will have some partial views of the Application Site that are screened by existing foliage. There is also an existing lit road between this receptor and the Application Site, which will reduce contrast with, and the visible effects of, the lighting on the Site. As such, the magnitude of change at this receptor is assessed as Minor Adverse.	No	Minor Adverse	Long
PHAR 007	This receptor location is immediately to the south of the Application Site. This receptor location will have some views of the Application Site that are screened by existing foliage. As such, the magnitude of change at this receptor is assessed as Minor Adverse.	No	Minor Adverse	Long
PHAR 008	This receptor location is immediately south of the Application Site and due to the proximity of the Site and the unlit nature of the Site, there will be an increase in the visibility of light.	No	Minor Adverse	Long

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	Therefore, the magnitude of change is assessed as Minor Adverse .			
PHAR 009	This receptor location is immediately south of the Application Site and due to the proximity of the Site and the unlit nature of the Site, there will be an increase in the visibility of light. Therefore, the magnitude of change is not likely to result in a breach in E3 zone criteria and is assessed as Minor Adverse.	No	Minor Adverse	Long
PSR 001	This receptor runs between the Land at Toton East proposed development and the Application Site and is a lit road. There will be some visibility of the lighting within the wider Application Site, but due to the mitigation embedded into the Lighting Strategy (Appendix 16.1) this is unlikely to result in an increase in glare or other effects on the road users. As such, this magnitude of change is assessed as Minor Adverse.	No	Minor Adverse	Long
PSR 002	This receptor is lit across its length and as it is an A road is likely lit to M class standard within BS 5489-1:2020. These lighting classes are typically brighter than subsidiary road lighting standards. There will be some visibility of the lighting within the wider Application Site, but due to the mitigation embedded into the Lighting Strategy (Appendix 16.1) this is unlikely to result in an increase in glare or other effects on the drivers and is not likely to alter the lighting levels on this roadway. As such, this magnitude of change is assessed as Negligible.	No	Negligible	Long

PSR 003	There is a good buffer of public open space between this receptor and the Residential part of the Proposed Development There will be some visibility of the lighting within the wider Application, but due to the mitigation embedded into the Lighting Strategy (Appendix 16.1) this is unlikely to result in an increase in glare or other effects on the drivers and is not likely to alter the lighting levels on this roadway. As such, this magnitude of change is assessed as Negligible.	No	Negligible	Long
PSER 001	This Local Nature Reserve and Local Wildlife Site lies immediately to the South of the Application Site; however, the illustrative masterplan at Figure 4.2 shows that the part of the Application Site bounding the LNR and LWS is retained as public open space. In addition the mitigation contained within the Lighting Strategy (Appendix 16.1) means that it is unlikely that there will be illuminance levels on the LNR and LWS above the 0.4 Lux recommendation from GNO8:2023. This magnitude of change is assessed as Negligible.	No	Negligible	Long
PSER 002	These receptors are the existing and retained hedge rows within the Application Site and the nocturnal species (bats) that use these. Mitigation is embedded into the Lighting Strategy (Appendix 16.1) to reduce the effects of lighting on areas deemed as ecologically sensitive. It is possible that there will be illuminance levels on some parts of these hedge rows above the 0.4 Lux	Yes (in small areas)	Minor Adverse	Long

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	recommendation from GN08:2023, however, there will be maintained dark areas for the nocturnal species (bats) to use. As such, the magnitude of change is assessed as Minor Adverse.			
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Significance of Effect Assessment

- 16.4.7. The significance of effect is calculated using the matrix in **Table 16.5** by comparing the sensitivity of a receptor with the magnitude of change.

Table 16.17: Operational Phase Significance of Effect Assessment

Receptor Number	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
PHAR 001	Medium	Negligible	Neutral (Not Significant)	Long
PHAR 002	Medium	Negligible	Neutral (Not Significant)	Long
PHAR 003	Medium	Minor Adverse	Slight (Not Significant)	Long
PHAR 004	Medium	Negligible	Neutral (Not Significant)	Long
PHAR 005	Medium	Negligible	Neutral (Not Significant)	Long
PHAR 006	Medium	Minor Adverse	Slight (Not Significant)	Long
PHAR 007	Medium	Minor Adverse	Slight (Not Significant)	Long
PHAR 008	Medium	Minor Adverse	Slight (Not Significant)	Long
PHAR 009	Medium	Minor Adverse	Slight (Not Significant)	Long
PSR 001	Medium	Minor Adverse	Slight (Not Significant)	Long

Receptor Number	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
PSR 002	Medium	Negligible	Neutral (Not Significant)	Long
PSR 003	Medium	Negligible	Neutral (Not Significant)	Long
PSER 001	High	Negligible	Slight (Not Significant)	Long
PSER 002	High	Minor Adverse	Moderate (Not Significant)	Long

16.5. Mitigation, Enhancement and Residual Effects

Mitigation by Design

- 16.5.1. All mitigation by design is embedded into the lighting designs for the Proposed Development. As such, assessment of operational effects of obtrusive light includes this mitigation.

Table 16.18: Mitigation by Design

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	Installation Location	How measure would be secured
1	All luminaires will have an Upward Light Output Ratio of 0%.	Throughout the Proposed Development	By Conditioning the Lighting Strategy
2	All luminaires will be installed with a 0° inclination tilt as standard. An allowance to tilt luminaires to 5° may be made, where it is demonstrated that: - This is required to achieve a standard lighting level on the task or area, and - This will not result in any significant effects on the surrounding receptors.	Throughout the Proposed Development	By Conditioning the Lighting Strategy
3	Manufacturers often provide “back light optics” where back light mitigation is integrated on the lenses of the luminaires.	Throughout the Proposed Development: Where luminaires are installed on the	By Conditioning the Lighting Strategy

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Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	Installation Location	How measure would be secured
	This is the preferred option as it provides the greatest degree of controlled. Where this is not available, traditional back light shields can be used.	boundary of an area facing into the site.	
4	Throughout the Proposed Development the standard Correlated Colour Temperature used will be $\leq 3000\text{K}$. Where there are areas of specific ecological sensitivity the lighting near this area will be dropped to $\leq 2700\text{K}$. In locations where there are specific safety concerns, the Correlated Colour Temperature may be increased to $\leq 4000\text{K}$. However, a risk assessment needs to be undertaken to justify this increase if this does not form part of a local authority adoptable specification.	Throughout the Proposed Development	By Conditioning the Lighting Strategy
5	All areas and tasks will be lit using the lowest practicable applicable lighting levels as defined in the relevant British Standard. This will ensure recognised and consistent levels of light are provided for all areas of the Proposed Development, whilst ensuring no area is over lit. During the detailed lighting design, a risk assessment must be undertaken to help defined the specific lighting class for any area.	Whole Proposed Development	By Conditioning the Lighting Strategy
6	Throughout the Proposed Development a centralised lighting control system/s will be used. This will ensure lighting is only active as require during the hours of darkness, will allow dimming based on traffic flow, and switching to take place based on the hours of use. For example: When a street is experiencing low use over night the lighting can be dimmed, This will not only reduce the effects of lighting, but will save money and energy for the owner of the lighting system.	Throughout the Proposed Development	By Conditioning the Lighting Strategy

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	Installation Location	How measure would be secured
7	All luminaires will be mounted at the minimum practical mounting height for the area or task. This will reduce the visibility of the luminaires in the landscape, by allowing surrounding trees and buildings to act as blocking features to direct views of luminaires. This will also help ensure there is minimum need to tilt luminaires, by providing enough height for the light to travel forward into the task area.	Throughout the Proposed Development	By Conditioning the Lighting Strategy
8	The luminaire optic used will be specific to the area being lit. This will ensure the task and area is lit to a standard level of light, while also allowing the lux contours to be shaped to the specific areas. This will help reduce light spill out of areas and the either over lighting or under lighting of areas.	Throughout the Proposed Development	By Conditioning the Lighting Strategy
9	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 reported and minimised or mitigated.	Throughout the Proposed Development	By Conditioning the Lighting Strategy
10	Retaining hedge rows within the Site and along the boundaries. This will reduce visibility into the Application Site and therefore will reduce visibility of the proposed lighting.	In the locations stated on the Parameters Plan (see Figure 4.1).	By Condition
11	Embedded mitigation for the construction phase of the Proposed Development is detailed within Chapter 4. This includes limiting the hours of work.	Throughout the Proposed Development	By Condition

Additional Mitigation.

16.5.2. Mitigation for lighting effects is typically embedded into a design, and addition mitigation tends to be applicable to more than one aspect of the development design. For example,

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- Landscape; and
- Noise.

16.5.3. **Table 16.19** contains additional mitigation that may be secured to reduce the visible of and the direct effects of lighting.

Table 16.19: Additional Mitigation

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured	
		By S.106	By Condition
1	The use of solid hoarding during the construction phase.		X
2	Detailed obtrusive light calculations will be completed for the identified receptors along with an Isolux Contour plan. This will be required as part of planning conditions.		X

Residual Effects

Table 16.20: Residual Effects

Receptor Number	Residual Effect (Table 16.6)		Description of effect
	Construction	Operation	
PHAR 001	Neutral (Not Significant)	Neutral (Not Significant)	No noticeable change.
PHAR 002	Neutral (Not Significant)	Neutral (Not Significant)	No noticeable change.
PHAR 003	Slight (Not Significant)	Slight (Not Significant)	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.
PHAR 004	Neutral (Not Significant)	Neutral (Not Significant)	No noticeable change.
PHAR 005	Neutral (Not Significant)	Neutral (Not Significant)	No noticeable change.
PHAR 006	Slight (Not Significant)	Slight (Not Significant)	Slight increase in the visibility of lighting.

Receptor Number	Residual Effect (Table 16.6)		Description of effect
	Construction	Operation	
			Very low likelihood of breaches in the environmental zone limits lighting.
PHAR 007	Slight (Not Significant)	Slight (Not Significant)	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.
PHAR 008	Slight (Not Significant)	Slight (Not Significant)	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.
PHAR 009	Slight (Not Significant)	Slight (Not Significant)	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.
PSR 001	Slight (Not Significant)	Slight (Not Significant)	Slight increase in the visibility of lighting
PSR 002	Neutral (Not Significant)	Neutral (Not Significant)	No noticeable change.
PSR 003	Neutral (Not Significant)	Neutral (Not Significant)	No noticeable change.
PSER 001	Slight (Not Significant)	Slight (Not Significant)	For the construction and operation phase levels are unlikely to exceed the 0.4 Lux recommendation for GN08:2023. Effects will be long term.
PSER 002	Moderate (Not Significant)	Moderate (Not Significant)	Isolated locations where light levels may exceed the 0.4 Lux recommendation for GN08:2023. For the construction phase this will be temporary, but medium term. For the operation phase this will be a long term change.

16.5.4. In summary, no significant effects on all identified receptors within 2km of the Site are anticipated.

16.5.5. Receptor PSER 002 may experience effects that could be considered Moderate. This is because isolated locations along the retained hedge rows and boundaries may experience illuminance levels marginally above 0.4 Lux, but the majority of these hedge rows and boundaries will be

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maintained at light levels below 0.4 Lux, hence this not being considered a significant effect of lighting.

- 16.5.6. In totality, the Proposed Development will not result in significant effects of lighting on the identified receptor locations.

16.6. Cumulative and In-Combination Effects

- 16.6.1. **Table 16.21** lists the cumulative sites that have been identified for the Proposed Development. These sites have been assessed for the likelihood of having cumulative effects alongside the Proposed Development, and these effects have been categorised into direct effects (light spill and light intrusion) and indirect effects (upward light and sky glow) on the identified sensitive receptors. This initial assessment is based on the distance of the cumulative sites from the Site and the receptor.

- 16.6.2. This is because the effects of lighting decrease proportionally to the square of the distance from the light source. This results in a very large decrease in measurable lighting effects over greater and great distances.

Table 16.21: Cumulative Sites

Site Number	Scheme and Planning Reference	Approximate Distance from Application Site	Potential for Effects of Lighting	
			Direct	Indirect
1	Southfields Farm, Common Lane, Bramcote, Nottinghamshire, NG9 3DT 24/00066/FUL	1.50km to the north east	No	No
2	Land at Toton North	450m to the north east	Yes	Yes
3	Land at Toton East	30m to the east	Yes	Yes
4	Site of The Magpie Toton Lane Stapleford Nottinghamshire 20/00478/FUL	600m to the north	No	No
5	Bramcote College, Moor Lane, Bramcote, Nottinghamshire, NG9 3GA 22/00740/FUL	3.1 km to the north	No	No
6	Field Farm, Ilkeston Road, Stapleford,	3.1 km to the north north-west	No	No

Site Number	Scheme and Planning Reference	Approximate Distance from Application Site	Potential for Effects of Lighting	
			Direct	Indirect
	Nottinghamshire, NG9 8JJ 20/00116/FUL			
7	Land Adjacent And North West Of Bramcote Crematorium Coventry Lane, Bramcote, Nottinghamshire 20/00352/OUT 22/00619/REM	3.2 km to the north	No	No
8	Land East of Coventry Lane (west Of Moor Lane) Bramcote, Nottinghamshire 22/00967/FUL	3.4 km to the north	No	No
9	Former Stanton Ironworks Site, Lows Lane, Stanton By Dale, Derbyshire Erewash Borough Council (EBC) 1221/0002*	3.7 km to the northwest	No	No

16.6.3. Those sites in **Table 16.21** that have been identified as being capable of having either/or direct or indirect effects alongside the Proposed Development will be assessed in more detail (**Table 16.22**).

Table 16.22: Cumulative Magnitude of Change

Site Number	Relevant Receptors	Effects Assessment
2	PHAR 003 PHAR 004 PHAR 005 PHAR 006	This cumulative site is located to the north-east of the Application Site and extends north and east of Toton Lane Park & Ride. This cumulative site is residential and commercial in nature and will require external lighting in a similar fashion to the Proposed Development.

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Site Number	Relevant Receptors	Effects Assessment
	PHAR 007 PSR 001 PSR 002 PSER 002	The embedded mitigation that is detailed within this Chapter and within the Lighting Strategy (Appendix 16.1) will also be embedded into the lighting design for this cumulative site. This is because all the embedded mitigation is required to achieve best practice in lighting design. PHAR 003 is greater than 300m to the west of this cumulative site at its closest point. Due to this, the cumulative site and the Application Site have the potential to have cumulative effects, however the cumulative magnitude of change is assessed to be Minor Adverse and non-significant. PHAR 004 is directly adjacent to the south of the cumulative site. It will have potentially Minor Adverse magnitude of change from the cumulative site but is too far from the Proposed Development for there to be cumulative magnitude of change greater than Minor Adverse. PHAR 005 is approximately 50m to the south of the cumulative site. This receptor will have potentially Minor Adverse magnitude of change from the cumulative site. It is assessed that the cumulative magnitude of change will be Minor Adverse. PHAR 006 is over 200m to the south west of the cumulative site. This receptor will have potentially Minor Adverse magnitude of change from the cumulative site. It is assessed that the cumulative magnitude of change will be Minor Adverse. PHAR 007 is over 400m to the south west of the cumulative site. This receptor will have potentially Negligible magnitude of change from the cumulative site. It is assessed that the cumulative magnitude of change will be Minor Adverse. PSR 001 is over 250m to the west of the cumulative site. This distance is assessed to be too great for there to be glare effects from the cumulative site. The cumulative effects will be no greater magnitude than those directly from the Site. Therefore, the cumulative magnitude of change is assessed as Minor Adverse. PSR 002 is some distance from the cumulative site. It is unlikely that there will be any cumulative effects. The cumulative magnitude of change is assessed as Neutral. PSER 002 is in excess of 400m from this cumulative site, The effects will be Negligible magnitude from the Site.

Site Number	Relevant Receptors	Effects Assessment
		The cumulative magnitude of change is assessed as Minor Adverse , but non-significant.
3	PHAR 003 PHAR 004 PHAR 005 PHAR 006 PHAR 007 PSR001 PSER 002	This cumulative site is located to the east of the Application Site, separated by the B6003 Stapleford Lane. This cumulative site is purely residential in nature and will require external lighting in a similar fashion to the Proposed Development. The embedded mitigation that is detailed within this Chapter and within the Lighting Strategy (Appendix 16.1) will also be embedded into the lighting design for this cumulative site. This is because all the embedded mitigation is required to achieve best practice in lighting design. PHAR 003 is approximately 65m to the west of this cumulative site at its closest point. Due to this, the cumulative site and the Application Site have the potential to have cumulative effects, however due to the screening from foliage, the cumulative magnitude of change is assessed to be Minor Adverse and non-significant. PHAR 004 is located 190m to the east of the cumulative site. The magnitude of change from the cumulative site is assessed to be Minor Adverse and the cumulative magnitude of change is no greater than Minor Adverse. PHAR 005 is located approximately 50m to the south and east of the cumulative site. The magnitude of change from the cumulative site is assessed to be Minor Adverse and the cumulative magnitude of change is no greater than Minor Adverse. PHAR 006 is immediately to the south of this cumulative site at its closest point. Due to this, the cumulative site and the Application Site have the potential to have cumulative effects, however the cumulative magnitude of change is assessed to be Minor Adverse and non-significant PHAR 007 is separated diagonally from the cumulative site by Stapleford Lane. The magnitude of change from the cumulative site is assessed to be Minor Adverse and the cumulative magnitude of change is no greater than Minor Adverse. PSR 001 separates the cumulative site and the Site. The magnitude of change from the cumulative site is assessed to be

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Site Number	Relevant Receptors	Effects Assessment
		Minor Adverse. There will be no cumulative effects greater than Minor Adverse. PSER 002 is to the west of the cumulative site. The effects will be of a lesser magnitude to those from the Site. Therefore, the cumulative magnitude of change is assessed as Negligible.

Table 16.23: Cumulative Significant Effect

Receptor Number	Sensitivity	Magnitude Change	of	Significance Effect	of
PHAR 001	Medium	Negligible		Neutral Significant)	(Not
PHAR 002	Medium	Negligible		Neutral Significant)	(Not
PHAR 003	Medium	Minor Adverse		Slight Significant)	(Not
PHAR 004	Medium	Minor Adverse		Slight Significant)	(Not
PHAR 005	Medium	Minor Adverse		Slight Significant)	(Not
PHAR 006	Medium	Minor Adverse		Slight Significant)	(Not
PHAR 007	Medium	Minor Adverse		Slight Significant)	(Not
PHAR 008	Medium	Minor Adverse		Slight Significant)	(Not
PHAR 009	Medium	Minor Adverse		Slight Significant)	(Not
PSR 001	Medium	Minor Adverse		Slight Significant)	(Not

PSR 002	Medium	Negligible	Neutral (Not Significant)
PSR 003	Medium	Negligible	Neutral (Not Significant)
PSER 001	High	Negligible	Slight (Not Significant)
PSER 002	High	Minor Adverse	Moderate (Not Significant)

16.6.4. It is accepted that there will be an increase in the volume of lighting within and surrounding the Site due to the Proposed Development and the cumulative sites. These are not likely to cause significant effects of lighting (or statutory nuisance) onto the identified receptors.

16.6.5. This increase in lighting is also not going to result in a change in the environmental zone of the area.

16.6.6. The area surrounding the Site is already a suburban location with sky quality typically of such a location, and the introduction of the Proposed Development and the cumulative sites will not change this.

16.6.7. As such, the environmental zone will remain E3.

16.7. Summary

Introduction

16.7.1. This assessment has been completed to assess the potential effects of the artificial lighting for the Proposed Development on the identified receptors.

16.7.2. This Chapter should be read in conjunction with the following technical appendices:

- **Appendix 16.1** – Lighting Strategy
- **Appendix 16.2** – Lighting Baseline Assessment
- **Appendix 16.3** – Lighting Receptor Locations

Baseline Conditions

16.7.3. The area surrounding the Site is a broad mixture of commercial uses and suburban settlement interspersed with agricultural land.

16.7.4. There is a large amount of existing artificial lighting in the area for commercial, residential and highway network purposes. This existing lighting is visible across the landscape and is affecting the district brightness of the surrounding area.

16.7.5. Due to the above, the Site and the surrounding area has been assessed as an E3 environmental zone

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- 16.7.6. Artificial lighting is prominent in the landscape. However, the direct effects of this lighting are concentrated close to the lit areas. This is shown by the measured illuminance results detailed in **Table 4** of **Appendix 16.2**.
- 16.7.7. Although there is a large presence of existing lighting surrounding the Site, there are large areas of relative darkness also within the Site.
- 16.7.8. This indicates that although several of the receptors to lighting identified in this chapter have direct views of existing lighting, they will not be experiencing significant existing direct effects of lighting. There are likely to be minor direct effects on these receptors by the existing lighting directly adjacent to them, but the further the distance from the existing lighting, the lower the lighting effect will be.

Likely Significant Effects

- 16.7.9. The Proposed Development is unlikely to result in significant effect on the identified receptors, both in isolation and cumulative with the relevant identified sites.
- 16.7.10. It should be noted that there may be isolated instances where the illuminance levels on the retained hedge rows exceed 0.4 Lux. This will only be where they are directly adjacent to roadways and the vast majority of these areas will be maintained in darkness.
- 16.7.11. The potential for the environmental zone to change as a result from the Proposed Development and the cumulative sites has been assessed.
- 16.7.12. The area surrounding the Site is already a suburban location with sky quality typically of such a location, and the introduction of the Proposed Development and the cumulative sites will not change this.
- 16.7.13. As such, the environmental zone will remain E3.

Mitigation and Enhancement

- 16.7.14. Both embedded mitigation (**Table 16.18**) and additional mitigation (**Table 16.19**) measures are proposed. All of which can be secured through planning conditions.
- 16.7.15. The embedded mitigation is also detailed within the Lighting Strategy (**Appendix 16.1**), and to comply with the Lighting Strategy the lighting designs must demonstrate they have incorporated this mitigation.

Conclusion

- 16.7.16. In conclusion, the Proposed Development will result in an increase in the visibility of lighting within the Application Site but there will not be significant effects of lighting on the identified receptors.
- 16.7.17. The identified receptors will not experience any statutory nuisance from the proposed lighting.
- 16.7.18. There will also be no change in the environmental zone of the area once the Proposed Development is in operation.
- 16.7.19. **Table 16.24** provides a summary of effects, mitigation and residual effects.

Table 16.24: Summary of Effects, Mitigation and Residual Effects

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
Construction								
PHAR 001	No noticeable change	Temporary / Direct	Medium	Negligible	Local	Neutral	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PHAR 002	No noticeable change	Temporary / Direct	Medium	Negligible	Local	Neutral	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PHAR 003	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.	Temporary / Direct	Medium	Minor Adverse	Local	Slight Adverse	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 004	No noticeable change	Temporary / Direct	Medium	Negligible	Local	Neutral	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PHAR 005	No noticeable change.	Temporary / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as	Neutral

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							detailed within the Lighting Strategy (Appendix 16.1)	(not significant)
PHAR 006	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.	Temporary / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 007	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.	Temporary / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 008	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.	Temporary / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 009	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.	Temporary / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)

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PSR 001	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.	Temporary / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PSR 002	No noticeable change	Temporary / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PSR 003	No noticeable change	Temporary / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PSER 001	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.	Temporary / Direct	High	Negligible	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PSER 002	Isolated locations where light levels may exceed the 0.4 Lux recommendation for GNO8:2023.	Temporary / Direct	High	Minor Adverse	Local	Moderate (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Moderate (not significant)

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	For the construction phase this will be temporary, but medium term.							
Operation								
PHAR 001	No noticeable change	Permanent / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PHAR 002	No noticeable change	Permanent / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PHAR 003	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits for lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 004	No noticeable change	Permanent / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PHAR 005	No noticeable change	Permanent / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as	Neutral

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							detailed within the Lighting Strategy (Appendix 16.1)	(not significant)
PHAR 006	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 007	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 008	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 009	Slight increase in the visibility of lighting. Very low likelihood of breaches in the environmental zone limits lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PSR 001	Slight increase in the visibility of lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as	Slight

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	Very low likelihood of breaches in the environmental zone limits lighting.						detailed within the Lighting Strategy (Appendix 16.1)	(not significant)
PSR 002	No noticeable change	Permanent / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PSR 003	No noticeable change	Permanent / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PSER 001	Illuminance will not exceed the 0.4 Lux recommendation for GNO8:2023.	Permanent / Direct	High	Negligible	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PSER 002	Isolated locations where light levels may exceed the 0.4 Lux recommendation for GNO8:2023. For the operation phase this will be a long term change.	Permanent / Direct	High	Minor Adverse	Local	Moderate (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Moderate (not significant)
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PHAR 001	No noticeable change	Permanent / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PHAR 002	No noticeable change	Permanent / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PHAR 003	Slight increase in the visibility and effects of lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 004	Slight increase in the visibility and effects of lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 005	Slight increase in the visibility and effects of lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 006	Slight increase in the visibility and effects of lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 007	Slight increase in the visibility and effects of lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)

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PHAR 008	Slight increase in the visibility and effects of lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PHAR 009	Slight increase in the visibility and effects of lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PSR 001	Slight increase in the visibility and effects of lighting.	Permanent / Direct	Medium	Minor Adverse	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)
PSR 002	No noticeable change	Permanent / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PSR 003	No noticeable change	Permanent / Direct	Medium	Negligible	Local	Neutral (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Neutral (not significant)
PSER 001	Illuminance will not exceed the 0.4 Lux recommendation for GN08:2023.	Permanent / Direct	High	Negligible	Local	Slight (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Slight (not significant)

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PSER 002	Isolated locations where light levels may exceed the 0.4 Lux recommendation for GNO8:2023.	Permanent / Direct	High	Minor Adverse	Local	Moderate (not significant)	Best practice for the designing of lighting as detailed within the Lighting Strategy (Appendix 16.1)	Moderate (not significant)

ⁱ Institution of Lighting Professionals (2021) Guidance Note 01:21 The Reduction of Obtrusive Light, Institution of Lighting Professionals

ⁱⁱ Institution of Lighting Professionals and Bat Conservation Trust (2023) Guidance Note 08:23 Bats and Artificial Lighting at Night, Institution of Lighting Professionals

ⁱⁱⁱ Institution of Lighting Professionals (2013) Professional Lighting Guide 04:13 Guidance on Undertaking Environmental Lighting Impact Assessments, Institution of Lighting Professionals

^{iv} Highways England, Transport Scotland, Welsh Government, Department for Infrastructure (27th August 2020) Design Manual for Roads and Bridges LA 104 Environmental Assessment and Monitoring, Highways England

^v Institution of Lighting Professionals (2019) Guidance Note 10:19 Night Time Photography, Institution of Lighting Professionals