



Lighting Strategy

Miller Homes, Campsfield, Southwater

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Basis of Report

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Executive Summary

The Client has instructed SLR Consulting Ltd to provide a lighting strategy to support an outline planning application for proposed housing development at Campsfield, Southwater, West Sussex, RH13 9FT.

The lighting strategy will consider the requirements of all current industry regulations and recommendations alongside the requirement to protect light sensitive ecology including affects to biodiversity.

A best practice approach has been taken to ensure the scheme has minimal impact on the surrounding environment whilst providing safe and secure lighting where necessary.

The result of a detailed lighting design based on the advice contained within this Lighting Strategy would provide a suitable and compliant scheme with minimal impact on ecology or other receptors.

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Acronyms and Abbreviations

CIBSE	Chartered Institute of Building Services Engineers
ILP	Institute of Lighting Professionals



1.0 Introduction

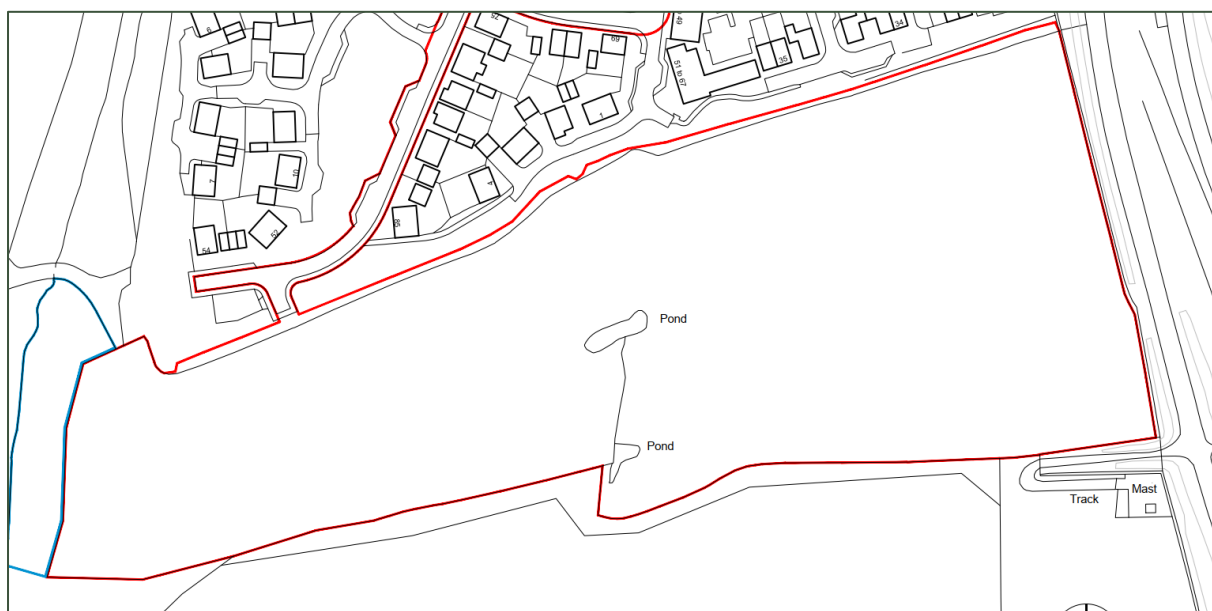
1.1 Purpose of Report

- 1.1.1 The Lighting Strategy is provided to support an outline planning application for proposed housing development at Campsfield, Southwater, West Sussex, RH13 9FT.
- 1.1.2 The report is intended to provide details of a carefully considered strategy for any lighting within the Proposed Development Site required for the safety, security and amenity of the residents whilst balancing the requirements to protect any identified receptors such as adjacent residential properties, light sensitive ecology, their linked natural habitats and the quality of the night sky. At this 'outline' application stage, the parameters considered by this report provide a framework for a sensitive lighting design at the detailed design stage.

1.2 Site Context

- 1.3 The proposed development is situated in Campsfield, Southwater, West Sussex, RH13 9FT. Centred on Grid Reference TQ161248. The site is approximately 55 metres west of the North bound A24 and borders an existing housing development based around Centenary Road. The site is located at what3words: ///happy.travels.masts and is within Horsham district.
- 1.4 The development will contain upto 82 residential properties of a mix of tenures, types and sizes supported by associated infrastructure.
- 1.5 The properties will be encompassed by large areas of public open space, strategic landscaping, including designated dark corridors for biodiversity and ecology.
- 1.6 The extent of the proposed development is shown in Figure 1 below:

Figure 1 – Location & Boundary



2.0 Methodology, Policy and Guidance

- 2.1 The lighting strategy uses the information provided in Section 2.2 below along with policy and guidance as per Section 2.3, to determine the best practise for lighting impacts to human and ecological receptors.
- 2.2 The following information has been considered:
- Drawing 02.40(02)00 Illustrative Masterplan;
 - Drawing 02.40(01)01 Parameter Plan; and
 - Information and advice from project ecologists Ecosupport Ltd.
- 2.3 The following documents have been referred to in the preparation of this document. It is expected that, at the time of Detailed Design, the latest issue of the documents below will be referred to so as to ensure current regulations and best practice are met:

Government

- Clean Neighbourhoods and Environment Act 2005, (Section 102).
- DEFRA: Guidance on Sections 101 to 103 of the Clean Neighbourhoods and Environment Act 2005.
- Wildlife & Countryside Act 1981.
- Conservation (Natural Habitats etc.) Regulations 1994.

ILP - Institution of Lighting Professionals

- GN01:2021. Guidance Notes for the Reduction of Obtrusive Light.
- PLG02:2013. The Application of Conflict Areas on the Highway.
- PLG03:2012. Lighting for Subsidiary Roads.
- PLG04:2013. Guidance on Undertaking Environmental Lighting Impact Assessments.
- Bat Conservations Trust ILP Guidance Note 08/23 - Bats and Artificial Lighting at Night
- TR12-1:1997. Lighting of Pedestrian Crossings.
- TR25:2002. Lighting for Traffic Calming Features.

SLL - The Society of Light and Lighting (CIBSE)

- Fact File 8: Lighting for People who are Visually Impaired 2012.
- The SLL Lighting Handbook 2018.
- The SLL Code for Lighting 2022.



CIE - International Commission on Illumination

- CIE Publication 150-2017. Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations, 2nd Edition.
- CIE Publication 115-2010. Lighting of Roads for Motor & Pedestrian Traffic.
- CIE Publication 126-1997. Guidelines for minimising sky glow.

British Standards

- BS 5489-1:2020 - Design of road lighting - Lighting of roads and public amenity areas. Code of Practice.
- BS EN 12464-2:2014 - Light and lighting - Lighting of work places - Part 2: Outdoor work places.

Other

- International Dark-Sky Association.
- All-party Parliamentary Group (APPG) for Dark Skies.
- Bat Conservations Trust.
- Eurobats Publication Series No.8 - Guidelines for Consideration of bats in lighting projects.

- 2.4 To determine the environmental zone for the site, information provided in the Institute of Lighting Professionals (ILP) Guidance Note 1 The Reduction of Obtrusive Light Table A is replicated below. Environmental Zone **E3** as the appropriate zone for the site.

Table A: ILP Environmental Zones			
Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones 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 of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity
a) Rural Zones under protected designations should use a higher standard of policy. b) Zone E0 must always be surrounded by an E1 Zone. c) Zoning should be agreed with the local planning authority.			



- 2.5 Table B below shows illuminance limitations (lux levels) and maximum luminous intensity (cd, candelas) for each Environmental Zone. These are the maximum levels of light that would be permitted at the receptor and the emission of the light source within the luminaire when viewed from the receptor position.
- 2.6 For Environmental Zone E3 this would be maximum of 10 lux pre-curfew and 2 lux post-curfew. As a simple comparison, a standard candle at 1 metre would give 1 lux and twilight is judged to be approximately 1 lux. The maximum luminous intensity allowed would be 10,000 cd pre-curfew and 1,000 cd post-curfew.
- 2.7 Pre-curfew hours would be considered from dusk until 21:00 hours (a reasonable expected time) then from 06:00 until dawn.

Table B: Illuminance Limitations & Maximum Luminous Intensity (Ap)				
Zone	Pre-Curfew (lx)	Post-Curfew (lx)	Pre-Curfew (cd)	Post-Curfew (cd)
E0	N/A	N/A	0	0
E1	2	<0.1*	2,500	0
E2	5	1	7,500	500
E3	10	2	10,000	1,000
E4	25	5	25,000	2,500
	* If the installation is for public (road) lighting then this can increase to 1 lx			

- 2.8 The Institute of Lighting Professionals (ILP) Guidance Note 8 Bats and Artificial Lighting 2023 provides further detail with particular attention to sections "Appropriate Luminaire Specifications 4.29" and "Lighting Contour Plans 4.51-4.54".
- 2.9 Potential receptors are identified as:
- **Bats**, especially light sensitive species utilising the treelines and hedgerows around the periphery of the Proposed Development Site as foraging and commuting routes as part of a network of linked habitats including the dense woodland to the east (either side of the A24) and the woodland belt to the west (following the watercourse to the north and south).
 - **Residential properties** to the north on Heasman Place and Centenary Road that may have outward view towards the Proposed Development Site although these receptors benefit from significant screening by the treelines at the boundary.
 - **The quality of the night sky** as the existing condition can be considered as Class 4 on the Bortle Scale, consistent with a 'Brighter Rural' sky.



2.10 Bats and Lighting

- 2.11 Relevant extracts from the 'National Planning Policy Framework (NPPF) December 2024':
- 2.12 Para 187: "Planning policies and decisions should contribute to and enhance the natural and local environment by: a) protecting and enhancing valued landscapes, sites of biodiversity or geological value. d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures and incorporating features which support priority or threatened species such as swifts, bats and hedgehogs."
- 2.13 Para 192: "To protect and enhance biodiversity and geodiversity, plans should: a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity⁶⁸; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity."
- 2.14 Para 193: "When determining planning applications, local planning authorities should apply the following principles: a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused; c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and. d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate."
- 2.15 Para 195: "The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site."
- 2.16 Para 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: c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."
- 2.17 Relevant extracts from the 'Bat Conservations Trust ILP Guidance Note 08/2023 - Bats and Artificial Lighting at Night' include:
- 2.18 (1.12) - *'In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats. Many night-flying species of insect that bats hunt are*



attracted to light, especially those light sources that emit an ultraviolet component (Light Emitting Diodes (LEDs) have removed this) or have a high blue spectral content.'

- 2.19 **Applied Strategy:** No lighting equipment to be specified that includes any UV emission and the colour temperature must be 2700k or lower.
- 2.20 (1.21) - *'Continuous lighting in the landscape, such as along roads or waterways, creates barriers which many bat species cannot cross, especially slower-flying species, even at very low light levels. Lesser Horseshoe bats have been shown to move their flight paths which link their roosts and foraging grounds to avoid artificial light installed on their usual commuting routes. Significant effects have been recorded from as low as 3.6 lux.'*
- 2.21 **Applied Strategy:** Careful consideration must be made for linear features such as the internal roadways requiring lighting at night, to prevent the bisection of parcels of habitat through continuous lighting. Mitigations such as part night lighting and part night dimming to be included in the control strategy as well as breaks in the lighting installed to create a network linked dark habitats via the hedgerows and tree lines throughout the proposed development.
- 2.22 (4.15) - *'An adverse impact from illumination onto a Key Habitat feature is likely to have a significant effect on the bats using it. Therefore, an absence of artificial illumination and glare acting upon both the feature and an appropriately sized buffer zone is most often the only acceptable solution. An ecologist will be best placed to set the size of such a buffer zone according to the species present and the level of usage, and these can be tens of metres if unattenuated light spill or glare from local sources is predicted. The input of a lighting professional should be sought when determining the distances of light spill from new sources and likelihood of glare.'*
- 2.23 **Applied Strategy:** In coordination with the project ecologist as part of the outline scheme design, buffers protecting areas of existing bat activity are to be defined with the intention of preserving relative darkness throughout those habitats, foraging and commuting routes. In addition, where the ecologist identifies suitable links to form 'dark corridors' enabling light sensitive ecology to access a wider network of linked habitats throughout the proposed development site, these must also be protected from light pollution.
- 2.24 (4.16) - *'...There is no legal duty requiring any place to be lit. British Standards and other policy documents allow for deviation from their own guidance where there are significant ecological/environmental reasons for doing so. It is acknowledged that in certain situations lighting is critical in maintaining safety... Nevertheless, these are not exempt from the statutory protection afforded to bats, their roosts and commuting routes directly associated with roosts, and good design principles such as the Institution of Lighting Professionals' GN01: The Reduction of Obtrusive Light remain best practice. However, in the public realm, while lighting can increase the perception of safety and security, measurable, objective benefits on safety and security are less well established. Consequently, lighting design should be holistic, taking into consideration the relevant British Standards or local policies concerning lighting but, through a risk assessment-style process, be able to fully take into account the presence of protected species and the likely adoption of mitigation approaches through proper engagement with local communities.'*



- 2.25 **Applied Strategy:** Subject to risk assessments at the detailed design phase, consideration should be made to areas of conflict between maintaining dark corridors and lighting for safety, security and amenity to potentially abstaining from lighting those areas and maintaining areas of unlit roadway to preserve dark 'hop-over' links to habitats beyond.
- 2.26 (4.31) - *'Light spill can be successfully screened through landscaping and the installation of walls and fences, or even banks and bunds. In order to ensure that fencing makes a long-term contribution, it is recommended that it is supported on concrete or metal posts. Fencing can also be over planted with hedgerow species or climbing plants to soften its appearance and provide a vegetated feature which bats can use for navigation or foraging.'*
- 2.27 **Applied Strategy:** Where appropriate, opaque fences should be included within the landscaping design to help with the limitation of light spill to any identified areas of sensitivity or to preserve the quality of lighting buffers.
- 2.28 (4.35) - *'Depending on the pattern of bat activity across the Supporting Habitat identified by the ecologist, it may be appropriate for an element of on-site lighting to be controlled by dimming or switching either diurnally, seasonally, or according to human activity (light on demand). This is known as Part-Night Lighting (PNL). It is important to state that PNL is not likely to be appropriate where Key Habitats are at risk, especially as PNL often results in lighting when bats are most active.'*
- 2.29 **Applied Strategy:** The inclusion of Part Night Lighting can be effective in managing areas such as roadways and associated active travel links that benefit from lighting in terms of road safety and a reduction in the fear of crime but would ideally not be continuously lit. Conflict areas and crossings may be continuously lit during the hours of darkness for safety whilst the typical roadway may be subject to 'switch off' during late night hours. This ensures the lighting is not continuous and therefore does not present a barrier to light sensitive species in the landscape.



3.0 Lighting Strategy

3.1 Highways

- 3.2 Primary roadways such as the primary spine roadway within the Proposed Development Site, require suitable lighting subject to risk assessments and suitable Lighting Classes defined at detailed design stage.
- 3.3 Primary roadways should meet all criteria for adopted highways in terms of illumination and uniformity. Any lighting proposals must comply with appropriate standards and guidance as appropriate for the road class and risk assessment.
- 3.4 Lighting should follow the hierarchy of the road network within the development plans. Higher levels of illumination may be required at junctions, conflict areas and spine roads with higher traffic volumes. Minor access roads can have lower column heights and lower levels of illumination proportionate to the roadway class and risk assessments. Peripheral areas such as hammer-heads and access to frontages should be left unlit to reduce any potential impact on the protected 'Dark Zones' as defined by the ecologist.
- 3.5 Mitigations such as back-light shields and good optical control can minimise impact where roadway lighting must be adjacent to light sensitive habitats such as tree lines. Low colour temperature warm white or red spectrum lighting can also be used where necessary to further reduce impacts on ecology.

3.6 Design Parameters

- 3.7 The Lighting Class identified for the core roadways by outline risk assessment should be P5 (lux ave 3 - 4.5, minimum 0.6) and the scheme should be calculated to this Lighting Class within the areas identified as 'Core Development' in Figure 2.
- 3.8 Columns should be a maximum of 6 metres in height and conform to local highways agency specifications.
- 3.9 LED luminaires should meet local highways agency standard specification or equivalent.
- 3.10 It is recommended that all lighting within the Proposed Development Site be a maximum colour temperature of 2700 kelvin with a minimum colour rendition CCT of 70+. Phosphor Converted (PC) amber 1700 kelvin LED lighting may also be considered appropriate.
- 3.11 Where the spine roadway crosses the area of linked habitat that bisects the Proposed Development parcels north/south, a dark area should be preserved.
- 3.12 This may be achieved by using red Light (1000 kelvin colour temperature) LED with part night switch off controls that covers at least 10 metres either side of the dark 'hop-over' shown in Figure 2. The same applies to the access from Centenary Road. This mitigation is for the protection of bat movement and other wildlife to utilise this linked habitat and prevents the bisection of foraging and commuting routes.



- 3.13 The use of monochromatic or red light is encouraged in the ILP Guidance Note 08/23 Bats and Artificial Lighting At Night where Case Study 7 may be referred to as a reference project.
- 3.14 Alternatively, the areas identified as a dark 'hop-over' may remain unlit subject to risk assessment at detailed design stage.
- 3.15 To reduce risks associated with unlit sections of the spine road, pedestrian / cycle routes are to be separated with a grass strip and a form of barrier such as low-level planting between the active travel paths and the carriageway, provided to dissuade crossing of the spine road in the dark areas.
- 3.16 An additional mitigation for safety in the dark areas are the inclusion of in-ground solar marker LEDs (with top shields) which do not provide illumination but do provide visible way finding in the dark areas. This technique is encouraged in the ILP Guidance Note 08/23 Bats and Artificial Lighting At Night where Case Study 1 may be referred to as a reference project. It should be noted *'No accidents or uplift in crime in this area was reported and the solar-powered way-markers have subsequently been integrated into downstream developments to protect bat foraging habitats, where these intersect with key green infrastructure components'*.
- 3.17 Hammerhead turning points and periphery access to frontages should not be illuminated to preserve and protect the dark borders for the benefit of ecology.
- 3.18 The pedestrian crossing required to cross the spine road (footpath aligned north/south located to the central east of the Site) will need to be assessed as part of the detailed lighting design to ensure sufficient illumination for the safety of pedestrians and cyclists in this area.
- 3.19 LED luminaires should match local highways agency controls specification or equivalent, to allow for easier adoption of site should adoption be required.

3.20 Residential

- 3.21 Developer installed exterior lighting equipment should be provided for all primary entrances, garages and rear gardens to dissuade the installation of ad-hoc lighting post habitation. No light from exterior amenity lighting should project beyond the property boundary.
- 3.22 Exterior lighting specified must have no visible light source or diffused surface, downward only optics, and very low output. Units should have inbuilt presence detection (with no manual override) and this should be set to minimum practical duration 'on' and minimum sensitivity to reduce false triggering from a distance.
- 3.23 Luminaires to the front of properties, rear gardens and garages should be of suitable domestic amenity use with a maximum of 2700 kelvin colour temperature, or ideally lower, contain no upward light distribution, and the downward distribution should not leave the immediate area intended for illumination (i.e. the immediate area at the front door, the immediate area at the garage door or rear garden access door).
- 3.24 Examples of good and poor domestic amenity lighting are shown in **Table C**:



Table C: Examples of Good & Bad Domestic Amenity Lighting		
Exterior Entrance Lighting	Exterior Garage Lighting	Exterior Garden Lighting
		
<p>Do Not Specify:</p> <ul style="list-style-type: none"> Directly visible light source / lit surface Excessively bright Source of glare Projects light laterally No optical control Upward light emission No presence detection 		
		
<p>Do specify:</p> <ul style="list-style-type: none"> No visible light source Minimal light output No glare Light constrained to area Good optical control No upward light emission Presence detection 		

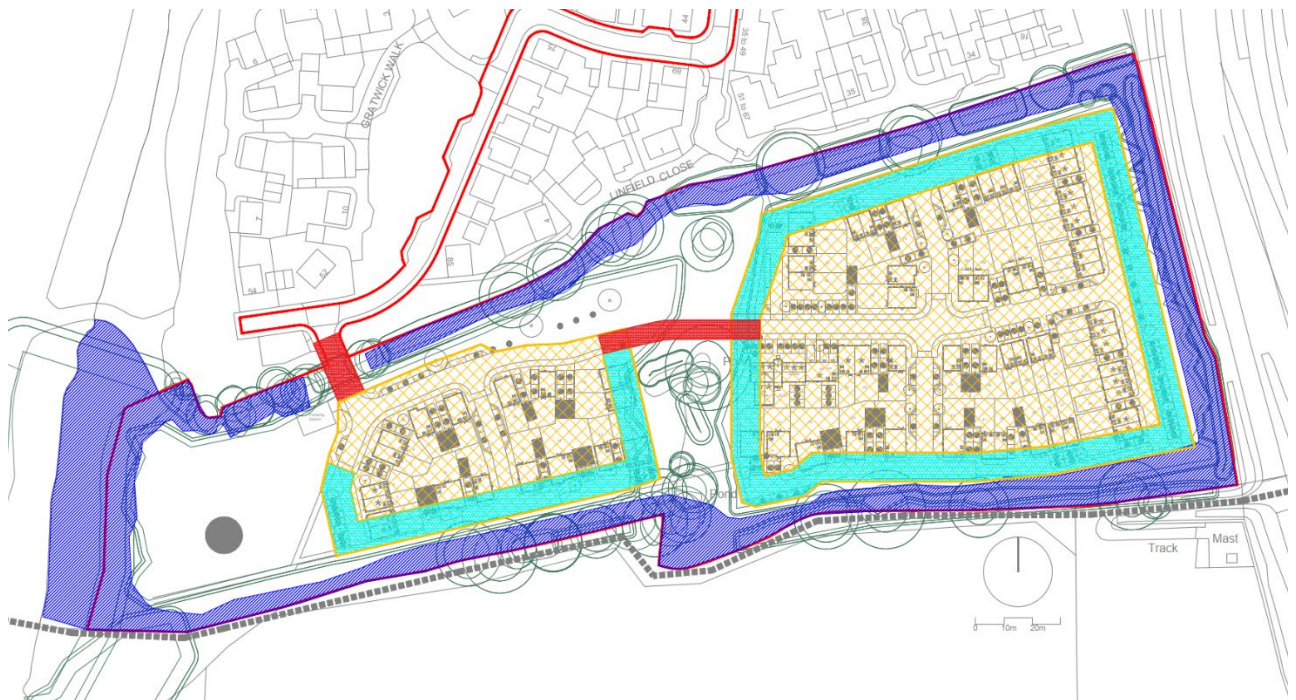
3.25 Sitewide

3.26 Areas surrounding the site are to be considered as 'low light zones' and linked habitats should be kept dark with reference to limits from "Institute of Lighting Professionals (ILP) Guidance Note 8 Bats and Artificial Lighting 2023" of 0.2 lux or below on the horizontal plane (ground level) and 0.4 lux on the vertical plane (0.5m – 8m height).

3.27 See **Figure 2** for site area descriptions:



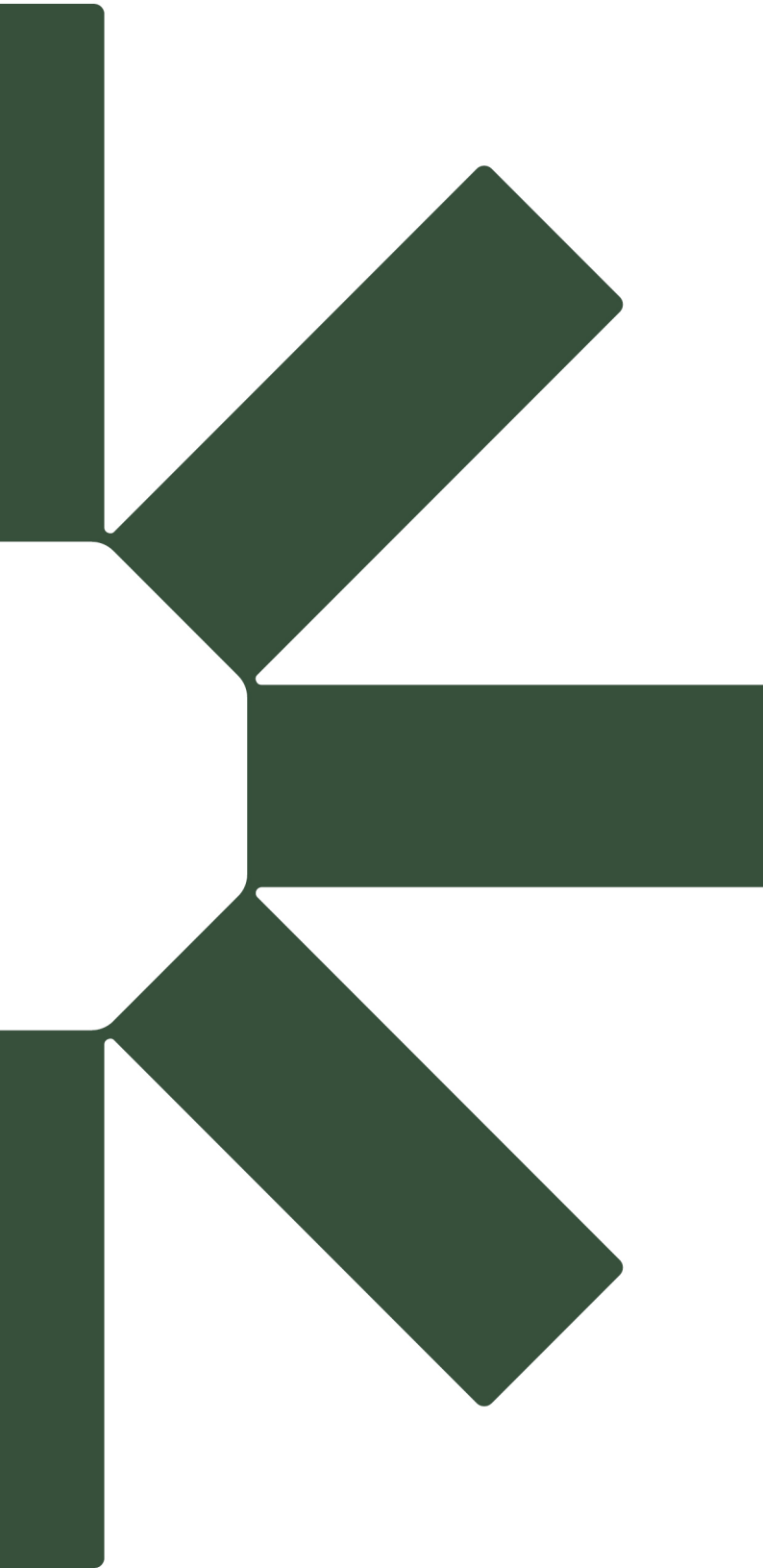
Figure 2 – Lighting Parameters



Key:

- Area hatched in **orange** represents the 'Core Development' parcels as per the development parameter plans.
 - Roads lit to Lighting Class P5.
 - Domestic Amenity Lighting (See Section 3.15).
- Area hatched in **cyan** representing a 'low light' zone, designed to act as a lighting buffer and set at 10 metres inwards from the core development area boundary.
 - No roadway lighting to hammer-heads or peripheral areas.
 - Minimal output residential amenity lighting (See Section 3.15) with presence detection.
- Area hatched in **red** represents dark 'hop-over' points to allow for linked habitats.
 - Use of monochromatic red light to Lighting Class P5.
 - Part night switch off from curfew time.
 - Lit from either side and minimal illumination in the centre to allow dark passage for foraging or commuting bats.
 - Separation of pedestrian and cycle paths from the carriageway plus inclusion of in-ground solar way markers to aid wayfinding.
- Area hatched in **dark blue** represents the area defined by the ecologist as sensitive habitat for light sensitive bat species
 - Peak illuminance of 0.4 lux on the vertical plane (0.5m to 8m from ground level).
 - Peak illuminance of 0.2 lux on the horizontal plane (at ground level).
 - No lighting of any kind installed in this zone.





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