

BRE Client Report

**Lighting report in relation to Planning Application
23/02913/FULMAJ, Land Opposite Nightingale Farm, Wantage
Road, Leckhampstead, Newbury**

Prepared for: Mr J Duffield
Date: 09 February 2024
Report Number: P127438-1000 Issue 1

BRE
Bucknalls Lane
Watford, Herts
WD25 9XX

T + 44 (0) 333 321 8811
E enquiries@bregroup.com
www.bregroup.com

Prepared for:

Mr J Duffield
Marcham Farms Limited
Down End House
Chieveley
Near Newbury
Berkshire
RG20 8TG



Prepared by

Name Dr Cosmin Ticleanu

Position Principal Consultant, Lighting

Date 09 February 2024

Signature

A handwritten signature in blue ink, appearing to read 'C. Ticleanu', is positioned to the right of the 'Signature' label.

Checked by

Name Gareth Howlett

Position Senior Consultant, Lighting

Date 09 February 2024

Signature

A handwritten signature in black ink, appearing to read 'G. Howlett', is positioned to the right of the 'Signature' label.

This report is made on behalf of Building Research Establishment Ltd. (BRE) and may only be distributed in its entirety, without amendment, and with attribution to BRE to the extent permitted by the terms and conditions of the contract. BRE's liability in respect of this report and reliance thereupon shall be as per the terms and conditions of contract with the client and BRE shall have no liability to third parties to the extent permitted in law.



Executive summary

Planning application ref 23/02913/FULMAJ has been submitted to West Berkshire Council for new agricultural premises at Land off of Wantage Road, Leckhampstead, RG20 8QT. This site is in the North Wessex Downs Area of Outstanding Natural Beauty (AONB). Concerns have been raised in relation to potential obtrusive light effects arising from the proposed development, yet the above planning application appears to contain limited information on the proposed external lighting, and no lighting design documentation or an assessment of potential light pollution impacts on the AONB.

BRE have been commissioned by Mr J Duffield of Marcham Farms Limited (the Client) through their instructing solicitors CMS Cameron McKenna Nabarro Olswang LLP to prepare an expert lighting report to support their planning objection to the proposal at the above site.

No site visit has been undertaken to survey the site location. In the absence of lighting design documentation and an assessment of potential light pollution impacts, this lighting report provides a qualitative evaluation of the available information and highlights aspects of concern and/or elements that may necessitate appropriate assessment as part of the planning process. It addresses both the reduction of obtrusive light in the surrounding environment and the need for protecting protected wildlife species from harmful effects of light (such as bats).

There is limited information in the planning application documentation in relation to the proposed external lighting and its potential impacts on the surrounding environment and the AONB. There are several conditions that the proposed external lighting should adhere to, yet no specific reference to the ILP guidelines could be found in the available documentation.

Besides the data presented in the 'Proposed External Lighting Plan' ref 2223 090, no lighting design material or an assessment of potential impacts arising from the proposed external lighting could be found in the documentation submitted with the application. There is limited information on luminaire specification and additional evidence on spatial light distribution would be needed.

Fully cut-off luminaires with a correlated colour temperature of no more than 2700K are recommended across the entire external lighting scheme proposed to limit the potential for obtrusive light effects.

The proposed lighting controls appear to be reasonable, yet there is no information on operational hours. If activities are expected to take place during the hours of darkness, it is strongly recommended to introduce curfew hours during which external lighting should be switched off or reduced to maintain environmental integrity. Given that the proposal site is in an AONB, it is recommended to consider a curfew start time of no later than sunset, and a curfew end time of no earlier than sunrise.

Overall, there is a relatively low light output for all proposed luminaire types. However, in the absence of a lighting design and an impact assessment for the proposed external lighting, it is not possible to ascertain whether adequate illumination will be provided for the activities taking place in the outdoor areas of the proposed development, nor whether light pollution effects will indeed be avoided.

As the external lighting proposal currently stands, there is insufficient evidence to establish whether or not the proposed development will cause light pollution impacts on local amenity and nature conservation including the nearby nature reserve and the wider AONB. A lighting impact assessment based on the design of the proposed external lighting and the guidelines in ILP GN 01/21 and ILP/BCT GN 08/23 is needed to ascertain the potential impact of light pollution from artificial lighting on local amenity and nature conservation, including the nearby nature reserve and the wider AONB.



Table of contents

1	Introduction	5
2	General effects arising from obtrusive light	6
3	Relevant legislation, policies, guidelines, and recommendations	7
3.1	Recommendations for reducing obtrusive light	8
3.2	Recommendations for reducing harmful effects on wildlife	11
3.3	Specific guidelines for the location of the proposed development	11
4	Review of lighting related information available for the proposed development	13
4.1	Available information	13
4.2	Assessment of the available information	15
5	Conclusions	16



1 Introduction

Planning application ref 23/02913/FULMAJ has been submitted to West Berkshire Council for new agricultural premises at Land off of Wantage Road, Leckhampstead, RG20 8QT. This site is in the North Wessex Downs Area of Outstanding Natural Beauty (AONB). Concerns have been raised in relation to potential obtrusive light effects arising from the proposed development, yet the above planning application appears to contain limited information on the proposed external lighting, and no lighting design documentation or an assessment of potential light pollution impacts on the AONB.

BRE have been commissioned by Mr J Duffield of Marcham Farms Limited (the Client) through their instructing solicitors CMS Cameron McKenna Nabarro Olswang LLP to prepare an expert lighting report to support their planning objection to the proposal at the above site.

This report reviews the information on external lighting currently contained in the above planning application. Namely, the following documents have been found within the submitted application that contain information relevant to lighting:

- 'Landscape and Visual Impact Assessment' ref 402.064750.00001 dated 24/11/2023
- 'Preliminary Ecological Appraisal' ref 402.064750.00001 dated 21/09/2023
- 'Design & Access Statement' dated 22/11/2023
- 'Proposed External Lighting Plan' ref 2223 090 dated 30/11/2023

The report is based on the guidance on limiting obtrusive light contained in the following key documents:

- Institution of Lighting Professionals (ILP), Guidance Note 01/21 'The reduction of obtrusive light'
- Institution of Lighting Professionals (ILP), Guidance Note 08/23 'Bats and artificial lighting at night'
- Commission Internationale de l'Éclairage (International Commission on Illumination; CIE), Technical Report 150:2017 'Guide on the limitation of the effects of obtrusive light from outdoor lighting installations'
- British Standards Institution (BSI), BS EN 12464-2:2014 'Lighting of workplaces – Outdoor workplaces'

No site visit has been undertaken to survey the site location. In the absence of lighting design documentation and an assessment of potential light pollution impacts, this lighting report provides a qualitative evaluation of the available information and highlights aspects of concern and/or elements that may necessitate appropriate assessment as part of the planning process. It addresses both the reduction of obtrusive light in the surrounding environment and the need for protecting protected wildlife species from harmful effects of light (such as bats).



2 General effects arising from obtrusive light

Artificial lighting at night can promote safety and security, enhance appreciation and enjoyment of the surroundings, facilitate sport and recreational activities, and contribute to increased work performance and productivity. However, it can also be obtrusive by causing sky glow, light trespass, or glare.

Sky glow occurs when light is shed upwards, either directly by light sources such as floodlights or streetlamps or when reflected from the ground or other surfaces. Dust or water vapour in the air scatter the light in the atmosphere and generate a glowing dome of light that makes it difficult to see stars and other astronomical phenomena. Sky glow is diffuse and can affect people over great distances.

Light trespass is a more localised issue, which occurs where artificial light sources are visible beyond the areas they are supposed to light. Often associated with poorly aimed floodlights or over-lighting of areas, light trespass can disturb and annoy people, who for example may find their bedrooms lit to the extent that they cannot sleep.

Additionally, external lighting can cause both disability and discomfort glare. Disability glare is caused by light scattered within the eye when exposed to a bright light source, typically by point light sources such as bright spotlights aiming at the observer's eye, or by large area sources such as a bright light fitting; it affects the ability to see by causing some degree of temporary loss of vision that may lead to safety problems whilst performing an activity or being in motion (e.g. walking, cycling, or driving). Discomfort glare is due to uncomfortable contrasts within the visual field and appears in the form of visual discomfort, annoyance, irritability, or distraction without affecting the ability to see, but leading to symptoms of visual fatigue and potentially affecting mood and wellbeing.

Obtrusive light, whether it affects someone inside a space by light spill through a window or impedes the view of the night sky, is a form of pollution. Sky glow (the brightening of the night sky), light intrusion (trespass, the spilling of light beyond the boundary of the property or area being lit), and glare (the uncomfortable brightness of a light source when viewed against a darker background) are all forms of obtrusive light which may cause nuisance to others.

In principle, potential impacts arising from obtrusive light could affect anyone in the surrounding external environment who has a view of the lighting that causes the obtrusive light, including motorists, cyclists, pedestrians, and occupants of nearby buildings and premises. Effects of obtrusive light on nearby receptors typically include a perceived change in amenity arising from an increased spill light entering indoor or outdoor areas that are normally darker, a direct view of bright light sources from typical viewing directions that may cause annoyance, distraction, or discomfort, increased ambient light levels overall in the environment due to upward light emission and the associated sky glow, or a combination of these. Through exposure to artificial light at night, depending on the exposure level and duration, obtrusive light may also have detrimental effects on human health by potentially disrupting the body's natural circadian rhythms and disturbing the natural cycle of melatonin production, which plays an important role in immune functions. Obtrusive light can also affect transport system users (pedestrians, cyclists, motorists) by affecting their ability to see due to disability glare caused by bright light sources and reduced contrasts between perceived objects and their backgrounds, as well as by creating visual clutter where transport signals are harder to distinguish correctly against a competing background of other lights, even more so if those lights are coloured. This can lead to safety risks for all transport system users.

Wildlife can also be affected by artificial light at night. Light can influence plants and animals even if it is not obtrusive in a literal sense. A variety of species of both flora and fauna are legally protected in the United Kingdom, yet specific guidance on avoiding harmful effects of artificial lighting is only given in relation to bats.



3 Relevant legislation, policies, guidelines, and recommendations

Different acts, policies, codes, guides, and standards exist to address specific aspects of obtrusive light.

The Clean Neighbourhoods and Environment Act (CNEA) 2005¹ introduced artificial light emitted from defined premises into the list of statutory nuisances. It amended section 79(1) of the Environmental Protection Act 1990² to classify “*artificial light emitted from premises so as to be prejudicial to health or a nuisance*” as a statutory nuisance. As such, Local Authorities and the Environment Agency may take enforcement action against inappropriate lighting. However, the light must come from one premises and affect another e.g., where lights shine directly into a neighbouring property’s window and cause annoyance or disturbance. The Act does not cover action against upward light pollution and lighting in areas that may not be considered to be premises, such as a public open space.

Additionally, paragraph 191 of the latest National Planning Policy Framework (NPPF) 2023³ states that “*planning policies and decisions [...] should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*”

The above acts address the specific form of obtrusive light. Numerical guidance on suitable lighting levels to limit obtrusive light is contained within the following key documents:

- Institution of Lighting Professionals (ILP), Guidance Note 01/21 ‘The reduction of obtrusive light’⁴
- Commission Internationale de l’Éclairage (International Commission on Illumination; CIE), Technical Report 150:2017 ‘Guide on the limitation of the effects of obtrusive light from outdoor lighting installations’⁵
- British Standards Institution (BSI), BS EN 12464-2:2014 ‘Lighting of workplaces – Outdoor workplaces’⁶

There is generally good agreement between the numerical criteria on obtrusive light contained in the key documents listed above, except in the case of upward light, where BS EN 12464-2:2014 is less stringent than the other documents. In addition to the other documents, the British Standard also provides recommended lighting levels for various outdoor work premises.

¹ Available from <https://www.legislation.gov.uk/ukpga/2005/16/resources>

² Available from <https://www.legislation.gov.uk/ukpga/1990/43/contents>

³ Available from <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

⁴ Available from <https://theilp.org.uk/publication/guidance-note-1-for-the-reduction-of-obtrusive-light-2021>

⁵ Available from <https://cie.co.at/publications/guide-limitation-effects-obtrusive-light-outdoor-lighting-installations-2nd-edition>

⁶ Available from <https://knowledge.bsigroup.com/products/light-and-lighting-lighting-of-work-places-outdoor-work-places?version=standard>



Additional guidance on avoiding harmful effects of artificial lighting on wildlife is given in relation to bats in the Institution of Lighting Professionals (ILP) Guidance Note 08/23 'Bats and artificial lighting at night'⁷, which is produced together with the Bat Conservation Trust (BCT).

The guidelines produced by the Institution of Lighting Professionals (ILP) are the most commonly used in the UK. The expectation is that local planning authorities throughout the UK refer to these guidelines to ensure the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation is limited. The environmental effect of artificial light at night can only be evaluated through a specialist light impact assessment carried out in line with the ILP guidelines, which is commonly required by local planning authorities in connection with planning applications. A light impact assessment for a proposed scheme usually includes proposed hours of operation, curfew (if any), proposed illuminance of the building/object/space, potential light spill, effect on residential properties in line of sight, effect on nocturnal wildlife (especially bats), and visual appearance of light fittings in daylight.

3.1 Recommendations for reducing obtrusive light

The recommendations given in the different standards on obtrusive light include:

- Limiting vertical illuminances on windows of neighbouring premises
- Limiting values for luminaire intensities in the field of view
- Limiting the effects on transport systems
- Limiting sky glow
- Limiting the effect of over-lit building façades and signs

The concept of a curfew is also introduced, where lighting is switched off or reduced at set times to save energy when lighting is not actually needed and maintain amenity and environmental integrity. Different guidelines are given before and after curfew hours. Since annoyance levels are subjective and there are significant inter-individual differences in light sensitivity, a lighting installation complying with the obtrusive light recommendations will not necessarily cause no adverse impacts on recipients affected by spill light from that installation. However, the aim is that spill light during curfew hours should be unobtrusive to most recipients.

The limits depend on the location of the site (for example whether it is an urban or rural site). Table 3.1 lists the environmental zones for exterior lighting control within development plans, and Tables 3.2 and 3.3 summarise the obtrusive light limitations for exterior lighting in these zones as per ILP GN 01/21 and CIE 150:2017. Additional limitations apply to luminaires visible from the road network to limit the effects on transport systems, as shown in Table 3.4.

As regards sky glow, these limits cannot apply to some lighting schemes that require the deliberate and careful use of upward light e.g., ground recessed luminaires, ground mounted floodlights, or festive lighting. However, lighting equipment that minimises the upward spread of light near to and above the horizontal is recommended, since the most sensitive/critical zones for minimising sky glow are those between 90° and 100°, referred to as the lower, upward light output zone (UL).

As for light intrusion into windows and luminaire intensity, the recommended levels may not be obtainable for some lighting schemes such as cases of road lighting on public highways where building façades are

⁷ Available from <https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/>



adjacent to the lit highway, or sports lighting applications with limited mounting heights. However, efforts should be made to reduce light intrusion into windows down to the post curfew value by fitting shields, replacing the luminaires, or by varying the lighting level.

Table 3.1 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 and city centres with high levels of night-time activity

SQM stands for Sky Quality Meter as referenced by the International Dark Skies Association (IDA). It is used for measurements of night sky brightness with a maximum value of 22 corresponding to the least light pollution.

Table 3.2 Obtrusive light limitations for exterior lighting installations.

Zone	Upward light output ratio (%)	Upward flux ratio (%)			Vertical illuminance on windows (lux)		Light fitting intensity (cd)		Average surface luminance (cd/m ²)	
		Road lighting	Amenity lighting	Sports lighting	Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Building façade	Sign
E0	0	n/a	n/a	n/a	n/a	n/a	0	0	0.1	0.1
E1	0	2	n/a	n/a	2	0.1	$k_1 * d$	0	0.1	50
E2	2.5	5	6	2	5	1	$k_2 * d$	$k_1 * d$	5	400
E3	5	8	12	6	10	2	$k_3 * d$	$k_1 * d$	10	800
E4	15	12	35	15	25	5	$k_4 * d$	$k_1 * d$	25	1000

Notes

- Upward light output ratio is applicable to individual luminaires, whereas upward flux ratio is applicable to whole lighting installations.
- Maximum admissible vertical illuminance on windows for an environmental zone E1 post-curfew is 1 lux in case of public road lighting.

Maximum values for luminous intensity of light fitting depend on the viewing distance d between observer and light fitting (in meters), and the projected area of the bright part of the light fitting in direction to the observer. The latter is factored in through coefficients k_1 to k_4 for each environmental zone, pre-curfew and post-curfew. The same coefficient k_1 is used for zone E1 pre-curfew and zones E2 to E4 post-curfew. For light fittings with a projected area of the bright part in direction to the observer above 0.5 m², there are fixed maximum values recommended regardless of the distance between observer and light fitting; these are shown in Table 3.3.



Table 3.3 Maximum light fitting intensity values recommended for light fittings with a projected area of the bright part in direction to the observer above 0.5 m².

Zone		E0	E1	E2	E3	E4
Light fitting intensity (cd)	Pre-curfew	0	2500	7500	10000	25000
	Post-curfew	0	0	500	1000	2500

Table 3.4 Maximum values of veiling luminance and threshold increment in the path of travel.

Lighting parameter	Road classification as per CIE 115:2010 'Lighting of roads for motor and pedestrian traffic'			
	No road lighting	Road class M6 / M5	Road class M4 / M3	Road class M2 / M1
Veiling luminance (L _v)	0.037 cd/m ²	0.23 cd/m ²	0.40 cd/m ²	0.84 cd/m ²
Threshold increment	15% based on adaption luminance of 0.1 cd/m ²	15% based on adaption luminance of 1 cd/m ²	15% based on adaption luminance of 2 cd/m ²	15% based on adaption luminance of 5 cd/m ²

Building façade luminance is applicable to buildings directly illuminated as a night-time feature as against the illumination of a building caused by spill light from adjacent luminaires or luminaires fixed to the building but used to light an adjacent area. This criterion is not applicable to self-luminous façades or illuminated advertisements including digital displays. For such applications, ILP GN 01/21 refers to the limits contained in ILP PLG 05/23 'The brightness of illuminated advertisements including digital displays'.⁸

Standard recommendations for limiting glare are given separately for interior and exterior lighting applications, and for different specific types of application. For example, particular glare metrics are used for street lighting and sports lighting. Glare in general exterior lighting applications is covered by BS EN 12464-2:2014 'Lighting of workplaces – Outdoor workplaces' and quantified through the summated effect of bright light sources in the visual field in relation to background luminance and relative positions of light sources as seen from the observer's eye. Maximum limits are given for various applications, yet this is less relevant in the context of environmental effects of artificial light at night.

Additional guidance provided in ILP PLG 04/2013 'Guidance on undertaking environmental lighting impact assessments'⁹ sets out the principles for assessing lighting impacts arising from new developments. This document followed the publication of the National Planning Policy Framework (NPPF) in 2012 and highlights the importance of lighting design being part of a planning application in order to limit detrimental environmental impacts of lighting. The guidance recommends that a lighting impact assessment be undertaken that considers the existing baseline lighting conditions around the proposed development, together with the proposed lighting performance for the various components of the proposed development site, with reference to the ILP recommendations for reducing obtrusive light. As a first step, sensitive receptor locations and viewpoints should be identified around the proposed development site in relation to

⁸ Available from <https://theilp.org.uk/publication/plg05-the-brightness-of-illuminated-advertisements/>

⁹ Available from <https://theilp.org.uk/publication/plg04-guidance-on-undertaking-environmental-lighting-impact-assessments/>



existing and proposed artificial lighting. Baseline and proposed lighting conditions should then be assessed in relation to the identified sensitive receptors, with reference to the ILP GN 01/21 guidelines, in order to determine both changes in conditions and compliance of proposed lighting with the guidelines. These findings would then determine the potential impacts arising from the proposed artificial lighting, based on which appropriate mitigation measures should be identified and implemented as necessary.

3.2 Recommendations for reducing harmful effects on wildlife

The ILP/BCT GN 08/23 gives specific guidance on avoiding harmful effects of artificial lighting on bat species. The guidelines characterise 'complete darkness' through illuminances below 0.2 lux on the horizontal plane and below 0.4 lux on the vertical plane. These figures are in line with research findings for the illuminance found at hedgerows used by lesser horseshoe bats, a species well known for its aversion to light. GN 08/23 emphasises the need for a planning application to include calculations and documentation demonstrating compliance with lighting limits or mitigation measures as recommended by the ecologist.

In cases where lighting impacts on bats are likely, GN 08/23 states that local planning authorities will require some form of documentation to demonstrate compliance with the guidelines. Depending on the level of detail in the application, this could be in the form of a Lighting Strategy, whereby the agreed lighting parameters, objectives, likely mitigation requirements and a plan are set out, or a Lighting Design or a Lighting Impact Assessment, whereby finalised details are provided, including a plan showing modelled illuminance from all proposed (and existing, where necessary) lighting, lighting specifications, assessment assumptions and justifications for mitigation measures that may be considered.

As part of the impact assessment, GN 08/23 recommends carrying out surveys of baseline conditions where existing lighting may act on key habitats and features and therefore may prevent the agreed or modelled illuminance limits from being achieved. Baseline measurements of illuminance are recommended at ground level on the horizontal plane, and in the vertical plane at heights that replicate the likely location of bats (for example, 1.5m or 2m above ground) in directions perpendicular to the dominant light sources or perpendicular to the surface/edge of the feature in question. To accurately represent the baseline during the principal active season for bats, GN 08/23 recommends that baseline measurements be taken during the spring and summer when vegetation is mostly in leaf.

To assess proposed lighting compliance with illuminance limits, GN 08/23 recommends producing horizontal illuminance maps (lux plots) at ground level to model the extent of any light spill from the proposals. Where relevant for sensitive areas, such as along the site-facing aspects of a hedgerow or façade of buildings containing roosts, GN 08/23 also recommends producing vertical illuminance maps to visualise illumination effects at the various heights at which different bat species fly.

Additional recommendations are given for post-construction/operational phase compliance-checking. This may include post-completion lighting surveys, remedial measures that may be required to achieve compliance, as well as ongoing monitoring schedules.

3.3 Specific guidelines for the location of the proposed development

With reference to the ILP GN 01/21 guidelines, the lighting environment of the proposed development site would be classified as a dark, natural surrounding – environmental zone E1 – corresponding to an area of



outstanding natural beauty. Namely, North Wessex Downs as per Natural England Open Data Publication¹⁰ showing the map Areas of Outstanding Natural Beauty (England).

Therefore, the recommendations for maximum spill light for the environmental zone of the proposed development site (zone E1) would be:

- Upward light output ratio (applicable to individual luminaires) of 0%
- Upward flux ratio (applicable to whole road lighting installations) of 2%
- Maximum vertical illuminance on windows of 2 lux pre-curfew, and 0.1 lux post-curfew
- Maximum luminous intensity of a light source when viewed from a sensitive receptor of $k_1 * d$ (expressed in cd) pre-curfew and 0 cd post-curfew, where d is the viewing distance between observer and light fitting (in meters), and k_1 varies between 0.29 and 5.1 depending on the projected area of the bright part of the light fitting in direction to the observer; for light fittings with a projected area of the bright part in direction to the observer above 0.5 m², maximum luminous intensity pre-curfew is 2500 cd
- Average surface luminance not to exceed 0.1 cd/m² for a building façade, or 50 cd/m² for a sign

As regards effects on transport systems, based on Google Maps imagery dated September 2021, there appears to be no road lighting at the site location. Therefore, maximum values of veiling luminance and threshold increment in the path of travel are 0.037 cd/m² and 15% (based on adaption luminance of 0.1 cd/m²), respectively.

In terms of avoiding harmful effects on bat species as recommended by ILP/BCT GN 08/23, illuminance values should be below 0.2 lux on the horizontal plane and below 0.4 lux on the vertical plane for all sensitive receptor locations in the vicinity of the proposal site.

¹⁰ Available from <https://naturalengland-defra.opendata.arcgis.com/datasets/areas-of-outstanding-natural-beauty-england>



4 Review of lighting related information available for the proposed development

This section reviews the lighting related material available for the proposed development. It is based on documentation submitted to West Berkshire Council as part of planning application ref 23/02913/FULMAJ for new agricultural premises at Land off of Wantage Road, Leckhampstead, RG20 8QT. Namely, the following documents have been found within the submitted application that contain information relevant to lighting:

- 'Landscape and Visual Impact Assessment' ref 402.064750.00001 dated 24/11/2023 by SLR Consulting
- 'Preliminary Ecological Appraisal' ref 402.064750.00001 dated 21/09/2023 by SLR Consulting
- 'Design & Access Statement' dated 22/11/2023 by Offgrid Architecture
- 'Proposed External Lighting Plan' ref 2223 090 dated 30/11/2023 by Offgrid Architecture

4.1 Available information

Section 3.2.9 of 'Landscape and Visual Impact Assessment' ref 402.064750.00001 refers to the West Berkshire Supplementary Planning Document on external lighting, which emphasises in paragraph 1.3.3 the need for new developments to "*avoid unacceptable levels of light pollution*" and encourages local planning authorities to "*resist intrusive development, preserve dark night skies and retain the quality of views to and from the AONB, which could be harmed by lighting structures.*"

In section 3.3.1, which addresses long-term goals as part of the AONB management plan, the 'Landscape and Visual Impact Assessment' document states that:

"A scheme of lighting has been devised to minimise light pollution and utilise downward illuminating luminaires as identified in the Design & Access Statement. This would avoid direct views of bulbs (point light sources) from outside the site and avoid the illumination of building facades as far as possible. No roof lights are proposed for any of the proposed buildings avoiding light spill from roofs."

The above is also stated in the 'Design & Access Statement' where exterior lighting is described (page 11). No other information related to the proposed exterior lighting is provided, except for screening effects being provided by some of the proposed buildings as well as existing retained hedgerows and new planting. Reference is also made to the 'Proposed External Lighting Plan' ref 2223 090.



The 'Preliminary Ecological Appraisal' ref 402.064750.00001 (sections 3.4.6.1 and 4.8.1) highlights the likelihood for the habitats within and around all parts of the proposal site to provide good foraging and commuting opportunities for various bat species. This document states that "*all surrounding hedgerow boundaries and trees will be retained*" and "*the establishment and appropriate long-term management of the new nature reserve in the south-west will enhance and improve foraging and commuting opportunities for bats.*" It also requires that lighting impacts "*should be reduced by implementing a suitable pollution and lighting mitigation plan during the construction phase of the works*" and "*a sensitive lighting design for the site (during and post construction)*", emphasising that "*this is a rural area*" and "*even a relatively low level of exterior lighting is known to negatively impact on foraging and commuting bats*". The 'Preliminary Ecological Appraisal' requests that "*downwardly directed lighting (with fitted hoods and cowls) with lux levels as low as possible should be used throughout*" and "*exterior lighting should avoid all boundary hedgerows.*"

The 'Proposed External Lighting Plan' ref 2223 090 gives positions of the proposed external lighting, along with proposed luminaire types, mounting height and aiming angles (as shown in Table 4.1). It also



indicates the presence of a nature reserve at the southern end of the proposal site, the aim of which is to promote biodiversity. No external lighting appears to be proposed in the nature reserve area.

Table 4.1 Luminaire types, mounting height and aiming angles. Taken from 'Proposed External Lighting Plan' ref 2223 090 by Offgrid Architecture.

Light	Image	Description	Lamp type and wattage	Mounting height	Luminaire tilt
TYPE A		-Finishes graphite texture paint -Body Die cast aluminium -IP44 - FULLY CUT-OFF LIGHT TYPE	--5 W - 330 Lumens (warm white) 2700 Kelvin ¹	-1.8m above floor level	0°
TYPE B		-Finishes Black -Body Die cast aluminium -IP65 PARTLY CUT-OFF LIGHT TYPE (fully cut-off due to positioning under eaves)	5 W 330 Lumens Warm White 2700 Kelvin (Dimmable)	-2.3m above floor level	45°
TYPE C		- Recycled plastic post -Light Finishes stainless steel PARTLY CUT-OFF LIGHT TYPE	-0.6 W LED -Warm Light - 50 Lumen emission (Not dimmable)	-1m above ground level	25°
TYPE D	 (or similar)	-UL Wet Locations -Dark Sky Approved (IDA) FULLY CUT-OFF LIGHT TYPE	-10 W -542 Lumens	-2.5 m above floor level	0°

The luminaires shown in Table 4.1 are being proposed as follows:

- 12 type A luminaires on external building walls adjacent to front, side, and rear entrance doors to illuminate door thresholds; controlled via PIR motion detection and timing
- 20 type B luminaires on external building walls at building corners and under eaves, angled to illuminate perimeter ground levels adjacent to buildings; controlled via PIR motion detection and timing
- 16 type C luminaires at ground level at changes of direction to provide general lighting to paths and vehicle movement areas; controlled via automatic switching and timing for use during operational hours
- 9 type D luminaires on external walls of workshop and vehicle storage building adjacent to industrial door openings to provide operational lighting to external spaces; controlled via automatic switching and timing for use during operational hours



4.2 Assessment of the available information

The available documentation that was submitted as part of planning application ref 23/02913/FULMAJ contains limited information related to the proposed external lighting and its potential impacts on the surrounding environment and the AONB. There are several conditions that the proposed external lighting should adhere to, yet no specific reference to the ILP guidelines could be found in the available documentation. The ILP guidelines are regularly used in the UK and local planning authorities are expected to refer to these guidelines to ensure the impact of light pollution from artificial light on local amenity and nature conservation is avoided or limited (see section 3 for more details).

Besides the data presented in the 'Proposed External Lighting Plan' ref 2223 090, no lighting design material or an assessment of potential impacts arising from the proposed external lighting could be found in the documentation submitted with the application. There is limited information on luminaire specification and additional evidence on spatial light distribution would be needed; this could be in the form of luminaire datasheets showing luminous intensity distribution curves (polar diagrams).

Whilst luminaire types A and D appear to be fixed (not adjustable) and cut-off, luminaire type B seems to be either adjustable or fixed but tilted 45°. Even if type B luminaires are installed under roof eaves, their tilting or adjustability will increase the likelihood of spill light; this risk is even higher when dust or similar particles are present in the air or when air humidity levels are high due to light scattering in the atmosphere. Luminaire type C is stated to be partly cut-off and tilted 25° and therefore a proportion of the emitted light is deemed to escape into the atmosphere; fully cut-off luminaires are recommended to limit the potential for obtrusive light effects.

Correlated colour temperature for luminaire types A and B is listed as 2700K. This is reasonable as it corresponds to a light spectrum with a reduced content of short wavelengths which typically present the higher risk of harmful obtrusive light effects. No correlated colour temperature is listed for luminaire types C and D; this data should have been provided and a value chosen at least as high as that used for luminaire types A and B.

The proposed lighting controls appear to be reasonable, yet there is no information on operational hours. As such, it is not clear whether activities are expected to take place during the hours of darkness. If this were the case, it would be strongly recommended to introduce curfew hours during which external lighting should be switched off or reduced to maintain environmental integrity. Given that the proposal site is in an AONB, it is recommended to consider a curfew start time of no later than sunset, and a curfew end time of no earlier than sunrise.

Overall, there is a relatively low light output for all luminaire types as per the 'Proposed External Lighting Plan' ref 2223 090. However, because a lighting design for the proposed external lighting has not been submitted as part of the planning application and hence this does not appear to have been undertaken, it is not possible to ascertain whether the proposed external lighting will indeed provide adequate illumination for the activities taking place in the outdoor areas of the proposed development in line with the recommendations given in BS EN 12464-2:2014 'Lighting of workplaces – Outdoor workplaces', nor whether the proposed external lighting will indeed avoid any obtrusive light effects in line with the recommendations given in ILP GN 01/21 'The reduction of obtrusive light' and ILP/BCT GN 08/23 'Bats and artificial lighting at night'.

As the external lighting proposal currently stands, there is insufficient evidence to establish whether or not the proposed development will cause light pollution impacts on local amenity and nature conservation including the nearby nature reserve and the wider AONB. Therefore, a lighting impact assessment based on the design of the proposed external lighting and the guidelines in ILP GN 01/21 and ILP/BCT GN 08/23 is strongly recommended in order to evaluate the impact of light pollution from artificial lighting on local amenity and nature conservation, including the nearby nature reserve and the wider AONB.



5 Conclusions

This report has reviewed the information on external lighting currently contained in planning application ref 23/02913/FULMAJ submitted to West Berkshire Council for new agricultural premises at Land off of Wantage Road, Leckhampstead, RG20 8QT. This site is in the North Wessex Downs Area of Outstanding Natural Beauty (AONB), and concerns have been raised in relation to potential obtrusive light effects arising from the proposed development.

BRE have been commissioned by Mr J Duffield of Marcham Farms Limited (the Client) through their instructing solicitors CMS Cameron McKenna Nabarro Olswang LLP to prepare an expert lighting report to support their planning objection to the proposal at the above site.

There is limited information in the planning application documentation in relation to the proposed external lighting and its potential impacts on the surrounding environment and the AONB. There are several conditions that the proposed external lighting should adhere to, yet no specific reference to the ILP guidelines could be found in the available documentation.

Besides the data presented in the 'Proposed External Lighting Plan' ref 2223 090, no lighting design material or an assessment of potential impacts arising from the proposed external lighting could be found in the documentation submitted with the application. There is limited information on luminaire specification and additional evidence on spatial light distribution would be needed.

Fully cut-off luminaires with a correlated colour temperature of no more than 2700K are recommended across the entire external lighting scheme proposed to limit the potential for obtrusive light effects.

The proposed lighting controls appear to be reasonable, yet there is no information on operational hours. If activities are expected to take place during the hours of darkness, it is strongly recommended to introduce curfew hours during which external lighting should be switched off or reduced to maintain environmental integrity. Given that the proposal site is in an AONB, it is recommended to consider a curfew start time of no later than sunset, and a curfew end time of no earlier than sunrise.

Overall, there is a relatively low light output for all proposed luminaire types. However, in the absence of a lighting design and an impact assessment for the proposed external lighting, it is not possible to ascertain whether adequate illumination will be provided for the activities taking place in the outdoor areas of the proposed development, nor whether light pollution effects will indeed be avoided.

As the external lighting proposal currently stands, there is insufficient evidence to establish whether or not the proposed development will cause light pollution impacts on local amenity and nature conservation including the nearby nature reserve and the wider AONB. A lighting impact assessment based on the design of the proposed external lighting and the guidelines in ILP GN 01/21 and ILP/BCT GN 08/23 is needed to ascertain the potential impact of light pollution from artificial lighting on local amenity and nature conservation, including the nearby nature reserve and the wider AONB.