

TECHNICAL REPORT

PROJECT: SEACOURT TENNIS CLUB

PREPARED FOR: SEACOURT TENNIS CLUB

Aug 2024

PROJECT NUMBER: 3097			DOCUMENT REF: 3097-DFL-ELG-XX-RP-EO-13001-S3			
S3	P06	For Planning	KS	AJB	AL	28/08/2024
S3	P05	For Planning	KS	AJB	AL	27/08/2024
S3	P04	For Planning	KS	AJB	AL	21/08/2024
S3	P03	For Planning	KS	AJB	AJB	12/04/2024
S3	P02	For Planning	KS	AL	AL	09/04/2024
S3	P01	For Planning	KS	AS	RC	10/08/2023
Suitability	Revision	Purpose Description	Originated	Checked	Authorised	Date



Contents

Executive Summary	3
1. Introduction	4
1.1 General.....	4
2. Legislation and Policy.....	6
2.1 Relevant National Policies.....	6
2.2 Relevant Local Policies	7
3. British Standards and Industry Guidance.....	9
3.1 Relevant British Standards	9
3.2 Lawn Tennis Association (LTA) Padel Court Data Sheet	10
3.3 Guidance Notes for the Reduction of Obtrusive Light (GN01:2021)	11
3.4 Obtrusive light limitations.....	12
3.5 GN08/23 Bats and Artificial Lighting in the UK – Bat Conservation Trust and Institution of Lighting Professionals.	13
4. Scope of Mitigation.....	15
4.1 Mitigation of lighting to reduce obtrusive light.	15
5. Lighting Design	16
5.1 Brief.....	16
5.2 Court lighting.....	16
6. Indicative Light Spill	18
7. Conclusion	19
Appendix 1 - Indicative Light Spill	20
Appendix 2 – Lighting Design Levels.....	22
Appendix 3 – CPRE Ambient Light Levels.....	24

Executive Summary

The site referred to in this document is the Seacourt Tennis Club, Victoria Avenue, hereafter referred to as the Site. It is located on Hayling Island with post code, PO11 9AJ.

The Proposed Development is two new Padel courts illuminated with 8 columns and luminaires at 6m mounting height. The design was carried out to meet the requirements for a Class 2 court as specified with the Lawn Tennis Association (LTA). This was chosen as the courts are in a residential area at a Tennis Club.

The design was carried out using Lighting Reality. This is an industry standard software for lighting design. The lighting was positioned so that the two courts can be lit individually or together and still meet the LTA requirements.

To maximise the lighting without increased light spill the courts were lit using 6 m columns with a 0° tilt on the luminaires.

It can be seen that the new lighting for the Padel Courts can be installed without detriment to the existing sensitive receptors with mitigation to minimise light spill.

As shown during the survey carried out on 13/02/2024, the existing lighting levels surrounding the padel courts range up to a maximum of 31 lux on a vertical plane and 21 lux on the horizontal. This is due to the already high levels of light due to the existing tennis courts and residential street lighting.

1. Introduction

1.1 General

- 1.1.1 This technical report is provided by Designs for Lighting Ltd, a specialist lighting design consultancy with experience and knowledge in lighting impact assessments, mitigation and lighting design.
- 1.1.2 The technical report outlines the lighting approach to apply to the installation of the proposed lighting. The aim of the technical report is to outline the levels to which lighting will be provided and where lighting will be provided, which is functional to ensure safety and sensitivity to both the environment and nearby ecological receptors (for example, bats).
- 1.1.3 The Application Site (**Figure 1**) sits under the jurisdiction of Havant Borough Council within Hampshire County Council with the Proposed Development shown in **Figure 2**.
- 1.1.4 Hayling Island is on the south coast of the UK and connected to the mainline by Langstone Bridge and the Application Site is close to the south coast of the island. The tennis club is situated in a residential area with some businesses including care homes and bed and breakfasts.



Figure 1 Proposed Application Site

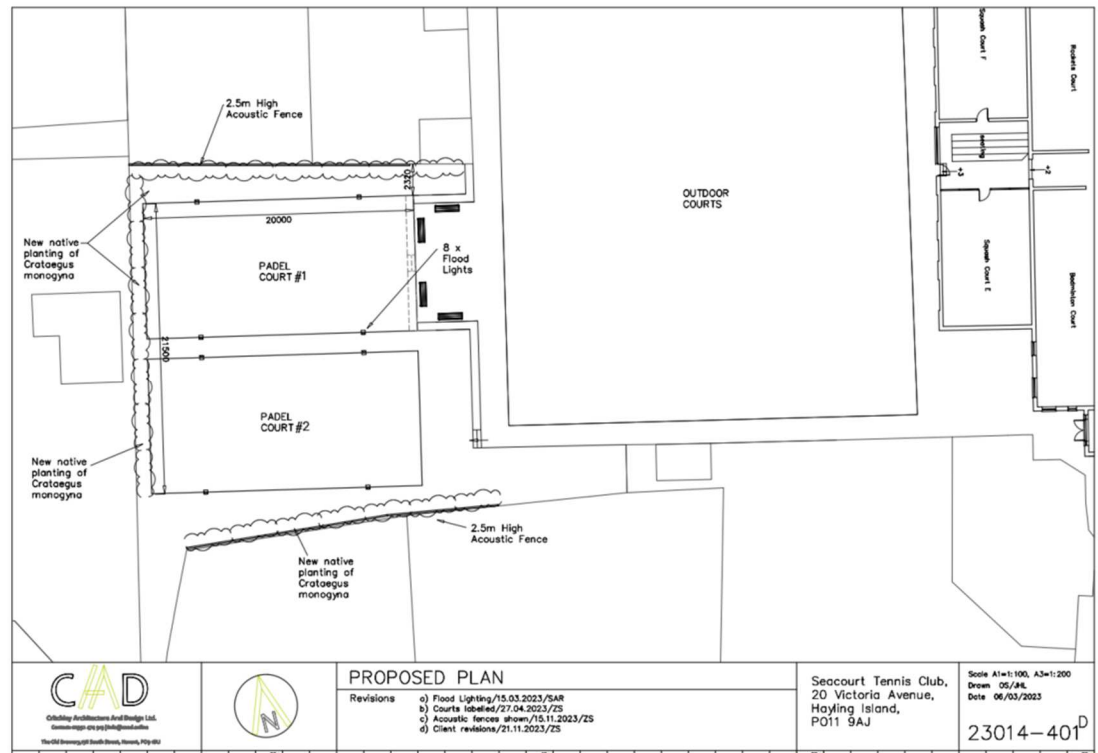


Figure 2 Proposed Development

2. Legislation and Policy

2.1 Relevant National Policies

Environmental Protection Act 1990 / Clean Neighbourhoods and Environment Act 2005

- 2.1.1 Since 2005, artificial light has been incorporated as a potential statutory nuisance. An amendment to section 79 of the Environmental Protection Act 1990, contained within the clean Neighbourhoods and Environment Act 2005, states:

“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 2021

- 2.1.2 The National Planning Policy Framework (NPPF) sets out the government’s planning policies for England and how they are expected to be applied and provides a framework for local plans. With regard to light pollution, the NPPF was updated in December 2023 and states that the following elements are to be considered:

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

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

Planning Practice Guidance

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

“Does an existing lighting installation make the proposed location for a development unsuitable, or suitable only with appropriate mitigation? For example, this might be because:

- > the artificial light has a significant effect on the locality; and/or*
- > users of the Proposed Development (e.g., a hospital) may be particularly sensitive to light intrusion from the existing light source.*

Where necessary, development proposed in the vicinity of existing activities may need to put suitable mitigation measures in place to avoid those activities having a significant adverse effect on residents or users of the proposed scheme, reflecting the agent of change principle. Additional guidance on applying this principle is set out in the planning practice guidance on noise.

- *Will a new development, or a proposed change to an existing site, be likely to materially alter light levels in the environment around the site and/or have the potential to adversely affect the use or enjoyment of nearby buildings or open spaces?*
- *Will the impact of new lighting conflict with the needs of specialist facilities requiring low levels of surrounding light (such as observatories, airports and general aviation facilities)? Impacts on other activities that rely on low levels of light such as astronomy may also be a consideration but will need to be considered in terms of both their severity and alongside the wider benefits of the development.*
- *Is the development in or near a protected area of dark sky or an intrinsically dark landscape where new lighting would be conspicuously out of keeping with local nocturnal light levels, making it desirable to minimise or avoid new lighting?*
- *Would new lighting have any safety impacts, for example in creating a hazard for road users?*
- *Is a proposal likely to have a significant impact on a protected site or species? This could be a particular concern where forms of artificial light with a potentially high impact on wildlife and ecosystems (e.g. white or ultraviolet light) are being proposed close to protected sites, sensitive wildlife receptors or areas, including where the light is likely to shine on water where bats feed.*
- *Does the Proposed Development include smooth, reflective building materials, including large horizontal expanses of glass, particularly near water bodies? (As it may change natural light, creating polarised light pollution that can affect wildlife behaviour.)"*

2.2 Relevant Local Policies

2.2.1 The most applicable policies for the development relating specifically to well-designed or thoroughly considered lighting are:

2.2.2 DM10 Pollution

Development that may cause pollution of water, air or soil or pollution through noise, smell, smoke, fumes, gases, steam, dust, vibration, light, heat, electromagnetic radiation and other pollutants will only be permitted where all of the following relevant criteria can be met:

1. *The health and safety of existing and future users of the site, or nearby occupiers and residents is not put at risk.*

2. *National air quality standards or objectives would not be breached.*
3. *The water environment would not be detrimentally affected.*
4. *It would not lead to an unacceptable deterioration in the quality or potential yield of coastal, surface and ground water resources.*
5. *External lighting is of the minimum level of illumination and duration required for security and operational purposes.*
6. *External lighting would not interfere with safe navigation in either Chichester or Langstone Harbours and other coastal locations.*

2.2.3 Sport England

Provides specific information on the planning and development of sports facilities. External flood lighting is often necessary to facilitate the playing of sports outside of the hours of daylight. However, flood lighting can impact adversely on neighbouring residential properties or the surrounding landscape. Careful consideration will need to be given to measures which mitigate these impacts. Where appropriate mitigation is not possible development which results in harmful light pollution will not be permitted. The standard of lighting is dependent on the standard of play and particular sports. It is, therefore, essential to determine the sports to be played at an early stage in the planning process in order that sufficient mitigating measures can be worked into the development proposal. It is advisable to contact the governing body for the relevant sport to determine what type of lighting is required.

3. British Standards and Industry Guidance

3.1 Relevant British Standards

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

- **BS EN 12193:2018 (Light and lighting – Sports Lighting)** – This contains lighting design guidance for a variety of indoor and outdoor sports applications.

3.1.2 In the context of Padel Courts, the following criteria are set out:

Outdoor			Reference area		Number of grid points	
			Length m	Width m	Length	Width
Tennis	PA		30	15	13	7
	TA		36	18	15	7
Padel ^a		PA	20	10	13	7
Class	Horizontal illuminance		Horizontal illuminance TA		R_G	R_a
	$E_{hor Ave lx}$	U^2_{hor}	$E_{hor Ave lx}$	U^2_{hor}		
I	500	0.70	75 % PA	75 % PA	50	70
II	300	0.70	75 % PA	75 % PA	50	60
III	200	0.60	75 % PA	75 % PA	55	60

^a A safety zone around both entrances of width 2 m, height 4 m and extending 4m from the centre to both sides is to be kept clear of any obstacles.

Table 1 BS EN 12193:2018 Outdoor Tennis Lighting Standards

- 3.1.3 As the courts are not for national / international competition, they are to be lit in accordance with Class II, which is defined as follows:

Lighting Class II: Mid-level competition such as regional or local club competition which generally involve medium size spectator capacities with medium viewing distances. High level training can also be included in this class.

3.2 Lawn Tennis Association (LTA) Padel Court Data Sheet

- 3.2.1 Minimum Lighting performance standards for Padel courts set out in the LTA Padel Court Data Sheet are as follows:

Minimum Lighting performance standards for padel courts are defined as follows:-

Outdoor courts: -	Minimum illumination at ground level (Z=0)
National and International Competition	500 lux (E av) with 0.7 uniformity
Regional competition, school & recreational use Indoor courts	300 lux (E av) with 0.5 uniformity
Indoor courts: -	Minimum Performance at ground level (Z=0)
National and International competition	500 lux (E av) with 0.7 uniformity
Regional competition, school & recreational use Indoor courts	300 lux (E av) with 0.5 uniformity

In the UK with outdoor tennis courts being usually lit to a standard higher than the minimum stated above then Clubs should undertake playing testing of floodlit padel courts to establish suitability for their scheme or may wish to adopt a higher standard.

While the minimum levels are stated above a 10% over performance should be taken into consideration when undertaking the initial design i.e. (0.9 maintenance factor).

- 3.2.2 Although the British Standard has a more onerous standard the decision was taken to use the LTA requirements. To achieve the higher uniformity, extra columns would need to be used with the specified luminaire. This would produce more obtrusive light which could be considered a nuisance for the neighbourhood dwellings and businesses.

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

- 3.3.1 Guidance notes produced by the Institution of Lighting Professional (ILP) are among the most commonly referenced guidance notes for good practice within the lighting design industry.
- 3.3.2 Obtrusive light (or sometimes referred to as light pollution) refers to any light emitted in a direction in which it is not required or wanted and as such is detrimental to other users.
- 3.3.3 Consideration is given to light intrusion, direct upward light (sky glow) and glare within the context of varying environmental zones.
- 3.3.4 Light intrusion refers to the spilling of light beyond the boundary of the area to be lit. This includes the intrusion of light into bedroom windows.
- 3.3.5 Sky glow refers to the brightening of the sky above towns caused by direct or reflected upward light.
- 3.3.6 Glare refers to the uncomfortable brightness of a light source when viewed against a dark background. **Figure 1** illustrates the different types of obtrusive light.

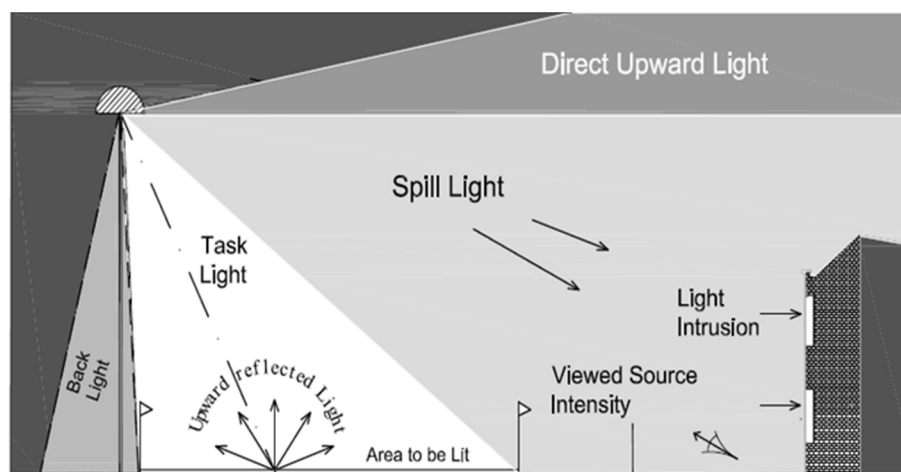


Figure 1 Obtrusive light diagram (GN01:2021, Figure 1)

- 3.3.7 The ILP Guidance Notes Guide quantify the levels of Obtrusive light regarded as acceptable for varying environmental zones E0 to E4.
- 3.3.8 The Site is located within an area of low to medium level of district brightness, given the generally rural local environment. Therefore, the Environmental Zone is categorised as **E3** (Environmental Zone) in accordance with the ILP Guidance Notes.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5 +)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty etc
E2	Rural	Low district brightness (SQM ~ 15 to 20)	Sparsely inhabited rural areas, Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, Small town centres or suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

Table 2 Environmental Zones

Notes:

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

3.4 Obtrusive light limitations

- 3.4.1 In the absence of suitable statutory guidance, the ILP “Guidance Notes for the Reduction of Obtrusive Light” GN01:2021 is typically used, in order to provide suitable assessment criteria against which to assess the likely effects of artificial lighting.
- 3.4.2 The relevant criteria of upward light, light intrusion shown in **Table 3** sets limits for the criteria of upward light and light intrusion.

Table 3 (CIE 150 table 2): Maximum values of vertical illuminance on properties.

Light technical parameter	Application conditions	Environmental zone				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E_v)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx*	1 lx	2 lx	5 lx

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

Table 3 Obtrusive light criteria relating to each Environmental Zones

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

- 3.5.1 This document is aimed at lighting professionals, lighting designers, planning officers, developers, bat workers/ecologists and anyone specifying lighting. It is intended to raise awareness of the impacts of artificial lighting on bats, and mitigation is suggested for various scenarios. However, it is not meant to replace site-specific ecological and lighting assessments, which states the following

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

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

“A buffer zone subdivided to into smaller zones of increasing illuminance limit further away from the Supporting Habitat would ensure light levels (illuminance - measured in lux) do not exceed certain defined limits. This has the effect of a gradual decrease in lighting from the developed zone, rather than a distinct cut-off, which may provide useable area for the project which also limits lighting impacts on less sensitive species, or less well-used habitat.” (see Figure 3).”

Example of illuminance limit zonation

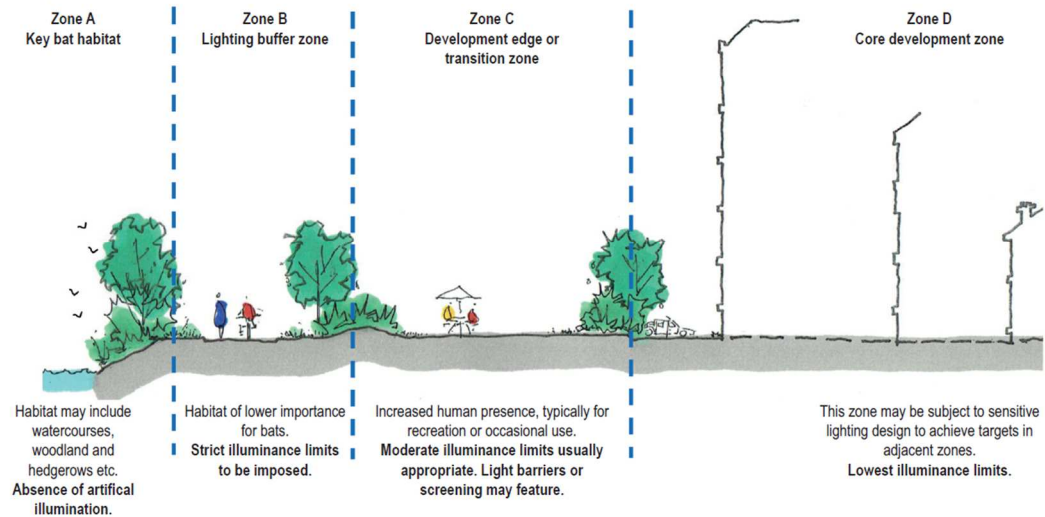


Figure 3 - Example of lighting zonation near sensitive boundaries and known ecological habitats

4. Scope of Mitigation

4.1 Mitigation of lighting to reduce obtrusive light.

- 4.1.1 The design has been carried out to meet the requirements in the relevant standards. This include ILP GN01 (Guidance note for the reduction of obtrusive light).
- 4.1.2 All designs have been carried out and checked by competent designers.
- 4.1.3 Pole mounted luminaires are set at 6m as specified by the client. This should help to limit the extent in which the light can spread as may happen with a higher mounting height.
- 4.1.4 All luminaires are positioned at 0° tilt to ensure no direct light will be emitted above the horizontal.
- 4.1.5 The luminaire used was requested by Seacourt Tennis club including the particular mounting height and colour temperature.
- 4.1.6 Although the requested luminaire uses a colour temperature (5000K as stated in BS12193) that is higher than would normally be recommended for ecologically sensitive areas.
- 4.1.7 The ambient light levels of the area as shown on CPRE website can be found in **Appendix 3**. The ambient light level of the Application Site is 4-8 NanoWatts/cm²/sr which is typical of an **E3** environmental zone.
- 4.1.8 The area of the padel courts have foliage around the boundary plus acoustic fencing to the north and south which will help reduce light spill into the gardens and onto the building facades. However, these are not represented during the modelling process to account for the worst case scenario.
- 4.1.9 The luminaires should be fitted with a visor / shield to reduce the amount of spill light. It should be confirmed with the luminaire manufacturer than a shield is available before procurement of any luminaire and if a visor is not available a similar luminaire should be used to achieve a similar light spill to meet the requirements of GN01/2021 and GN08/2023. An example of a shield for the 1KW luminaire has been shown in **Figure 4**.



Figure 4 - Example of luminaire visor

5. Lighting Design

5.1 Brief

- 5.1.1 The Proposed Development will require lighting for amenity and safe use during the hours of darkness, whilst ensuring that potential light spill onto the plot boundaries and sensitive receptors of the site is limited.
- 5.1.2 This lighting strategy considers the relevant local planning policies as outlined in **Section 2**, thus aiming to provide minimal lighting levels where required, whilst remaining unobtrusive to nearby sensitive receptors.
- 5.1.3 Lighting is to be applied, in accordance with the current regulations as outlined in **Section 3** and in accordance with **Table 1**.
- 5.1.4 During the months of April to October the lighting levels of the courts will be reduced from 300 lux to 200 lux. This is the usual times for bat breeding season and the reduced light will lessen the impact on any nearby bats.

5.2 Court lighting

- 5.2.1 Lighting of the proposed Padel court will be provided for amenity, and safety when the courts are in use.

Lighting Type	Installation Requirements
Correlated Colour Temperature (Kelvin)	5000K (Maximum)
Luminaire Manufacturer	ProSportLED (or equivalent)
Luminaire Model	ProSportLED MAH150-B50NGP with visor (or equivalent)
Lighting Class	LTA Outdoor Padel Court (300 lux maintained average illuminance, 50% Uniformity, dimming to 200 lux and maintaining uniformity)
Typical Luminaire Image	
Light Source	LED
Mounting Height	6 meters (Maximum)
Mounting Type	Post-Top Asymmetrical Floodlight
Luminaire Tilt	0°
Controls	To be controlled via remote switching, such that lighting is switched off when not in use.

Table 4 Luminaire Performance Requirements

6. Indicative Light Spill

- 6.1.1 The indicative light spill models included in **Appendix 1 - Indicative Light Spill** demonstrates the ability to provide lighting to the proposed Padel Courts and to ensure that a relatively sensitive lighting solution is installed. Although it does not take any blocking effect of obstacles into consideration, the spill light has reduced to 10 lux just beyond the hedges surrounding the site.
- 6.1.2 The light spill diagram demonstrates the restrictions in light spill essential to fall in Line with the current lighting guidance outlined by the ILP (GN01) whilst illuminating the courts in accordance with LTA (300 Lux Average, 0.50 Uo). **Table 5** shows that the vertical illuminance pre-curfew to be 10 lux maximum and 2 lux post-curfew. The results obtained can be seen in **Appendix 2** where Grids 4 and 5 are at the closest dwellings.
- 6.1.3 The proposed lighting uses luminaires that focus the light down onto the ground, reducing the likelihood of upward light and light spill. The Isolux contours demonstrate the initial light output ultimately demonstrating the absolute adverse scenario.
- 6.1.4 The light fittings installed should be mounted on columns no higher than 6 metres, using an Asymmetric fitting with the same photometric outlay as the suggested fitting outlined in **Section 4.3**, and a Lumen output of 21,760 lumens.
- 6.1.5 The luminaires used have been fitted with a front visor to help reduce spill light. As only the 1 KW output was available with photometry, this has been used with the output reduced to the 150W equivalent. If the luminaire used in the light spill diagram is not available with the visor then an equivalent luminaire must be used that achieves a similar light spill.
- 6.1.6 The current model with the visor use has reduced the vertical light spill grids from 9.11 lux (Grid 5) without a visor to 0.55 lux (Grid 5), this is further reduced during the breeding season to 0.35 lux (Grid 5) with extra dimming applied to the luminaires.

Environmental Zones	Sky Glow ULR ¹ (Max %)	Light Trespass (Into Windows) Ev (lux)		Building Luminance Average, Pre-curfew
		Pre- Curfew	Post-Curfew ²	Average L (cd/m2)
E0	0	0	0	0
E1	0	2	0 (1*)	0
E2	2.5	5	1	5
E3	5	10	2	10
E4	15	25	5	25

Table 5: Obtrusive Light Criteria

¹ ULR (Upward Light Ratio) is the maximum permitted percentage of luminaire flux that goes directly into the sky

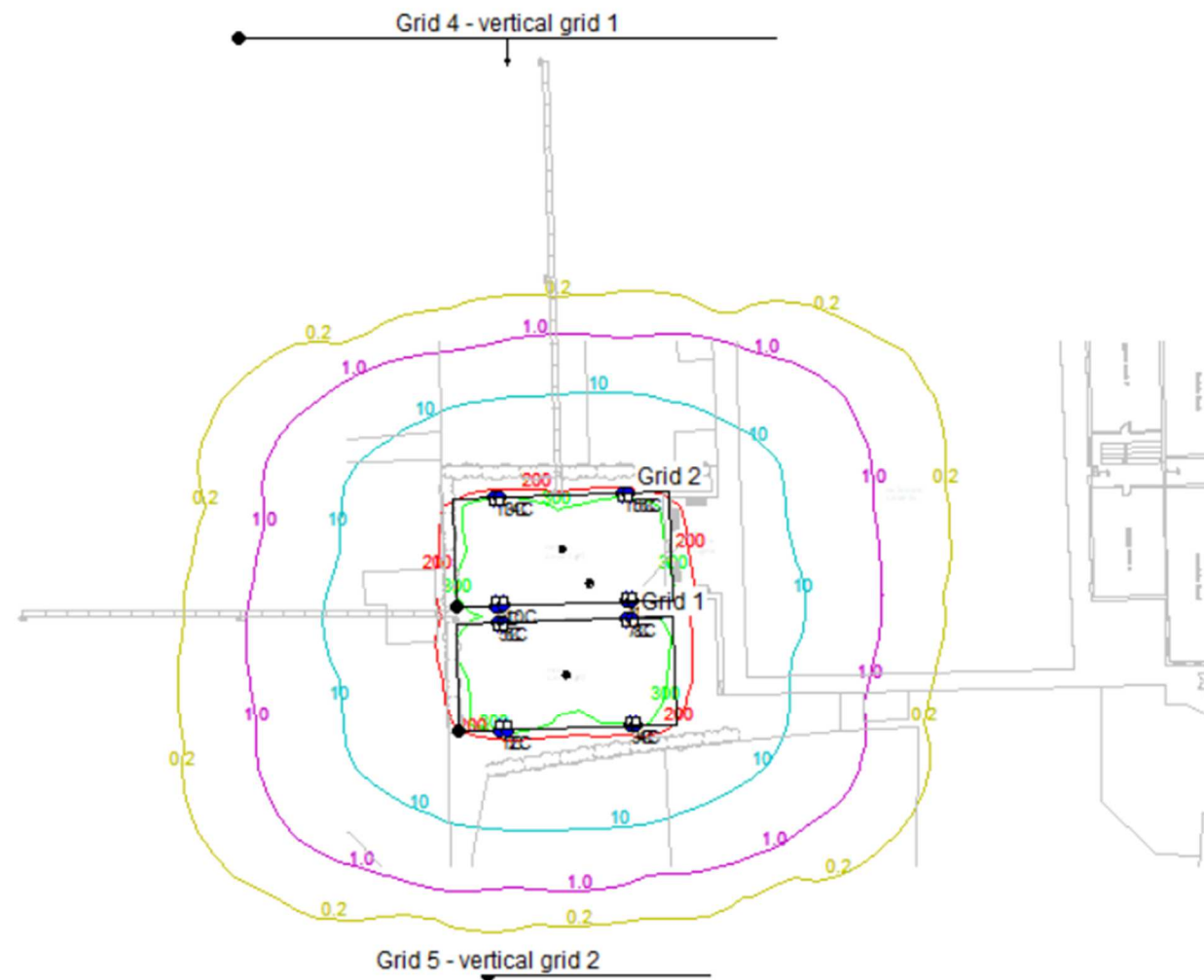
² Curfew refers to a time when the local planning authority has agreed that the lighting installation should be switched off; this typically refers to 23h00 – 07h00

7. Conclusion

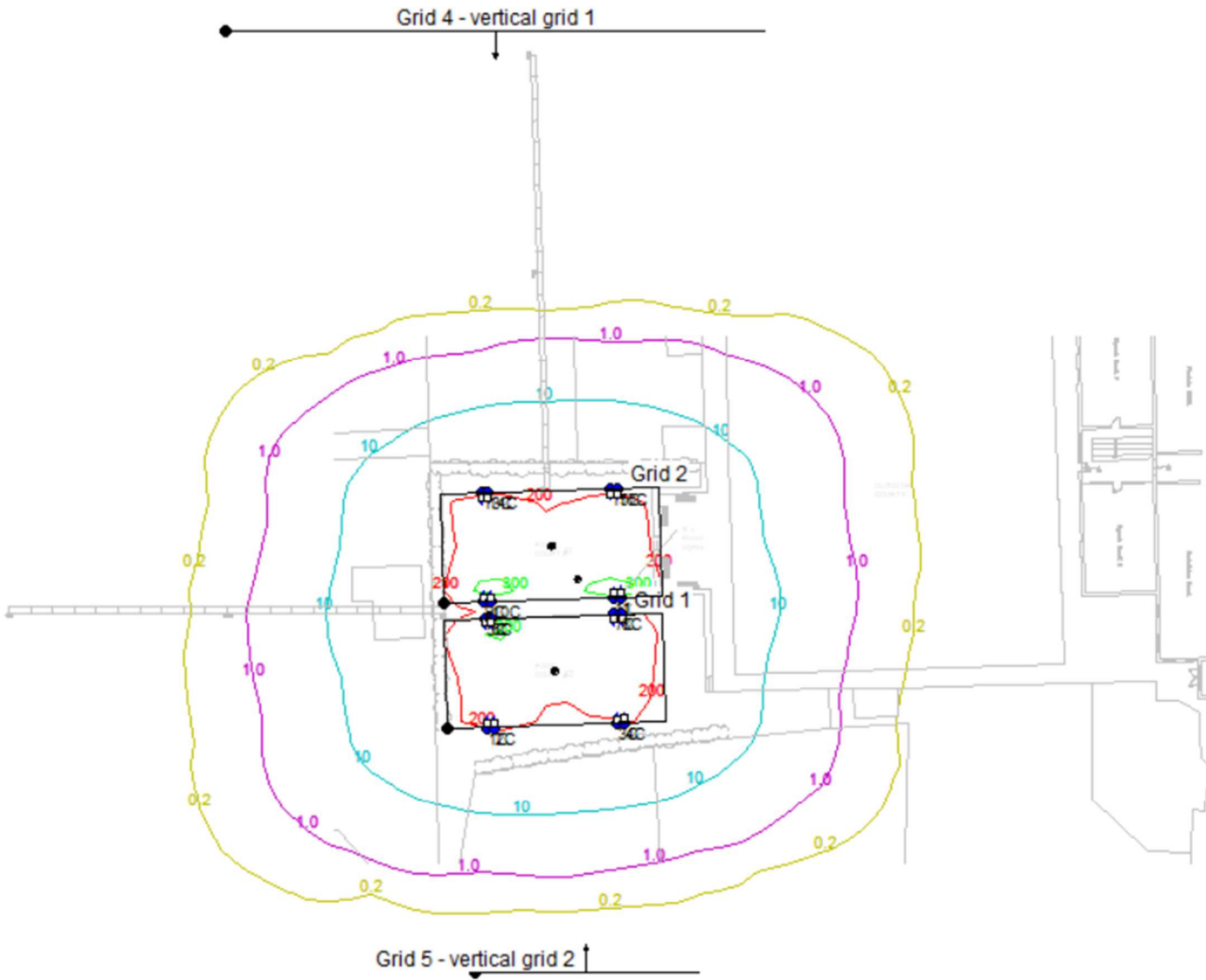
- 7.1.1 The lighting strategy outlines the criteria for the lighting design of the Proposed Development. This lighting strategy aims to ensure that the lighting is fit for purpose whilst maintaining sensitivity towards the site boundaries.
- 7.1.2 To ensure that the potential for obtrusive light is minimised, it is necessary to restrict the mounting heights of the luminaires, tilt angle and lumen output to those specified in **Section 5**.
- 7.1.3 The lighting to each court should be controlled via switching in a separate location with the ability to turn the lights on in an occupied court only. The lighting levels achieved in each scenario has been shown in **Appendix 2**.
- 7.1.4 The light spill diagrams in **Appendix 1- Indicative Spill Lighting** outlines the maximum adverse scenario, with all the tennis court lighting turned on at the same time.
- 7.1.5 In conclusion, the indicative light spill diagram presented in **Appendix 1- Indicative Spill Lighting** shows that implementing the strategy detailed in **Section 5** will ensure that increases in light levels will be kept to a minimum outside of the confines of the facility, whilst lighting all areas required, to an appropriate light level.
- 7.1.6 It can be seen that the new lighting for the Padel Courts can be installed without detriment to the existing sensitive receptors due to court locations, existing ambient light levels and the use of visors.
- 7.1.7 The luminaires must be fitted with a visor to limit the light spill. The use of the visor reduces the spill lighting on the vertical grids significantly.

Appendix 1 - Indicative Light Spill

See file: 3097-DFL-ELG-XX-LD-EO-13001-S3 – 300 lux



See file: 3097-DFL-ELG-XX-LD-EO-13002-S3 – 200 lux



Appendix 2 – Lighting Design Levels



300 lux levels – luminaires dimmed to 70%

	Individual Lighting	Combined Lighting
Grid 1	Eave = 312.79 lux & Uo = 77%	Eave = 345.80 lux & Uo = 72%
Grid 2	Eave = 312.75 lux & Uo = 77%	Eave = 345.80 lux & Uo = 72%

	Vertical Grid
Grid 4	0.18 lux (MF=1)
Grid 5	0.55 lux (MF=1)

200 lux levels – luminaires dimmed to 45%

	Individual Lighting	Combined Lighting
Grid 1	Eave = 201.08 lux & Uo = 77%	Eave = 222.30 lux & Uo = 72%
Grid 2	Eave = 201.05 lux & Uo = 77%	Eave = 222.30 lux & Uo = 72%

	Vertical Grid
Grid 4	0.12 lux (MF=1)
Grid 5	0.35 lux (MF=1)

Comparison with revised design

	Without Visor (Aug 2023)	With Visor (Aug 2024)		
	Report P01	300 lux	200 lux	Maximum Reduction
Grid 4	0.89 lux	0.18	0.12	86.5%
Grid 5	3.20 lux	0.55	0.35	89.1%

Appendix 3 – CPRE Ambient Light Levels

