



TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

This short technical note has been produced in response to comments received from both Hampshire County Council (HCC) Ecology (27th October 2021), South Downs National Park (SDNP) (9th November 2021) and Natural England (6th December 2021) in relation to Outline Planning Application APP/21/00893 Land North of Long Copse Lane.

The aim of the note is to answer raised comments from all parties, provide a further technical response and outline a proof of concept in relation to mitigation measures included in the submitted WSP Lighting Strategy document 70052250-WSP-GSC-XX-RP-LI-0001.

HAMPSHIRE COUNTY COUNCIL (HCC) ECOLOGY CONSULTATION QUERY

Comments extracted from email dated 27th October 2021

'Proposed mitigation, compensation and enhancement entails the establishment of unlit, wide buffers to the site boundaries. This includes a dedicated 'bat buffer' along the entire western and northern boundaries, extending to c.35m at its maximum. The principle of these boundary buffers is welcome.....

The potential impact of lighting on these buffers is also of concern. The submitted Lighting Assessment includes outline details of proposed lighting, but the level of detail required to assess the impacts of lighting on the proposed buffer and adjacent habitats is not provided. It is hoped to provide unlit areas adjacent to the buffers but this is not guaranteed.....

With respect to lighting, the submitted assessment provides some very welcome text on the proposed lighting strategy and its adherence to industry best-practice guidance on bats and lighting. I consider that further information is required to provide reassurance that these aspirations are deliverable and that proposals achieve the desired outcome of ensuring that key bat habitat is protected and enhanced. A lighting plan with contours and critically, vertical spillage, is necessary to fully understand how the site will interact with the adjacent woodland, proposed woodland buffer and retained boundary habitats. The protection of adjacent woodland habitat is essential in determining the acceptability of the proposal.'

NATURAL ENGLAND (NE) CONSULTATION QUERY

Comments extracted from letter dated 6th December 2021

'In line with the 'avoid, mitigate, compensate' hierarchy, Natural England recommends that potential impacts are avoided in the first instance, for example through the design of the scheme, such as location of built development, access restrictions, sensitive lighting strategy.....

A detailed lighting strategy should also be submitted to and approved by the HCC ecologist which outlines how light spill will be prevented in the unlit bat buffers.

WSP RESPONSE

The light source being widely used in many lighting applications is LED. LED light sources can be manufactured with a multitude of directional optics allowing the designer a good level of choice and

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

opportunity to be able to direct the light to the task area with minimal light being cast outside the area of interest or what is more commonly known as spill light.

WSP has produced two calculations that are representative of and proof of concept as to how lighting can be provided for the purposes of resident's safety whilst minimising spill light to levels identified that are required for Bechstein's and other light sensitive species within the proposed ecological buffer zones at Long Copse Lane. The presented calculations cannot and do not cater for additional mitigation such as baffles or screening provided by existing or proposed trees; as such the calculations very much represent a worst-case scenario.

The representative areas are as indicated in Figure 1 below.



Figure 1 – Proposed development Masterplan

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

Calculations have been based on the following Parameters:

- Target level of illumination BS5489-1:2020 & BS EN13201-2:2015 Class P6 (lowest defined level in BS5489) for areas of the development that abut the ecological buffer zones.
- Luminaire – Urbis Schreder Axia 2 complete with 8 3000k LEDs at 1.57klm output with internal rear louvres (embedded into LED optics) ¹
- Mounting height of 6m (maximum height for this type of development and in accordance with HCC specification)
- Maintenance factor of 1.0 to represent day 1 switch on output and worst case scenario i.e. no lumen depreciation.
- Vertical grids placed at a distance of 20m and 30m from the development ,with a height of 6.0m (grid spacing of 1.0m x 1.0m).
- Horizontal grid and isolux contours indicate spread of light at ground level. Refer to drawing number 70052250-WSP-SK-LI-001-P02

¹ Axia 3, current HHC specification luminaire data was not available at the time of calculations, but assumption is that new data will be the same or improvement on that which has been utilised.



Figure 2 – Urbis Schreder Axia 2 Luminaire

Discussions with scheme ecologist have resulted in the following criteria to which the scheme developer is committed to ensure the development provides the required conditions for bats:

- Minimum of 20 metres from site boundary below 0.2 lux on vertical and horizontal (indicated as the **purple** grid in the calculation screen shots)
- Minimum of 30 metres from site boundary below 1 lux on vertical and horizontal (indicated as the **blue** grid in the calculation screen shots)

The following outline concept design is based on internal baffles embedded at the back of the LED optics. This is presented as the worst-case scenario, which can be further mitigated at detailed design with the inclusion of external baffles should it be deemed necessary.

It is proposed that target levels of illumination for areas that abut ecology buffer zones are reduced from the P4 outlined in the Lighting Strategy to a P6. Target levels are shown in Table 1. A departure from standard may be required from HCC, for areas that have potential to be ecologically sensitive. This reduction in levels being the most logical for such instances.

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

Table 1 – P Class Lighting Levels extracted from BS EN13201-2:2015.

Class	Horizontal illuminance		Additional requirement if facial recognition is necessary	
	E in lx (minimum maintained)	E _{min} in lx (maintained)	EV, min in lx (maintained)	Esc, min in lx (maintained)
P1	15 (22.5)	3	5.0	5.0
P2	10 (15)	2	3.0	2.0
P3	7.5 (11.25)	1.5	2.5	1.5
P4	5 (7.5)	1	1.5	1.0
P5	3 (4.5)	0.6	1.0	0.6
P6	2 (3)	0.4	0.6	0.2
P7	Performance not determined	Performance not determined		
To provide for uniformity, the actual value of the maintained average illuminance may not exceed 1.5 times the minimum E value indicated for the class (figure shown in brackets).				

Note: ILP GN08-18 'Bats and artificial lighting' states:

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 averse behaviour (Stone, 2012).'

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

This note and associated outline design demonstrates what can be achieved with readily available lighting products. As well as the positioning of the street lighting sufficient distance from the ecological buffers, additional mitigation will be achieved by tree and shrub planting in and around the buffers to further reduce penetration of light. Therefore, the lux levels shown in this report are a maximum which in practice will be lower due to the effects of landscaping (and the external baffles previously referenced).

The following pages are a summary of calculations undertaken as proof of lighting concept. Key results from the calculations have been summarised in Table 2.

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

NORTHERN BUFFER ZONE RESULTS

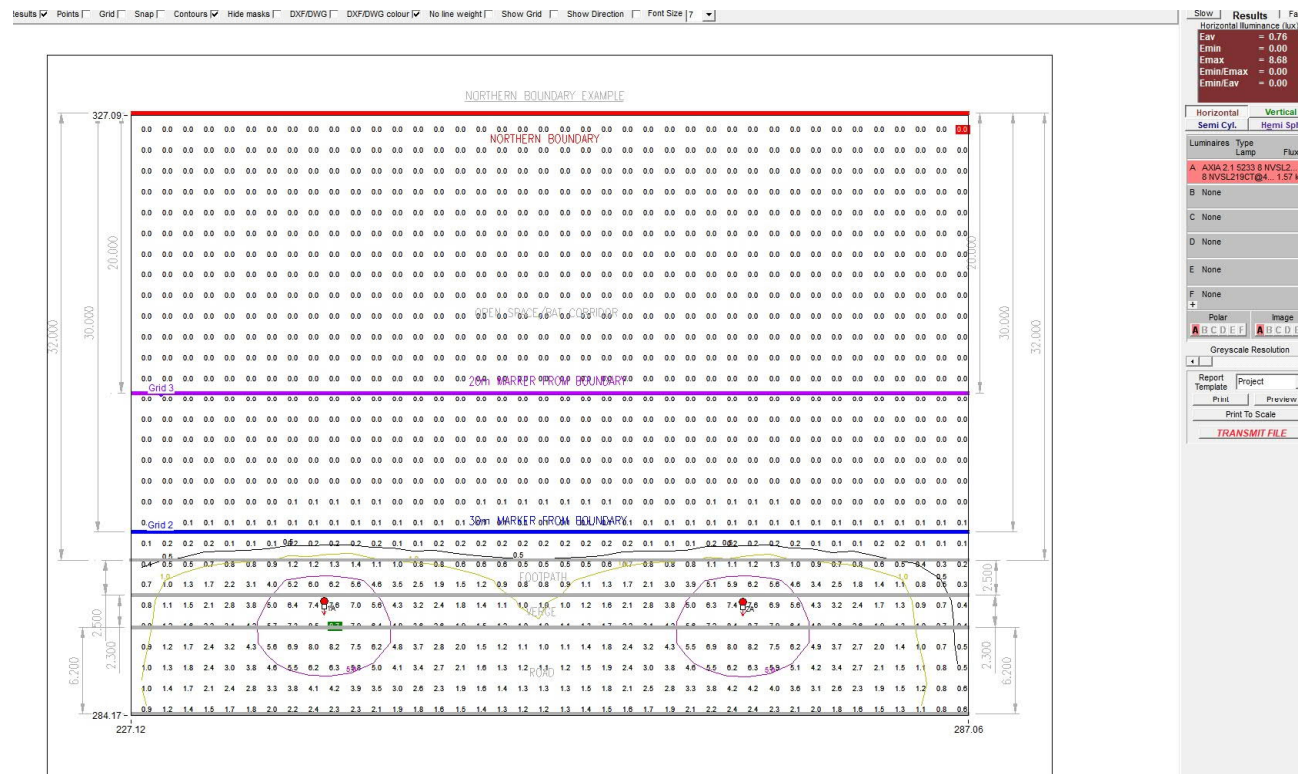


Figure 3 – Northern Buffer Zone Grid 1 (horizontal grid)

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

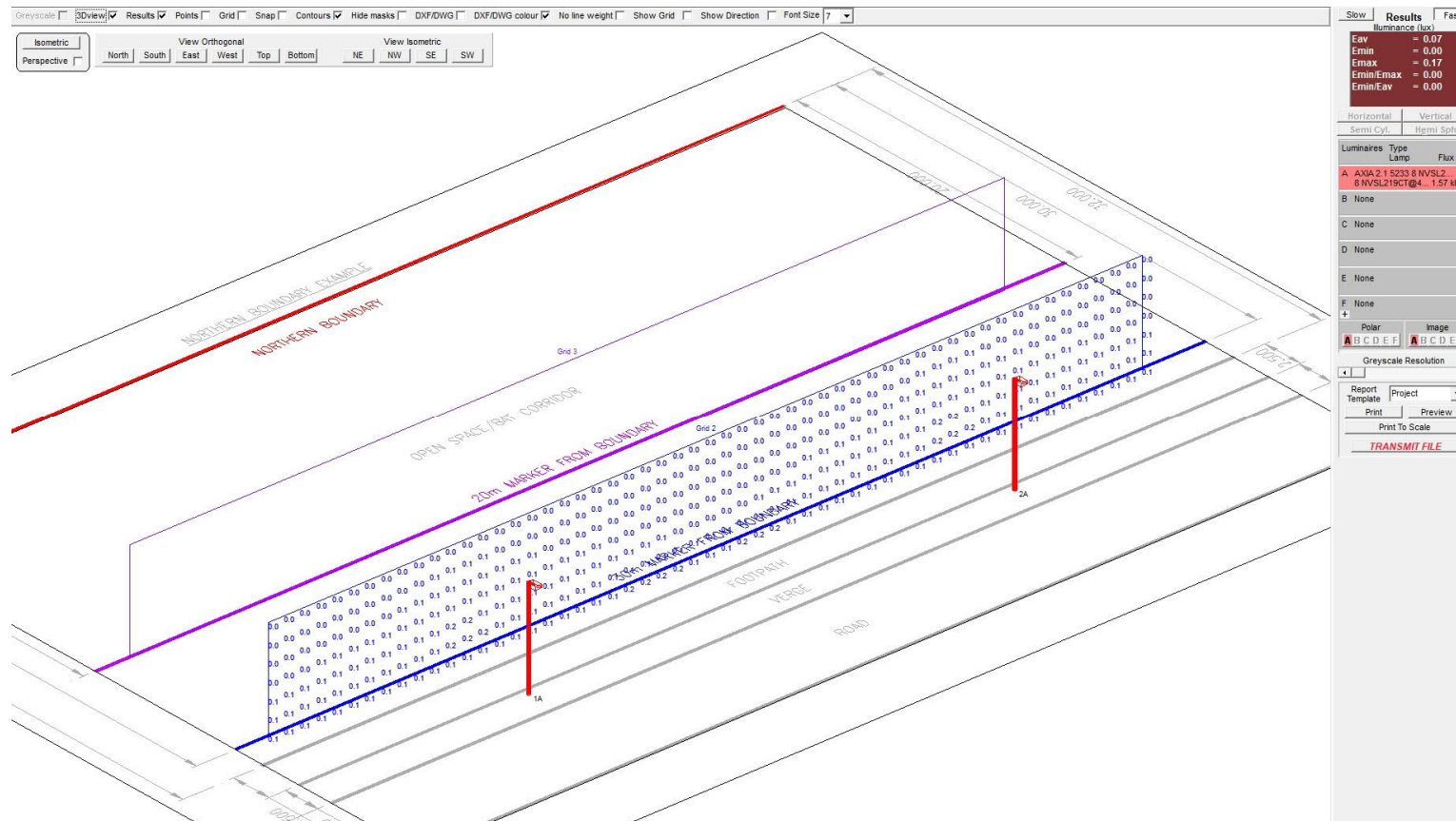


Figure 4 – Northern Buffer Zone Grid 2 (30m from boundary vertical grid)

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

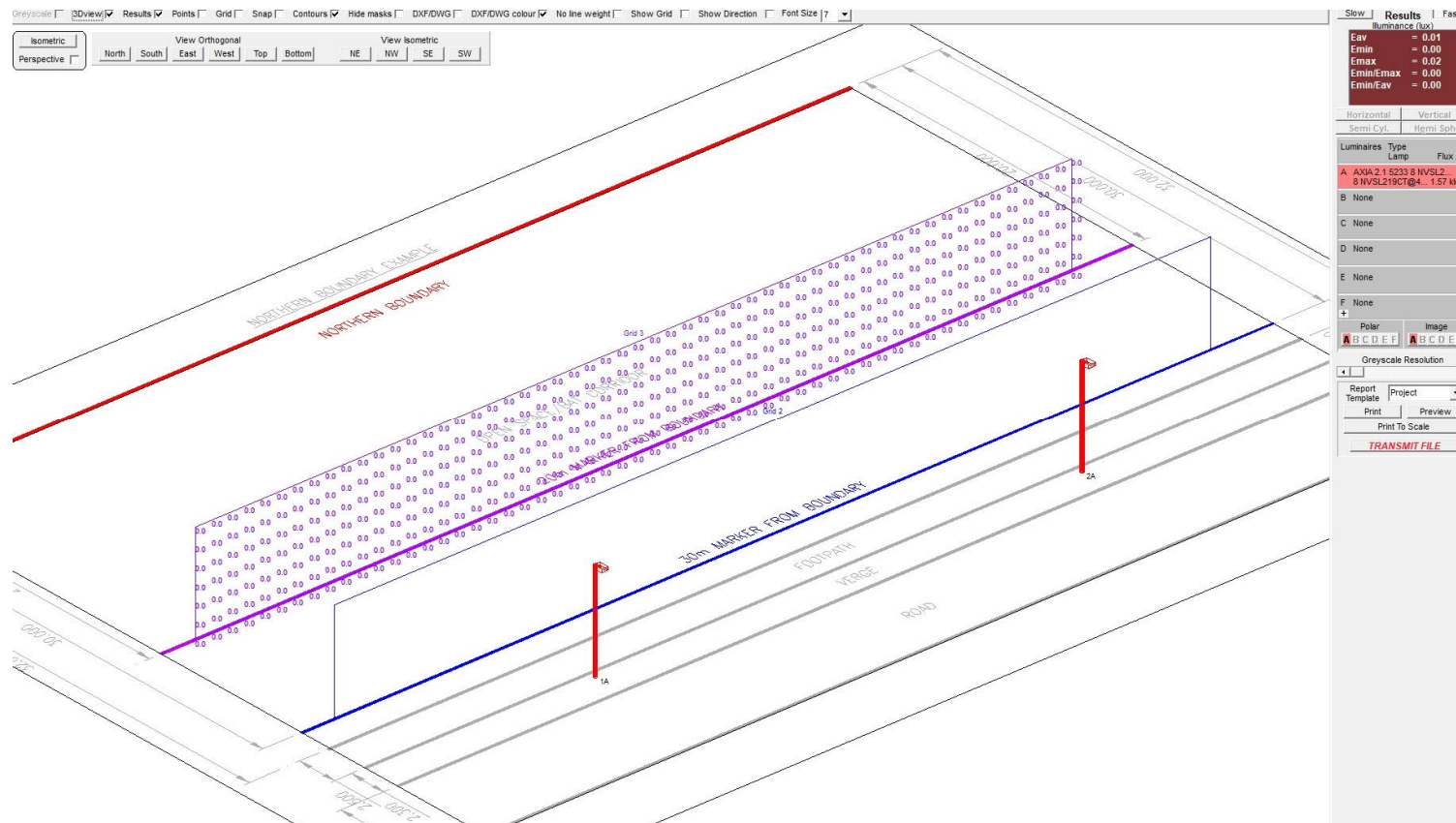


Figure 5 – Northern Buffer Zone Grid 3 (30m from boundary vertical grid)

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

EASTERN BUFFER ZONE RESULTS

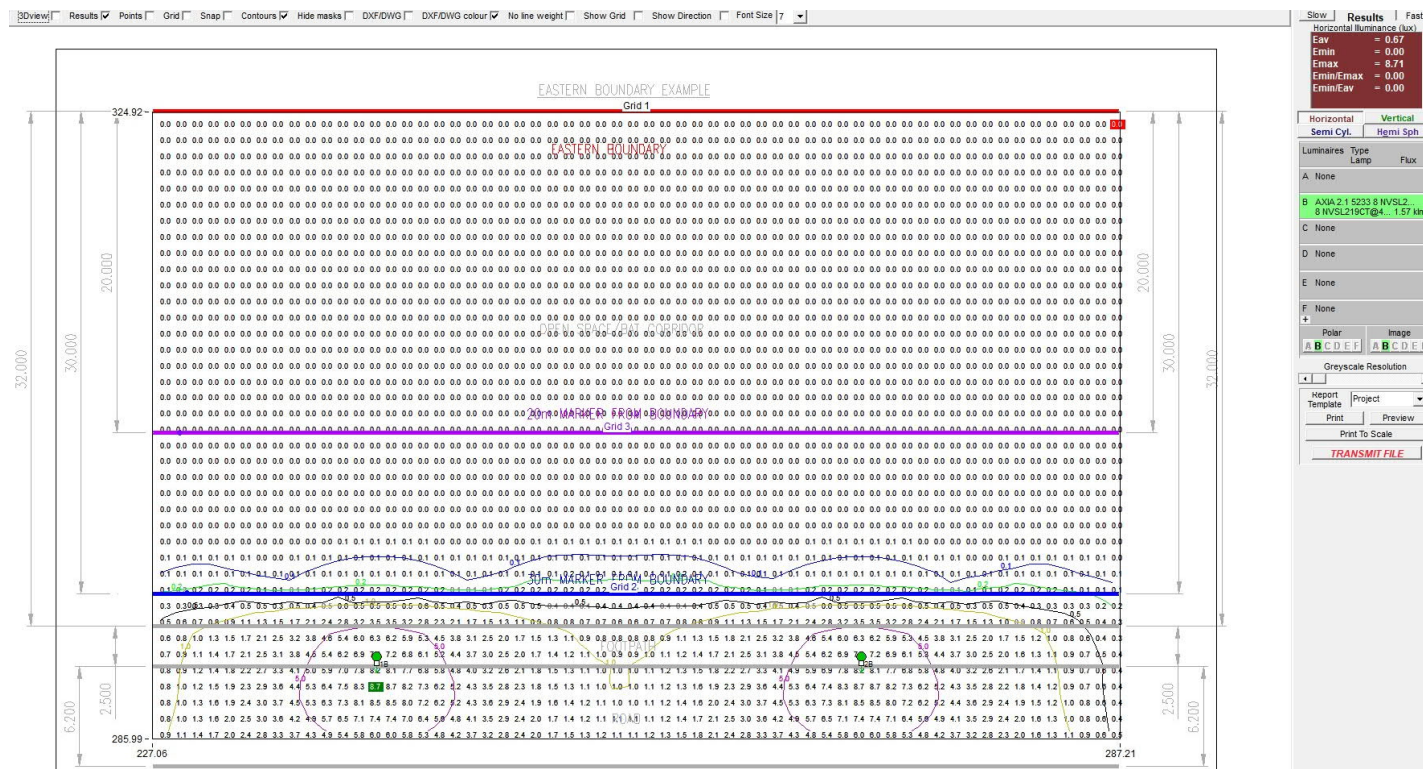


Figure 6 – Eastern Buffer Zone Grid 1 (horizontal grid)

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

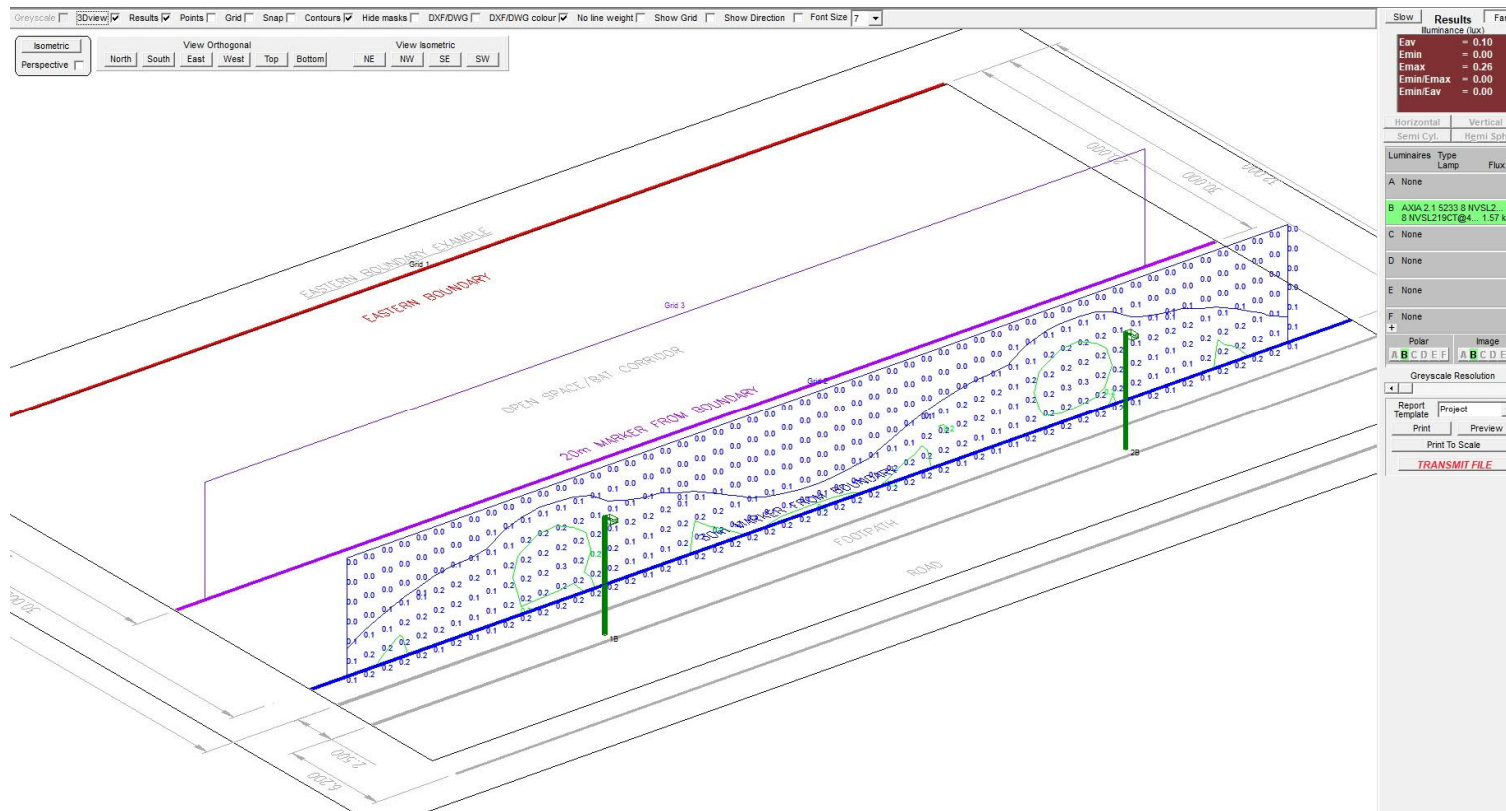


Figure 7 – Eastern Buffer Zone Grid 2 (30m from boundary vertical grid)

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

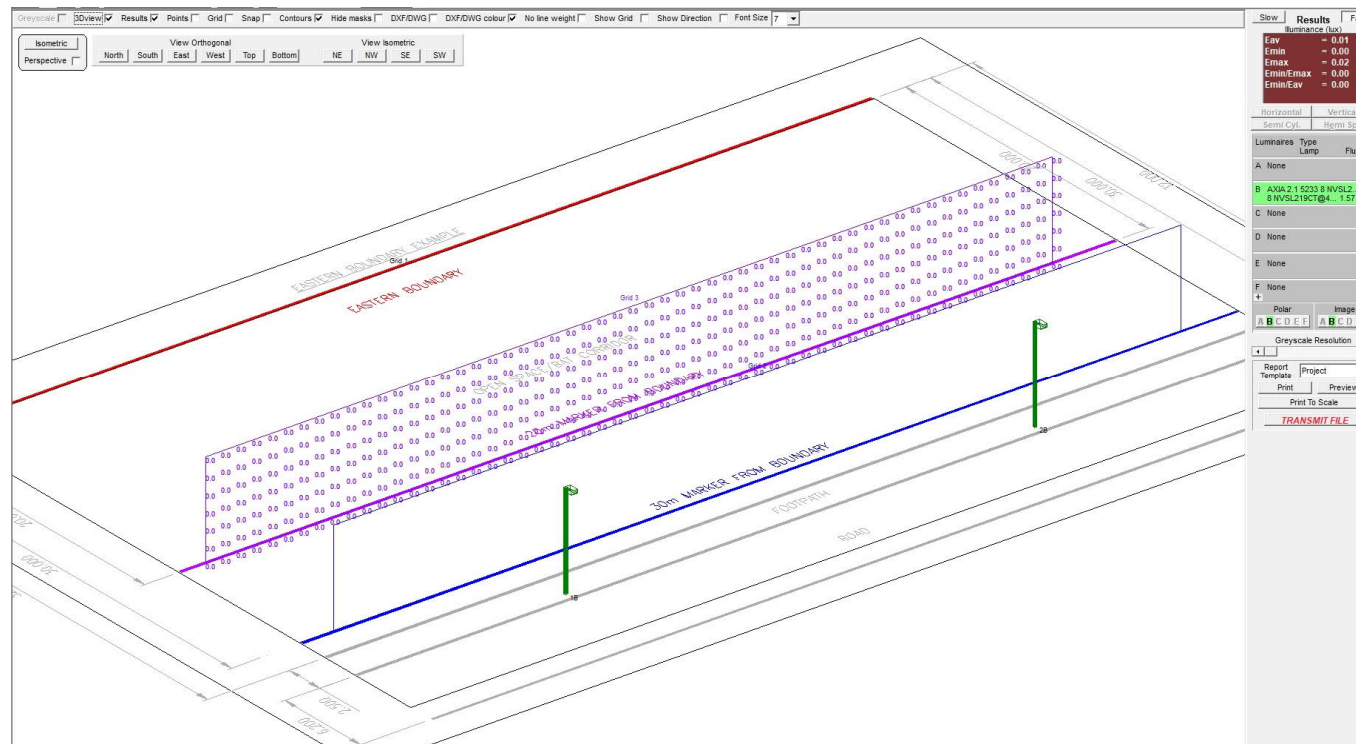


Figure 8 – Eastern Buffer Zone Grid 3 (20m from boundary vertical grid)

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

CALCULATION SUMMARY

Table 2 – Calculation Grid Summary

Buffer Zone	Grid Number	Emax (Lux)	Comment
Northern	1 (Horizontal grid @ 30m line)	0.20	Within the agreed standards across the whole grid.
Northern	2 (Vertical grid @ 30m line)	0.17	Within the agreed standards across the whole grid.
Northern	3 (Vertical grid @ 20m line)	0.02	Within the agreed standards across the whole grid.
Eastern	1 (Horizontal @ 30m line)	0.50	Within the agreed standards across the whole grid.
Eastern	2 (Vertical grid @ 30m line)	0.26	Within the agreed standards across the whole grid.
Eastern	3 (Vertical grid @ 20m line)	0.02	Within the agreed standards across the whole grid.

As can be seen from the calculation's grids and summary Table 2, a conventional method of lighting can be utilised to provide levels of illumination suitable for the safety and security needs of pedestrians/residents and sensitive ecological receptors that will occupy/use the buffer zones.

Further isolux contour plots have been provided on sketch number 70052250-WSP-SK-LI-001 to provide context of lighting in situ to surroundings of the proposed development for the northern and eastern ecological buffer zones. Note that the contours are overlaid on a hand drawn Masterplan, therefore not suitable for scaling.

It is proposed that this concept of lighting be used throughout the proposed development at the detailed design stage when near buffer zones.

Where footpaths are remote from the minor access roads/private roads, such as Colman's Copse (south west corner of site), it is suggested that a means of wayfinding only lighting be employed. This does not necessarily mean the use of bollard lighting, but an alternative in the form of LED solar studs, as produced by Solareye 80 (<https://www.solar-eye.com/>).

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard



Figure 9 – SolarEye 80

This product is an inground solar stud which can be used as an alternative wayfinding product. This does not offer a level of illumination across the surface but installed to provide a guide. The inclusion of a bat hat (product indicated in top right image) reduces upward light to 2%, but of a level which does not disturb/disrupt light sensitive bat species.

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

SOUTH DOWNS NATIONAL PARK (SDNP) CONSULTATION QUERY

Comments extracted from letter dated 9th November 2021 (Ref: SDNP/21/04629/ADJAUT)

'With the intended luminaire, it is likely that the upward light ratio will be close - if not, will be – to zero. Although the development is within an E2 zone, we would prefer to see the luminaires installed at the E1 requirements with zero upward light. We request this is given further consideration.'

WSP RESPONSE

As highlighted in the HCC response, calculations have been carried out utilising an Urbis Schreder Axia 2 LED luminaire. When installed at an inclination of zero degrees to the finished surface, the luminaire is compliant with G4 class of BS EN13201-2:2015, having a ULR of 0 i.e. no light above the horizontal (90°), ensuring compliance with the GN01 E1 ULR requirement of 0.

Table 2 - ILP GN01 Obtrusive light limitations for exterior lighting installations (compressed version of tables contained in GN01).

Environmental Zone	Sky Glow ULR [Max %]	Light Intrusion (into windows) Ev [lux]		Luminaire Intensity I [cd]		Building Luminance Pre-curfew
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average L [cd/m2]
E0	0	0	0	0	0	0
E1	0	2	0(1*)	2,500	0	0
E2	2.5	5	1	7,500	500	5
E3	5	10	2	10,000	1,000	10
E4	15	25	5	25,000	2,500	25

TECHNICAL NOTE 1

DATE:	19 January 2022	CONFIDENTIALITY:	Public
SUBJECT:	Long Copse Lane - Lighting Response to SDNP, HBC and NE		
PROJECT:	Long Copse Lane	AUTHOR:	P. Batchelor
CHECKED:	N. Griffin	APPROVED:	A. Howard

Polar diagram of Axia 2 file reference AXIA 2.1 5233 8 NVSL219CT 480mA WW830 13W 7x5 II-Short 400952 Integrated lenses Back louvers 230V EF. Compliant figures circled in red.

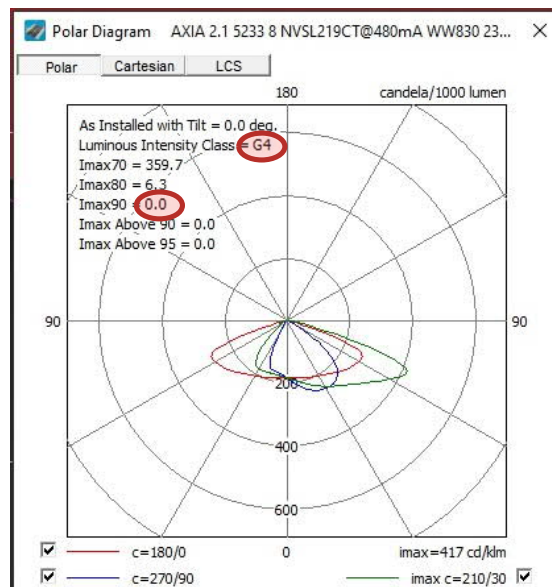


Figure 10 – Axia 2 Polar Diagram

Given the sensitive surroundings of the proposed development, the detailed design and implementation phases are crucial in ensuring that the perceived wider impacts associated with artificial lighting are effectively mitigated throughout all the development stages.



KEY:

- SITE BOUNDARY
- 30m BUFFER ZONE LINE
- 20m BUFFER ZONE LINE
- 0.2 LUX ISOLUX CONTOUR LINE
- 0.4 LUX ISOLUX CONTOUR LINE
- 1.0 LUX ISOLUX CONTOUR LINE
- 5.0 LUX ISOLUX CONTOUR LINE
- INDICATIVE LIGHTING COLUMN LOCATION

DO NOT SCALE

NOTES:

- TO BE READ IN CONJUNCTION WITH 'PLANNING RESPONSE - LIGHTING TECHNICAL NOTE - P02'
- THIS DRAWING IS FOR INFORMATION ONLY AND SHOULD NOT BE REFERRED TO FOR DETAILED DESIGN OR CONSTRUCTION INFORMATION.

P02	12/01/22	PB	SECOND ISSUE FOR INFORMATION ONLY	NG	AH
P01	17/12/21	PB	ISSUE FOR INFORMATION ONLY	NG	AH
REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: S2 - FOR INFORMATION

Unit 9 The Chase, John Tate Road, Foxholes Business Park, Hertford, SG13 7NN, UK
T+ 44 (0) 1992 526 000, F+ 44 (0) 1992 526 001
wsp.com

CLIENT: LAND AND PARTNERS LTD

ARCHITECT: PEGASUS

SITE/PROJECT: LONG COPSE LANE, EMSWORTH

TITLE: OUTLINE LIGHTING STRATEGY
ECOLOGY BUFFER ZONES

SCALE @ A1: NTS	CHECKED: NG	APPROVED: AH
PROJECT NO: 70052250	DESIGNED: PB	DRAWN: PB
DATE: January 22		REV: P02

DRAWING NO: 70052250-WSP-SK-LI-001-P02

© WSP UK Ltd

File name: I:\KINGSGROUP\COMMON\DATA\PROJECTS\70052250\70052250 - LONG COPSE LANE - EBSWORTH - PL SUPPORT\WSP\LIGHTING\02 DRAWINGS\01 CURRENT\70052250-WSP-SK-LI-001-P02.DWG, printed on 12 January 2022 12:55:04 by Barbara, Paul

UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT LOCAL AUTHORITIES OR STATUTORY BODIES, IT SHOULD BE UNDERSTOOD THAT ALL DRAWINGS ARE ISSUED AS PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR AND / OR EMPLOYER COMMENCE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT THEIR OWN RISK