

EXTERNAL LIGHTING STRATEGY REPORT

OLDLANDS FARM
NEWLANDS ROAD
BOGNOR REGIS
PO22 9FJ

Client

LYSANDER

Consulting Services Engineer
Kelly Taylor & Associates
1 Ashleigh Way
Langage Business Park
Plymouth
PL7 5JX

MC/10383/ELR-02

April-2021

KTA 

Report issue 28 April 2021

Author / Amended by:	Authorised by	Date:	Version:
Mark Cramp Senior Electrical Engineer	Paul Hastie Director	12.04.2021	Report issue 01
Mark Cramp Senior Electrical Engineer	Paul Hastie Director	28.04.2021	Report issue 02

CONTENTS

1. EXTERNAL LIGHTING STRATEGY

1.1	Assessment of the Need for Lighting	1
1.2	Relevant British Standards and Codes	2
1.3	Best Practice Lighting Design Principles	3
1.4	Luminaire Performance Criterion	4
1.5	Luminaire Selection	5
1.6	Design Illuminance	7
1.7	Residential & Ecological Receptors	8
1.8	Artificial External Lighting Decree	8
1.9	Excerpt of External Lighting Lux Level Plot drawing 10274-PL-100	9

1.0 EXTERNAL LIGHTING STRATEGY

Assessment of the Need for Lighting

- 1.1 This lighting assessment report sets out the external lighting strategy in support of a full planning application for the comprehensive redevelopment of Oldlands Farm off Newlands Road in Bognor Regis to provide erection of a warehouse (Use class B8) with ancillary office, associated parking, van storage, plant, ancillary structure, lighting landscaping and infrastructure works. Including earthworks to facilitate flood compensation area.

All details of the proposed lighting scheme are noted below and detailed on drawing KTA Drawing Number: 10383-PL-100 External Lighting Lux Level Plot. An excerpt of said drawing is appended to this report.

The number/ type of lighting installation, beam orientation and schedule of equipment, as well as proposed lighting levels within and beyond the site, are covered within this report and our external lighting lux level plot.

Notwithstanding the legislative requirements to provide adequate means of illumination to prevent the occurrence of dangerous incidents, external lighting is an industry standard requirement with focus on loss prevention as a policy, with additional requirements included to reduce the possibility of vehicular and pedestrian potentially harmful incidents.

The safety and loss prevention benefits of providing external lighting outweigh any negatives for not providing external lighting.

Lighting in itself is not a problem; it only becomes a problem where it is excessive, poorly designed or badly installed. Additional mitigation measures for reducing the effects of providing artificial external lighting have been considered and will be incorporated into the external lighting design where required.

Relevant British Standards and Codes

1.2 The following standards, policies, guidance notes and framework documents will form the basis within this report for assessment with consultation prior to, during and post completion of the Development solution: -

- National Planning Policy Framework (Revision 19th June 2019)
- Clean Neighbourhoods and Environment Act 2005 (CNEA)
- Environmental Protection Act (1990)
- HSE Executive Lighting at Work (ISBN 978 0 7176 1232 1) 1997
- British Standards, Lighting of Outdoor Work Places (BS EN 12464, 2:2014)
- British Standards, Lighting of Indoor Work Places (BS EN 12464-1:2011)
- British Standards, Accessible & Inclusive Built Environment (BS 8300-1:2017)
- British Standards, Photobiological Safety of Lamp Systems (BS EN 62471:2008)
- CIBSE Lighting Guide LG1, The Industrial Environment (2012)
- CIBSE Lighting Guide LG6, The Outdoor Environment (2016)
- ILP Technical Report TR12 Lighting of Pedestrian Crossings (2007)
- ILP Guidance Notes for the Reduction of Obtrusive Light (2020)
- ILP Technical Report TR23 Lighting of Cycle Tracks (1998)
- IWBI The Well Building Standard™ v1 (2019)
- UK Green Building Council, Net Zero Carbon Buildings (2019)
- DEFRA, Clean Air Strategy (PB14554:2019)

Best Practice Lighting Design Principles

1.3 In order to prevent any mitigation against the statutory requirements in terms of light nuisance, further stipulations were imposed upon the lighting design for the proposed Development: -

- Light fittings have been strategically located to ensure optimum highway safety along the boundary with Felpham Relief Road. The light fittings are positioned pointing away from the road and are designed to reduce backwards light spill.
- All lighting should have a clear purpose and avoid the use of unnecessary lighting simply to create a 'presence' at night.
- Concentrate lights where they are needed and establish a clear hierarchy, with minimum lighting around the outer perimeter of the proposed Development (isoLUX boundary contour lines are shown at 0.5 lux and 1.0 lux).
- Reduce the scale of street/road lighting and consider height and spacing of lights in relation to buildings.
- Direct all floodlights carefully and away from any residential receptors to where they are most needed and design equipment to minimise light pollution.
- Ensure that the design of the lighting is in harmony with the building envelope.
- Propose a unified lighting scheme, ensuring that different types of light sources or colour temperatures are not specified.
- Alternative value-engineered luminaires are not to be proposed as a point-for-point replacement post tender as the total solution is unique to the manufacturer verified within this process, after careful pre-analysis of all performance criteria has been undertaken in terms of the following: -
 - Obtrusive Glare
 - Disability Glare
 - Source Intensity
 - Efficacy
 - Design Efficiency
 - Solution Capital Cost
 - BWIC Cost
 - Building Luminance
 - Sky-Glow
 - Sustainability

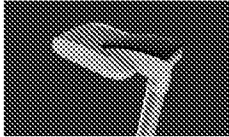
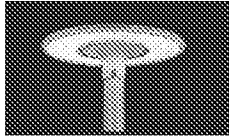
Luminaire Performance Criterion

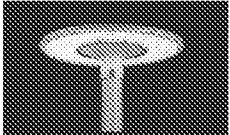
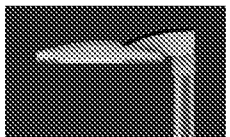
1.4 Additional stipulations are imposed upon the lighting design and luminaire selection to ensure that the total solution provides a harmonised and 'best in class' solution: -

- ILP Guidance Notes and best practice limitations stipulate that in order to reduce levels of Obtrusive Glare and provide a safe working environment that the peak intensity of all the luminaires should be below 70° in the horizontal position.
- BREEAM Ene03 External Lighting (one credit) dictates that all external light fittings within the construction zone, have an average luminaire efficacy not less than 70 luminaire lumens per circuit watt (>70 lm/cW).
- Luminaires will be protection rated to a minimum of IP65/IK08.
- The lighting design will be simulated using luminaires with a Colour Temperatures of 4,000°K and a Colour Rendering > 60 (CRI).
- Each luminaire will comply fully with BS EN 62471:2008 and protect from physiological, photochemical and biological reactions including infrared radiation, ultraviolet radiation and retinal thermal injuries.
- In the horizontal position, each luminaire will emit no upward light (0% ULOR).
- The complete light engine will have a rated lifetime >100,000 hrs at L90/B10, other lifetime metrics will not be stipulated (i.e. L70/B50).
- The use of back-light shields is to be specified where either perimeter lighting is to be restricted or receptor views of the light source inhibited.
- All luminaires are to be installed at no more than 10m AGFL in order to reduce both building illumination and scale of sky-glow.
- Column mounted luminaires will not be configured in multiple arrangements (>2 luminaires) on a single lighting column unnecessarily creating 'hot-spots' of light (interreflection into the nigh-sky) and potentially causing a serious risk upon failure (dark-spots).

Luminaire Selection

- 1.5 Additional wall mounted and column mounted luminaires are required to ensure that the total solution provides a harmonised and 'best in class' solution in achieving the design illuminance: -

Reference Manufacturer	Product Name Optical Array	cW Lumens	Efficacy lm/cW	Quantity	Luminaire Image
B1 & B1.2 THORLUX	Starbeam Eco GA2 Area Optic	35 4135	120	38	
C4 THORLUX	Starbeam GR5 Roadway	209 29,995	144	38	
D1 THORLUX	Starbeam GA2 open area	95 12,570	135	1	
D2, D2.w THORLUX	Starbeam GA2 open area	132 17,435	133	10	
D4 THORLUX	Starbeam GA2 open area	209 27,470	132	3	
H1 THORLUX	Juno D Sy PLY	197 24,020	121	4	

H3 THORLUX	Juno D Sy PLY	350 39,940	114	4	
J1 THORLUX	Juno D Asy PLY	108 12,515	115	8	
ZL,ZR THORLUX	Aspect 3	68 10,130	150	16	

Design Illuminance

- 1.6 The lighting design appended to this report stipulates and demonstrates the achieved horizontal design illuminances by 'Task Zone' contained within the Site and applicable to the Development; all derived from the above standards or guides (Section 1.2) and increased where necessary to the Applicants own lighting design standard for safe external Site operations.

The 'Task Zone' is the area where specifically designated functions are performed, it is important and stipulated by the HSE to consider the ratios of illuminance for adjacent areas or Task Zones.

Maximum ratios of illuminance for exterior applications are stipulated as 10:1. This ratio is between the minimum lux level achieved within a Task Zone to the Maximum lux level achieved within the adjacent Task Zone. This also applies where interior applications transition into exterior applications, i.e. Dock-Level Doors or Building Entrances.

A transition zone may be required between adjacent high and low district brightness areas.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5+)	UNESCO starlight reserves, IDA dark sky places.
E1	Natural	Dark (SQM 20 to 20.5)	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 & urban settlements, small town centres of suburban locations.
E4	Urban	High district brightness	Town/city centres with high levels of night time activity.

The lighting design demonstrates full compliance with all standards and guides whilst not including any obstructions, landscaping and changes in topology; it is therefore considered worst-case and in practice the levels of horizontal light-spill, obtrusive glare, visible source intensity and building luminance are permissible within the Environmental Zone classification of 'E2'. The existing conditions in the vicinity of the site are considered to correspond with Environment Zone E4.

Residential & Ecological Receptors

- 1.7 The current Site has no residential properties in relatively close proximity that could require design compliance against the ILP Guidance Notes for Obtrusive Light in obedience of Light Intrusion into Windows (lux) and Luminaire Intensity (candelas).

The lighting design also ensures that ecological receptors including tress, flora and hedgerows adjacent to the Site are considered and mitigated with the purposeful direction of artificially emitted light away from the Site boundary with minimal Light Trespass, Sky-Glow and interreflected light.

Artificial External Lighting Decree

- 1.8 It is considered that the submitted External Artificial Lighting Design (Appendix A) complete with luminaire selection achieves the industry recognised and desired task illuminance lighting level(s); are wholly appropriate, acceptable and conditionally demonstrate compliance within this report against all relevant standards, guides and planning policies.

Confirmation is given that mitigation measures have been considered and included for the final operation of the site to ensure that the proposed lighting design minimises and mitigates any effects that are produced with exterior artificial lighting including; trespass, obtrusive glare, sky-glow and light nuisance in terms of local residents, highways users and the local ecology.

The artificial exterior lighting design for the completed and operational Development at the Site considers each task and any potential hazards and ensures safe operations for the associated tasks: -

- Site-wide roaming pedestrians, cyclists and assisted accessibility.
- HGV & LGV vehicles queuing, idling, parking, loading and unloading and reversing.
- Gatehouse procedures, biometric identification, vehicle checks, administration etc.
- Regular vehicle traffic & movement including parking, electric vehicle charging and pedestrian accessibility.
- Site security, CCTV and facial recognition.
- Muster-points and methods of escape, emergency lighting levels.
- Transition zones from building interior to exterior, e.g. level access doors & reception.
- Plant maintenance, operation and meter checking.
- Light nuisance to neighbouring residents and any receptor locations, including light trespass, sky-glow, obtrusive glare and building luminance.
- Adjoining highways traffic in terms of acceptable design illuminance(s) and disability glare to non-Site traffic.

Excerpt of External Lighting Lux Level Plot drawing 10274-PL-100. Site overspill levels produced from proposed lighting design. **No obstructions have been taken into account.**

