



TECHNICAL REPORT

PROJECT: KEYSTONE CENTRE, LITTLEHAMPTON

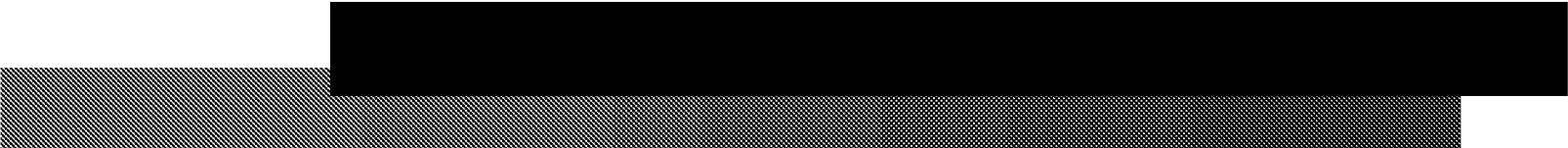
PREPARED FOR: LITTLEHAMPTON TOWN COUNCIL

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Designs for Lighting Ltd
17 City Business Centre, Hyde Street, Winchester, SO23 7TA



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1. Introduction

1.1 General

- 1.1.1 Designs for Lighting Ltd were commissioned by Littlehampton Town Council to develop a sensitive lighting strategy to support the Proposed Development, for the purposes of minimising the impacts of lighting on potentially sensitive receptors.
- 1.1.2 This lighting strategy is provided by Designs for Lighting Ltd, a specialist lighting design consultancy with experience and knowledge in lighting impact assessments, mitigation, and lighting design in relation to bats.
- 1.1.3 This strategy concerns land at south of Eldon Way, Wick, Littlehampton (hereafter referred to as the Application Site), to support proposals for the construction of a replacement youth centre and associated car parking (hereafter referred to as the Proposed Development).
- 1.1.4 The Proposed Development requires artificial lighting for safety, security, and amenity. Lighting can be applied sensitively to ensure that the potential for obtrusive light is suitably minimised in compliance with the predetermined obtrusive light limits within the Environmental Zone in which the Application Site is located.
- 1.1.5 The lighting strategy proposes good practice and outlines a suitable approach to apply to the installation of the proposed lighting. The aim of the strategy is to outline a minimally obtrusive approach to lighting, which is functional, as well as ensuring sensitivity to the local environment and residents.
- 1.1.6 Lighting within the Application Site will comply with GN01:2021 - Guidance Notes for the Reduction of Obtrusive Light published by the Institution of Lighting Professionals (ILP).

2. Standards and Policies

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 ... (fb) 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 July 2021 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:

- a) 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;*
- b) 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*
- c) 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), which was revised in Nov 2019. The guidance relevant to lighting 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 Application site is located within the boundaries of Arun District Council, and the lighting strategy is informed by the relevant local policies as detailed in Arun District Council's policy documents.
- 2.2.2 The most relevant local planning guidance is outlined in the Arun District Local Plan 2011-2031 (Adopted 2018), with Policy QE DM2 – *Light Pollution* being the most relevant to the Proposed Development.

Policy QE DM2 – Light Pollution

"Planning permission for proposals which involve outdoor lighting must be accompanied by a lighting scheme prepared according to the latest national design guidance and relevant British Standards publications. Outdoor lighting schemes will be considered against the following criteria:

- a. No adverse impact on neighbouring uses or the wider landscape, particularly with regard to the South Downs International Dark Sky Reserve designation;*
- b. Light levels being the minimum required for security and working purposes;*
- c. Minimising the potential glare and spillage; and*
- d. The degree to which outdoor lighting can be powered by on-site renewable sources.*

Where appropriate, the Local Planning Authority will seek to control the times of illumination."

2.3 Guidance

Guidance Notes for the Reduction of Obtrusive Light (GN01:2021) Institution of Lighting Professionals

- 2.3.1 The lighting strategy shall be informed by industry guidance notes. This aims to reduce the potential for obtrusive light to occur, caused by poorly designed and installed exterior artificial lighting. The lighting strategy is informed by the most relevant sections of GN01/21 (published in May 2021) to reduce the potential for obtrusive light from a wide range of exterior lighting applications.
- 2.3.2 The environmental zone criteria detailed within **Tables 1** and **2** will form the basis for the lighting strategy.

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 1 Environmental Zone Descriptions

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.

Environmental Zones	Sky Glow ULR (Max %)	Light Trespass (into Windows) E_v (lux)		Building Luminance Average, Pre-curfew Average L (cd/m ²)
		Pre-Curfew	Post-Curfew	
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 2 Obtrusive light criteria relating to each Environmental Zone

Notes to table:

- *ULR (Upward Light Ratio) is the maximum permitted percentage of luminaire flux that goes directly into the sky;*
- *E_v is Vertical Illuminance in Lux;*
- *I is viewed Light source Intensity in Candelas;*
- *L is Luminance in Candelas per square metre; and*
- *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.*
- *(*) Permitted only from Public road lighting installations.*

GN08/18 Bats and Artificial Lighting in the UK – Bat Conservation Trust and Institution of Lighting Professionals.

2.3.3 Guidance for artificial lighting and bats was updated in Autumn 2018, the guidance 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 averse behaviour (Stone, 2012).

2.4 Relevant British Standards

2.4.1 Lighting design criteria outlined within *BS 5489-1:2020 – Code of Practice for the Design of Road Lighting – Lighting of Roads and Public Amenity Areas* is potentially applicable to the proposed car park associated with the Proposed Development.

2.4.2 The most relevant section of the British Standard is Table 4 – *Maintained lighting levels for outdoor car parks*. This table is used to determine appropriate lighting classes for outdoor car parks, with consideration given to the level of traffic typical to the application. Table 4 is included for reference in **Figure 1**:

Type of area and usage	Values in lux	
	$\bar{E}$	U_e
Light traffic, e.g. parking areas of shops, terraced and apartment houses; cycle parks	5	0.25
Medium traffic, e.g. parking areas of department stores, office buildings, plants, sports and multipurpose building complexes	10	0.25
Heavy traffic, e.g. parking areas of major shopping centres, major sports and multipurpose sports and building complexes	20	0.25

Figure 1 BS 5489-1:2020 – Table 4.

3. Lighting Strategy

3.1 Brief

- 3.1.1 The Proposed Development will require lighting for safety, amenity, and security during the hours of darkness. This section outlines the requirements for the lighting design, ensuring that it is fit for purpose and sensitive to the environment surrounding the Application Site.
- 3.1.2 The Application site is broadly set within an E3 environmental zone, adjacent to the illuminated Eldon Way to the north, residential developments to the east, and the developed Lineside Industrial Estate to the west. The land immediately adjacent to the Application Site to the south is currently used as a BMX track.
- 3.1.3 Further afield, to the south and west, land is used for industrial purposes until meeting the river Avon approximately 360m to the west. The land to the north and east of the Application Site forms part of the built-up area of Wick, Littlehampton, and is developed for approximately 800m to the north, and 1200m to the east (before meeting playing fields).
- 3.1.4 The site is currently used as recreational land with a children's play area at the northern boundary and is used as access for a BMX track to the immediate southeast.
- 3.1.5 *Night Blight* mapping undertaken by the CPRE (Campaign to Protect Rural England) indicates that levels of background luminance are typical for those found within an E3 environmental zone, as shown in **Figure 2**:

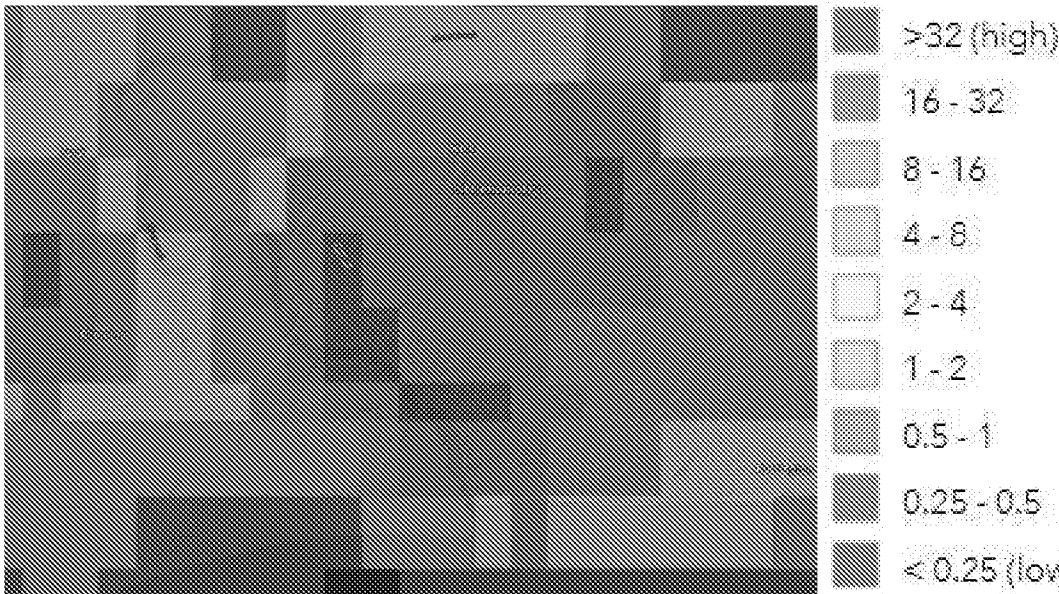


Figure 2 CPRE Night Blight Mapping Overlayed on the CPRE Star Count Mapping Tool (Approximate Application Site position shown in Red)

- 3.1.6 This lighting strategy seeks to outline the most sensitive approaches to lighting whilst meeting the intended lighting levels, and is intended to comply with the lighting specifications set out within the Adoptable Specification for Highway Schemes in West Sussex.

3.2 Key Areas Requiring Lighting

3.2.1 Lighting will be required in the following application areas:

- Parking Area; and
- Youth Centre Amenity Lighting.

3.3 Parking Area

- 3.3.1 The parking area to the Proposed Development will require lighting in accordance with *BS 5489-1:2020*, and the Adoptable Specification for West Sussex. Light spill onto boundary features will be restricted by orienting luminaires appropriately such that they focus light where needed during the hours of darkness.
- 3.3.2 The Adoptable Specification for West Sussex (outlined within *Lighting of Developer-Promoted Highway Schemes in West Sussex* issued 4th Sept 2019) does not specify lighting levels for car parking areas. The equipment specification outlined within this strategy is intended to match the Adoptable Specification for subsidiary roads in West Sussex.
- 3.3.3 Site roadways and car parking areas are to be lit in accordance with the requirements for *Light traffic* outdoor car parks, as defined within *BS 5489-1:2020*. This lighting class has been selected in accordance with the criteria set out in *BS 5489-1:2020 - Table 4*.
- 3.3.4 Luminaire colour temperature will not exceed 4000K (Kelvin), in accordance with the West Sussex Adoptable Specification.
- 3.3.5 Luminaire performance parameters for the parking area are outlined in **Table 3**.

Equipment Specification	Description
Location	Parking Area
Light Source	LED [Light Emitting Diode]
Luminaire Type	Philips Micro Luma (or equivalent approved)
CCT of Light Source (Kelvin)	4000K (maximum)
Luminous Intensity Class	G4 (minimum)
Luminaire Tilt	0 degrees from horizontal
Dimming and switching requirements	To be controlled via timedock. Luminaire to switch ON at dusk; and to be switched off an hour after the standard closing time for the centre.
Design Guidance	
Lighting Standard	<i>BS5489-1:2020 – Outdoor Car Parks, Light Traffic</i>
Lighting Class	Average: 5.00 Lux / Uniformity: 25%
Mounting Arrangement	Post Top
Restrictions	The peak beam angle of all lights directed towards any potential observer is not to be more than 70 degrees when the luminaire is installed with a tilt angle of 0 degrees. 5.0 metre maximum column height Where possible columns to be setback at a distance no less than that stated in <i>BS 5489-1:2020</i> .

Table 3 Parking Area - Luminaire Performance Requirements

3.4 Youth Centre Amenity Lighting

- 3.4.1 The exterior of the youth centre proposed to be built on the site will be illuminated for safety, amenity, and security during the hours of darkness.
- 3.4.2 Lighting is to be applied sensitively, through the minimal use of wall mounted luminaires to the exterior of the proposed building.
- 3.4.3 Luminaires will distribute light downwards only to reduce the potential for light spill onto the boundaries surrounding the building and upwards towards the sky. Wall mounted luminaires will not be mounted above 2.0m in height to ensure that light is maintained at a low level.
- 3.4.4 Luminaires will be located adjacent to doorways, and under canopies where relevant, focused downwards. Luminaires are to be of a reasonably low lumen output, to ensure light spill outside the Application Site is minimised, as illustrated in **Appendix 1**.
- 3.4.5 Luminaire performance parameters for the amenity lighting are outlined in **Table 4**.

Equipment Specification	Description
Location	Amenity Lighting
Light Source	LED (Light Emitting Diode)
Luminaire Type	Urbis Schreder INDU Wall Pack (or equivalent approved)
CCT of Light Source (Kelvin)	3000K (maximum)
Luminous Intensity Class	G3 (minimum)
Luminaire Tilt	0 degrees from horizontal
Dimming and switching requirements	To be controlled via timedclock. Luminaire to switch ON at dusk; and to be switched off an hour after the standard closing time for the centre.
Design Guidance	
Lighting Standard	N/A
Lighting Class	N/A
Mounting Arrangement	Wall mounted
Restrictions	The peak beam angle of all lights directed towards any potential observer is not to be more than 70 degrees when the luminaire is installed with a tilt angle of 0 degrees. 2.0 metre maximum mounting height

Table 4 Amenity Lighting - Luminaire Performance Requirements

4. Technical Assessment

4.1 Brief

- 4.1.1 Lighting for the Proposed Development is to be implemented according to the strategy outlined in **Section 3**.
- 4.1.2 The implementation of this strategy will enable lighting to be minimally obtrusive within the environment and to any nearby potentially sensitive receptors with views of the Application Site.
- 4.1.3 A site survey was undertaken on the 9th June 2021, starting at 23:10. The weather was overcast, and the moon was not visible. According to www.moonphases.co.uk the moon was in a New Moon phase, and was less than 1% visible; and is therefore unlikely to have contributed to existing light levels within the Application Site.
- 4.1.4 The survey was undertaken using an independently calibrated Konica Minolta T-10 illuminance meter (Serial number: 55611050) with a validated test certificate (LB201401), which was used to measure illuminance on site.
- 4.1.5 Measurements of horizontal illuminance were taken at ground level, and 4 separate measurements of vertical illuminance were taken at 2.0m in height facing north, east, south, and west.
- 4.1.6 The results of the site survey are presented in **Appendix 2**.
- 4.1.7 Relevant night-time photographs taken during the site survey are presented in **Appendix 3**.

4.2 Existing Lighting & Site Photography

- 4.2.1 The Application Site is currently used as open space, with an associated play area, and access to the existing BMX track to the south.
- 4.2.2 Poorly controlled floodlighting to the rear of the *Finecast Foundries* building to the south is directed into the Application Site (shown in **Appendix 3, Image 1**). The rears of properties on Latham Close are illuminated by this floodlighting (**Appendix 3, Image 2**).
- 4.2.3 Existing road lighting to Eldon Way spills into the Application Site from the north (**Appendix 3, Image 3**), and limited lighting to industrial units to the west of the Application Site contributes to lighting levels along the western boundary.
- 4.2.4 The lighting of the adjacent roads and streets is provided by a mixture of column mounted luminaires, sign lighting, and floodlighting. Porch mounted amenity lighting to residential properties also contributes to the lit appearance of the local area (**Appendix 3, Images 4, 5, & 6**).
- 4.2.5 Poorly controlled floodlighting associated with the existing Keystone Centre building is directed into the Application Site from the north (**Appendix 3, Image 7**).
- 4.2.6 The rears of properties on Clun Road are currently broadly unilluminated, however, proximity detection floodlighting or switched amenity lighting to the rears of the properties may be present, but not have been switched on during the site survey (**Appendix 3, Image 8**).

4.3 Baseline lighting levels

- 4.3.1 Light readings taken within the Application Site are consistent with the points outlined above, and demonstrate low lighting levels within the boundary of the Application Site.
- 4.3.2 Light readings taken at points 004, 005, 006, 007, 008, & 009 demonstrate increased vertical illuminance from the south as a result of the floodlighting to the *Finecast Foundries* building.

- 4.3.3 Light readings taken at points 001, 014, 015, & 016 demonstrate increased vertical illuminance from the north, and increased horizontal illuminance, as a result of the existing street lighting and amenity lighting to Eldon Way.
- 4.3.4 Light readings taken at points 010, 011, 012, & 013 demonstrate the broadly dark nature of the western boundary of the Application Site.
- 4.3.5 Light readings taken at points 015, 016, 017, 018, 019, & 020 demonstrate the typical light levels associated with roads adjacent to the Application Site.

4.4 Proposed Lighting

- 4.4.1 Lighting is proposed for the car park at the north of the Application Site, and to the exterior of the Keystone Centre building, according to the lighting strategy and luminaire specifications set out in **Section 3**.
- 4.4.2 Car Park Lighting is to be provided by well controlled LED luminaires, mounted at 0 degrees to the horizontal. All luminaires proposed are to have a 0% Upward Light Output Ratio (ULOR) when mounted at 0 degrees.
- 4.4.3 The proposed lighting is to be warm white, at colour temperatures not exceeding 4000K, to improve visual amenity for users and local residents; whilst maintaining compliance with the Adoptable Specification.
- 4.4.4 Lighting is to be energy efficient and applied only where needed, reducing the overall energy consumption of the Proposed Development and the existing areas to be relit.

4.5 Likely Impacts

- 4.5.1 Whilst the lighting level within the Application Site will increase, the use of well controlled LED luminaires will limit the potential for significant levels of obtrusive light to leave the site.
- 4.5.2 The use of luminaires with a 0% ULOR, in accordance with GN01:2021, will significantly limit the potential for the Proposed Development to contribute to local levels of sky glow, and limit the amount of light required.
- 4.5.3 Lighting is to be applied where needed only and a comprehensive dimming and control regime is to be implemented to limit the impact of the proposed lighting outside of the main hours of use.
- 4.5.4 Nearby potentially sensitive receptors are likely to have limited sensitivity to changes in lighting levels, due to the relatively high levels of background illuminance from street lighting and private lighting in the vicinity of the Application Site.
- 4.5.5 Isolux contours showing the relatively low levels of spill light leaving the Application Site are presented in **Appendix 1**. Contours are presented for horizontal illuminance at Lux levels of 5.0, 1.0, and 0.2 demonstrating that levels of spill light onto nearby residences are highly unlikely to exceed the 2 Lux post-curfew maximum for an E3 Environmental Zone.
- 4.5.6 Modelling of the potential levels of Vertical Illuminance onto the rears of properties on Clun Road has been undertaken and is presented in **Appendix 4**. Modelling indicates a maximum Vertical Illuminance of 0.12 Lux, which falls well below the post-curfew limit of 2 Lux for an E3 Environmental Zone, and is compliant with the limitation of 1 Lux for the more stringent E2 Environmental Zone.
- 4.5.7 Measurements of Vertical Illuminance taken during the site survey indicate that lighting to nearby roadways is likely to exceed the levels associated with the Proposed Development; further reducing the potential visual impact of the proposed lighting.

- 4.5.8 Light spill modelling presents the absolute adverse scenario and does not consider the blocking or shading effects of screening in the form of site topography or planting features; thus, the isolux contours presented are typical of the worst-case on-site scenario at start of life.
- 4.5.9 On balance, due to the levels of background illuminance in the vicinity of the Application Site, and the minimal increase in lighting levels onto potentially sensitive receptors from the Proposed Development, impacts associated with lighting for the Proposed Development are likely to be of negligible significance.
- 4.5.10 Modelling undertaken of lighting associated with the Proposed Development supports this conclusion, as lighting levels outside the Application Site are unlikely to increase beyond the limitations for an E3 Environmental Zone shown in **Section 2**.

5. Conclusion

5.1 Introduction

- 5.1.1 This strategy document is provided to outline a Lighting Strategy and associated Technical Assessment for the lighting of a Proposed Development at land to the south of Eldon Way, Wick, Littlehampton.
- 5.1.2 The Proposed Developments is for the construction of a Youth Centre (referred to as the Keystone Centre) with associated car parking, which requires artificial lighting for safety, security, and amenity during the hours of darkness.

5.2 Lighting Strategy

- 5.2.1 The lighting strategy provided outlines the criteria for the lighting design of the Proposed Development to ensure that the lighting is fit for purpose, whilst maintaining sensitivity to human and environmental receptors through compliance with relevant British Standards and Guidance.
- 5.2.2 The Proposed Development is specifically to comply with recommendations set out within Institution of Lighting Professionals Guidance Notes for the reduction of obtrusive light (GN01:2021).
- 5.2.3 To ensure that the potential for obtrusive light is minimised, it is necessary to restrict the mounting heights, tilt angle, colour temperature and lumen output of exterior light sources to those specified in **Section 3**.

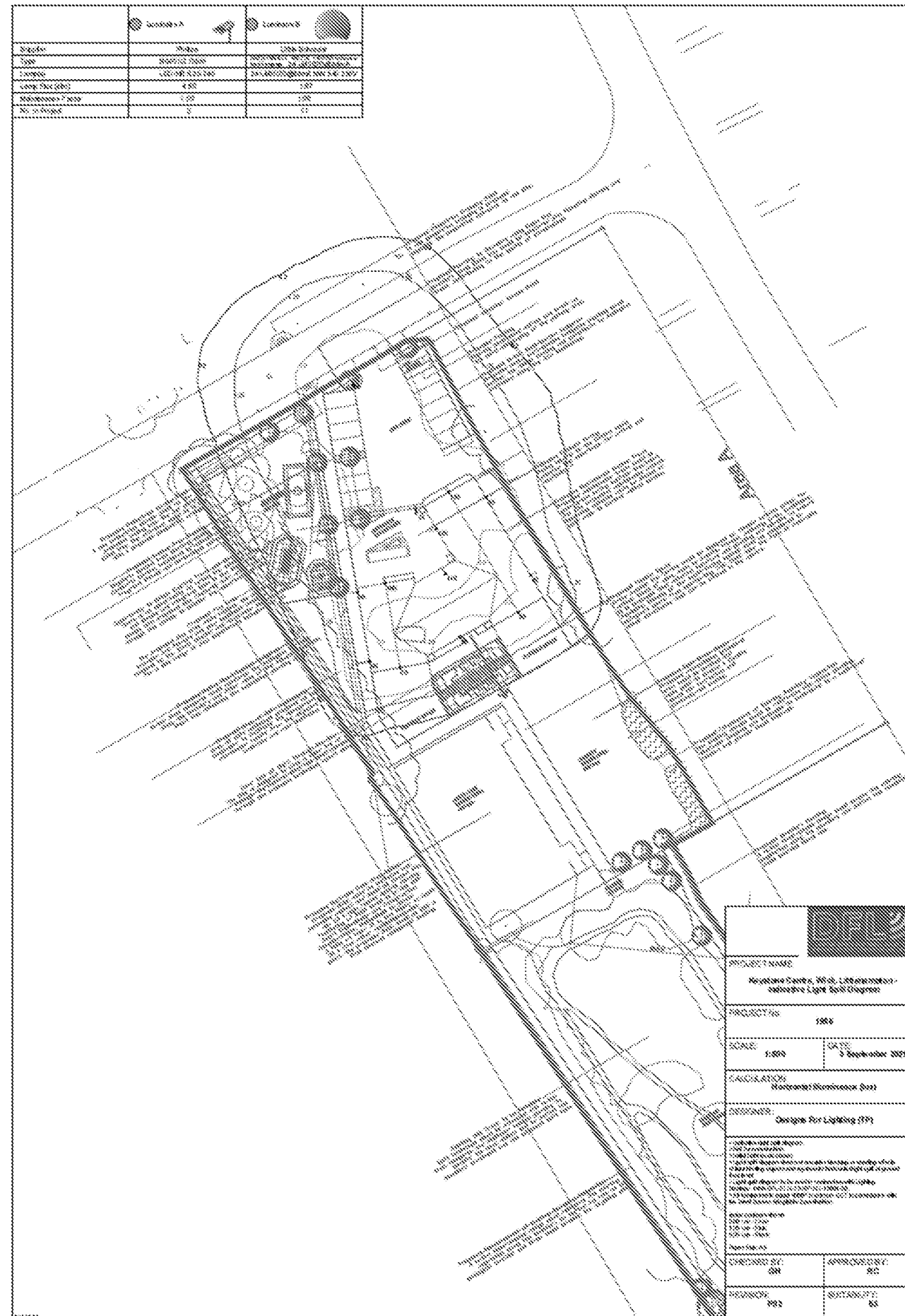
5.3 Technical Assessment

- 5.3.1 Compliance with the lighting strategy will allow a safe and sensitive level of light to enable the usage of the Proposed Development at night, whilst limiting obtrusive light to a negligible level and in compliance with ILP GN01:2021, which seeks to reduce light spill onto site boundaries.
- 5.3.2 Whilst the lighting level within the Application Site will increase, the lighting strategy proposed will limit the potential for significant levels of obtrusive light to leave the site.
- 5.3.3 The impacts associated with lighting for the Proposed Development are likely to be of negligible significance, as lighting levels outside the Application Site are unlikely to increase, and lighting levels outside the Application Site are unlikely to increase beyond the limitations for an E3 Environmental Zone.
- 5.3.4 The technical assessment has been informed by a night-time survey undertaken on the 9th June 2021, where photography of the existing lighting conditions and measurements of vertical and horizontal illuminance were taken.

5.4 Summary

- 5.4.1 Lighting will be applied minimally, and controlled such that increases in lighting levels do not adversely affect nearby residential amenity.
- 5.4.2 The overall levels of light spill identified are highly unlikely to exceed limitations set out in the Institution of Lighting Professionals guidance document GN01:2021 for an E3 environmental zone.

See separate file: 1956-DFL-ELG-XX-CA-EO-13001-S3-P02



Appendix 2 – Survey results

Baseline Measurement Points



Baseline Survey Results

Point #	Vertical Illuminance				Horizontal Illuminance	Notes
	North	East	South	West		
1	7.47	0.33	0.29	1.55	4.48	
2	0.75	0.04	0.4	0.38	0.55	Taken in front of overhanging tree
3	0.16	0.09	0.05	0.22	0.14	
4	0.12	0.06	0.55	0.2	0.22	
5	0.12	0.04	0.71	0.2	0.22	Vegetation to the east
6	0.11	0.05	0.45	0.17	0.11	
7	0.14	0.09	0.85	0.19	0.16	
8	0.11	0.11	0.87	0.15	0.16	
9	0.11	0.15	0.44	0.04	0.11	Vegetation west
10	0.05	0.01	0	0.03	0.03	
11	0.09	0.12	0.09	0.02	0.06	
12	0.14	0.14	0.05	0.03	0.06	
13	0.39	0.54	0.04	0.03	0.36	
14	0.4	1.86	0.13	0.26	0.97	
15	8.33	4.03	0.52	7.75	5	
16	11.97	5.23	0.49	1.09	8.33	
17	8.23	1.42	0.68	8.25	4.46	
18	1.32	0.62	0.37	2.6	4.9	
19	3.41	1.98	0.5	3.8	6.37	
20	12.63	0.36	0.97	4.53	8.98	

All measurements in Lux.

Appendix 3 – Site Photography



Image 1 -- Existing floodlighting to the south of the Application Site.

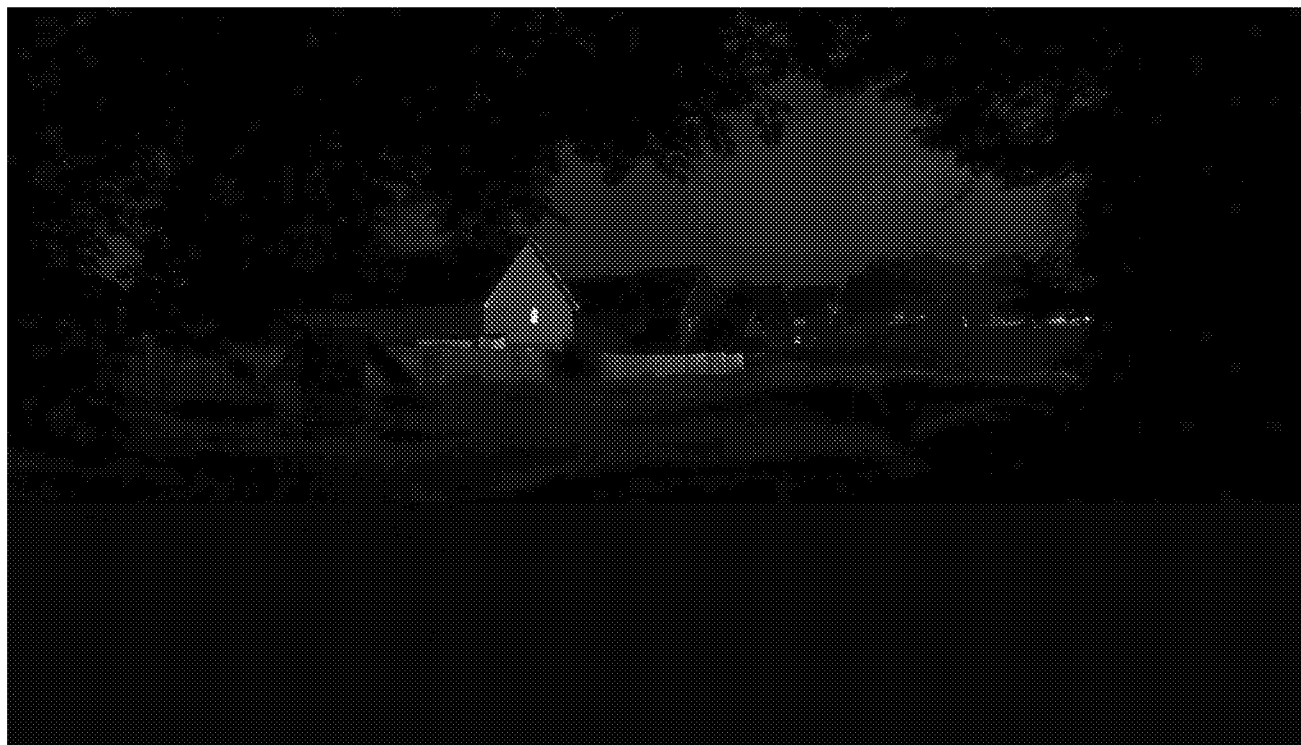


Image 2 -- Rear faces of properties on Latham Close, illuminated by existing floodlighting.



Image 3 -- Light spill into the north of the Application Site from Eldon Way.



Image 4 -- Existing street lighting and sign lighting facing west on Eldon way.



Image 5 -- Existing street lighting and sign lighting looking east on Eldon Way, and existing floodlighting to "The Chalet".

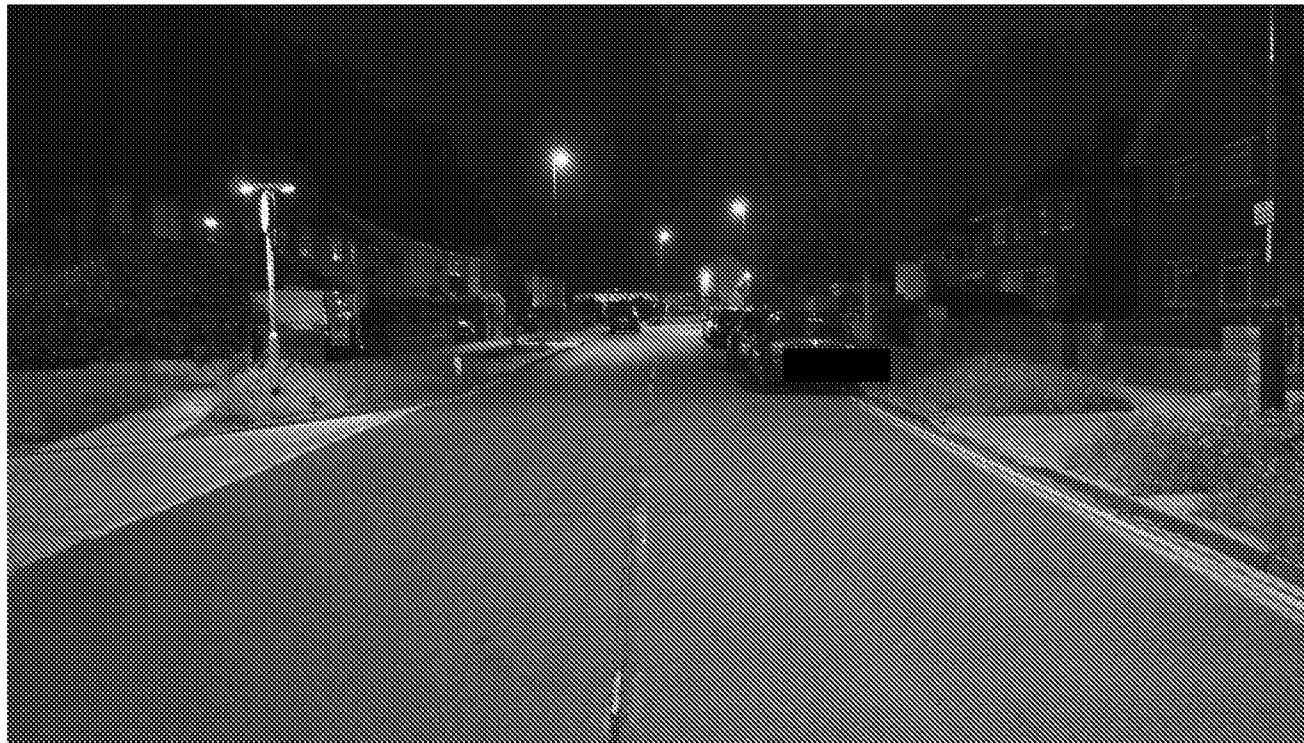


Image 6 -- Existing street and sign lighting at the junction of Eldon Way and Clun Road.



Image 7 -- Floodlighting to the existing Keystone Centre building.



Image 8 -- Rear of properties on Clun Road to the east of the Application Site.

Appendix 4 – Lighting calculations and modelling of Vertical Illuminance

See separate file: 1956-DFL-ELG-XX-CA-EO-13002-S3-P02