

**DATE:** 24 April 2024  
**DESIGNER:** SHD Lighting Consultancy Ltd  
**PROJECT No:** SHD1457  
**PROJECT NAME:** Newton Haye



It is assumed that the wall lights are to be angled at 0° tilt to the horizontal plane and shall be switched using motion sensors, activated only when movement is detected.

All footpath bollard lighting are to be switched using individual motion sensors.

Isolux contour lines shown represent a 'day one' worst-case scenario with a maintenance factor of 1.0, as this demonstrates the maximum lumen output not taking into consideration any LED degradation, driver deterioration or weather grime and lens dirt which will occur during the lifespan of the lighting installation.

## Outdoor Lighting Report

**PREPARED BY:** SHD Lighting Consultancy Ltd  
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## Layout Report

### General Data

Dimensions in Metres Angles in Degrees

### Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1	488745.84	503910.61	69.00	72.00	1.50	1.50
2	Grid 2: North vertical cal...	488747.04	503980.29	50.00	10.00	1.00	1.00
3	Grid 3: East vertical calc...	488795.60	503967.11	50.00	10.00	1.00	1.00
4	Grid 4: South vertical cal...	488811.46	503926.93	50.00	10.00	1.00	1.00
5	Grid 5: West vertical calc...	488746.85	503978.65	70.00	10.00	1.00	1.00

### Luminaires

#### Luminaire A Data

Supplier	
Type	99857K3
Lamp(s)	963 lm,20 W
Lamp Flux (klm)	0.96
File Name	BE_99857K3.IES
Maintenance Factor	0.80
Lum. Int. Class	G3
No. in Project	7

#### Luminaire C Data

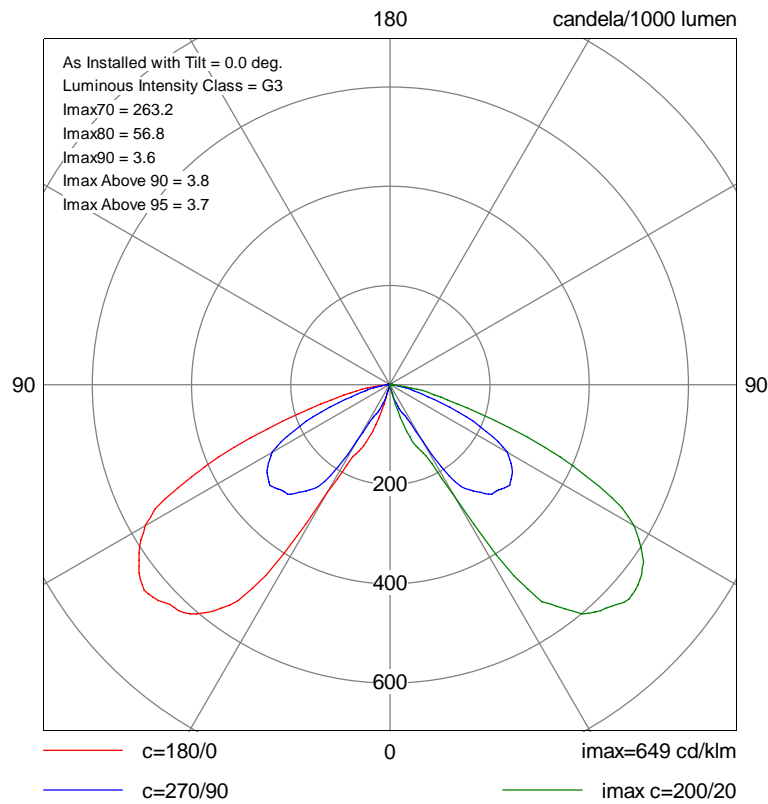
Supplier	
Type	Reef LED Directional Wall Light
Lamp(s)	
Lamp Flux (klm)	0.44
File Name	AREELEDWLD (3000K).ldt
Maintenance Factor	0.80
Lum. Int. Class	G3
No. in Project	3

### Layout

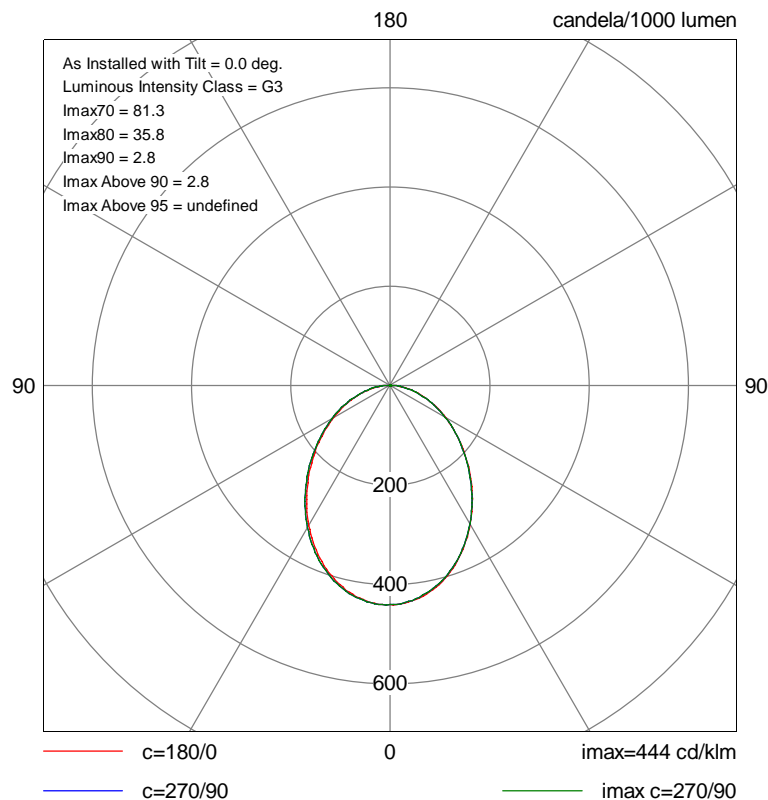
ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	488774.61	503969.13	0.75	252.00	0.00	0.00	0.00			
2	A	488770.42	503961.13	0.35	160.00	0.00	0.00	0.00			
4	A	488781.01	503952.98	0.75	17.00	0.00	0.00	0.00			
4	A	488780.68	503961.31	0.75	188.00	0.00	0.00	0.00			
6	A	488785.45	503939.46	0.75	16.00	0.00	0.00	0.00			
8	A	488791.48	503929.97	0.75	198.00	0.00	0.00	0.00			
7	A	488784.79	503947.16	0.75	198.00	0.00	0.00	0.00			
8	C	488772.06	503949.21	2.00	22.00	0.00	0.00	0.00			
9	C	488781.53	503935.70	2.00	34.00	0.00	0.00	0.00			
10	C	488788.46	503924.22	2.00	35.00	0.00	0.00	0.00			

## Polar Diagrams

### Luminaire A 99857K3

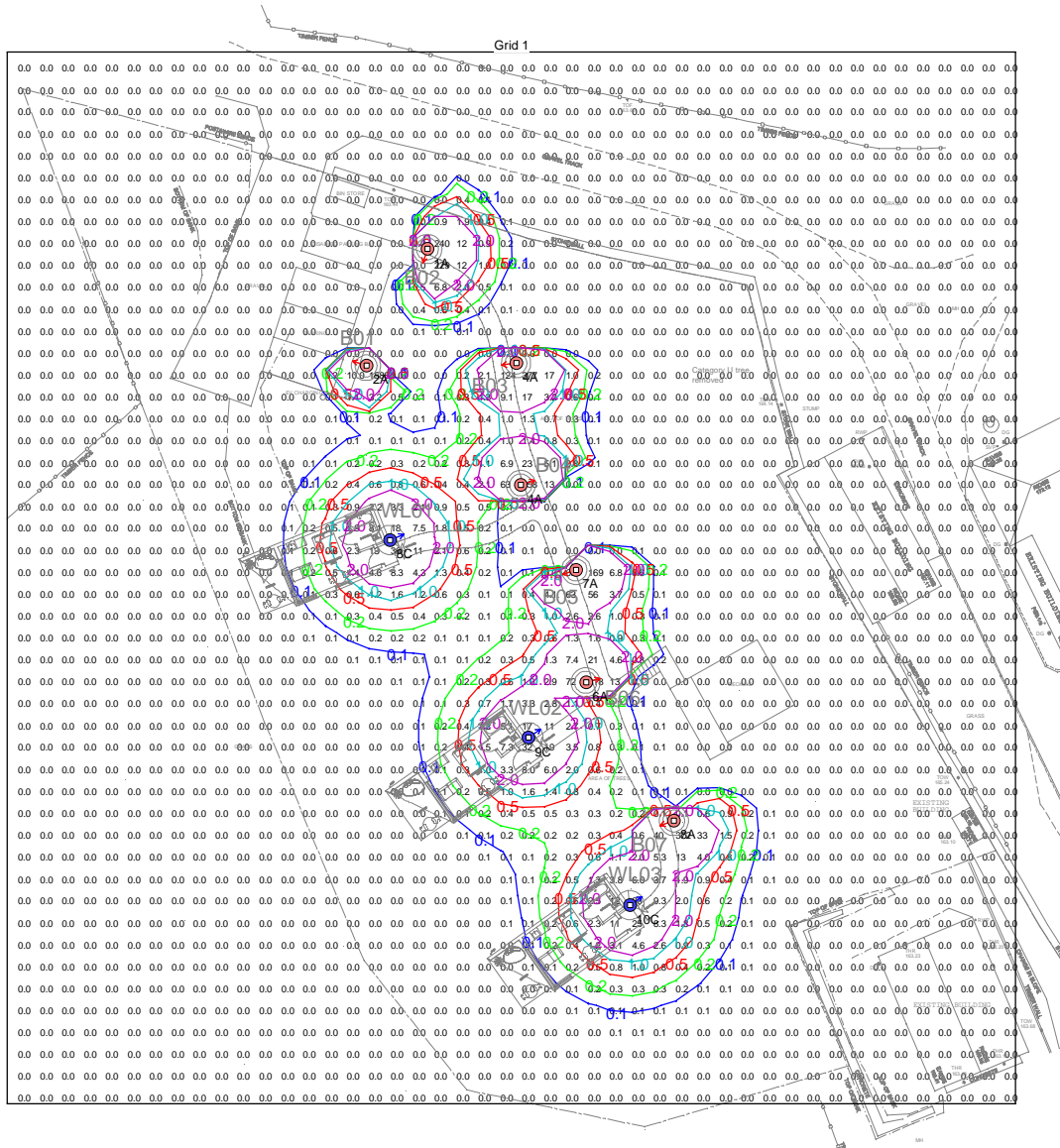


### Luminaire C Reef LED Directional Wall Light



# Horizontal Illuminance (lux)

Grid 1



## Results

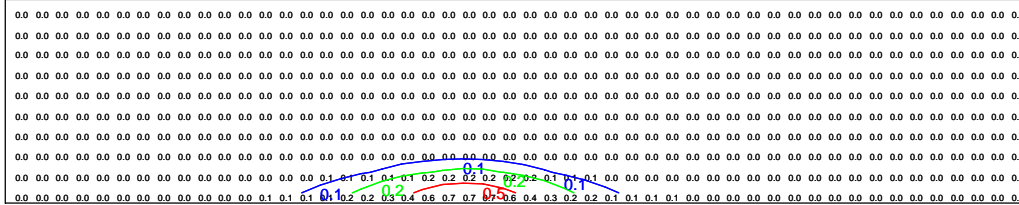
Eav	2.06
Emin	0.00
E <sub>max</sub>	1585.68
E <sub>min</sub> /E <sub>max</sub>	0.00
E <sub>min</sub> /E <sub>av</sub>	0.00





## Illuminance (lux)

Grid 4: South vertical calculation grid

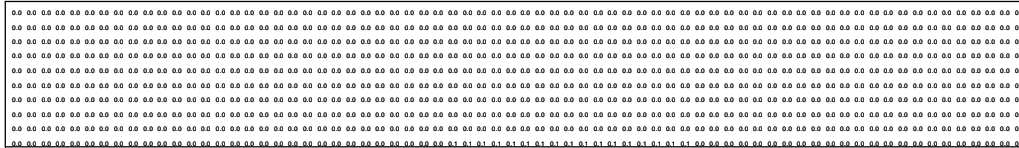


### Results

Eav	0.03
Emin	0.00
Emax	0.73
Emin/Emax	0.00
Emin/Eav	0.11

## Illuminance (lux)

Grid 5: West vertical calculation grid



### Results

Eav	0.01
Emin	0.00
Emax	0.07
Emin/Emax	0.01
Emin/Eav	0.08





# Environmental Lighting Impact Assessment Report

## Newton Haye

Project number: SHD1457

Document reference: SHD1457-SHD-HLG-NEWT-RP-EO-Lighting Assessment Report-R0

Revision	Purpose of document	Compiled by	Reviewed by	Review date
R0	Planning	Steve Higham	Steve Higham	24/04/2024



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## 1. INTRODUCTION

### 1.1 General

- 1.1.1 This report has been prepared by SHD Lighting Consultancy Ltd on behalf of Dualmech Limited to develop a sensitive lighting strategy to illuminate the access paths leading to three holiday let cabins and at each entrance door per cabin.
- 1.1.2 The site entrance shall be accessed off Foss Lane, Newton Haye (hereafter referred to as the *proposed development*).
- 1.1.3 The report has been prepared by SHD Lighting Consultancy Ltd to the best of our knowledge using information provided by Dualmech Limited.
- 1.1.4 The report assesses the potential effects of obtrusive light that could arise from outdoor artificial lighting at the proposed development.
- 1.1.5 This lighting assessment has been conducted by an individual with Level 4 expertise, aligned with the competency standards outlined by the Institution of Lighting Professionals.
- 1.1.6 SHD Lighting Consultancy specializes in designing outdoor lighting and conducting studies on lighting effects.
- 1.1.7 Our design team has the knowledge, experience, and professional qualifications, and is well-equipped to perform calculations for lighting design and assessments on environmental lighting impact.
- 1.1.8 SHD Lighting Consultancy Ltd accepts no responsibility or liability for:
- The consequence of this documentation being used for any purpose or project other than that for which it was commissioned.
  - The issue of this document to any third party with whom approval for use has not been agreed.
- 1.1.9 The principal objective of this lighting assessment report is to identify the effects of proposed outdoor lighting and the associated with obtrusive light on identified sensitive receptors and propose suitable mitigation measures.

## **2. LEGISLATION, PLANNING, AND POLICY GUIDANCE**

### **2.1 Legislative Background**

- 2.1.1 Light pollution was introduced within the Clean Neighbourhoods and Environment Act (2005) as a form of statutory nuisance under the Environmental Protection Act (the 'EPA', 1990), which was amended in 2006 to include the following nuisance definition:

“Artificial light emitted from premises to be prejudicial to health or nuisance”

- 2.1.2 Although light was described as having the potential to cause statutory nuisance, no prescriptive limits or rules were set for impact assessment purposes.
- 2.1.3 While not specifically requiring external lighting schemes to be submitted for approval, it does suggest planning authorities have the right to request such information as part of the approval process.

### **2.2 National Planning Policy Framework**

- 2.2.1 The National Planning Policy Framework (NPPF), was first published in March 2012 and has recently been revised in December 2023.
- 2.2.2 The National Planning Policy Framework is a key document in the planning system of England that guides local authorities and other stakeholders on planning policies and decision-making. It sets out the government's planning policies for sustainable development, including housing, the environment, and economic growth.
- 2.2.3 Planning policies and decisions should also ensure that the Proposed 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 Proposed development.

## 2.3 Relevant Lighting Standards

2.3.1 The applicable standards for outdoor lighting that relate to the Proposed development are:

**Guidance Notes for the Reduction of Obtrusive Light; GN01/21 (2021) published by The Institution of Lighting Professionals (ILP)**

2.3.2 Guidance Notes for the Reduction of Obtrusive Light published by The Institution of Lighting Professionals (ILP) provide practical guidelines to minimize the negative impacts of outdoor lighting installations on the environment and neighbouring areas.

2.3.3 These notes offer advice on how to design, install, and manage lighting systems to mitigate issues such as light pollution, glare, and light trespass.

2.3.4 The guidance focuses on ensuring that lighting is effective and efficient while also being considerate of the surrounding community and environment.

2.3.5 This resource is valuable for lighting professionals, planners, and decision-makers seeking to create lighting installations that balance visibility needs with minimizing obtrusive light effects.

**CIE 150: Guide on the limitations of the effects of obtrusive light from outdoor lighting installations (2003)**

2.3.6 CIE 150: Guide on the limitations of the effects of obtrusive light from outdoor lighting installations (2003) is a technical document created by the Commission Internationale de l'Éclairage (CIE), also known as the International Commission on Illumination.

2.3.7 CIE is an international organisation that sets standards and provides guidelines related to lighting, colour, and vision.

2.3.8 The purpose of CIE 150 is to provide guidance and recommendations on how to minimise the negative impacts of outdoor lighting installations, specifically focusing on obtrusive light.

2.3.9 Obtrusive light refers to light that spills or shines where it is not intended, causing visual discomfort, glare, or other adverse effects. This can include light trespass onto neighbouring properties, skyglow that affects astronomical observations, and other forms of light pollution.

2.3.10 The guide addresses various aspects related to outdoor lighting, such as fixture design, aiming, and control mechanisms, to mitigate the potential negative consequences of light pollution.

2.3.11 It aims to help lighting designers, planners, and decision-makers in designing and implementing outdoor lighting installations that are not only effective but also environmentally responsible and considerate of the surrounding community.

2.3.12 By following the recommendations outlined in CIE 150, stakeholders can work towards creating lighting designs that minimize light pollution and its impact on the environment, human health, and astronomical observations.

**CIE 126: Guidelines for Minimising Sky Glow (1997)**

- 2.3.13 CIE 126: Guidelines for Minimising Sky Glow (1997) is a technical document created by the Commission Internationale de l'Éclairage (CIE), an international organisation that sets standards and provides guidance on lighting, color, and vision.
- 2.3.14 The purpose of CIE 126 is to provide guidelines specifically focused on reducing the phenomenon known as "sky glow."
- 2.3.15 Skyglow refers to the brightening of the night sky over populated areas due to the scattering of artificial light by particles and molecules in the atmosphere.
- 2.3.16 This effect can lead to a loss of visibility of stars and celestial objects, impacting astronomical observations and the overall quality of the night sky.
- 2.3.17 CIE 126 offers practical recommendations and strategies to minimize sky glow resulting from outdoor lighting installations.
- 2.3.18 It addresses factors such as the design and positioning of luminaires, the choice of lighting technologies, and proper lighting controls to limit the upward-directed light that contributes to sky glow.
- 2.3.19 These guidelines are relevant for the UK and other regions concerned with preserving natural nighttime conditions, reducing light pollution, and supporting astronomical observations.

**The Exterior Environment: Lighting Guide 6 (2016) as published by The Chartered Institution of Building Services Engineers (CIBSE)**

- 2.3.20 The Exterior Environment: Lighting Guide 6 (2016) is a comprehensive publication by The Chartered Institution of Building Services Engineers (CIBSE), an organisation in the UK that offers guidance and standards for building services and environmental engineering.
- 2.3.21 This guide focuses on providing in-depth recommendations and best practices for outdoor lighting design and implementation. It covers various aspects of lighting in exterior spaces such as streets, public areas, parks, and building exteriors.
- 2.3.22 The guide offers guidance on creating effective and sustainable lighting solutions that enhance safety, security, aesthetics, and functionality in outdoor environments while also considering energy efficiency and minimising light pollution.
- 2.3.23 Lighting Guide 6 is a valuable resource for lighting designers, engineers, architects, and other professionals involved in outdoor lighting projects.
- 2.3.24 It provides practical insights, technical information, and design considerations to ensure that outdoor lighting installations are well-designed, visually appealing, and environmentally responsible.

**Public Lighting Guide 04: Guidance on Undertaking Environmental Lighting Impact Assessments (2013) as published by The Institution of Lighting Professionals (ILP)**

- 2.3.25 Public Lighting Guide 04: Guidance on Undertaking Environmental Lighting Impact Assessments (2013) is a publication by The Institution of Lighting Professionals (ILP), an organisation based in the UK that focuses on promoting excellence in lighting.
- 2.3.26 This guide serves as a comprehensive resource for professionals involved in the design and implementation of outdoor lighting projects.
- 2.3.27 Its primary focus is to guide on assessing and mitigating the potential environmental impacts of outdoor lighting installations.
- 2.3.28 The guide addresses various aspects related to lighting effects on the environment, including issues such as light pollution, sky glow, glare, and other obtrusive light-related concerns.
- 2.3.29 Key elements covered in the guide include methodologies for conducting environmental lighting impact assessments, techniques for modeling and predicting lighting effects, and recommendations for designing lighting schemes that minimise negative impacts while achieving their intended goals.
- 2.3.30 The guide takes into account factors like visual comfort, energy efficiency, and the preservation of natural darkness.
- 2.3.31 Public Lighting Guide 04 is a valuable tool for lighting professionals, local authorities, planners, and other stakeholders who seek to create outdoor lighting installations that are both visually effective and environmentally responsible.
- 2.3.32 It helps ensure that lighting projects contribute positively to the built environment while considering their impact on the natural surroundings and quality of life.

**Yorkshire Dales National Park Dark Sky Reserve Help protect our Dark Skies. Dark Skies Friendly Lighting Advice**

- 2.3.33 This document is intended as a summary to help understand the impact of poor lighting and to offer examples of lighting to reduce nuisance and light pollution. It contains examples of lighting considered to be Dark Skies Friendly and suitable for use in reducing light spill/nuisance.

**North York Moors National Park Authority, Local Plan July 2020**

- 2.3.34 The North York Moors National Park Authority Local Plan sets out planning policies for the North York Moors National Park that will be used to help decide planning applications in the future.

**Bat Conservation Trust Lighting Guidance; GN08/23 (2023) as published by The Institution of Lighting Professionals (ILP)**

2.3.35 The Bat Conservation Trust and the ILP produced a paper in 2018 and updated in 2023, “Bats and artificial lighting at night”, discussing the appropriate lighting levels, types of lamps, colour temperatures, etc. which are suitable for lighting areas adjacent to bat houses

2.3.36 Guidance for artificial lighting and bats was updated in Autumn 2023, 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 adverse behaviour (Stone,2012).”

“Dark buffers, illuminance limits, and zonation dark buffer zones can be used as a good way to separate habitats or features from lighting by forming a dark perimeter around them.

Buffer zones rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided into zones of increasing illuminance limits radiating away from the feature” (refer to Figure 2.1)

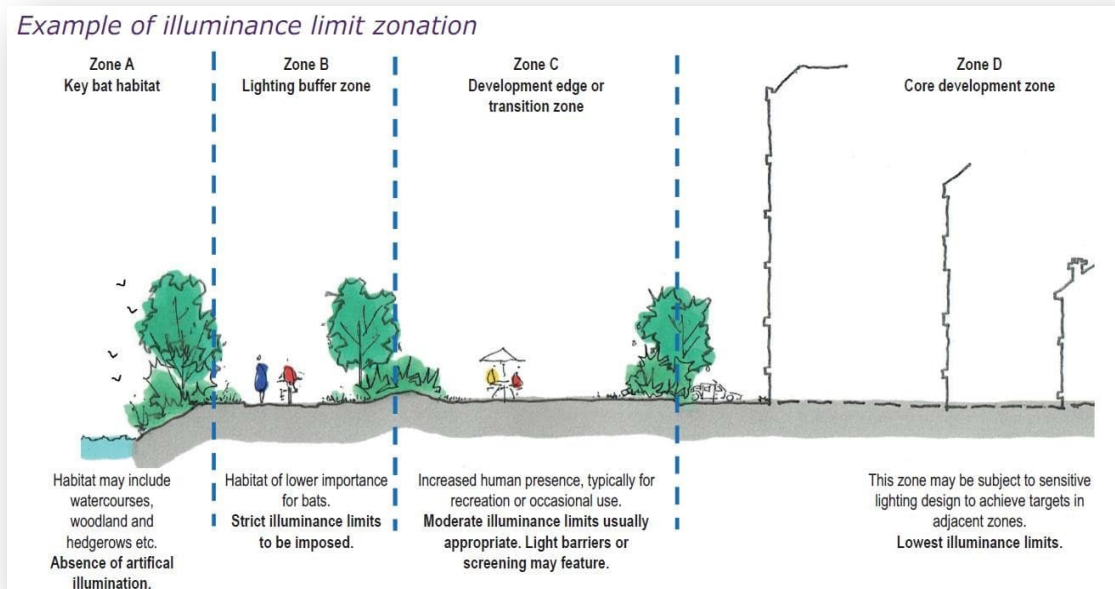


Figure 2.1

Extract from The Institution of Lighting Professionals: Guidance Note 08/18: Guidance notes for bats and artificial lighting in the UK (2023)



## 3. ASSESSMENT METHODOLOGY

### 3.1 Environmental Zone Classification

- 3.1.1 All standards consulted are nationally recognised documents, (some internationally also) which deal with all design issues associated with external lighting.
- 3.1.2 CIE Standards, the CIBSE, and the Society of Light & Lighting guidance documents, all apply a common Environmental Zoning system, which is summarised in Table 3.1 below.

ENVIRONMENTAL ZONE CLASSIFICATION AND PARAMETERS			
Zone	Surrounding	Lighting Environment	Example
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty
E2	Rural	Low district brightness	Village or relatively dark outer suburban location
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town or City centres with high levels of nighttime activity

Table 3.1

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 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 relative intrinsic value in the UK.

- 3.1.3 Using Table 3.1, the assessment site would be classified as **E1 Intrinsically dark**

### 3.2 Obtrusive Light Limitation for Outdoor Lighting Installations

3.2.1 Obtrusive light or light pollution is any light that strays to areas other than where it is intended and can include light intrusion (spill light) into neighbouring properties, upward light (which can create sky glow), and visual source intensity (glare).

It can also create effects on ecological receptors in the area, particularly concerning bat roosts and foraging corridors.

3.2.2 The ILP Guidance Notes for the Reduction of Obtrusive Light (ILP GN01/21) provide guidelines and threshold values applicable to each Environmental Zone.

3.2.3 The table below (extracted from GN01/21) provides guidance for obtrusive light limitations for exterior lighting installations.

OBTRUSIVE LIGHT LIMITATIONS FOR EXTERIOR LIGHTING INSTALLATIONS						
Zone	Sky Glow ULR % (i)	Light intrusion into windows $E_v$ , measured in Lux (ii)		Luminaire intensity $I$ , measured in kilo candelas (iii)		Building luminance $L$ , ( $cd/m^2$ ) (iv)
		Pre-curfew	Post- curfew	Pre-curfew	Post- curfew	Pre-curfew
E0	0	0	0	0	0	0
E1	0	2	0 (1*)	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5.0	10	2	10	1	10
E4	15	25	5	25	2.5	25

Table 3.2

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 measured flat on the glazing at the centre of the window

$I$  is Light Intensity in Candelas.

$L$  is Luminance in Candelas per square metre.

Curfew = the time after which stricter requirements (for the control of obtrusive light) will apply subject to the conditions of the local planning authority.

\* Permitted only from public road lighting installations only

### 3.3 Obtrusive Light

#### 3.3.1 Poorly designed lighting can contribute to the following obtrusive light components:

- Obtrusive light (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.
- Nuisance/intrusion, the spilling of light beyond the area or property being lit. Light nuisance can include intrusion into windows of neighbouring properties, but it can also cause issues to habitats and areas of high biodiversity interest.
- Sky glow, this is the glow that is visible around urban areas resulting from the scattering of artificial light. Sky glow is light from reflected surfaces and badly directed light sources illuminating air molecules and other particles. A major effect of sky glow at night is to reduce contrast in the sky. This is the most pervasive form of light pollution and can affect areas many miles from the original light source.
- Glare, the uncomfortable brightness of a light source when viewed against a contrasting darker background. Glare forms a veil of luminance from poorly controlled and directed lighting that reduces contrast and visibility.

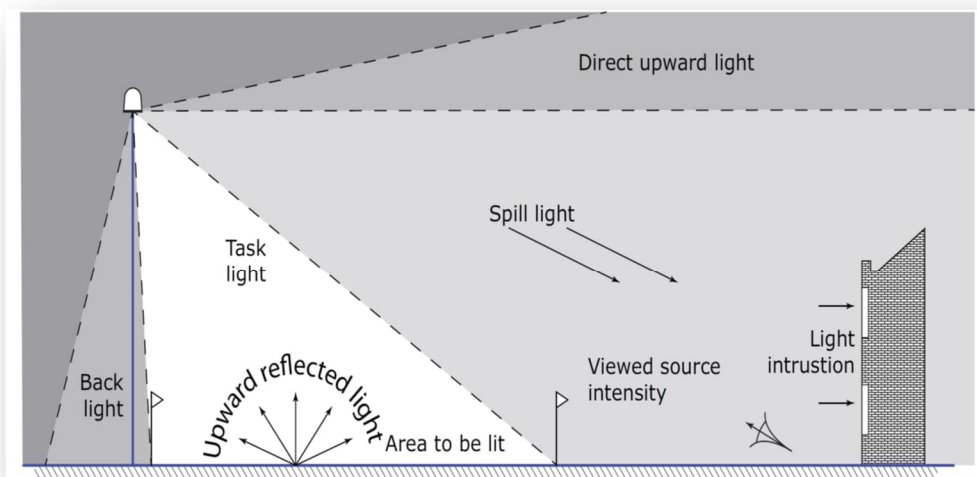


Figure 3.1: Obtrusive light diagram

Extract from The Institution of Lighting Professionals: Guidance Note 01/21: Guidance notes for the reduction of obtrusive light (2021)

**3.4 Potential Effects**

- 3.4.1 Many potential effects of artificial lighting can be effectively managed through a well-considered lighting strategy, thoughtful design, and appropriate selection of lighting equipment. Such design work must be undertaken by a qualified and competent professional.
- 3.4.2 Poorly designed lighting often involves a sparse arrangement of luminaires attempting to illuminate a wide area.
- 3.4.3 Consequently, these luminaires are often tilted excessively to spread light over intended and unintended surfaces, leading to excess light spill and unwanted sky glow.
- 3.4.4 Minimising lighting impact is achievable by employing established methods of lighting control, mainly involving limiting light intensity and managing light spill.
- 3.4.5 Lighting should primarily ensure safety and security while avoiding light pollution beyond site boundaries.
- 3.4.6 For this lighting scheme, LED light sources are specified due to their low lumen output and high efficiency. All luminaires incorporate electronic drivers and control gear.
- 3.4.7 Combining electronic drivers with LED light sources creates an energy-efficient lighting system that reduces overall energy consumption and lessens the environmental strain on natural resources.
- 3.4.8 The proposed lighting design has integrated these established methods to ensure minimal overall impact and to uphold environmental considerations.

## 4. BASELINE CONDITIONS

### 4.1 Site Overview

- 4.1.1 The site for the proposed development is off Foss Lane, Newton Haye which is located close to/within the valley forming Littlebeck/Falling Foss. Approximately 2 miles from the small village of Sneaton.
- 4.1.2 The site is South West facing on a slight gradient, providing excellent panoramic valley views over moorland, forest and farmland.

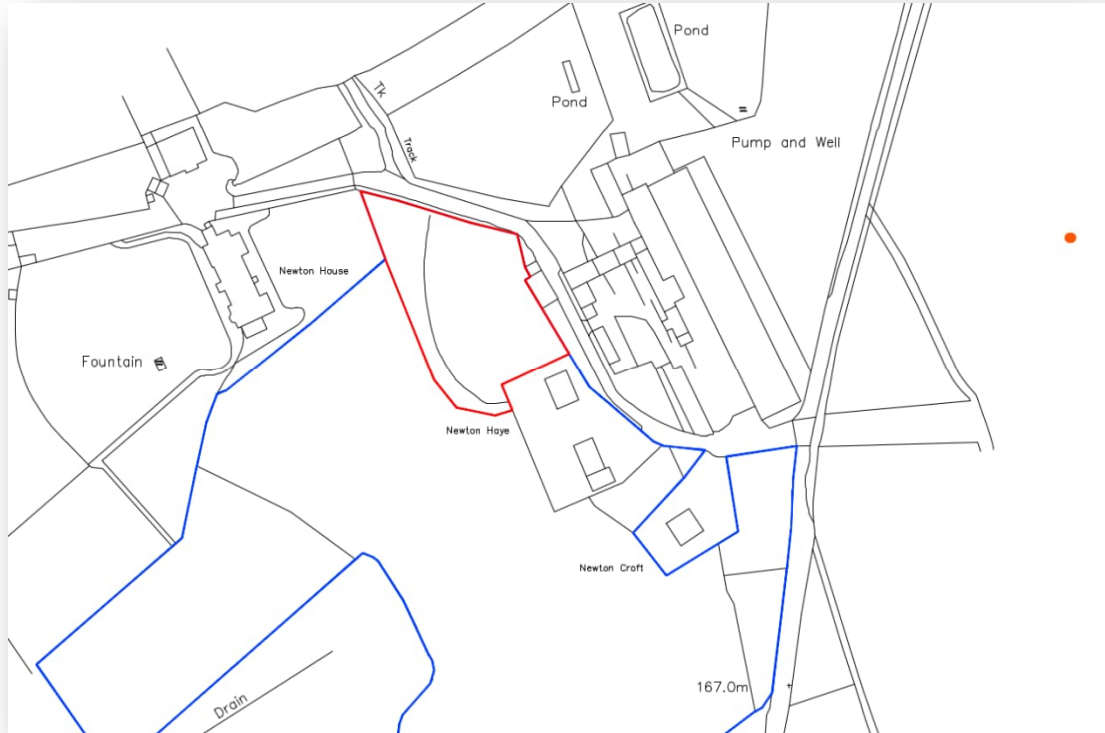


Figure 4.1: Proposed development red boundary outline (001 Site Location Plan.pdf)

- 4.1.3 The proposed development is located within the North Yorkshire Moors National Park which was designated a Dark Sky Reserve by Darksky International in December 2020.

## **5. LIGHTING STRATEGY**

### **5.1 Lighting Brief**

5.1.1 The objective of the lighting strategy is to guarantee that the lighting fulfils its intended function and adheres to the guidance and recommendations provided in the documents described in Section 2 of this report.

5.1.2 This ensures the safety and comfort of on-site activities during nighttime hours, all while actively reducing the risk of disruptive light.

5.1.3 Lighting performance details outlined in this section of the document are to be considered in conjunction with the following key documents:

- SHD1457-SHD-HLG-NEWT-CA-EO-Lighting Calculation-R0
- SHD1457-SHD-HLG-NEWT-CA-EO-Light Spill Drawing-R0

### **5.2 Key Areas Requiring Lighting**

5.2.1 Lighting is required within the following areas:

- Access path leading to holiday let cabins.
- Entrance door for each of the holiday let pods.

### **5.3 Dark Sky friendly recommendations**

5.3.1 Dark Skies  
Friendly Lighting Advice recommends the following guidance when considering outdoor lighting.

- Lighting should be used where needed and when needed
- Angle lights downward – so there is no unnecessary light above or near the horizontal
- Lamps of 500 lumens and less are appropriate for most domestic purposes
- All lights should have a colour temperature of less than 3000K as a default specification
- Point where the light is needed
- Switch lights off when not needed. Use proximity sensors. Avoid dusk-till-dawn sensors
- Light to the appropriate illuminance – do not over light needlessly
- Install at the lowest possible height to achieve lighting levels
- Avoid bright white and cooler temperature LEDs

## 5.4 Lighting Proposals

5.4.1 Outdoor artificial lighting is to be provided for the following areas:

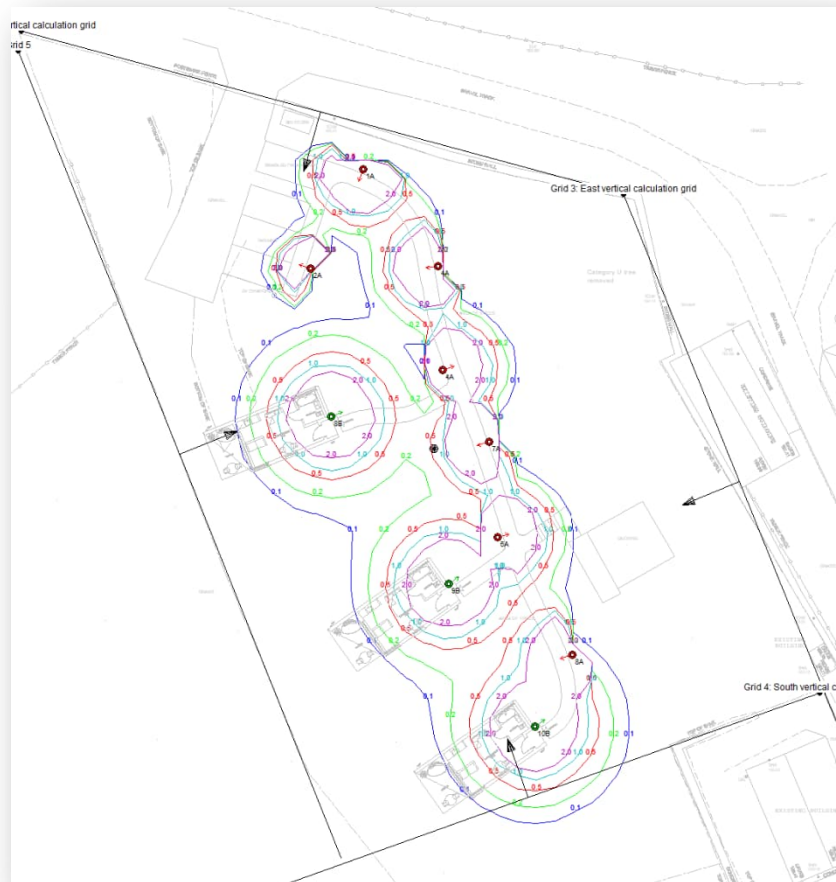


Figure 5.1: Access path and proposed luminaire locations.

## **6. OUTDOOR LIGHTING REQUIREMENTS**

### **6.1 Proposed Lighting Requirements**

- 6.1.1 Lighting has been designed according to the relevant and appropriate guidance documents as outlined within Section 2 of this document.
- 6.1.2 Additionally, lighting has been designed in accordance with obtrusive light guidance, to ensure that obtrusive light potential is minimised in accordance with E1 Environmental Zone criteria.
- 6.1.3 It is proposed that the external lighting along the access footpath shall consist of seven 1000m high illuminated bollards using warm white LED light sources, which have downward firing LED optics and 180° optical distribution, which will help minimise any sky glow or potential rear light spill.
- 6.1.4 The footpath bollards each have an integral PIR motion sensor, operating the bollard lights only when movement is detected, which will then dim the bollards down to only 10% light output when not in use.
- 6.1.5 Manufacturers guidance notes state the level of dimming can be configured during procurement, as we would recommend 0% (full off) when not in operation, but for the purpose of this assessment report, we have used the generic settings shown on the technical datasheet available online.
- 6.1.6 Each cabin will have a single downward firing warm white (3000k) LED wall light, operating only when motion is detected via a PIR sensor and will remain off at all other times.



**6.2 Lighting Calculations and Modelling**

- 6.2.1 An external lighting design has been prepared by SHD Lighting Consultancy Ltd for the proposed development off Foos Lane, Newton Haye.
- 6.2.2 SHD Lighting Consultancy does not assume responsibility for any lighting designs and strategies produced by anyone other than themselves.
- 6.2.3 The proposed development had the lighting calculations completed using industry-standard software Lighting Reality.
- 6.2.4 Lighting Reality, a computer software calculation tool, employs photometric data files supplied by manufacturers to replicate the lighting performance of selected light fixtures.
- 6.2.5 The calculation model (illustrated by illuminance levels and Isolux contour lines on a drawing) does not include any proposed or existing planting/ hedgerows/trees on site, or in the surrounding area.
- 6.2.6 In light of this, the light spill diagram presents an intensified and most extreme scenario regarding the ground-level light spill, assuming the absence of light-restricting elements.
- 6.2.7 From these calculations, drawings illustrating the illuminance levels throughout the site and at the boundary have been produced so that the lighting scheme's impact can be assessed.

**6.3 Maintenance Factors**

- 6.3.1 The light spill model provides light spill details for the initial light output, therefore disregarding the maintenance factor used for ensuring the lighting design performs as required at the end of its life.
- 6.3.2 In lighting assessments, the concept of a maintenance factor is used to account for the reduction in light output over time due to factors like dirt, dust, and the ageing of lamps or luminaires. A maintenance factor less than 1.0 indicates a decrease in light output over time.
- 6.3.3 However, ILP GN04, which is a guidance note published by the Institution of Lighting Professionals (ILP) in the UK, suggests assigning a maintenance factor of 1.0 to luminaires in certain cases.
- 6.3.4 This is typically done when you want to assess the lighting conditions in a scenario that assumes optimal maintenance. In other words, it assumes that the luminaires are being cleaned, maintained, and replaced as necessary to maintain their initial performance throughout the assessment period.
- 6.3.5 Assigning a maintenance factor of 1.0 simplifies the assessment process by eliminating the need to calculate and account for maintenance-related losses.
- 6.3.6 It provides a best-case scenario where the luminaires' light output remains constant throughout the assessment period.
- 6.3.7 This approach is useful for comparing different lighting designs or technologies under the assumption of ideal maintenance practices.
- 6.3.8 However, in real-world applications, maintenance factors less than 1.0 would be used to more accurately reflect the actual degradation of light output over time due to practical maintenance challenges.

#### 6.4 Access Footpath

- 6.4.1 Lighting is required to the pathways and entrance of the holiday let pods to aid access during darkened hours.
- 6.4.2 To provide adequate lighting along the footpath to each pod, a series of seven 1000mm high, illuminated bollards are to be installed, uniformly along the rear edge of the footpath, leading from the car park area to the further southern pod.
- 6.4.3 Each illuminated bollard comprises of a warm white 3000k LED light source, with downward firing optics, ensuring minimal upward light spill.
- 6.4.4 The bollard head also has a 180° rear integral shield eliminating any back light.
- 6.4.5 Each bollard will operate independently using an integral PIR motion sensor, which switches the bollards on at 100% output when movement is detected and reduces the light output to 10% at all other times, to provide minimal light, whilst illuminating the footpath edges for health and safety.
- 6.4.6 The proposed bollard system comprises of an aluminum tube that is 815mm in height and post top mounted illuminated bollard head.
- 6.4.7 Each bollard tube has an integral PIR motion sensor and light sensor, preventing the bollard from operating during daylight hours.

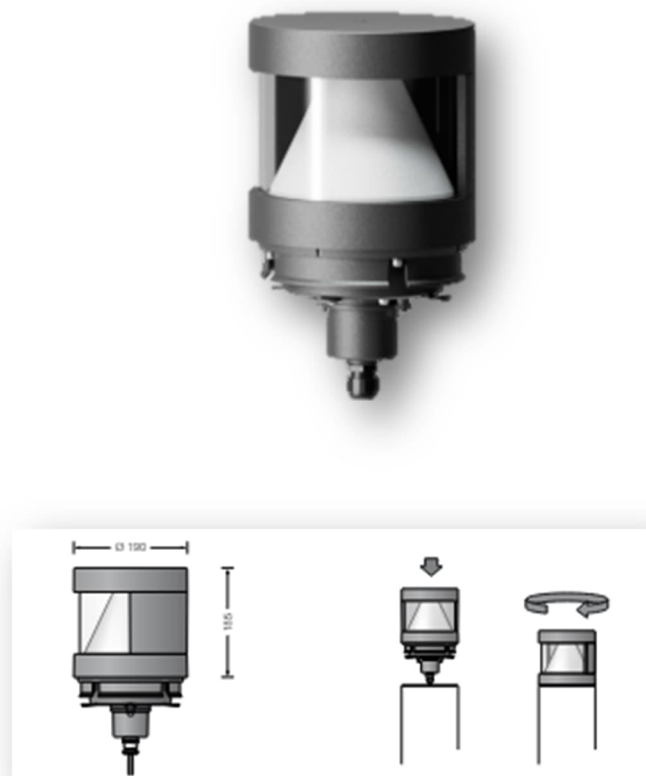


Figure 6.1: Example images of illuminated bollard head

6.4.8 Lighting performance parameters for the proposed access footpath are outlined in Table 6.1 below

LUMINAIRE SPECIFICATION	
Location:	Along footpath
Luminaire Manufacturer:	BEGA
Luminaire model ref:	99 857 K2 Shielded with reflector 180°
Luminaire style:	Illuminated bollard
Mounting height:	900mm
Mounting type:	Root mounted
Luminaire tilt:	Downward firing LED optic
Light source:	20w warm white LED 3000k
Luminaire control:	Integral PIR motion sensor per bollard unit

Table 6.1: Access footpath lighting performance parameters



Figure 6.2: Bollard tube with integral PIR motion and light sensor

**6.5 Cabin Lighting**

- 6.5.1 Each of the three holiday let pod entrance doors shall have a single downward firing wall light to aid access during darkened hours.
- 6.5.2 The proposed wall lights consist of a 5w warm white LED (3000k) light with downward firing optics, ensuring minimal upward light spill.
- 6.5.3 Each wall light will operate independently using a PIR motion sensor, which switches on at 100% output when movement is detected and remains off at all other times.
- 6.5.4 It is recommended that the duration of the PIR timers be set at no longer than 3 minutes, to minimise light spill and ensure light is kept to an absolute minimal when not in operation.



Figure 6.3: Example images of LED wall light

6.5.5 Lighting performance parameters for the proposed pod lighting are outlined in Table 6.2 below

LUMINAIRE SPECIFICATION	
Location:	Entrance door per pod
Luminaire Manufacturer:	Ansell Lighting
Luminaire model ref:	ARREELEDWLD 5w 3000k LED
Luminaire style:	Downward firing LED wall light
Mounting height:	2000mm from ground level
Mounting type:	Wall mounted aimed at the ground
Luminaire tilt:	0° aimed downwards
Light source:	5w warm white LED 3000k
Luminaire control:	PIR motion sensor per wall light

Table 6.2: Pod lighting performance parameters

## 6.1 Sensitive Receptors

6.1.1 Although no specific sensitive receptors have been identified, minimising sky glow to ensure compliance with Yorkshire Dales National Park Dark Sky Reserve Help protect our Dark Skies. Dark Skies Friendly Lighting Advice and North York Moors National Park Authority, Local Plan July 2020 is extremely important.

## 6.2 Vertical Lighting Calculation

6.2.1 To demonstrate how introducing artificial lighting within the proposed development has been carefully considered and controlled, four vertical lighting calculation grids were placed at the boundary limit edges.

6.2.2 Each vertical grid, measures 10m in height and has a grid spacing of 1.0m x 1.0m

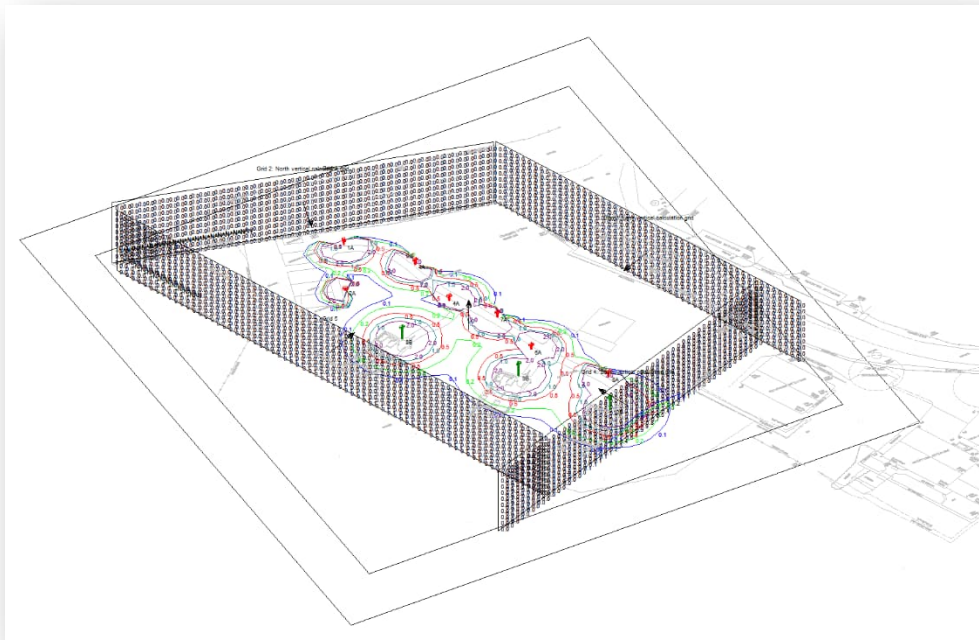


Figure 6.4: Vertical calculation grids

6.2.3 Taking measurements from ground level across the full façade of each vertical grid, these calculation grids measure a worse case scenario of all lighting being operated at 100% lumen output with all units operating at the same time.

6.2.4 The calculated measurements also do not take into consideration any reduction of the luminaire maintenance factor described in Section 6.3 of this assessment report.

6.2.5 Figures 6.5 to 6.8 show the calculated light levels at each of the 1m spaced measurement points.

6.2.6 The maximum measured level of lux is shown on the south vertical grid, measuring 0.92 lux taken at ground level.

6.2.7 Taking into consideration the maintenance factor described in Section 6.3 and the pod cabin has not been factored as a blocking effect, the light spill onto the south grid is acceptable in our opinion.

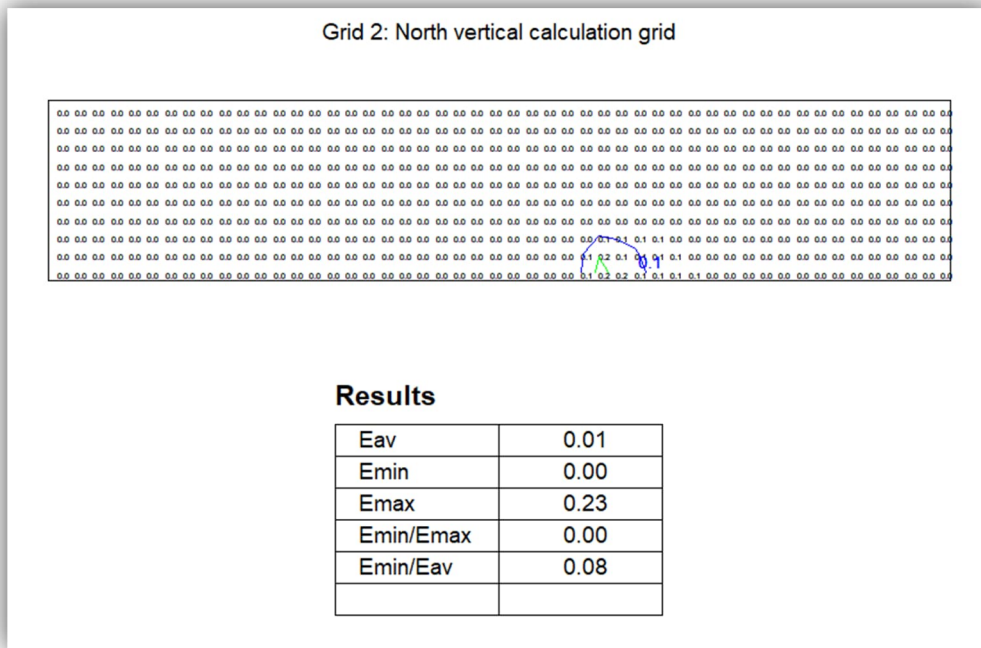


Figure 6.5: North vertical calculation grid

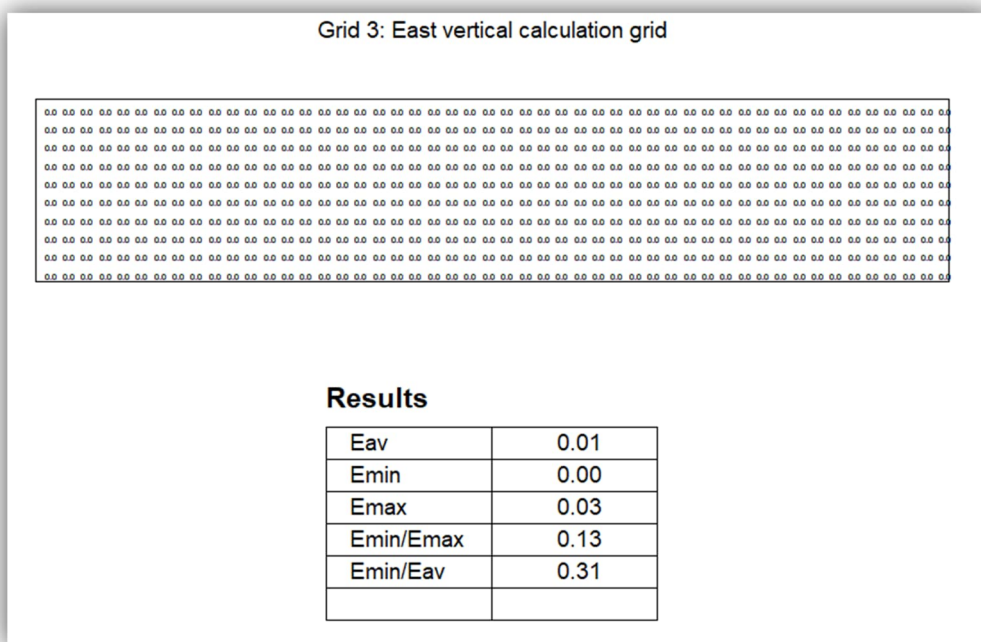


Figure 6.6: East vertical calculation grid

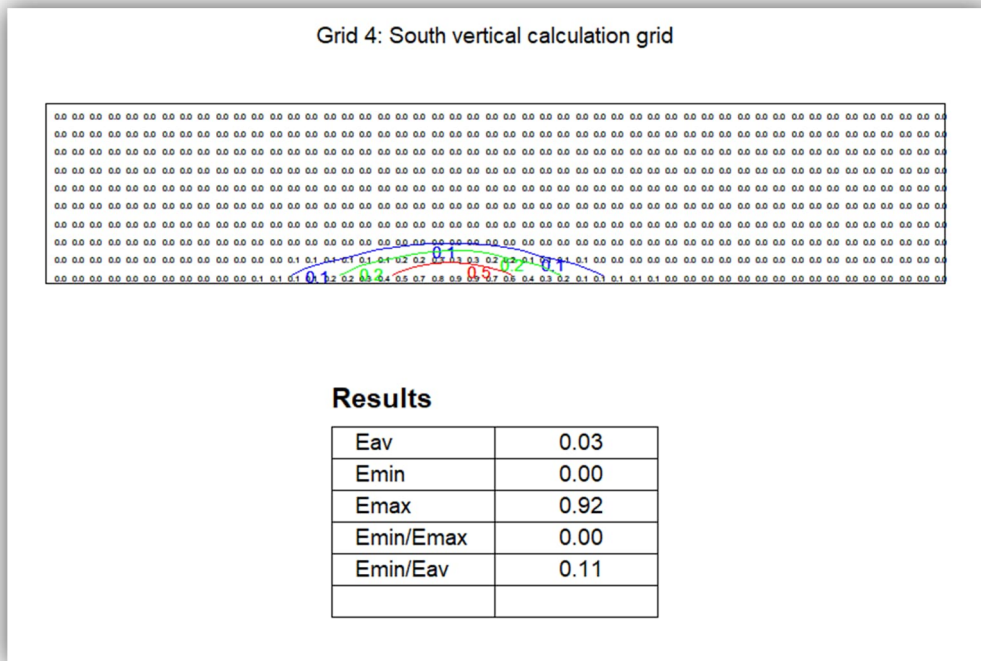


Figure 6.7: South vertical calculation grid

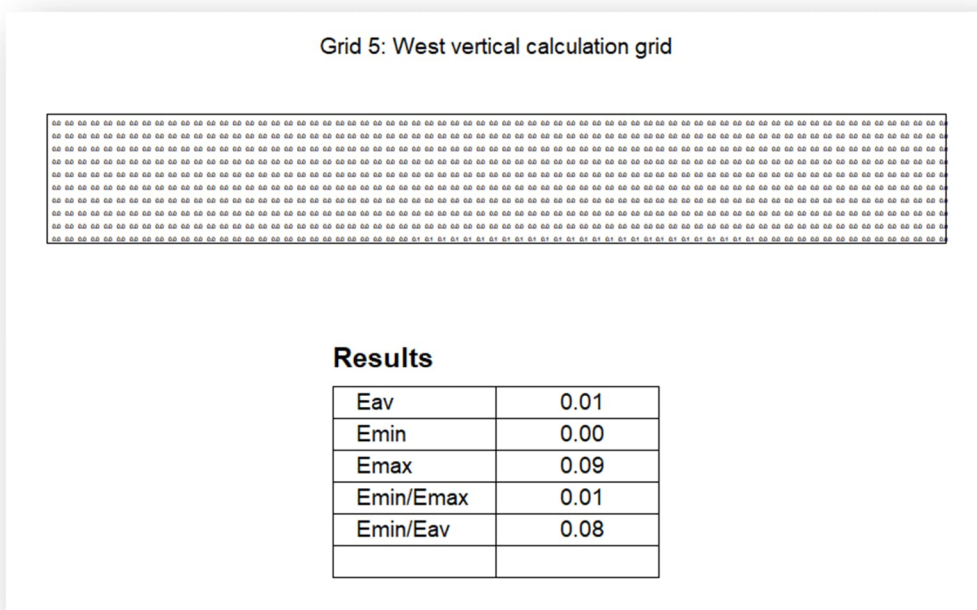


Figure 6.8: West vertical calculation grid



## 7. CONCLUSION

### 7.1 Mitigation

7.1.1 Following the guidelines described in Section 2 of this assessment report, this lighting strategy ensures that all luminaires are directed downward, with a tilt angle set at 0° in relation to the horizontal plane.

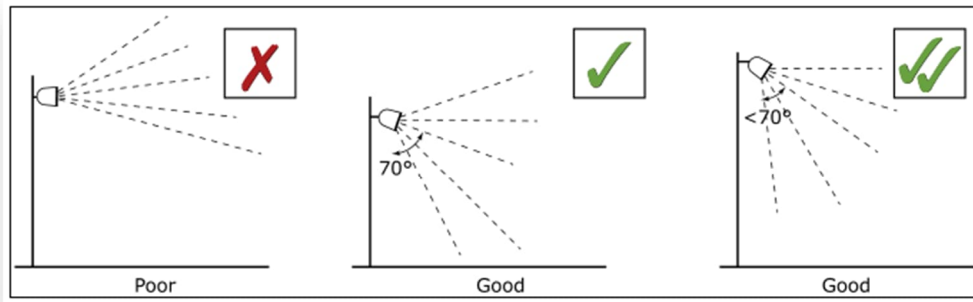


Figure 7.1: Luminaire aiming angles

Extract from The Institution of Lighting Professionals: Guidance Note 01/21: Guidance notes for the reduction of obtrusive light (2021)

7.1.2 This arrangement is designed to mitigate the potential for glare from each LED luminaire.

7.1.3 Any deviation from the specified tilt angle will result in inaccuracies in the provided lighting calculations and Isolux line drawings.

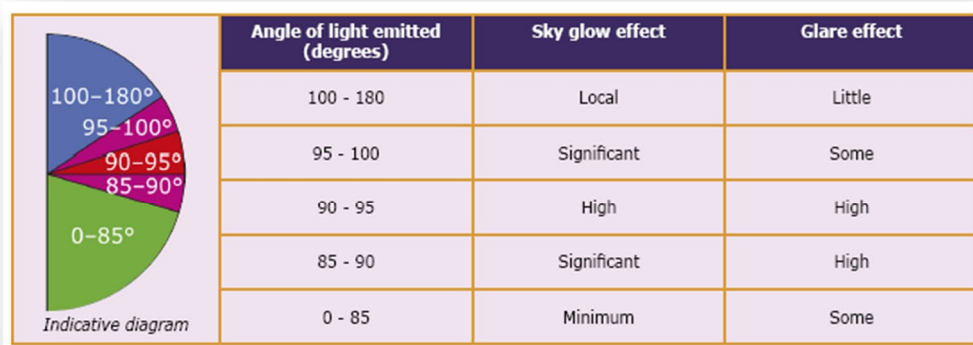


Figure 7.2: The effect on the ability to view the night sky at various angles

Extract from The Institution of Lighting Professionals: Guidance Note 01/21: Guidance notes for the reduction of obtrusive light (2021)

7.1.4 Through the use of professional-grade luminaires that comply with minimum luminous intensity limitations, glare will be suitably controlled and mitigated.

## 7.2 Indicative Light Spill

- 7.2.1 The indicative light spill models included in **Appendix A** demonstrate the ability to provide lighting for the proposed development and to ensure that a sensitive lighting solution is installed.
- 7.2.2 The isolux contour lines shown at ground level, demonstrate the tight restrictions in light spill that are essential for protecting the immediate surroundings and receptors of the proposed development.
- 7.2.3 As the models do not consider obstructions such as the buildings, any proposed fencing, buildings, landscaping features, or site topography.
- 7.2.4 The Isolux contours presented in **Appendix A** represent the adverse scenario.
- 7.2.5 Blocking effects of the site features would further reduce the potential for light spill to affect the boundaries of the proposed development.
- 7.2.6 The proposed lighting uses luminaires that focus the light down onto the ground, reducing the likelihood of upward light and light spill, as the installation will achieve a 0% Upward Light Ratio.
- 7.2.7 The Isolux contours shown at ground level demonstrate the initial light output demonstrating the absolute worst-case scenario.

## 7.3 Upward Light and Glare

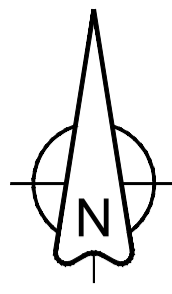
- 7.3.1 Luminaires will be installed with 0° tilt and are professional grade luminaires, designed in accordance with industry-specific luminaire design and photometric standards.
- 7.3.2 As such, they are all compliant with a minimum luminous intensity class of G3. Thus, ensuring that the Upward Light Ratio for the installation is lower than the maximum permitted value of 0% for E1 Environmental Zones.

## 7.4 Design Commentary

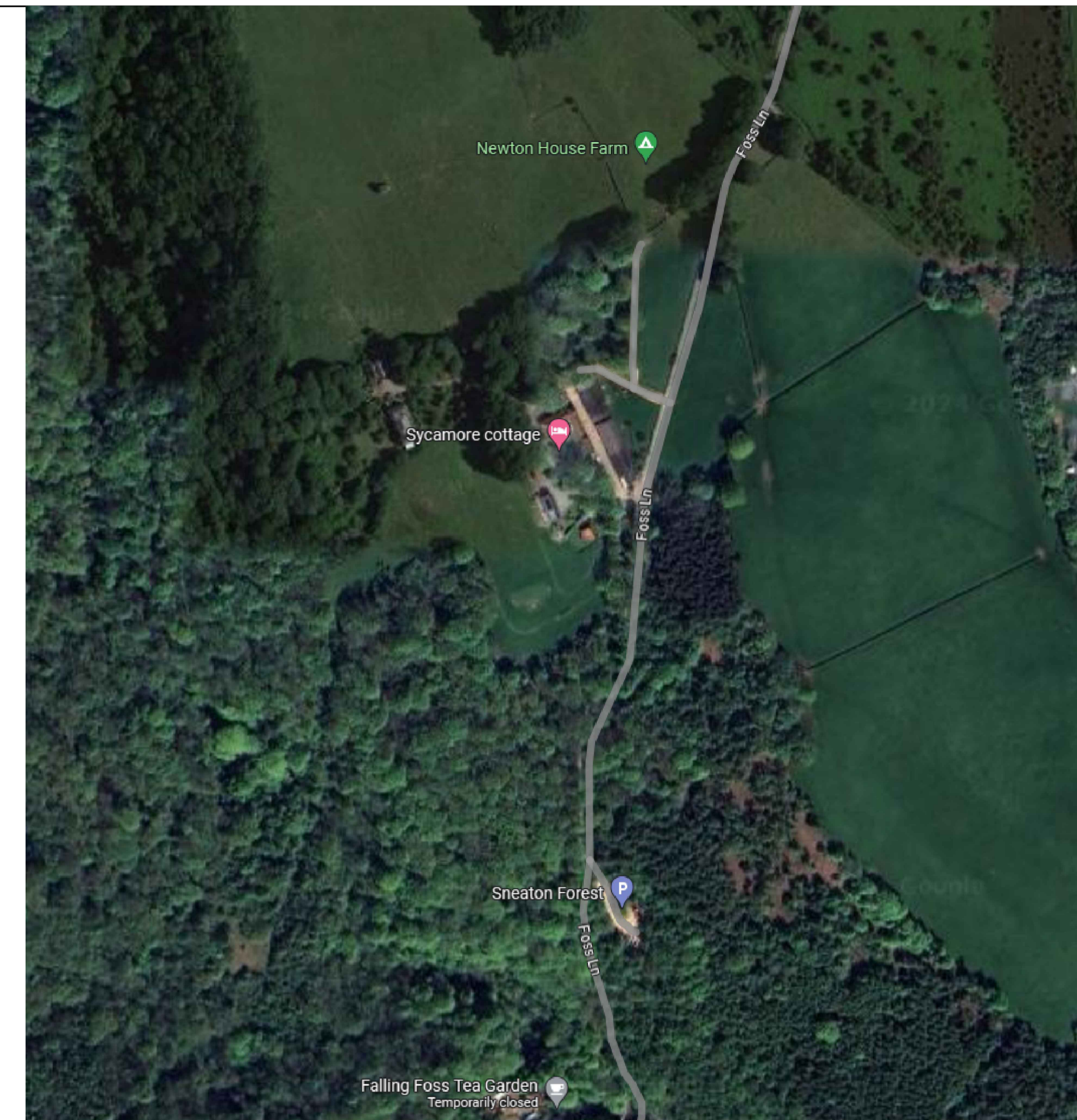
- 7.4.1 This lighting strategy and assessment outlines the lighting design for the Proposed development. The objective is to ensure the lighting serves its purpose effectively while demonstrating sensitivity to the environment.
- 7.4.2 The outdoor lighting detailed in the lighting strategy will align with the specifications designated for an E1 Environmental Zone, as indicated in Tables 3.1 and 3.2.
- 7.4.3 In summary, our expert assessment indicates that the proposed lighting installation is not anticipated to yield significant adverse effects on the immediate environment in terms of lighting pollution or energy consumption and that all reasonable measures have been integrated into the design phase of this lighting scheme to minimise its impact on the environment.

**8. APPENDIX A****8.1 Light Spill Drawing**

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LOCATION:  
EASTING 488765.61  
NORTHING 503967.87



LUMINAIRE SPECIFICATION	
Location:	Along footpath
Luminaire Manufacturer:	BEGA
Luminaire model ref:	99 857 K2 Shielded with reflector 180°
Luminaire style:	Illuminated bollard
Mounting height:	900mm
Mounting type:	Root mounted
Luminaire tilt:	Downward fring LED optic
Light source:	20w warm white LED 3000k
Luminaire control:	Integral PIR motion sensor per bollard unit

LUMINAIRE SPECIFICATION	
Location:	Entrance door per pod
Luminaire Manufacturer:	Ansell Lighting
Luminaire model ref:	ARRELEDWLD 5w 3000k LED
Luminaire style:	Downward fring LED wall light
Mounting height:	2000mm from ground level
Mounting type:	Wall mounted aimed at the ground
Luminaire tilt:	0° aimed downwards
Light source:	5w warm white LED 3000k
Luminaire control:	PIR motion sensor per wall light

**UNIT IDENTIFICATION KEY:**  
**B\*\*** Proposed illuminated bollard identification number  
**WM\*\*** Proposed wall mounted downlight identification number

**ISOLUX LEVEL KEY (AT GROUND LEVEL):**  
 Contour line (Lux values shown on line)

**ISOLUX LEVEL KEY (0.5m FROM GROUND LEVEL):**  
 Contour line (Lux values shown on line)

It is assumed that the wall lights are to be angled at 0° tilt to the horizontal plane and shall be switched using motion sensors, activated only when movement is detected.

All footpath bollard lighting are to be switched using individual motion sensors.

Isolux contour lines shown represent a 'day one' worst-case scenario with a maintenance factor of 1.0, as this demonstrates the maximum lumen output not taking into consideration any LED degradation, driver deterioration or weather grime and lens dirt which will occur during the lifespan of the lighting installation.

REV	DESCRIPTION	DATE	BY
R0	INITIAL DESIGN FOR REVIEW AND COMMENT	24/04/2024	SRH

**SHD**  
 info@shdlighting.co.uk 07834 490 192 www.shdlighting.co.uk

SCHEME:	FOSS LANE, NEWTON HAYE		
DRAWING:	LIGHT SPILL DRAWING		
CLIENT:	DUALMECH LIMITED		
DRAWING NUMBER:	SHD1457-SHD-HEG-NEWTON-DR-ED-LIGHT-SPILL-R0	DRAWN:	SRH
	SHEET 1 OF 1	CHECKED:	SRH
CONTRACT NUMBER:	SHD1457	DATE:	24/04/2024
		SCALE @ A1:	1:250
		REVISION:	R0

**PRELIMINARY DESIGN - NOT FOR CONSTRUCTION**

The details provided on this drawing are subject to comments by all the relevant approving authorities or overseeing organisation. No construction works shall take place until technical approval has been obtained by the approving authority or overseeing organisation. It is to be understood that these drawings and the information shown are preliminary only and shall not be used for construction. Should the contractor commence work on site prior to obtaining technical approval, then it is entirely at their own risk and no liability shall be accepted by SHD Lighting Consultancy Ltd.

24/04/2024 17:25:21, SHD Plotstamp

**9. APPENDIX B****9.1 Lighting Calculation Reports**

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**DATE:** 24 April 2024  
**DESIGNER:** SHD Lighting Consultancy Ltd  
**PROJECT No:** SHD1457  
**PROJECT NAME:** Newton Haye



It is assumed that the wall lights are to be angled at 0° tilt to the horizontal plane and shall be switched using motion sensors, activated only when movement is detected.

All footpath bollard lighting are to be switched using individual motion sensors.

Isolux contour lines shown represent a 'day one' worst-case scenario with a maintenance factor of 1.0, as this demonstrates the maximum lumen output not taking into consideration any LED degradation, driver deterioration or weather grime and lens dirt which will occur during the lifespan of the lighting installation.

## Outdoor Lighting Report

**PREPARED BY:** SHD Lighting Consultancy Ltd  
Contact: info@shdlighting.co.uk  
Phone: 07834 490 192  
Website: www.shdlighting.co.uk

## Layout Report

### General Data

Dimensions in Metres Angles in Degrees

### Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1	488745.84	503910.61	69.00	72.00	1.50	1.50
2	Grid 2: North vertical cal...	488747.04	503980.29	50.00	10.00	1.00	1.00
3	Grid 3: East vertical calc...	488795.60	503967.11	50.00	10.00	1.00	1.00
4	Grid 4: South vertical cal...	488811.46	503926.93	50.00	10.00	1.00	1.00
5	Grid 5: West vertical calc...	488746.85	503978.65	70.00	10.00	1.00	1.00

### Luminaires

#### Luminaire A Data

Supplier	
Type	99857K3
Lamp(s)	963 lm,20 W
Lamp Flux (klm)	0.96
File Name	BE_99857K3.IES
Maintenance Factor	0.80
Lum. Int. Class	G3
No. in Project	7

#### Luminaire C Data

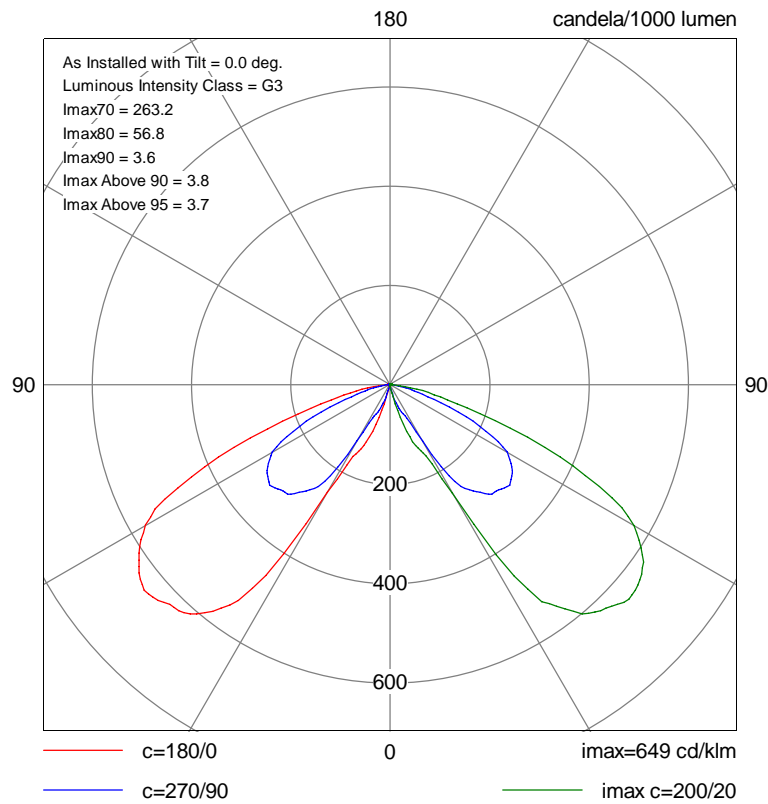
Supplier	
Type	Reef LED Directional Wall Light
Lamp(s)	
Lamp Flux (klm)	0.44
File Name	AREELEDWLD (3000K).ldt
Maintenance Factor	0.80
Lum. Int. Class	G3
No. in Project	3

### Layout

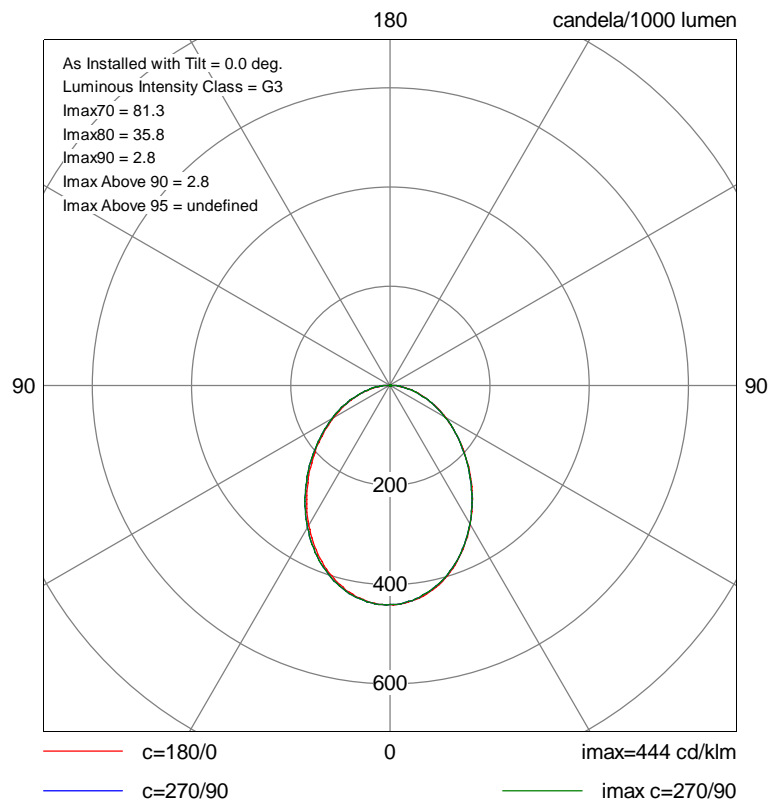
ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	488774.61	503969.13	0.75	252.00	0.00	0.00	0.00			
2	A	488770.42	503961.13	0.35	160.00	0.00	0.00	0.00			
4	A	488781.01	503952.98	0.75	17.00	0.00	0.00	0.00			
4	A	488780.68	503961.31	0.75	188.00	0.00	0.00	0.00			
6	A	488785.45	503939.46	0.75	16.00	0.00	0.00	0.00			
8	A	488791.48	503929.97	0.75	198.00	0.00	0.00	0.00			
7	A	488784.79	503947.16	0.75	198.00	0.00	0.00	0.00			
8	C	488772.06	503949.21	2.00	22.00	0.00	0.00	0.00			
9	C	488781.53	503935.70	2.00	34.00	0.00	0.00	0.00			
10	C	488788.46	503924.22	2.00	35.00	0.00	0.00	0.00			

## Polar Diagrams

### Luminaire A 99857K3



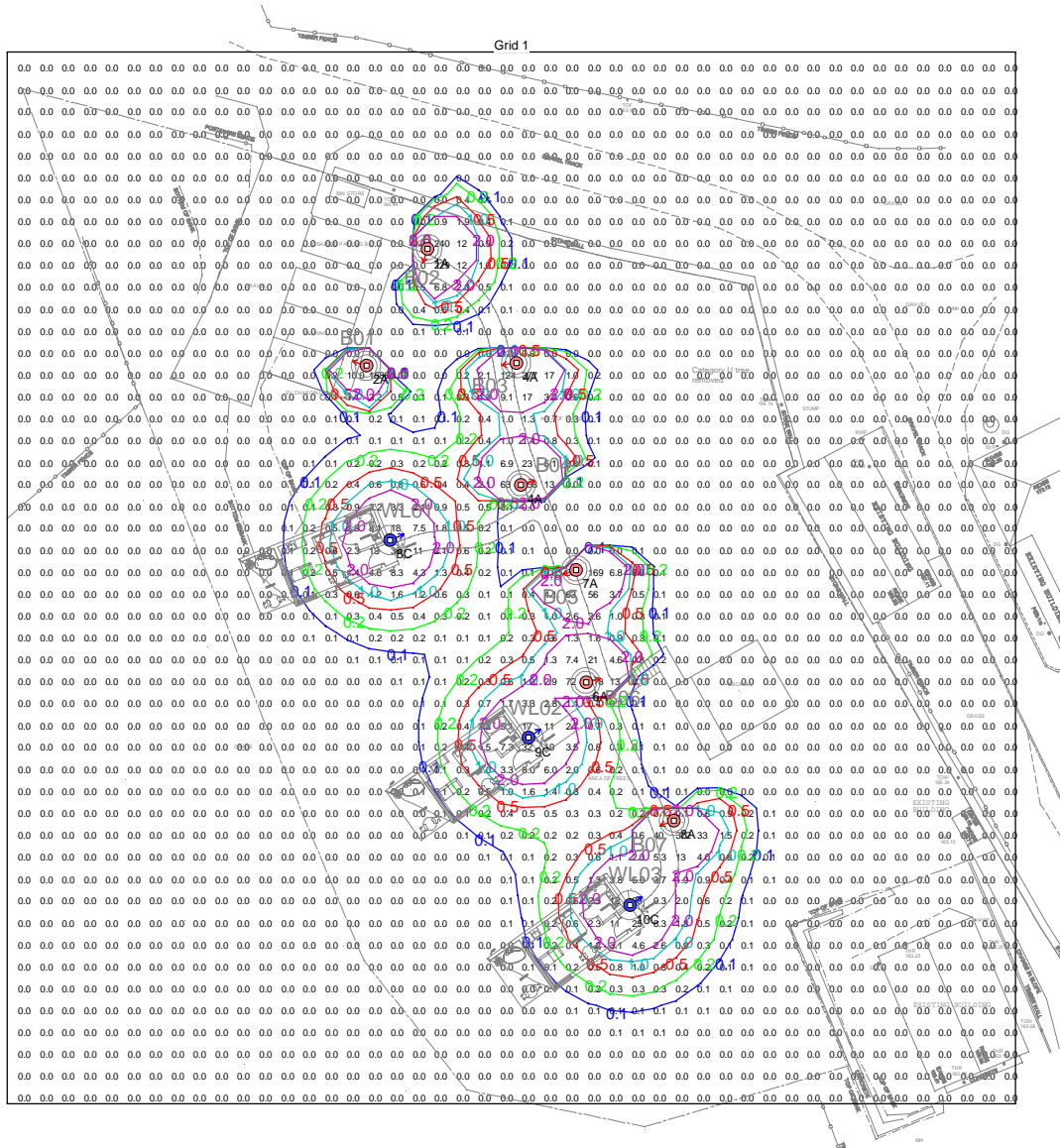
### Luminaire C Reef LED Directional Wall Light





# Horizontal Illuminance (lux)

Grid 1



## Results

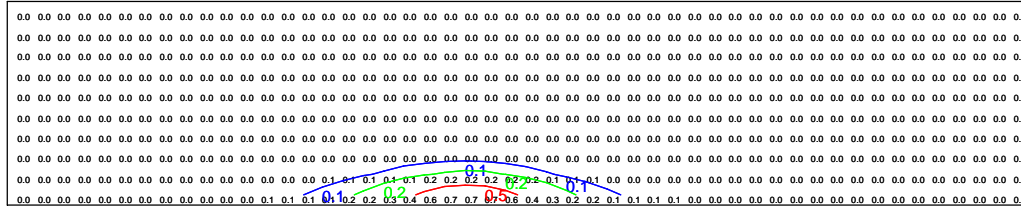
Eav	2.06
Emin	0.00
Emax	1585.68
Emin/Emax	0.00
Emin/Eav	0.00





## Illuminance (lux)

Grid 4: South vertical calculation grid

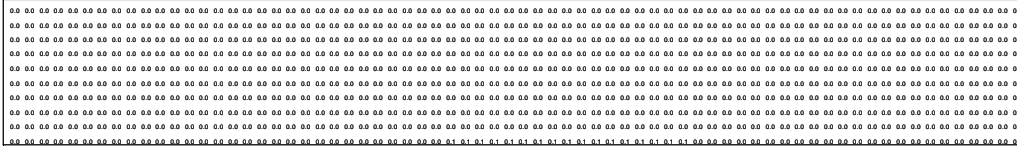


### Results

Eav	0.03
Emin	0.00
Emax	0.73
Emin/Emax	0.00
Emin/Eav	0.11

## Illuminance (lux)

Grid 5: West vertical calculation grid



### Results

Eav	0.01
Emin	0.00
Emax	0.07
Emin/Emax	0.01
Emin/Eav	0.08

**10. APPENDIX C****10.1 Manufacturers datasheets**

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**BEGA****84 760**

Bollard tube with PIR and light sensor

IP 65

Project · Reference number

Date

## Product data sheet

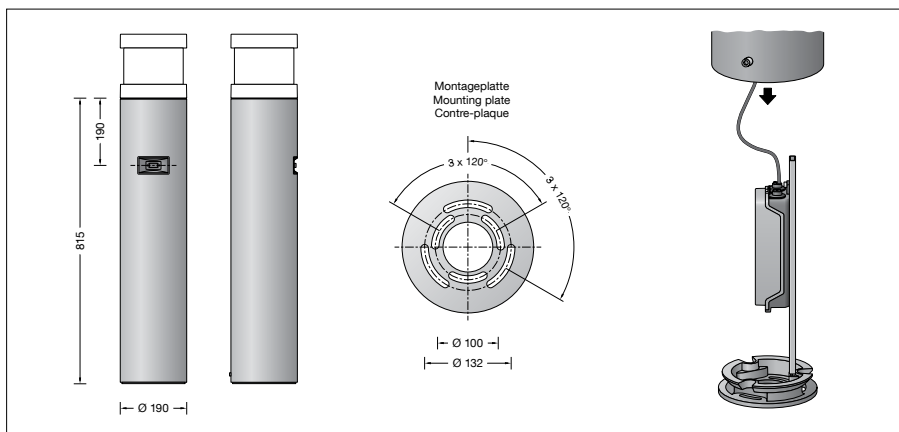
### Application

Bollard tube  $\varnothing$  190 mm  
with integral passive infrared motion sensor  
and light sensor.

For usage in the modular system bollard range.  
The integrated passive infrared motion and light  
sensor responds to heat emission in the dark  
and therefore activates in case of human or  
animal movement in the vicinity of the luminaire.  
Configuration is done via Bluetooth and the free  
BEGA Tool app.

### Product description

Bollard tube made of aluminium  
BEGA Unidure® coating technology  
Mounting plate made of cast aluminium  
for bolting onto a foundation or  
an anchorage unit  
Mounting plate with two pitch circles:  
 $\varnothing$  100 mm, 3 elongated holes 9 mm wide  
 $\varnothing$  132 mm, 3 elongated holes 9 mm wide  
Passive infrared motion sensor (PIR)  
Range up to 12 m  
Opening angle 120°-150°  
Decals for reducing the detection range are  
provided  
Minimum temperature difference between  
moving object and environment 4 °C  
Object speed ideally 1 m/s  
Adjustable sensitivity of the motion sensor (inertia)  
Shut-down delay adjustable between 5 s and  
240 min  
Light sensor: adjustable value range from  
darkness to approaching dusk (approx. 150 lx)  
Fixed pre-set time hysteresis for suppression  
of undesired switching operations in luminaires  
during rapid brightness fluctuations  
Transmission frequency range:  
2400-2483.5 MHz  
Maximum transmission output: 10 mW  
Connection box 71 084  
for through-wiring – for 2 cables up to 7 × 6<sup>2</sup>  
Fuse terminal with micro fuse  
6,3 A slow  $\varnothing$  5 × 20 mm  
Luminaire switchable via relay output (on/off)  
integrated in the sensor module  
Relay contact with a switching capacity of  
2300 W · 10 A  
Please note the starting current of the switching  
loads (max. 100 A)  
Ambient temperature: -25°C to +55°C  
220-240 V ~ 50-60 Hz  
Safety class I  
Protection class IP 65  
Dust-tight and protection against water jets  
Impact strength IK05  
Protection against mechanical  
impacts < 0.7 joule  
**CE** – Conformity mark  
Weight: 6.4 kg



### Accessories

**70 896** Anchorage unit  
with mounting flange made of hot-dip  
galvanised steel. Overall length 500 mm.  
3 stainless steel M8 mounting screws.  
Pitch circle  $\varnothing$  132 mm.

See the separate instructions for use.

### Article No. 84 760

Colour graphite or silver  
graphite – article number  
silver – article number + **A**

**BEGA****99 857**

Bollard head



Project · Reference number



Date

## Product data sheet

### Application

Bollard head with shielded light. Light exit 180°. The light is deflected by means of a conical reflector onto the surface to be illuminated. For usage in the modular system bollard range.

### Product description

Luminaire made of cast aluminium, aluminium and stainless steel  
 BEGA Unidure® coating technology  
 Borosilicate glass  
 Single side light exit 180°  
 Suitable for bollard tube  $\varnothing$  190 mm  
 Connecting cable X05BQ-F 5 G 1 mm<sup>2</sup>  
 LED power supply unit  
 220-240 V  $\sim$  0/50-60 Hz  
 DC 176-280 V  
 DC Start  $\geq$  190 V  
 DALI-controllable  
 Basic insulation is provided between the mains and control cables  
 BEGA Thermal Control®  
 Temporary thermal regulation to protect temperature-sensitive components without switching off the luminaire  
 Safety class I  
 Protection class IP 65  
 Dust-tight and protection against water jets  
 Impact strength IK06  
 Protection against mechanical impacts < 1 joule  
 – Safety mark  
 – Conformity mark  
 Weight: 4.9 kg  
 This product contains light sources of energy efficiency class(es) D

### Lamp

Module connected wattage	16 W
Luminaire connected wattage	19.5 W
Rated temperature	$t_a = 25$ °C
Ambient temperature	$t_{a \max} = 50$ °C

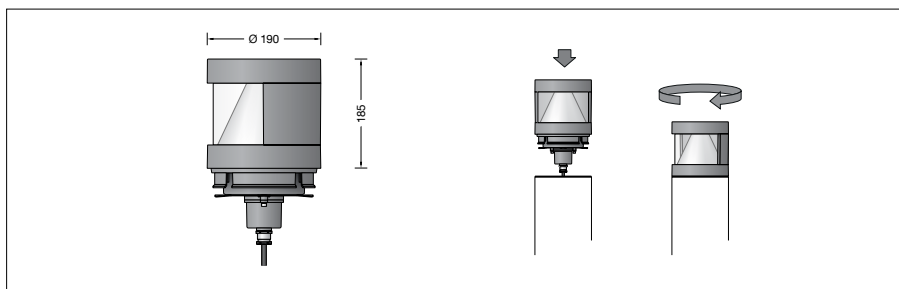
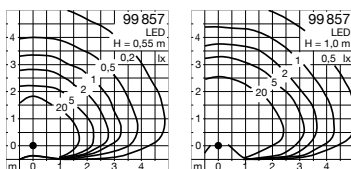
### 99 857 K3

Module designation	LED-0382/830
Colour temperature	3000 K
Colour rendering index	CRI > 80
Module luminous flux	2795 lm
Luminaire luminous flux	963 lm
Luminaire luminous efficiency	49,4 lm/W

### 99 857 K4

Module designation	LED-0382/840
Colour temperature	4000 K
Colour rendering index	CRI > 80
Module luminous flux	2835 lm
Luminaire luminous flux	977 lm
Luminaire luminous efficiency	50,1 lm/W

### Light distribution



### Emergency lighting

In combination with bollard tubes with integrated emergency lighting battery the luminaire luminous flux during emergency operation reads 462 lm.

### Service life · Ambient temperature

Rated temperature  $t_a = 25$  °C  
 LED psu: > 50,000 h  
 LED module: > 200,000 h (L.80 B 50)  
 100,000 h (L.90 B 50)

Ambient temperature max.  $t_a = 50$  °C (100 %)  
 LED psu: 50,000 h  
 LED module: > 200,000 h (L.80 B 50)

### Lighting technology

Luminaire data for the DIALux lighting design program for outdoor lighting, street lighting and indoor lighting, as well as luminaire data in EULUMDAT and IES format are available on the BEGA website at [www.bega.com](http://www.bega.com).

### Inrush current

Inrush current: 24 A / 115  $\mu$ s  
 Maximum number of luminaires of this type per miniature circuit breaker:  
 B 10 A: 31 luminaires  
 B 16 A: 51 luminaires  
 C 10 A: 53 luminaires  
 C 16 A: 86 luminaires

### Article No. 99 857

LED colour temperature optionally 3000 K or 4000 K  
 3000 K – Article number + **K3**  
 4000 K – Article number + **K4**

Colour graphite or silver  
 graphite – article number  
 silver – article number + **A**

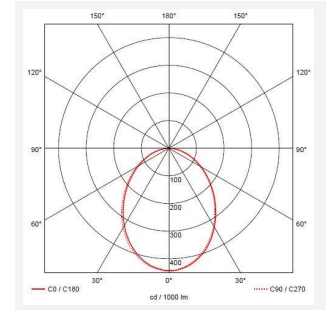
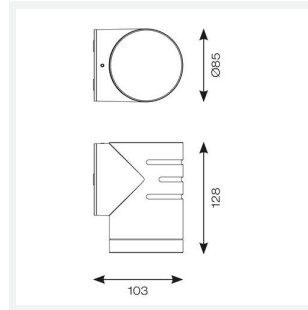
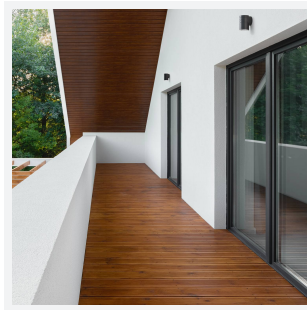
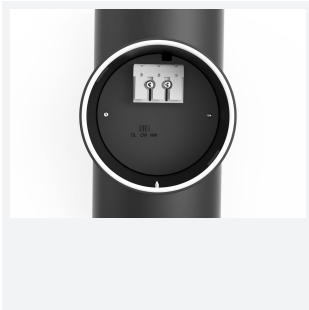




# Reef Directional

Reef CCT Directional Wall Light Black  
Code: AREELEDWLD

Category	Wall Lights
Application	Hospitality, Outdoor, Residential, Retail
Specification	Architectural



## PRODUCT FEATURES

- Durable outdoor directional wall light suitable for residential and hospitality applications
- Choice of matt white or black finishes
- CCT selectable between 3000K, 4000K and 6000K
- Non-dimmable
- Installation in either upward or downward orientation
- Polycarbonate construction ideal for coastal applications
- Unique lockable installation base plate with push fit loop-in loop-out terminals for ease of installation

GENERAL INFORMATION	
Wattage	5W
Lumens Delivered	430lm - 410lm (3000K - 6000K)
Lm/W	85lm/W - 82lm/W (3000K - 6000K)
Beam Angle	90
CRI	80
CCT	3000/4000/6000K
Input	220/240V
Operating Temp	-20°C - 40°C
SDCM	6
Product Weight without Packaging	0.215 kg

TECHNICAL INFORMATION	
Light Source	LED
Colour / Finish	Black
IP Rating	IP65
Class Protection	2
Internal / External	Internal / External
Surface / Recessed / Suspended	Wall
Lumen Depreciation	L80 54,000h
Warranty (Years)	3
CE Mark	Yes
Diameter	85 mm
Height	128 mm



**BEGA****99 857**

Bollard head



Project · Reference number

Date

## Product data sheet

### Application

Bollard head with shielded light. Light exit 180°. The light is deflected by means of a conical reflector onto the surface to be illuminated. For usage in the modular system bollard range.

### Product description

Luminaire made of cast aluminium, aluminium and stainless steel  
 BEGA Unidure® coating technology  
 Borosilicate glass  
 Single side light exit 180°  
 Suitable for bollard tube  $\varnothing$  190 mm  
 Connecting cable X05BQ-F 5 G 1 mm<sup>2</sup>  
 LED power supply unit  
 220-240 V  $\sim$  0/50-60 Hz  
 DC 176-280 V  
 DC Start  $\geq$  190 V  
 DALI-controllable  
 Basic insulation is provided between the mains and control cables  
 BEGA Thermal Control®  
 Temporary thermal regulation to protect temperature-sensitive components without switching off the luminaire  
 Safety class I  
 Protection class IP 65  
 Dust-tight and protection against water jets  
 Impact strength IK06  
 Protection against mechanical impacts < 1 joule  
 – Safety mark  
 – Conformity mark  
 Weight: 4.9 kg  
 This product contains light sources of energy efficiency class(es) D

### Lamp

Module connected wattage	16 W
Luminaire connected wattage	19.5 W
Rated temperature	$t_a = 25^\circ\text{C}$
Ambient temperature	$t_{a\text{max}} = 50^\circ\text{C}$

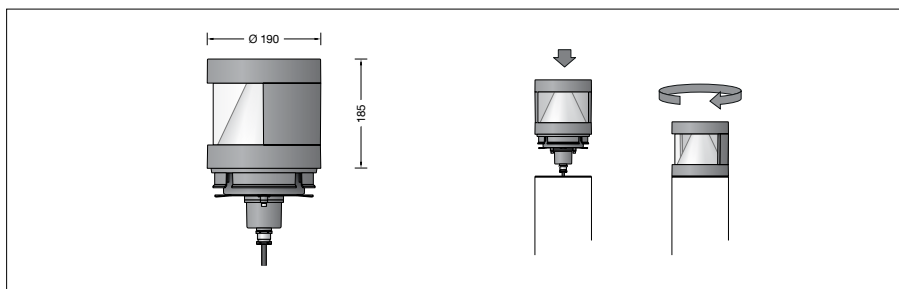
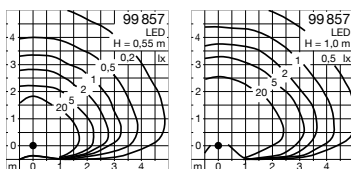
### 99 857 K3

Module designation	LED-0382/830
Colour temperature	3000 K
Colour rendering index	CRI > 80
Module luminous flux	2795 lm
Luminaire luminous flux	963 lm
Luminaire luminous efficiency	49,4 lm/W

### 99 857 K4

Module designation	LED-0382/840
Colour temperature	4000 K
Colour rendering index	CRI > 80
Module luminous flux	2835 lm
Luminaire luminous flux	977 lm
Luminaire luminous efficiency	50,1 lm/W

### Light distribution



### Emergency lighting

In combination with bollard tubes with integrated emergency lighting battery the luminaire luminous flux during emergency operation reads 462 lm.

### Service life · Ambient temperature

Rated temperature  $t_a = 25^\circ\text{C}$   
 LED psu: > 50,000 h  
 LED module: > 200,000 h (L.80 B 50)  
 100,000 h (L.90 B 50)

Ambient temperature max.  $t_a = 50^\circ\text{C}$  (100 %)  
 LED psu: 50,000 h  
 LED module: > 200,000 h (L.80 B 50)

### Lighting technology

Luminaire data for the DIALux lighting design program for outdoor lighting, street lighting and indoor lighting, as well as luminaire data in EULUMDAT and IES format are available on the BEGA website at [www.bega.com](http://www.bega.com).

### Inrush current

Inrush current: 24 A / 115  $\mu\text{s}$   
 Maximum number of luminaires of this type per miniature circuit breaker:  
 B 10 A: 31 luminaires  
 B 16 A: 51 luminaires  
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### Article No. 99 857

LED colour temperature optionally 3000 K or 4000 K  
 3000 K – Article number + **K3**  
 4000 K – Article number + **K4**

Colour graphite or silver  
 graphite – article number  
 silver – article number + **A**

**BEGA****84 760**

Bollard tube with PIR and light sensor

IP 65

Project · Reference number

Date

## Product data sheet

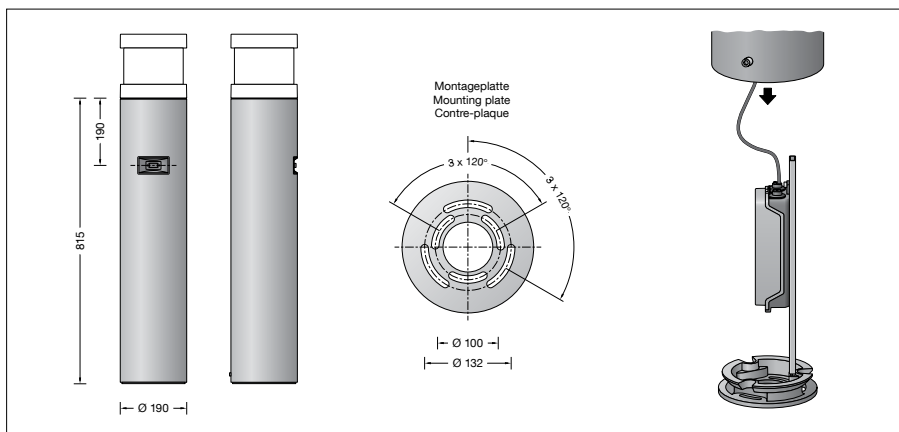
### Application

Bollard tube  $\varnothing$  190 mm  
with integral passive infrared motion sensor  
and light sensor.

For usage in the modular system bollard range.  
The integrated passive infrared motion and light  
sensor responds to heat emission in the dark  
and therefore activates in case of human or  
animal movement in the vicinity of the luminaire.  
Configuration is done via Bluetooth and the free  
BEGA Tool app.

### Product description

Bollard tube made of aluminium  
BEGA Unidure® coating technology  
Mounting plate made of cast aluminium  
for bolting onto a foundation or  
an anchorage unit  
Mounting plate with two pitch circles:  
 $\varnothing$  100 mm, 3 elongated holes 9 mm wide  
 $\varnothing$  132 mm, 3 elongated holes 9 mm wide  
Passive infrared motion sensor (PIR)  
Range up to 12 m  
Opening angle 120°-150°  
Decals for reducing the detection range are  
provided  
Minimum temperature difference between  
moving object and environment 4 °C  
Object speed ideally 1 m/s  
Adjustable sensitivity of the motion sensor (inertia)  
Shut-down delay adjustable between 5 s and  
240 min  
Light sensor: adjustable value range from  
darkness to approaching dusk (approx. 150 lx)  
Fixed pre-set time hysteresis for suppression  
of undesired switching operations in luminaires  
during rapid brightness fluctuations  
Transmission frequency range:  
2400-2483.5 MHz  
Maximum transmission output: 10 mW  
Connection box 71 084  
for through-wiring – for 2 cables up to 7 × 6<sup>2</sup>  
Fuse terminal with micro fuse  
6,3 A slow  $\varnothing$  5 × 20 mm  
Luminaire switchable via relay output (on/off)  
integrated in the sensor module  
Relay contact with a switching capacity of  
2300 W · 10 A  
Please note the starting current of the switching  
loads (max. 100 A)  
Ambient temperature: -25°C to +55°C  
220-240 V ~ 50-60 Hz  
Safety class I  
Protection class IP 65  
Dust-tight and protection against water jets  
Impact strength IK05  
Protection against mechanical  
impacts < 0.7 joule  
**CE** – Conformity mark  
Weight: 6.4 kg



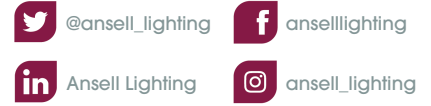
### Accessories

**70 896** Anchorage unit  
with mounting flange made of hot-dip  
galvanised steel. Overall length 500 mm.  
3 stainless steel M8 mounting screws.  
Pitch circle  $\varnothing$  132 mm.

See the separate instructions for use.

### Article No. 84 760

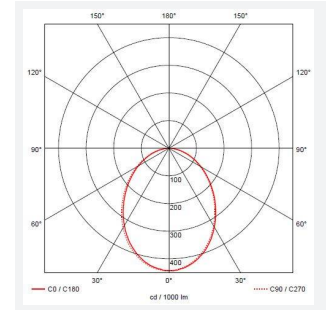
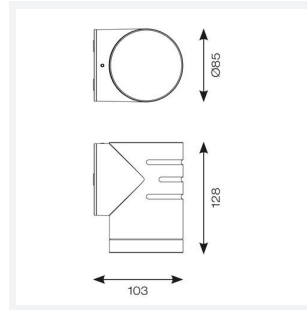
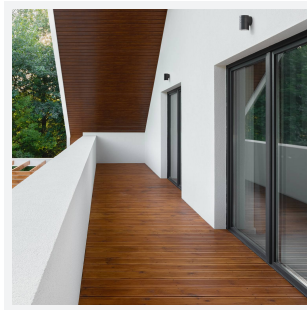
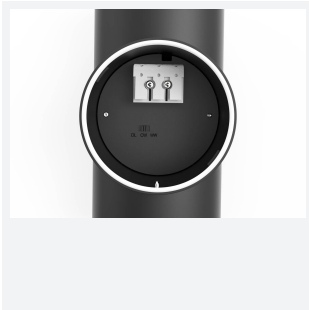
Colour graphite or silver  
graphite – article number  
silver – article number + **A**



# Reef Directional

Reef CCT Directional Wall Light Black  
Code: AREELEDWLD

Category	Wall Lights
Application	Hospitality, Outdoor, Residential, Retail
Specification	Architectural



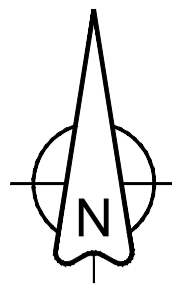
## PRODUCT FEATURES

- Durable outdoor directional wall light suitable for residential and hospitality applications
- Choice of matt white or black finishes
- CCT selectable between 3000K, 4000K and 6000K
- Non-dimmable
- Installation in either upward or downward orientation
- Polycarbonate construction ideal for coastal applications
- Unique lockable installation base plate with push fit loop-in loop-out terminals for ease of installation

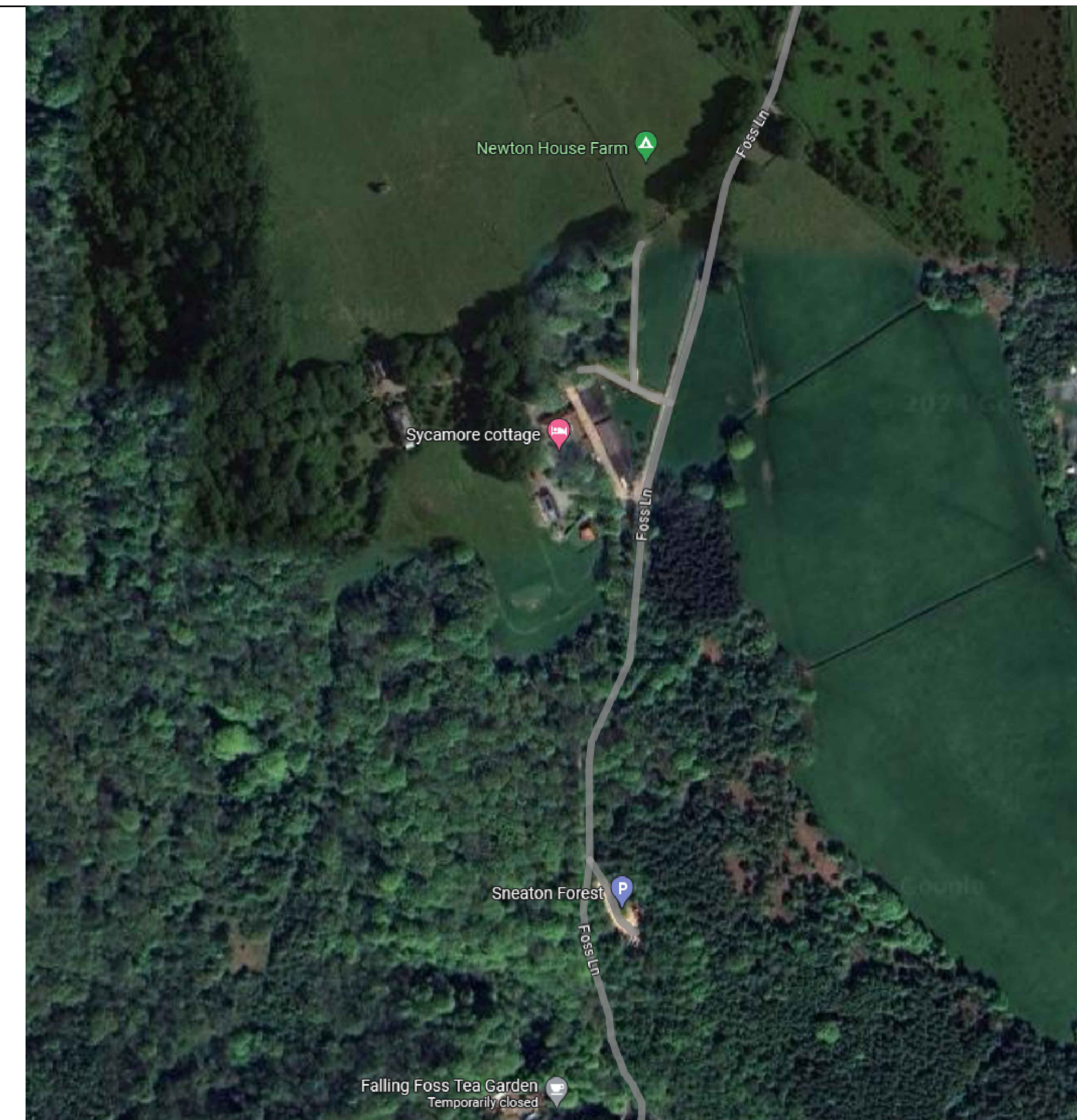
GENERAL INFORMATION	
Wattage	5W
Lumens Delivered	430lm - 410lm (3000K - 6000K)
Lm/W	85lm/W - 82lm/W (3000K - 6000K)
Beam Angle	90
CRI	80
CCT	3000/4000/6000K
Input	220/240V
Operating Temp	-20°C - 40°C
SDCM	6
Product Weight without Packaging	0.215 kg

TECHNICAL INFORMATION	
Light Source	LED
Colour / Finish	Black
IP Rating	IP65
Class Protection	2
Internal / External	Internal / External
Surface / Recessed / Suspended	Wall
Lumen Depreciation	L80 54,000h
Warranty (Years)	3
CE Mark	Yes
Diameter	85 mm
Height	128 mm





LOCATION:  
EASTING 488765.61  
NORTHING 503967.87



LUMINAIRE SPECIFICATION	
Location:	Along footpath
Luminaire Manufacturer:	BEGA
Luminaire model ref:	99 857 K2 Shielded with reflector 180°
Luminaire style:	Illuminated bollard
Mounting height:	900mm
Mounting type:	Root mounted
Luminaire tilt:	Downward fring LED optic
Light source:	20w warm white LED 3000k
Luminaire control:	Integral PIR motion sensor per bollard unit

LUMINAIRE SPECIFICATION	
Location:	Entrance door per pod
Luminaire Manufacturer:	Ansell Lighting
Luminaire model ref:	ARRELEDWLD 5w 3000k LED
Luminaire style:	Downward fring LED wall light
Mounting height:	2000mm from ground level
Mounting type:	Wall mounted aimed at the ground
Luminaire tilt:	0° aimed downwards
Light source:	5w warm white LED 3000k
Luminaire control:	PIR motion sensor per wall light

**UNIT IDENTIFICATION KEY:**  
**B\*\*** Proposed illuminated bollard identification number  
**WM\*\*** Proposed wall mounted downlight identification number

**ISOLUX LEVEL KEY (AT GROUND LEVEL):**  
 Contour line (Lux values shown on line)

**ISOLUX LEVEL KEY (0.5m FROM GROUND LEVEL):**  
 Contour line (Lux values shown on line)

It is assumed that the wall lights are to be angled at 0° tilt to the horizontal plane and shall be switched using motion sensors, activated only when movement is detected.

All footpath bollard lighting are to be switched using individual motion sensors.

Isolux contour lines shown represent a 'day one' worst-case scenario with a maintenance factor of 1.0, as this demonstrates the maximum lumen output not taking into consideration any LED degradation, driver deterioration or weather grime and lens dirt which will occur during the lifespan of the lighting installation.

REV	DESCRIPTION	DATE	BY
R0	INITIAL DESIGN FOR REVIEW AND COMMENT	24/04/2024	SRH

info@shdlighting.co.uk 07834 490 192 www.shdlighting.co.uk

SCHEME:	FOSS LANE, NEWTON HAYE		
DRAWING:	LIGHT SPILL DRAWING		
CLIENT:	DUALMECH LIMITED		
DRAWING NUMBER:	SHD1457-SHD-HEG-NEWTON-DR-LED-LIGHT-SPILL-R0	DRAWN:	SRH
	SHEET 1 OF 1	CHECKED:	SRH
CONTRACT NUMBER:	SHD1457	DATE:	24/04/2024
		SCALE @ A1:	1:250
		REVISION:	R0

**PRELIMINARY DESIGN - NOT FOR CONSTRUCTION**

The details provided on this drawing are subject to comments by all the relevant approving authorities or overseeing organisation. No construction works shall take place until technical approval has been obtained by the approving authority or overseeing organisation. It is to be understood that these drawings and the information shown are preliminary only and shall not be used for construction. Should the contractor commence work on site prior to obtaining technical approval, then it is entirely at their own risk and no liability shall be accepted by SHD Lighting Consultancy Ltd.



24/04/2024 17:25:21, SHD Plotstamp