

Outdoor Lighting Report

Proposed Commercial Development, Newtown, Powys, SY16 4HZ

Project number: SHD326

Document reference: SHD326-SHD-HLG-BOOT-RP-EO-Lighting Report-R0

Revision	Purpose of document	Compiled by	Reviewed by	Review date
R0	Planning	Steve Higham	Steve Higham	26/09/2021

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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 Berrys to develop a sensitive lighting strategy to support the outline planning application for the construction of a mixed-use development comprising of a petrol filling station, restaurant/drive thru, hotel and public house on land to the west of Newtown, Powys. (hereafter referred to as the *Proposed Development*).
- 1.1.2 The report has been prepared by SHD Lighting Consultancy Ltd to the best of our knowledge using information provided by Berrys.
- 1.1.3 The Proposed Development is to be constructed at land accessed from Newtown Bypass and Llandiloes Road, approximately 1.7 miles from Newtown (hereafter referred to as the *Application Site*).
- 1.1.4 The lighting design should be carried out by a competent person governed by the Institution of Lighting Professionals.
- 1.1.5 SHD Lighting Consultancy are a lighting design consultancy who specialise in outdoor lighting design and lighting assessments and have knowledge, experience and professional qualifications to undertake lighting designs and outdoor lighting impact assessment reports.
- 1.1.6 SHD Lighting Consultancy Ltd accept 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.
- 1.1.7 The lighting impact assessment considers the maximum adverse scenario in relation to the proposed artificial lighting, in order to assess the significance of the potential effects on the local environment.

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 so as 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.

2.2 National Planning Policy Framework

- 2.2.1 The National Planning Policy Framework (NPPF), published in July 2021, sets out the governments planning policies for England and how they are expected to be applied and provides a framework for local plans.
- 2.2.2 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 British and European Lighting Standards

- 2.3.1 The most applicable British Standards for lighting that relate to the Proposed Development are:
- BS 5489-1: 2020 Code of practice for the design of road lighting
 - BS EN 12464-2:2104: Lighting of outdoor workplaces

3. BASELINE CONDITIONS

3.1 Site Overview

- 3.1.1 The site for the Proposed Development is to be accessed from Llanidloes Road and Newtown Bypass. The section of highway in this area is currently unlit during the hours of darkness.
- 3.1.2 Information in this report will assess the impact on the introduction of artificial lighting which consists of lighting columns with post top mounted LED luminaires on the proposed access road, a petrol filling station forecourt and loading area, restaurant drive thru and car parking area and a hotel and public house, including patron and staff car parking areas and rear loading areas.



Figure 3.1: Proposed Development boundary outline (Aerial View)

4. LIGHTING STRATEGY

4.1 Lighting Brief

- 4.1.1 The aim of the lighting strategy is to ensure that lighting is fit for purpose and compliant with British Standards to ensure safety and amenity of on-site operations during the hours of darkness, whilst minimising the potential for obtrusive light.
- 4.1.2 Lighting performance details outlined in this section of the document are to be considered in conjunction with the following key documents:
- SHD326-SHD-HLG-NEWT-CA-EO-Access Road-R0
 - SHD326-SHD-HLG-NEWT-CA-EO-Drive-Thru-R0
 - SHD326-SHD-HLG-NEWT-CA-EO-Garage Calculation-R0
 - SHD326-SHD-HLG-NEWT-CA-EO-Hotel and Car Park-R0

4.2 Existing Lighting

- 4.2.1 The Application Site is within a rural area with no existing lighting illuminating the highway during the hours of darkness.
- 4.2.2 There are existing street lighting columns approximately 170m to the west of the Application Site.

4.3 Lighting Criteria

- 4.3.1 The areas to be illuminated are the access road to the north of the Proposed Development, a fuel filling station forecourt and deliver area to the north west of the development.
- 4.3.2 There is a public house car parking area to the east and hotel car park and delivery area to the south east.
- 4.3.3 A drive-thru coffee car parking area is planned to the south west of the Proposed Development, as shown in Figure 4.1.



Figure 4.1: Areas to be illuminated

4.4 Lighting Calculations and Modelling

- 4.4.1 An external lighting design has been prepared by SHD Lighting Consultancy Ltd for the Proposed Development
- 4.4.2 SHD Lighting Consultancy do not accept design responsibility for any lighting designs and strategies prepared by others.
- 4.4.3 The site was modelled, replicating the design provided by others, using industry standard software Lighting Reality.
- 4.4.4 Lighting Reality is a computer software calculation package which utilises manufacturers photometric data files to simulate the lighting output of chosen light fittings.
- 4.4.5 It is to be noted that the lighting calculation report has been produced with a luminaire maintenance factor of 1.0 as specified in the ILP publication, Public Lighting Guide 04 – Guidance on undertaking an Environmental Assessment Report.
- 4.4.6 It defines a maintenance factor of 1.0 as being worst-case scenario as all the outdoor lighting will be performing at peak intensity.
- 4.4.7 Light spill calculations are based on the luminaires at full output, with a maintenance factor of 1.0, as this will represent the worst-case scenario.
- 4.4.8 The light spill model does not consider physical obstructions and 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.
- 4.4.9 Considering this, the light spill diagram provides an exaggerated and absolute worst-case scenario with regards to the light spill at ground level, assuming no light limiting features are present.
- 4.4.10 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.
- 4.4.11 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.

5. OUTDOOR LIGHTING REQUIREMENTS

5.1 Proposed Lighting Requirements

- 5.1.1 Lighting has been designed in accordance with the relevant and appropriate British Standards.

5.2 Access Road lighting classification.

- 5.2.1 Using BS 5489-1:2020 as reference, the desired lighting classification shall be P3
- 5.2.2 The chosen lighting class requires the following lighting levels to be met to be compliant with BS 5489-1:2020.

Minimum maintained average illuminance (Eav): >7.50 lux <11.25 lux

Minimum illuminance (Emin): >1.50 lux

Emin/Eav (Uniformity): >0.20 (20%)

5.3 Drive Thru and Drive Thru car park lighting classification.

- 5.3.1 Using BS EN 12464-2:2014 (Table 5.9) as reference, the desired lighting classification shall be a light traffic car park.

Minimum maintained average illuminance (Eav): >5.00 lux

Emin/Eav (Uniformity): >0.25 (25%)

5.4 Garage forecourt and HGV loading area lighting classification.

- 5.4.1 Using BS EN 12464-2:2014 (Table 5.6) as reference, the desired lighting levels shall be:

Minimum maintained average illuminance (Eav): >20.00 lux

Emin/Eav (Uniformity): >0.40 (40%)

5.5 Public House and Hotel car parking and delivery area lighting classification.

- 5.5.1 Using BS EN 12464-2:2014 (Table 5.9) as reference, the desired lighting classification shall be a light traffic car park.

Minimum maintained average illuminance (Eav): >5.00 lux

Emin/Eav (Uniformity): >0.25 (25%)

5.6 Comparable light levels

CHART OF EXAMPLE LUX LEVELS FOR REFERENCE			
Lighting Conditions	Lux Level	Lighting Conditions	Lux Level
British summer sunshine	50,000	Typical side road lighting	5
Overcast sky	5,000	Minimum security lighting	2
Well-lit office	500	Twilight	1
Minimum for easy reading	300	Clear full moon	0.25 to <1
Passageway or outside working area	50	Typical moonlight/cloudy sky	0.1
Good main road lighting	5 to 20	Typical starlight	0.001
Sunset	10	Poor starlight	0.0001

Table 5.1: Chart of example lux levels for reference

5.7 Access Road

- 5.7.1 Lighting of the access road will be provided in accordance with British Standards. This will ensure that the lighting levels provided are suitable for operational purposes, whilst ensuring the environmental surrounds are suitably mitigated against, in accordance with the guidance.
- 5.7.2 Luminaires will distribute light downwards only to reduce the potential for light spill onto the boundaries surrounding the building and upwards towards the sky. Luminaires will not be mounted above 8.0m in height to ensure that light spill and direct upward light is mitigated against.
- 5.7.3 Luminaires will be located to the rear of the footpath, perpendicular to the kerb edging and are mounted horizontally at 0°. This minimizes any sky glow or potential light spill.
- 5.7.4 Lighting performance parameters for the adoptable lighting are outlined in Table 5.2 below
- 5.7.5 The LED luminaires have integral optic designed to prevent back light and this helps minimizes light spill, ensuring light is only projected onto the adoptable roads and footpaths and limits light spill, whilst ensuring the roads are lit to the required BS 5489-1: 2020 lighting classification for adoptable roads.

LUMINAIRE SPECIFICATION	
Location:	Access Road
Luminaire Manufacturer:	Philips
Luminaire model ref:	BGP703 DW50 BL1
Luminaire style:	Street lighting luminaire
Mounting height:	8m
Mounting type:	Post top mounted
Luminaire tilt:	0°
Light source:	4000k 8.00 klm LED
Lighting luminous intensity class:	G3 (BS EN 13201-2:2015)
DESIGN PARAMETERS	
Lighting classification:	P3
Luminaire control:	Photo electric control unit

Table 5.2: Access Road lighting performance parameters

5.8 Garage Forecourt and HGV Area

- 5.8.1 Lighting of the garage forecourt and HGV loading areas will be provided in accordance with British Standards. This will ensure that the lighting levels provided are suitable for operational purposes, whilst ensuring the environmental surrounds are suitably mitigated against, in accordance with the guidance.
- 5.8.2 Luminaires will distribute light downwards only to reduce the potential for light spill onto the boundaries surrounding the building and upwards towards the sky. Luminaires will not be mounted above 8.0m in height to ensure that light spill and direct upward light is mitigated against.
- 5.8.3 There is a single luminaire to be installed at a height of 6.0m to the rear of the filling station building.
- 5.8.4 Luminaires will be are mounted horizontally at 5° to reduce the quantity of lighting columns needed to illuminate the area and to remove the need to tilt the luminaire excessively which would introduce unwanted light pollution and sky glow.
- 5.8.5 Lighting performance parameters for the adoptable lighting are outlined in Table 5.3 below

LUMINAIRE SPECIFICATION	
Location:	Garage forecourt and HGV loading areas
Luminaire Manufacturer:	Philips
Luminaire model ref:	BGP650 DX51
Luminaire style:	Floodlight
Mounting height:	8m
Mounting type:	Post top mounted
Luminaire tilt:	5°
Light source:	4000k 22.00 klm LED
Lighting luminous intensity class:	G2 (BS EN 13201-2:2015)
DESIGN PARAMETERS	
Lighting classification:	Table 5.6 (BS EN 12464-2:2014)
Luminaire control:	Photo electric control unit with manual override / timeclock

Table 5.3: Garage Forecourt and HGV loading area lighting performance parameters

5.9 Hotel and Public House Car Parking Areas and Delivery Areas

- 5.9.1 Lighting of the hotel and public house car parking areas and delivery areas will be provided in accordance with British Standards. This will ensure that the lighting levels provided are suitable for operational purposes, whilst ensuring the environmental surrounds are suitably mitigated against, in accordance with the guidance.
- 5.9.2 Luminaires will distribute light downwards only to reduce the potential for light spill onto the boundaries surrounding the building and upwards towards the sky. Luminaires will not be mounted above 6.0m in height to ensure that light spill and direct upward light is mitigated against.
- 5.9.3 Luminaires will be are mounted horizontally at 5° on 6.0m lighting columns around the periphery of the car parking areas and two twin arm 6.0m lighting column within the public house car park to reduce the quantity of lighting columns needed to illuminate this area and to remove the need to tilt the luminaire excessively which would introduce unwanted light pollution and sky glow.
- 5.9.4 Lighting performance parameters for the adoptable lighting are outlined in Table 5.4 below

LUMINAIRE SPECIFICATION	
Location:	Hotel and Public House Car Parks
Luminaire Manufacturer:	Philips
Luminaire model ref:	BGP702 DW50 BL1
Luminaire style:	Street lighting luminaire
Mounting height:	6m
Mounting type:	Post top mounted
Luminaire tilt:	5°
Light source:	4000k 5.00 klm LED
Lighting luminous intensity class:	G2 (BS EN 13201-2:2015)
DESIGN PARAMETERS	
Lighting classification:	Table 5.9 (BS EN 12464-2:2014)
Luminaire control:	Photo electric control unit with manual override / timeclock

Table 5.4: Hotel and Public House Car Parking Areas and Delivery Areas lighting performance parameters

5.10 Drive Thru and Drive Thru Car Parking Areas

- 5.10.1 Lighting of the drive thru and drive thru car parking areas will be provided in accordance with British Standards. This will ensure that the lighting levels provided are suitable for operational purposes, whilst ensuring the environmental surrounds are suitably mitigated against, in accordance with the guidance.
- 5.10.2 Luminaires will distribute light downwards only to reduce the potential for light spill onto the boundaries surrounding the building and upwards towards the sky. Luminaires will not be mounted above 6.0m in height to ensure that light spill and direct upward light is mitigated against.
- 5.10.3 Luminaires will be are mounted horizontally at 5° on 6.0m lighting columns around the periphery of the car parking areas and two twin arm 6.0m lighting column to reduce the quantity of lighting columns needed to illuminate this area and to remove the need to tilt the luminaire excessively which would introduce unwanted light pollution and sky glow.
- 5.10.4 Lighting performance parameters for the adoptable lighting are outlined in Table 5.5 below

LUMINAIRE SPECIFICATION	
Location:	Hotel and Public House Car Parks
Luminaire Manufacturer:	Philips
Luminaire model ref:	BGP702 DW50 BL1
Luminaire style:	Street lighting luminaire
Mounting height:	6m
Mounting type:	Post top mounted
Luminaire tilt:	5°
Light source:	4000k 5.00 klm LED
Lighting luminous intensity class:	G2 (BS EN 13201-2:2015)
DESIGN PARAMETERS	
Lighting classification:	Table 5.9 (BS EN 12464-2:2014)
Luminaire control:	Photo electric control unit with manual override / timeclock

Table 5.5: 5.10 Drive Thru and Drive Thru Car Parking Areas

5.11 Potential Effects

5.11.1 Poorly designed lighting can contribute the following obtrusive light components:

- Light spill into windows: this is typical of wall mounted luminaires with high tilt angles
- Upward light causing sky glow: this is typical of up-lighting
- Glare: due to high light source intensity from floodlights
- Intrusive light affecting ecology: caused by excessive height and tilt.

5.11.2 Poorly designed lighting generally consists of the installation of a limited number of luminaires that are being used to light a wide area. Due to this, the lighting is normally installed with tilt angles that are too great, because there is a need to spread the light as far as possible, lighting the intended area, as well as surfaces where the lighting was not intended.

5.11.3 The following paragraphs outline good lighting practices to be applied to the design of the artificial lighting required for the adoptable lighting during normal operation.

5.11.4 Many of the potential effects of artificial lighting can be effectively mitigated by a suitable lighting strategy, good design and choice of suitable lighting equipment and the lighting design being carried out by a suitably qualified and competent professional.

5.11.5 It is proposed that the lighting impact can be minimised by using accepted methods of lighting control, essentially limiting illuminance and controlling light spill.

5.11.6 Generally lighting shall be selected to provide safety and security without polluting the boundary site residents.

5.11.7 The light source specified for this lighting scheme is LED, this is a low lumen output, high efficiency light source with all luminaires having electronic ballasts and electronic control gear.

5.11.8 The electronic drivers and LED lamps running together produce a very efficient lighting system which reduces overall energy usage and environmental impact on natural resources.

5.11.9 Desk top assessments on the proposed lighting installation indicate (with respect to identified sensitive receptors) that overall surrounding light pollution levels will not be significantly influenced by the proposed lighting

5.11.10 These accepted methods have all been adopted within the proposed lighting design to keep the overall impact of the lighting to a minimum.

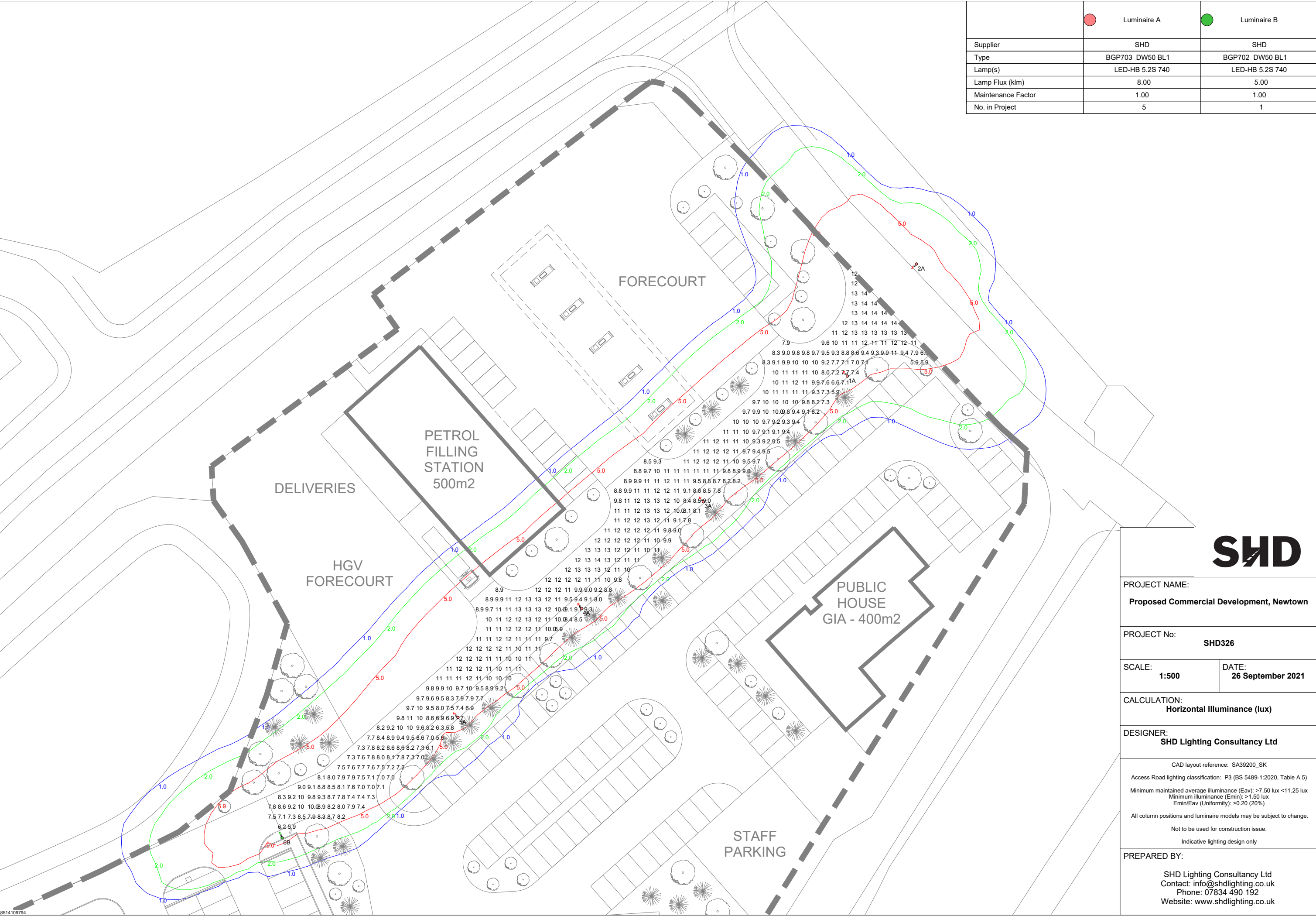
5.12 Indicative Light Spill

- 5.12.1 The indicative light spill models included in **Appendix A** demonstrates the ability to provide lighting for the Proposed Development and to ensure that a sensitive lighting solution is installed.
- 5.12.2 The light spill diagrams closely demonstrate the tight restrictions in light spill that are essential for protecting the immediate surrounds and receptors of the Proposed Development.
- 5.12.3 As the models do not consider obstructions such as the buildings, any proposed fencing, landscaping features or the topography of the area.
- 5.12.4 The Isolux contours presented in **Appendix A** represent the adverse scenario. Blocking effects of the site features would further reduce the potential for light spill to affect the boundaries of the Proposed Development.
- 5.12.5 The Isolux contours demonstrate the initial light output ultimately demonstrating the absolute worst-case scenario.

6. APPENDIX A

6.1 Light Spill Drawing

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	<div><div></div></div> Luminaire A	<div><div></div></div> Luminaire B
Supplier	SHD	SHD
Type	BGP703 DW50 BL1	BGP702 DW50 BL1
Lamp(s)	LED-HB 5.2S 740	LED-HB 5.2S 740
Lamp Flux (klm)	8.00	5.00
Maintenance Factor	1.00	1.00
No. in Project	5	1

SHD

PROJECT NAME:
Proposed Commercial Development, Newtown

PROJECT No:
SHD326

SCALE: 1:500
DATE: 26 September 2021

CALCULATION:
Horizontal Illuminance (lux)

DESIGNER:
SHD Lighting Consultancy Ltd

CAD layout reference: SA39200_SK
Access Road lighting classification: P3 (BS 5489-1:2020, Table A.5)
Minimum maintained average illuminance (Eav): >7.50 lux <11.25 lux
Minimum illuminance (Emin): >1.50 lux
Emin/Eav (Uniformity): >0.20 (20%)
All column positions and luminaire models may be subject to change.
Not to be used for construction issue.
Indicative lighting design only

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





	<div><div></div><div>Luminaire A</div></div>
Supplier	SHD
Type	BGP702 DW50 BL1
Lamp(s)	LED-HB 5.2S 740
Lamp Flux (klm)	5.00
Maintenance Factor	1.00
No. in Project	13

SHD

PROJECT NAME:
Proposed Commercial Development, Newtown

PROJECT No:
SHD326

SCALE:
1:500

DATE:
26 September 2021

CALCULATION:
Horizontal Illuminance (lux)

DESIGNER:
SHD Lighting Consultancy Ltd

CAD layout reference: SA39200_SK
Hotel Car Park and Delivery Area lighting classification:
(BS 12464-2:2014, Table 5.9)
Minimum maintained average illuminance (Eav): >5.00 lux
Emin/Eav (Uniformity): >0.25 (25%)
All column positions and luminaire models may be subject to change.
Not to be used for construction issue.
Indicative lighting design only

PREPARED BY:
SHD Lighting Consultancy Ltd
Contact: info@shdlighting.co.uk
Phone: 07834 490 192
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	<div><div></div>Luminaire A</div>
Supplier	SHD
Type	BGP702 DW50 BL1
Lamp(s)	LED-HB 5.2S 740
Lamp Flux (klm)	5.00
Maintenance Factor	1.00
No. in Project	9

SHD

PROJECT NAME:
Proposed Commercial Development, Newtown

PROJECT No:
SHD326

SCALE:
1:500

DATE:
21 September 2021

CALCULATION:
Horizontal Illuminance (lux)

DESIGNER:
SHD Lighting Consultancy Ltd

CAD layout reference: SA39200_SK
Car Park and Drive-thru lighting classification:
(BS 12464-2:2014, Table 5.9)
Minimum maintained average illuminance (Eav): >5.00 lux
Emin/Eav (Uniformity): >0.25 (25%)
All column positions and luminaire models may be subject to change.
Not to be used for construction issue.
Indicative lighting design only

PREPARED BY:
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Phone: 07834 490 192
Website: www.shdlighting.co.uk

7. APPENDIX B

7.1 Lighting Design Calculation Reports

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DATE: 26 September 2021
DESIGNER: SHD Lighting Consultancy Ltd
PROJECT No: SHD326
PROJECT NAME: Proposed Commercial Development, Newtown



CAD layout reference: SA39200_SK

Access Road lighting classification: P3 (BS 5489-1:2020, Table A.5)

Minimum maintained average illuminance (Eav): >7.50 lux <11.25 lux

Minimum illuminance (Emin): >1.50 lux

Emin/Eav (Uniformity): >0.20 (20%)

All column positions and luminaire models may be subject to change.

Not to be used for construction issue.

Indicative lighting design only

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	910.95	-240.56	127.38	33.00	1.50	1.50
2	Grid 2	846.07	-259.95	227.83	181.04	1.50	1.50

Luminaires

Luminaire A Data

Supplier	SHD
Type	BGP703 DW50 BL1
Lamp(s)	LED-HB 5.2S 740
Lamp Flux (klm)	8.00
File Name	Luma Gen2 Mini_BGP703_DW50 BL1_800 0_40LED_5.2S_CLO_L90_740.ies
Maintenance Factor	0.80
Lum. Int. Class	G3
No. in Project	5

Luminaire B Data

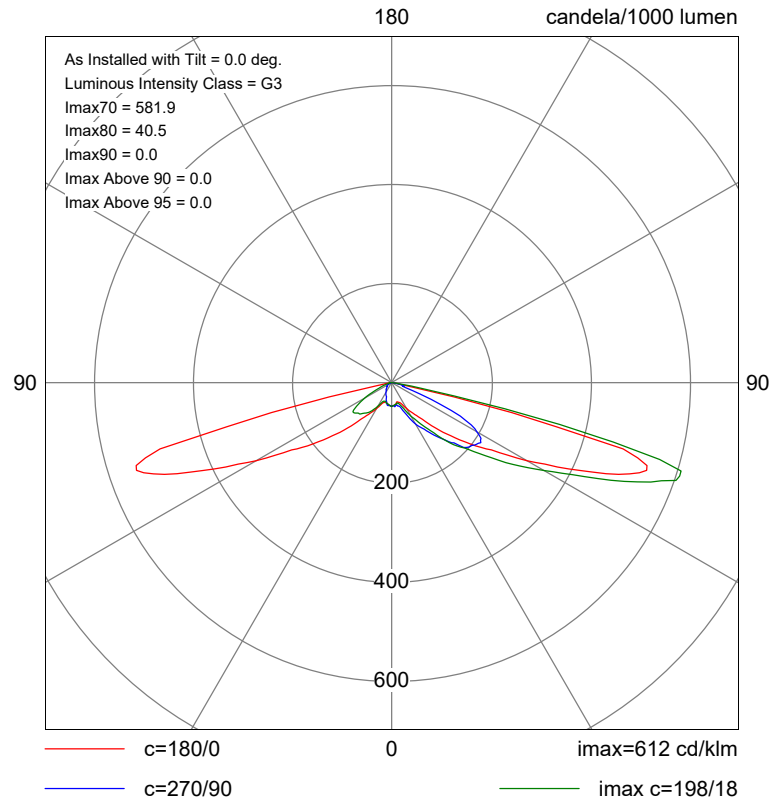
Supplier	SHD
Type	BGP702 DW50 BL1
Lamp(s)	LED-HB 5.2S 740
Lamp Flux (klm)	5.00
File Name	Luma Gen2 Micro_BGP702_DW50 BL1_50 00_20LED_5.2S_CLO_L90_740.ies
Maintenance Factor	0.80
Lum. Int. Class	G2
No. in Project	1

Layout

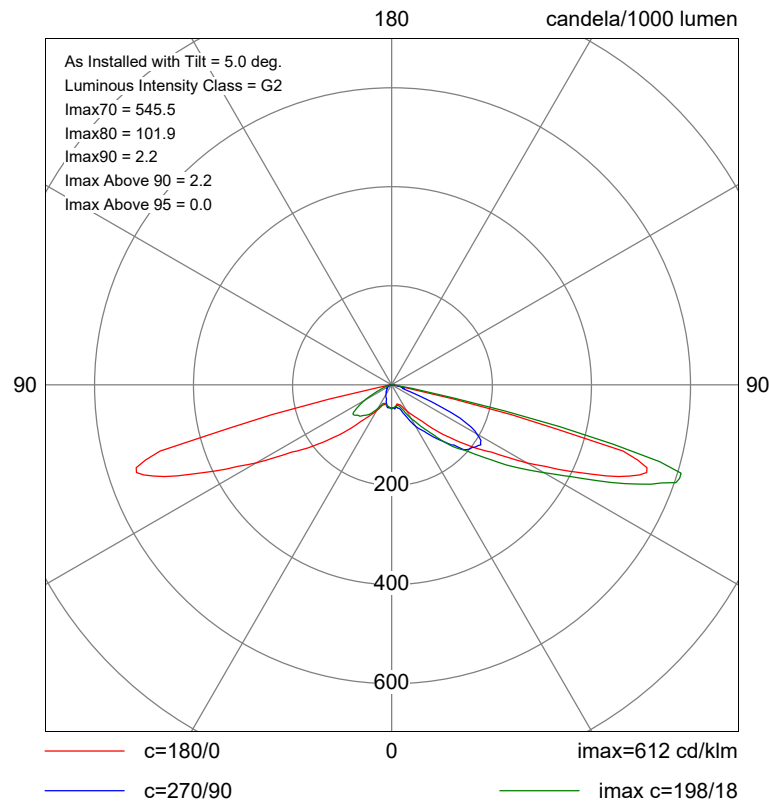
ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	988.63	-157.01	8.00	131.00	0.00	0.00	0.40			
2	A	999.12	-140.02	8.00	223.00	0.00	0.00	0.40			
3	A	966.80	-176.03	8.00	132.00	0.00	0.00	0.40			
4	A	948.35	-192.21	8.00	128.00	0.00	0.00	0.40			
5	A	929.58	-208.73	8.00	134.00	0.00	0.00	0.40			
6	B	902.92	-226.97	6.00	115.00	5.00	0.00	0.40			

Polar Diagrams

Luminaire A BGP703 DW50 BL1



Luminaire B BGP702 DW50 BL1



Horizontal Illuminance (lux)

Grid 1



Results

Eav	8.05
Emin	4.70
Emax	11.45
Emin/Emax	0.41
Emin/Eav	0.58

Horizontal Illuminance (lux)

Grid 1



Results

Eav	8.05
Emin	4.70
Emax	11.45
Emin/Emax	0.41
Emin/Eav	0.58

Horizontal Illuminance (lux)

Grid 1



Results

Eav	8.05
Emin	4.70
Emax	11.45
Emin/Emax	0.41
Emin/Eav	0.58

Horizontal Illuminance (lux)

Grid 1



DATE: 21 September 2021
DESIGNER: SHD Lighting Consultancy Ltd
PROJECT No: SHD326
PROJECT NAME: Proposed Commercial Development, Newtown



CAD layout reference: SA39200_SK

Forecourt lighting classification: (BS 12464-2:2014, Table 5.6)

Minimum maintained average illuminance (Eav): >20.00 lux
Emin/Eav (Uniformity): >0.40 (40%)

No canopy or other amenity lighting shown.

All column positions and luminaire models may be subject to change.

Not to be used for construction issue.

Indicative lighting design only

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	912.84	-214.58	39.00	54.00	1.50	1.50
2	Grid 2	946.85	-183.28	57.00	57.00	1.50	1.50
3	Grid 3	846.07	-259.95	227.83	181.04	1.50	1.50

Luminaires

Luminaire A Data

Supplier	SHD
Type	BGP702 DW50 BL1
Lamp(s)	LED-HB 5.2S 740
Lamp Flux (klm)	5.00
File Name	Luma Gen2 Micro_BGP702_DW50 BL1_50 00_20LED_5.2S_CLO_L90_740.ies
Maintenance Factor	0.80
Lum. Int. Class	G2
No. in Project	1

Luminaire B Data

Supplier	Philips
Type	BVP650 DX51
Lamp(s)	LED-HB 5.1S
Lamp Flux (klm)	22.00
File Name	Clearflood Small_BVP650_DX51_22000_5. 1S_L90 CLO_NW.ies
Maintenance Factor	0.80
Lum. Int. Class	G2
No. in Project	10

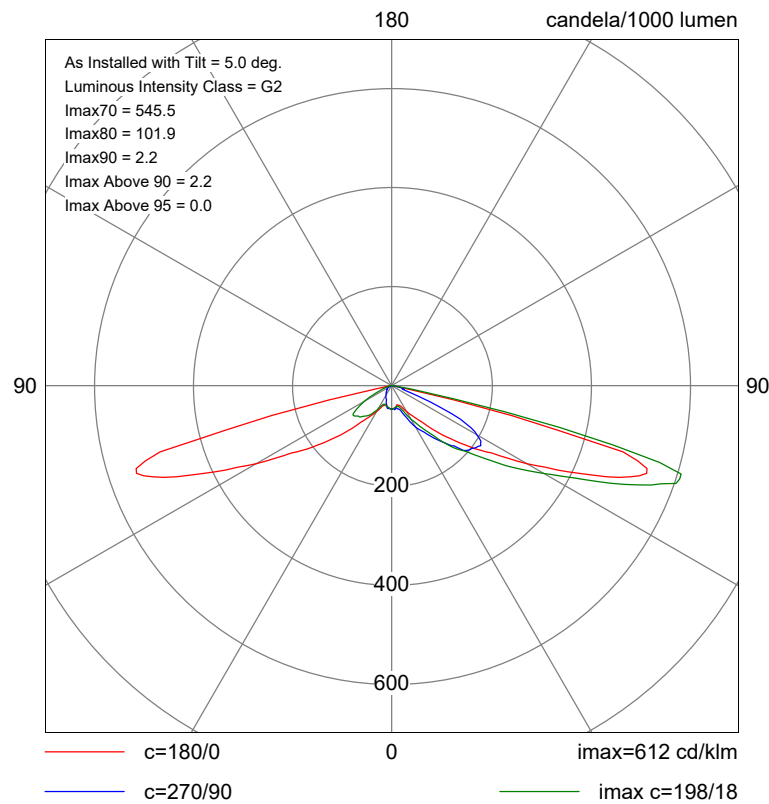


Layout

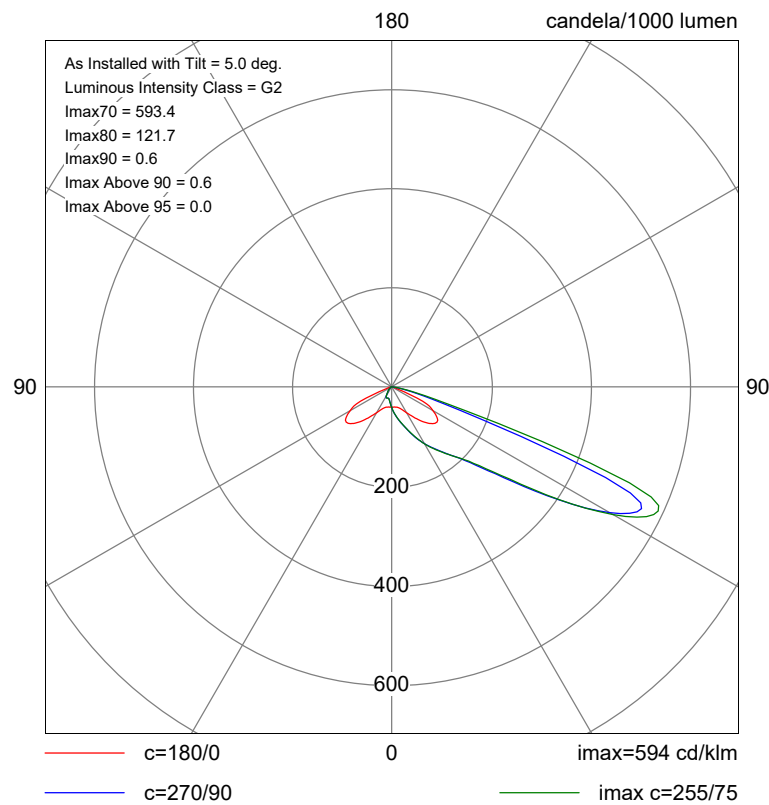
ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	B	909.97	-206.87	8.00	25.00	5.00	0.00	0.40			
2	B	897.25	-182.65	8.00	34.00	5.00	0.00	0.40			
3	A	923.37	-152.48	6.00	126.00	5.00	0.00	0.40			
4	B	900.70	-164.93	8.00	308.00	5.00	0.00	0.40			
5	B	928.45	-196.27	8.00	133.00	5.00	0.00	0.40			
7	B	923.44	-139.90	8.00	308.00	5.00	0.00	0.40			
8	B	945.62	-122.81	8.00	304.00	5.00	0.00	0.40			
9	B	963.33	-118.92	8.00	230.00	5.00	0.00	0.40			
10	B	973.35	-155.65	8.00	130.00	5.00	0.00	0.40			
11	B	950.23	-175.04	8.00	135.00	5.00	0.00	0.40			
12	B	975.34	-135.91	8.00	222.00	5.00	0.00	0.40			

Polar Diagrams

Luminaire A BGP702 DW50 BL1

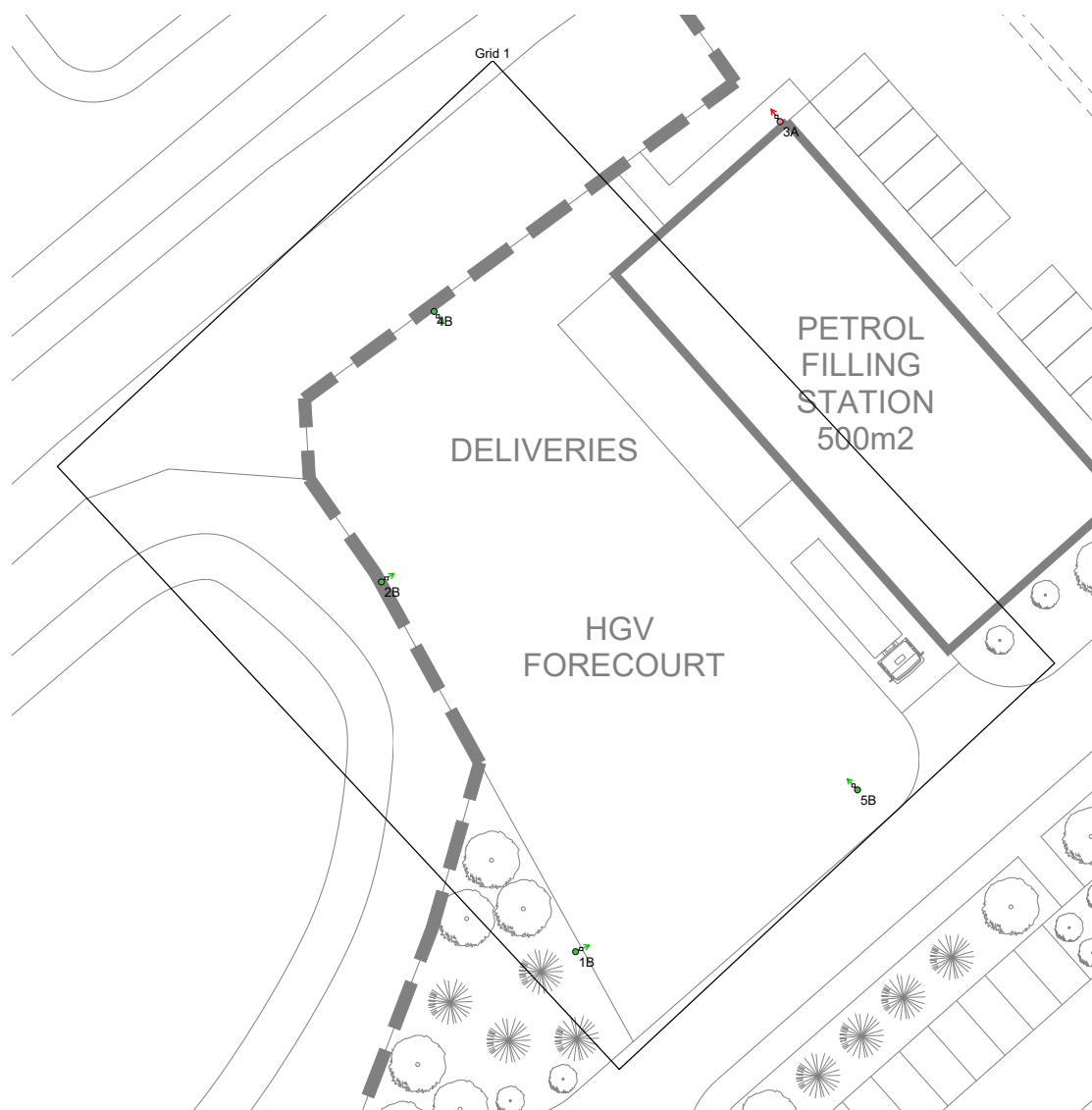


Luminaire B BVP650 DX51



Horizontal Illuminance (lux)

Grid 1

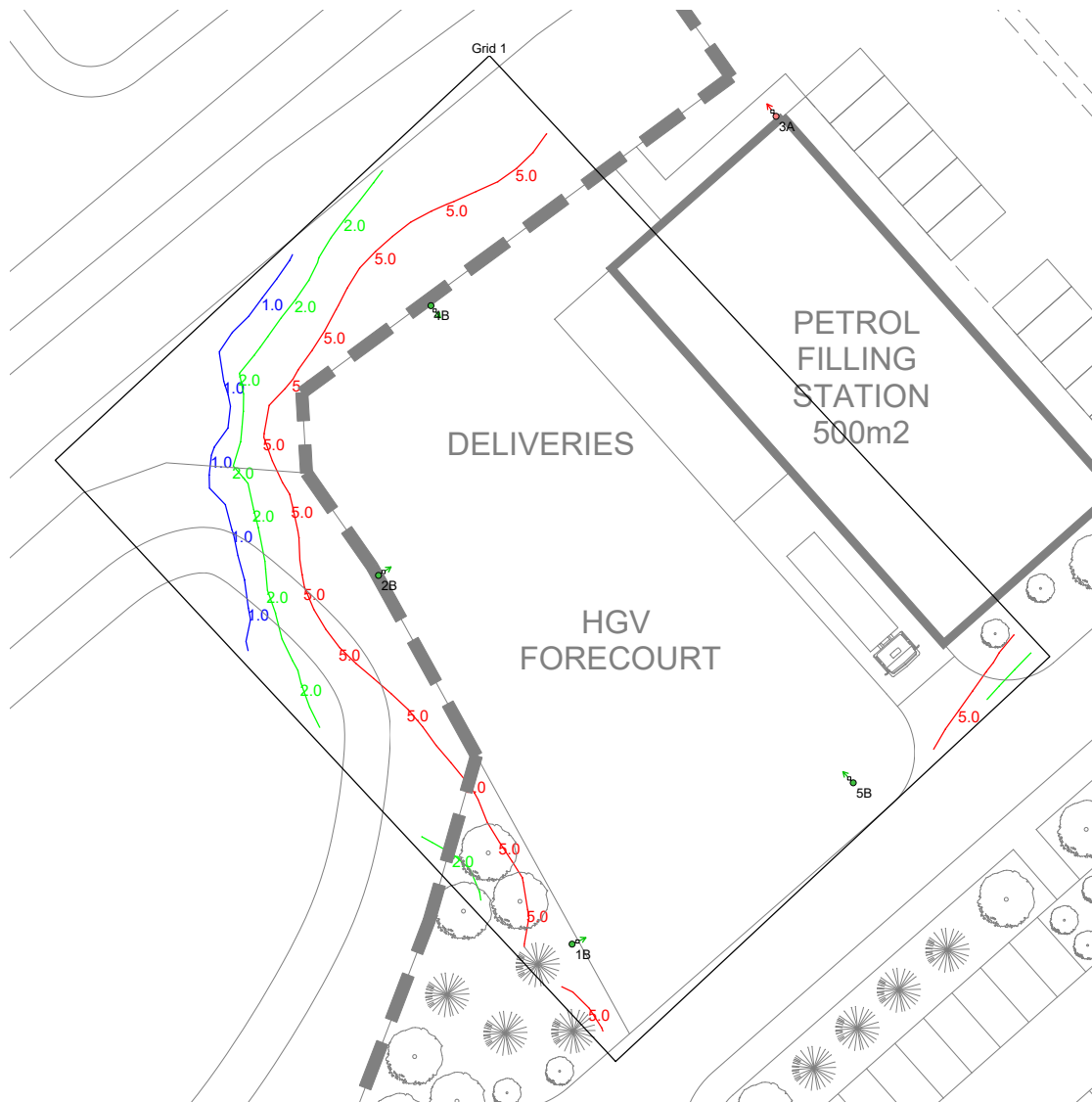


Results

Eav	23.14
Emin	9.97
Emax	32.91
Emin/Emax	0.30
Emin/Eav	0.43

Horizontal Illuminance (lux)

Grid 1

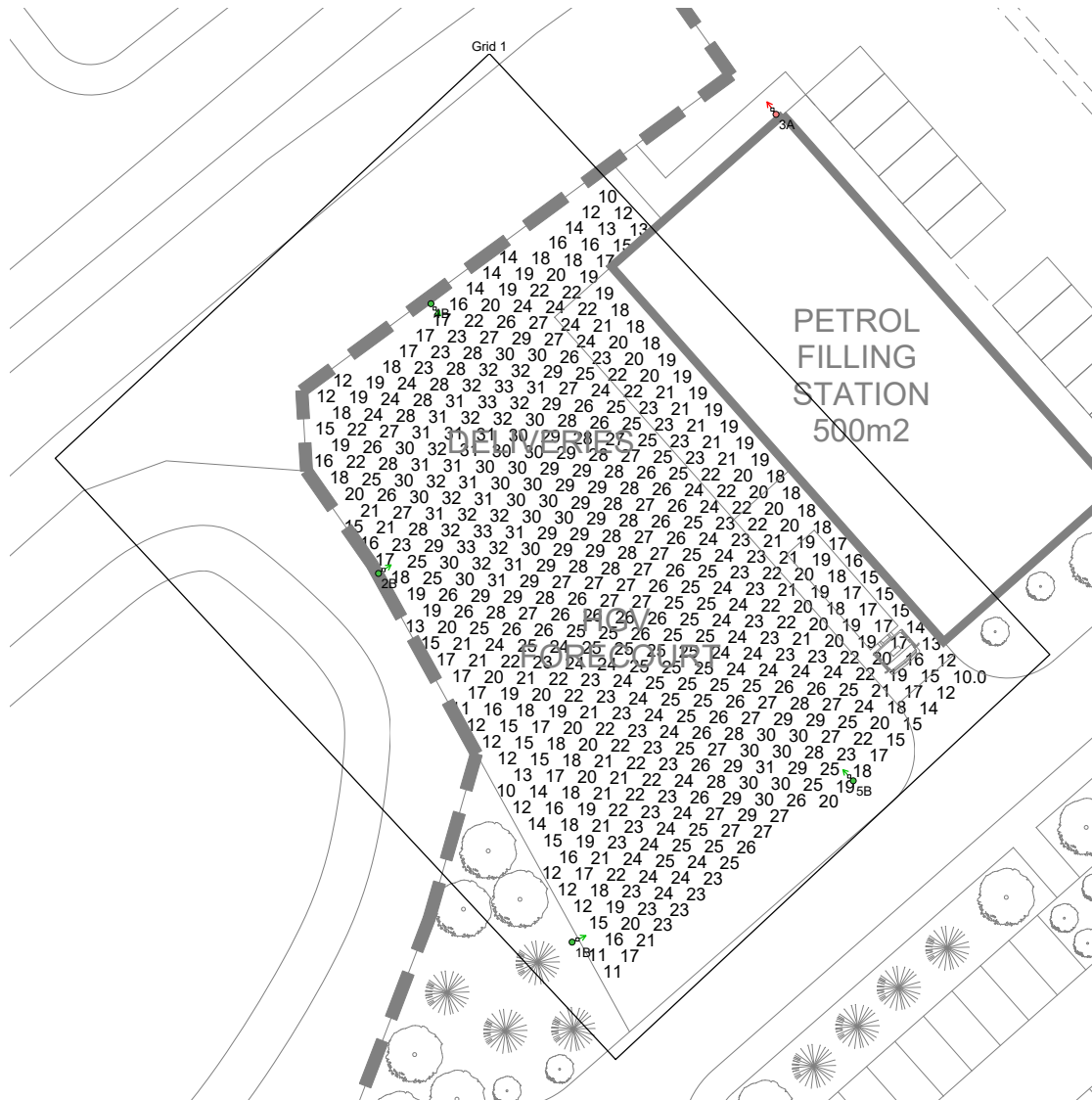


Results

Eav	23.14
Emin	9.97
Emax	32.91
Emin/Emax	0.30
Emin/Eav	0.43

Horizontal Illuminance (lux)

Grid 1

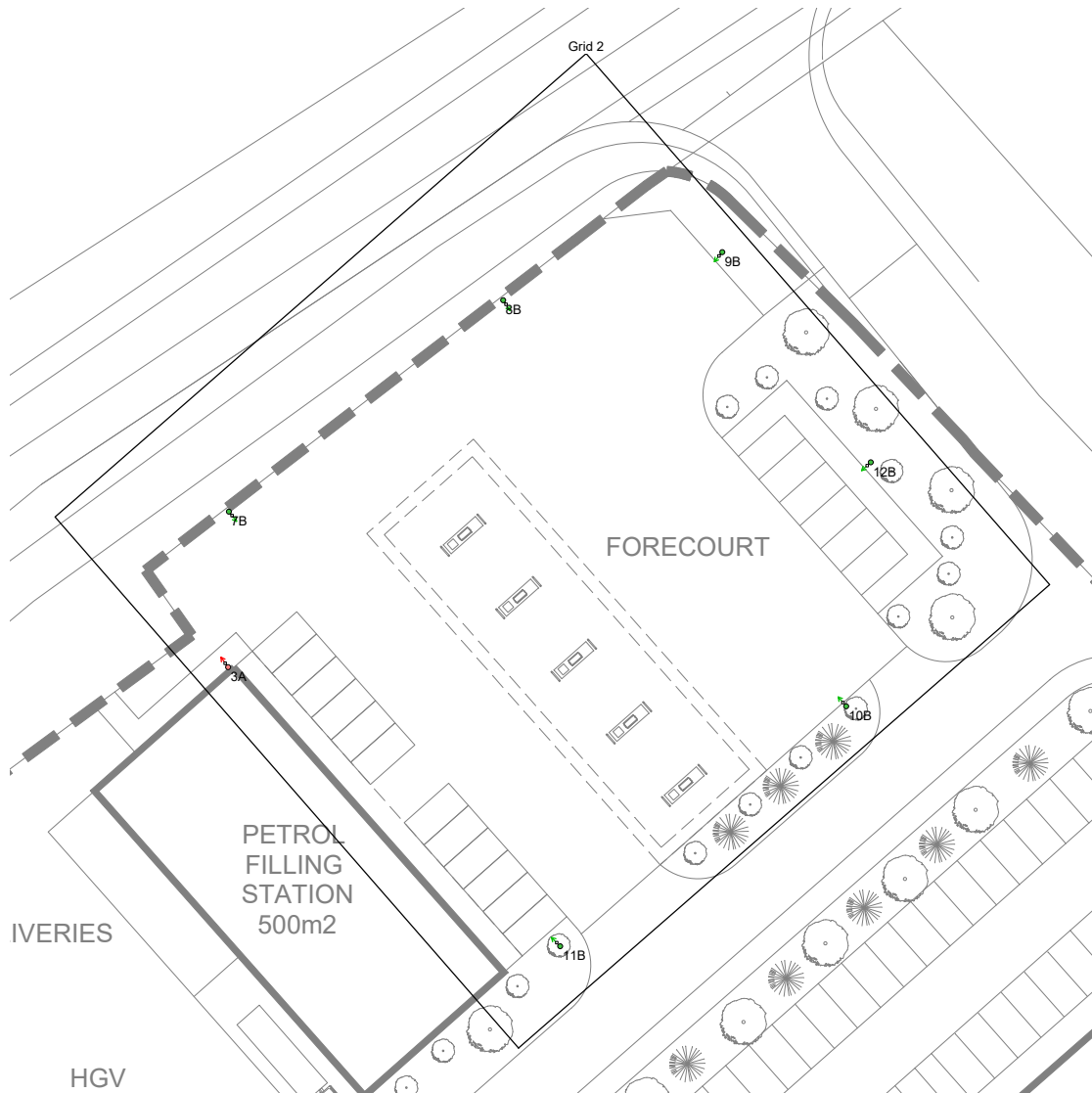


Results

Eav	23.14
Emin	9.97
Emax	32.91
Emin/Emax	0.30
Emin/Eav	0.43

Horizontal Illuminance (lux)

Grid 2

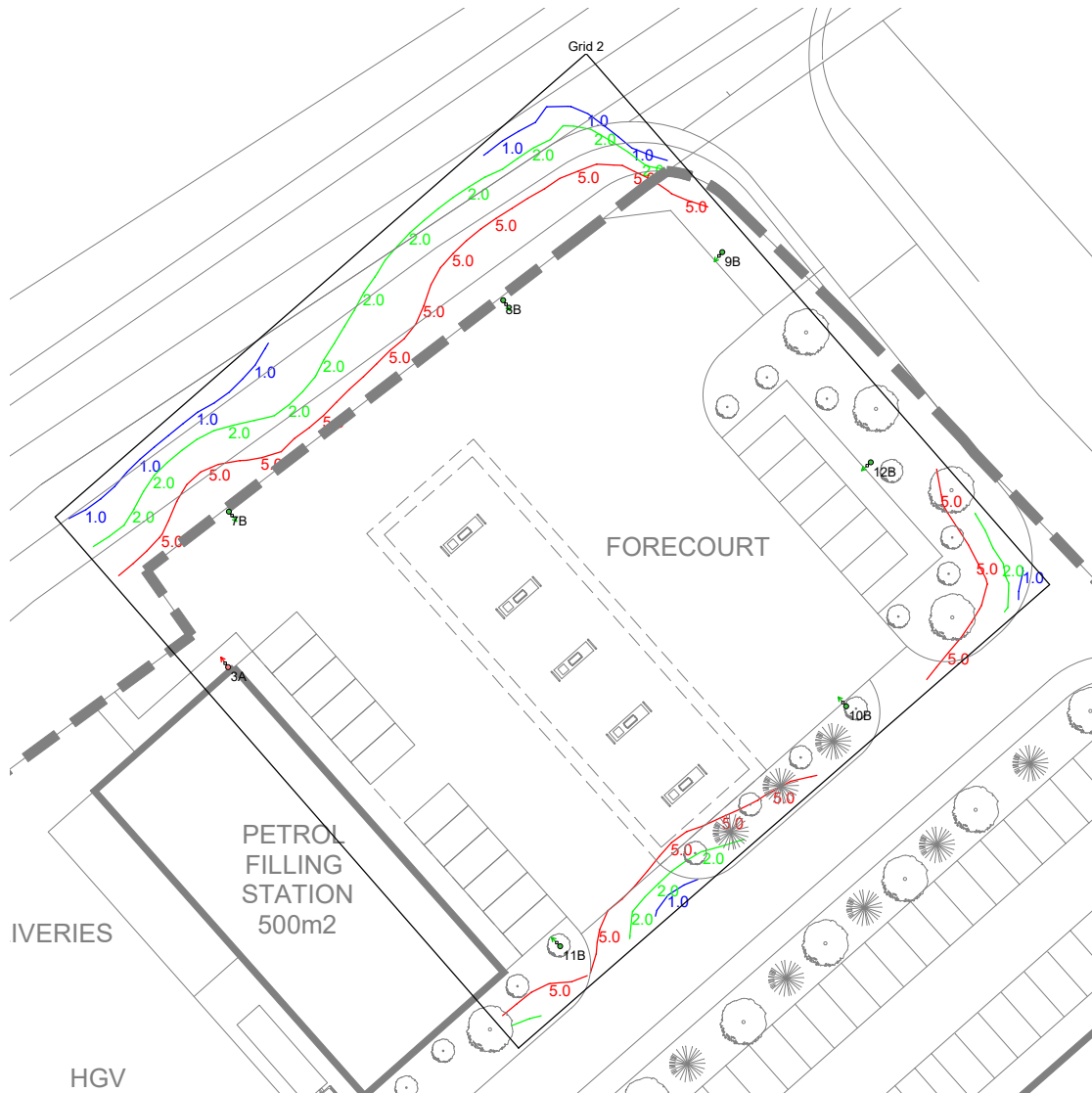


Results

Eav	22.14
Emin	8.88
Emax	35.27
Emin/Emax	0.25
Emin/Eav	0.40

Horizontal Illuminance (lux)

Grid 2

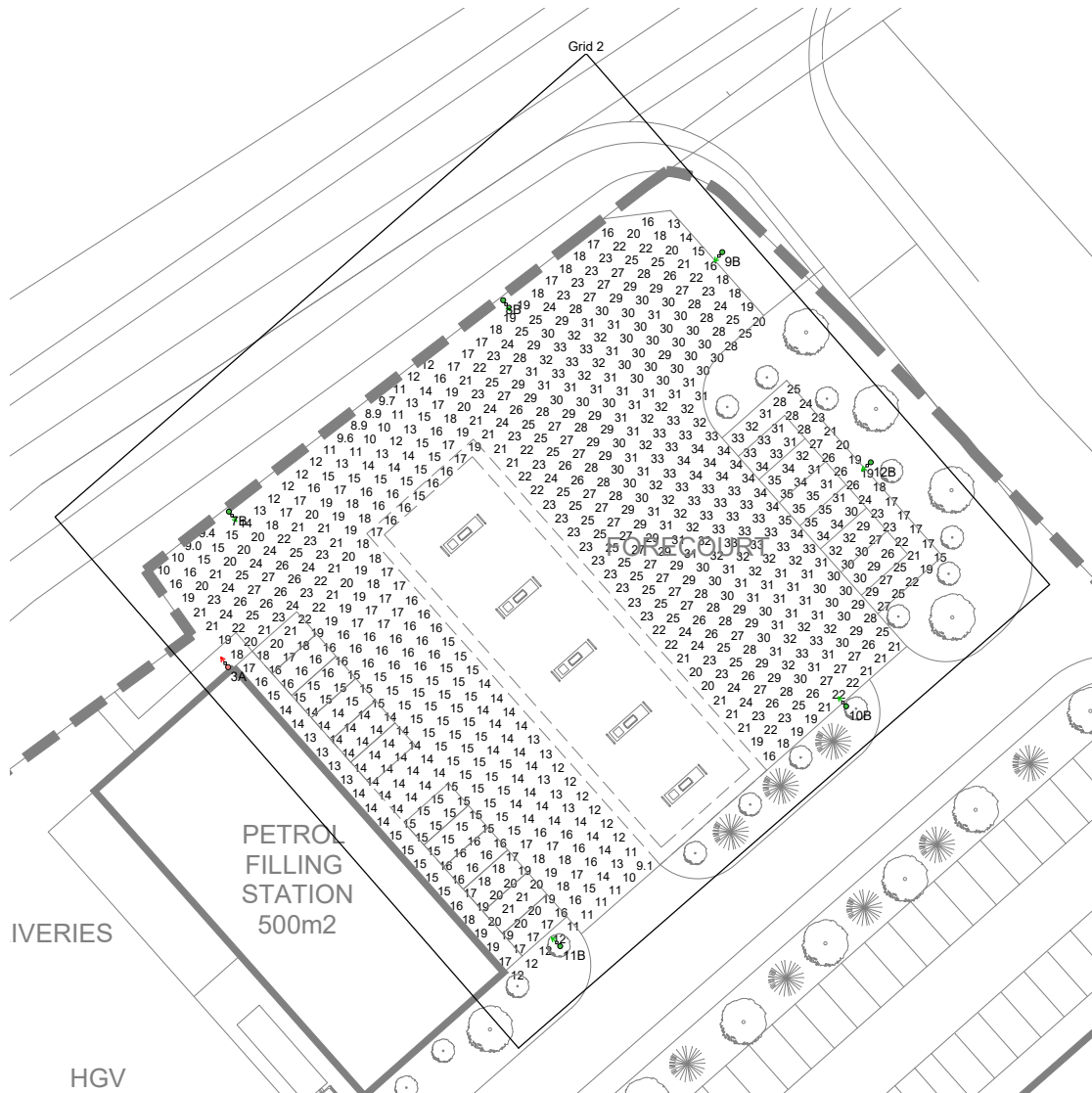


Results

Eav	22.14
Emin	8.88
E _{max}	35.27
Emin/E _{max}	0.25
Emin/Eav	0.40

Horizontal Illuminance (lux)

Grid 2



Results

Eav	22.14
Emin	8.88
Emax	35.27
Emin/Emax	0.25
Emin/Eav	0.40

DATE: 21 September 2021
DESIGNER: SHD Lighting Consultancy Ltd
PROJECT No: SHD326
PROJECT NAME: Proposed Commercial Development, Newtown



CAD layout reference: SA39200_SK

Hotel Car Park and Delivery Area lighting classification:
(BS 12464-2:2014, Table 5.9)

Minimum maintained average illuminance (Eav): >5.00 lux
Emin/Eav (Uniformity): >0.25 (25%)

All column positions and luminaire models may be subject to change.

Not to be used for construction issue.

Indicative lighting design only

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	957.88	-262.88	108.00	60.00	1.50	1.50
2	Grid 2	907.41	-279.53	57.00	57.00	1.50	1.50
3	Grid 3	890.30	-296.57	150.00	165.00	1.50	1.50

Luminaires

Luminaire A Data

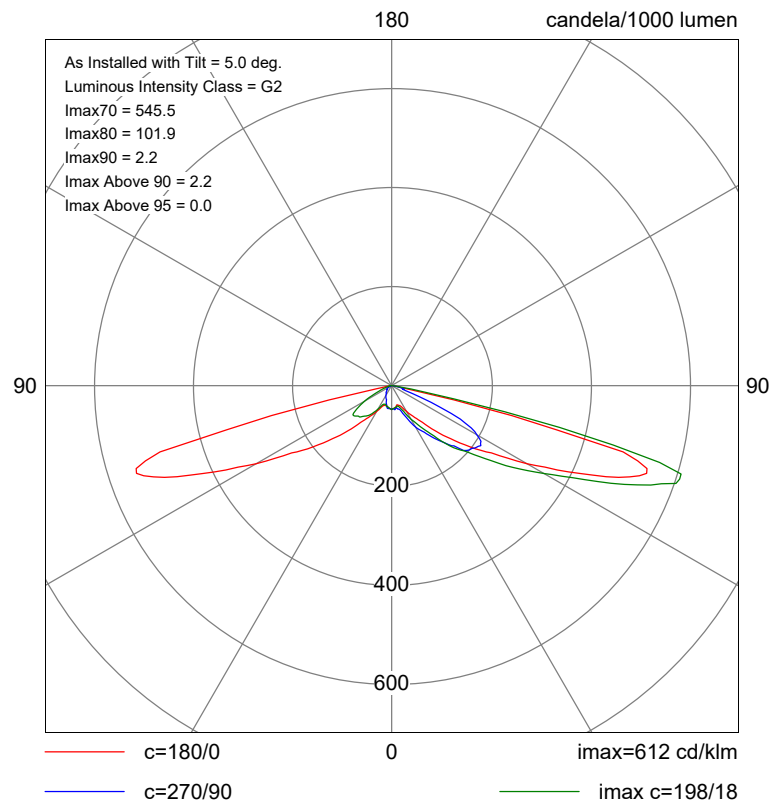
Supplier	SHD
Type	BGP702 DW50 BL1
Lamp(s)	LED-HB 5.2S 740
Lamp Flux (klm)	5.00
File Name	Luma Gen2 Micro_BGP702_DW50 BL1_50 00_20LED_5.2S_CLO_L90_740.ies
Maintenance Factor	0.80
Lum. Int. Class	G2
No. in Project	13

Layout

ID /Mast	Type	X	Y	Height	Angle	Tilt	Cant	Out- reach	Target X	Target Y	Target Z
1	A	961.58	-186.10	6.00	311.00	5.00	0.00	0.40			
3	A	1012.13	-179.36	6.00	128.00	5.00	0.00	0.40			
4	A	991.45	-159.56	6.00	311.00	5.00	0.00	0.40			
6	A	976.94	-203.41	6.00	220.00	5.00	0.00	0.40			
7	A	913.92	-229.26	6.00	22.00	5.00	0.00	0.40			
8	A	980.87	-230.95	6.00	148.00	5.00	0.00	0.40			
9	A	929.00	-214.61	6.00	312.00	5.00	0.00	0.40			
10	A	919.88	-260.48	6.00	15.00	5.00	0.00	0.40			
11	A	943.56	-263.84	6.00	96.00	5.00	0.00	0.40			
12	A	989.60	-182.89	6.00	131.00	5.00	0.00	0.40			
11/1	A	953.29	-215.76	6.00	310.00	5.00	0.00	0.70			
12/1	A	953.29	-215.76	6.00	130.00	5.00	0.00	0.70			
17	A	956.92	-235.05	6.00	131.00	5.00	0.00	0.40			

Polar Diagram

Luminaire A BGP702 DW50 BL1



Horizontal Illuminance (lux)

Grid 1



Results

Eav	6.14
Emin	1.57
Emax	11.08
Emin/Emax	0.14
Emin/Eav	0.26

Horizontal Illuminance (lux)

Grid 1



Results

Eav	6.14
Emin	1.57
Emax	11.08
Emin/Emax	0.14
Emin/Eav	0.26

Horizontal Illuminance (lux)

Grid 1



Results

Eav	6.14
Emin	1.57
Emax	11.08
Emin/Emax	0.14
Emin/Eav	0.26

Horizontal Illuminance (lux)

Grid 2

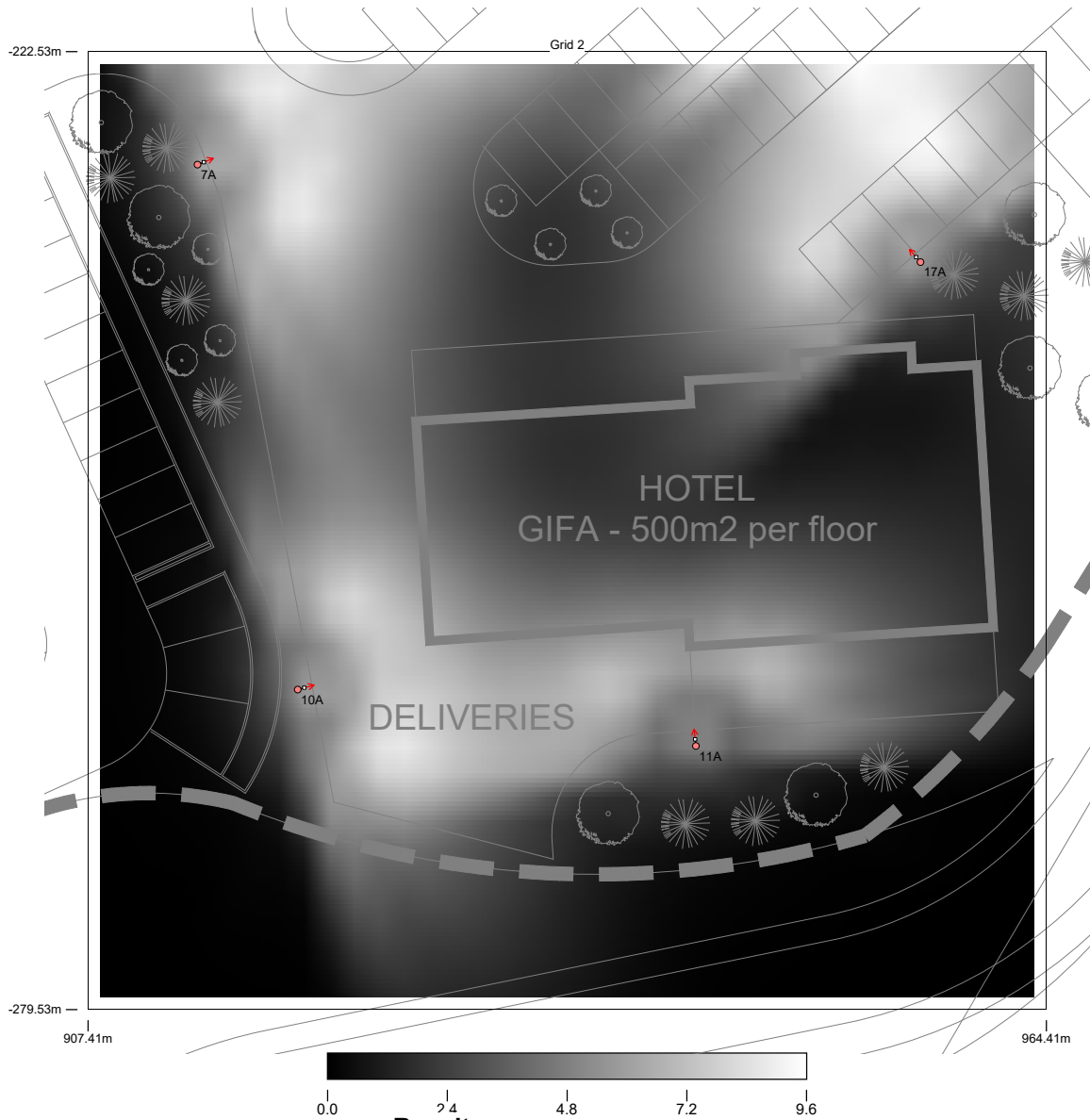


Results

Eav	5.28
Emin	1.79
Emax	8.95
Emin/Emax	0.20
Emin/Eav	0.34

Horizontal Illuminance (lux)

Grid 2

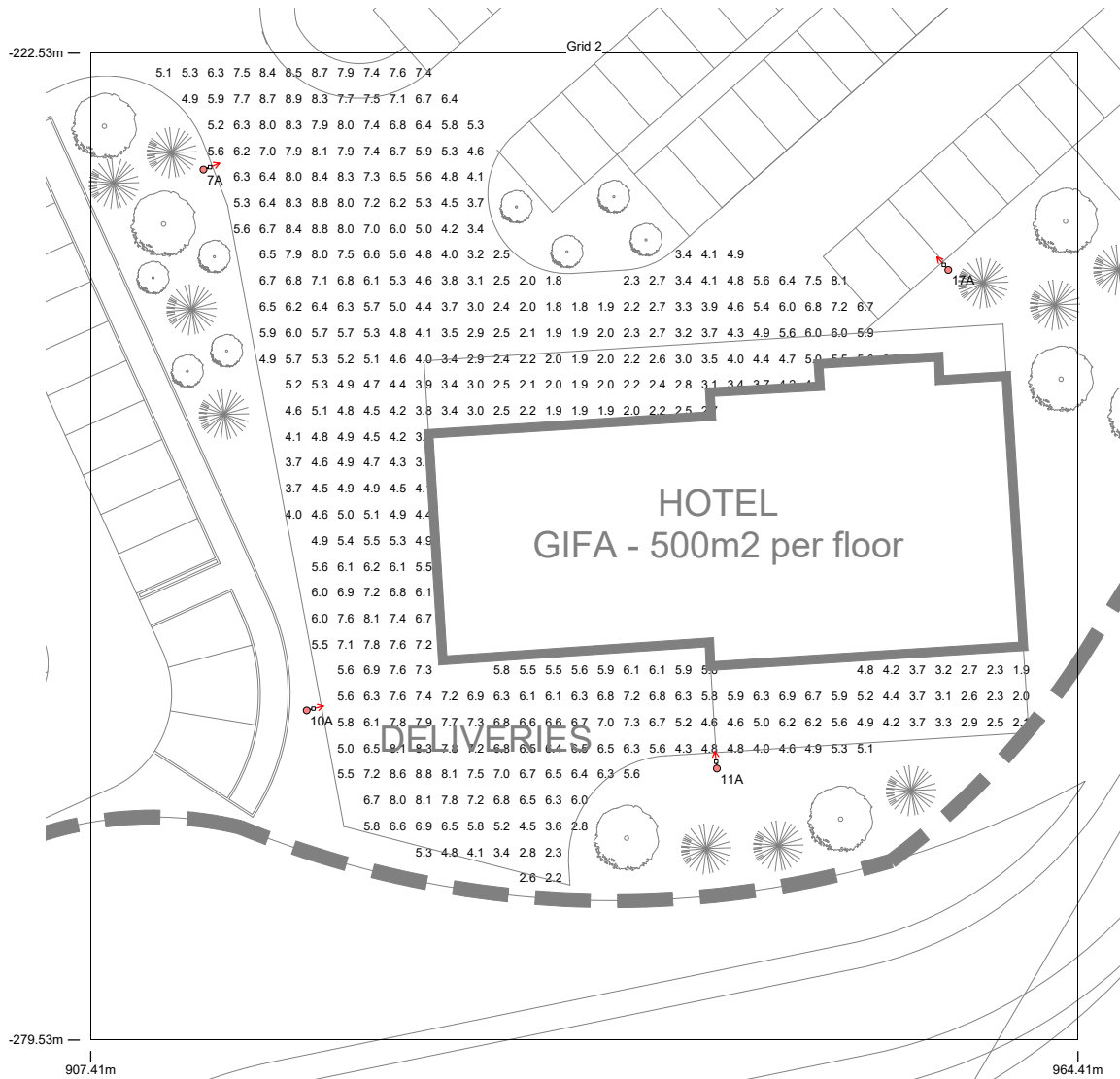


Results

Eav	5.28
Emin	1.79
Emax	8.95
Emin/Emax	0.20
Emin/Eav	0.34

Horizontal Illuminance (lux)

Grid 2



Results

Eav	5.28
Emin	1.79
Emax	8.95
Emin/Emax	0.20
Emin/Eav	0.34

DATE: 21 September 2021
DESIGNER: SHD Lighting Consultancy Ltd
PROJECT No: SHD326
PROJECT NAME: Proposed Commercial Development, Newtown



CAD layout reference: SA39200_SK

Car Park and Drive-thru lighting classification:
(BS 12464-2:2014, Table 5.9)

Minimum maintained average illuminance (Eav): >5.00 lux
Emin/Eav (Uniformity): >0.25 (25%)

All column positions and luminaire models may be subject to change.

Not to be used for construction issue.

Indicative lighting design only

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	870.43	-314.13	93.00	88.22	1.50	1.50

Luminaires

Luminaire A Data

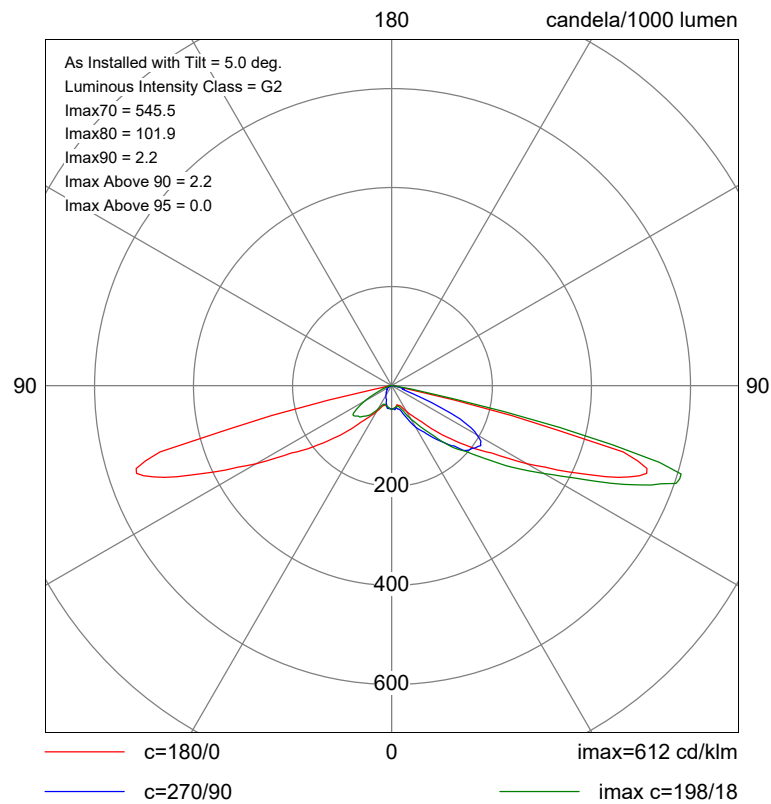
Supplier	SHD
Type	BGP702 DW50 BL1
Lamp(s)	LED-HB 5.2S 740
Lamp Flux (klm)	5.00
File Name	Luma Gen2 Micro_BGP702_DW50 BL1_50 00_20LED_5.2S_CLO_L90_740.ies
Maintenance Factor	0.80
Lum. Int. Class	G2
No. in Project	9

Layout

ID /Mast	Type	X	Y	Height	Angle	Tilt	Cant	Out- reach	Target X	Target Y	Target Z
1	A	902.92	-226.97	6.00	115.00	5.00	0.00	0.40			
2	A	873.83	-238.15	6.00	114.00	5.00	0.00	0.40			
3	A	854.70	-242.79	6.00	340.00	5.00	0.00	0.40			
4	A	878.74	-268.89	6.00	234.00	5.00	0.00	0.40			
5	A	916.64	-250.81	6.00	208.00	5.00	0.00	0.40			
6/3	A	889.71	-235.40	6.00	293.00	5.00	0.00	0.70			
7/3	A	889.71	-235.40	6.00	113.00	5.00	0.00	0.70			
8/4	A	900.10	-258.45	6.00	294.00	5.00	0.00	0.70			
9/4	A	900.10	-258.45	6.00	114.00	5.00	0.00	0.70			

Polar Diagram

Luminaire A BGP702 DW50 BL1



Horizontal Illuminance (lux)

Grid 1



Results

Eav	6.49
Emin	1.77
Emax	13.24
Emin/Emax	0.13
Emin/Eav	0.27

Horizontal Illuminance (lux)

Grid 1



Results

Eav	6.49
Emin	1.77
Emax	13.24
Emin/Emax	0.13
Emin/Eav	0.27

Horizontal Illuminance (lux)

Grid 1



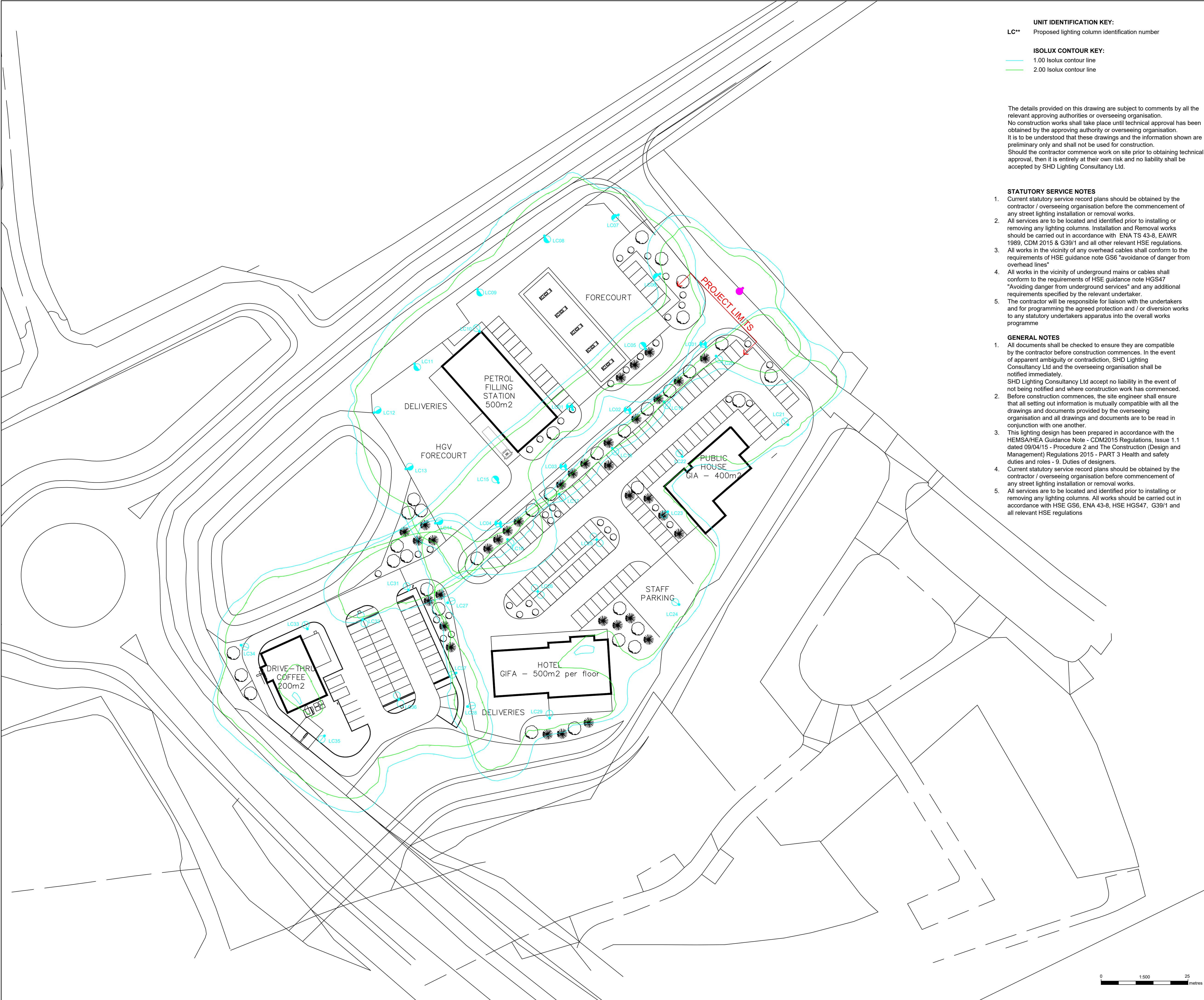
Results

Eav	6.49
Emin	1.77
Emax	13.24
Emin/Emax	0.13
Emin/Eav	0.27

8. APPENDIX C

8.1 Indicative Lighting Design Layout

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UNIT IDENTIFICATION KEY:
LC** Proposed lighting column identification number

ISOLUX CONTOUR KEY:
1.00 Isolux contour line
2.00 Isolux contour line

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.

- STATUTORY SERVICE NOTES**
- Current statutory service record plans should be obtained by the contractor / overseeing organisation before the commencement of any street lighting installation or removal works.
 - All services are to be located and identified prior to installing or removing any lighting columns. Installation and Removal works should be carried out in accordance with ENA TS 43-8, EAWR 1989, CDM 2015 & G39/1 and all other relevant HSE regulations.
 - All works in the vicinity of any overhead cables shall conform to the requirements of HSE guidance note GS6 "avoidance of danger from overhead lines".
 - All works in the vicinity of underground mains or cables shall conform to the requirements of HSE guidance note HGS47 "Avoiding danger from underground services" and any additional requirements specified by the relevant undertaker.
 - The contractor will be responsible for liaison with the undertakers and for programming the agreed protection and / or diversion works to any statutory undertakers apparatus into the overall works programme

- GENERAL NOTES**
- All documents shall be checked to ensure they are compatible by the contractor before construction commences. In the event of apparent ambiguity or contradiction, SHD Lighting Consultancy Ltd and the overseeing organisation shall be notified immediately.
SHD Lighting Consultancy Ltd accept no liability in the event of not being notified and where construction work has commenced.
 - Before construction commences, the site engineer shall ensure that all setting out information is mutually compatible with all the drawings and documents provided by the overseeing organisation and all drawings and documents are to be read in conjunction with one another.
 - This lighting design has been prepared in accordance with the HEMSA/HEA Guidance Note - CDM2015 Regulations, Issue 1.1 dated 09/04/15 - Procedure 2 and The Construction (Design and Management) Regulations 2015 - PART 3 Health and safety duties and roles - 9. Duties of designers.
 - Current statutory service record plans should be obtained by the contractor / overseeing organisation before commencement of any street lighting installation or removal works.
 - All services are to be located and identified prior to installing or removing any lighting columns. All works should be carried out in accordance with HSE GS6, ENA 43-8, HSE HGS47, G39/1 and all relevant HSE regulations

Qty 4	Lighting Column: Proposed galvanised tubular steel lighting column of 8.0 metre nominal height with a planted base with glass flake root protection. Column to be manufactured to EN 40 standards
	Luminaire: Philips Luma Gen2 Mini Mounting Type: Post top mounted Manufacturer Ref: BGP703 DW50 BL1 Lumen Output: 8.00 km Colour Temperature: Neutral White (4000k) Luminaire Tilt Inclination: 0° Luminous Intensity: G3 Control Type: Lucy Zodion ZCELL LED 20 lux (1:1 ratio) Supply: To be confirmed by others Internal Wiring: Internal wiring to luminaire shall be 1.5mm² PVC insulated flexible cable Door Orientation: Perpendicular to kerb edge
Qty 11	Lighting Column: Proposed galvanised tubular steel lighting column of 8.0 metre nominal height with a planted base with glass flake root protection. Column to be manufactured to EN 40 standards
	Luminaire: Philips Clearflood Small Mounting Type: Post top mounted on stirrup bracket Manufacturer Ref: BGP703 DW50 BL1 Lumen Output: 22.00 km Colour Temperature: Neutral White (4000k) Luminaire Tilt Inclination: 5° Luminous Intensity: G2 Control Type: Lucy Zodion ZCELL LED 20 lux (1:1 ratio) Supply: To be confirmed by others Internal Wiring: Internal wiring to luminaire shall be 1.5mm² PVC insulated flexible cable Door Orientation: Facing towards forecourt area
Qty 16	Lighting Column: Proposed galvanised tubular steel lighting column of 6.0 metre nominal height with a planted base with glass flake root protection. Column to be manufactured to EN 40 standards
	Luminaire: Philips Luma Gen2 Micro Mounting Type: Post top mounted Manufacturer Ref: BGP702 DW50 BL1 Lumen Output: 5.00 km Colour Temperature: Neutral White (4000k) Luminaire Tilt Inclination: 5° Luminous Intensity: G3 Control Type: Lucy Zodion ZCELL LED 20 lux (1:1 ratio) Supply: To be confirmed by others Internal Wiring: Internal wiring to luminaire shall be 1.5mm² PVC insulated flexible cable Door Orientation: Perpendicular to kerb edge
Qty 4	Lighting Column: Proposed galvanised tubular steel lighting column of 8.0 metre nominal height with a planted base with glass flake root protection. Column to be manufactured to EN 40 standards
	Luminaire: Philips Luma Gen2 Micro Mounting Type: Post top mounted twin bracket arm Manufacturer Ref: BGP702 DW50 BL1 Lumen Output: 5.00 km Colour Temperature: Neutral White (4000k) Luminaire Tilt Inclination: 0° Luminous Intensity: G3 Control Type: Lucy Zodion ZCELL LED 20 lux (1:1 ratio) Supply: To be confirmed by others Internal Wiring: Internal wiring to luminaire shall be 1.5mm² PVC insulated flexible cable Door Orientation: Perpendicular to kerb edge
Contributory lighting column only. Indicative position only. Make & Model of luminaire may be subject to change.	

RD	INITIAL DESIGN FOR REVIEW AND COMMENT	26/09/2021	SRH
REV	DESCRIPTION	DATE	BY

SHD
OUTDOOR LIGHTING CONSULTANCY

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

SCHEME:	PROPOSED COMMERCIAL DEVELOPMENT NEWTOWN, POWYS SY16 4HZ		
DRAWING:	INDICATIVE LIGHTING DRAWING		
CLIENT:	BERRYS		
DRAWING NUMBER:	SHD326-SHD-HLG-NEWT-DR-EO-Design Layout-RD	DRAWN:	SRH
	SHEET 1 OF 1	CHECKED:	SRH
CONTRACT NUMBER:	SHD326	APPROVED:	N.T.S
	DATE: 26/09/2021	SCALE @ A1	REVISION: R0

PRELIMINARY DESIGN - NOT FOR CONSTRUCTION

9. APPENDIX D

9.1 Abbreviations and Definitions

Colour Rendering Index

A scale from 0 to 100 percent indicating how accurate a given light source is at rendering colour when compared to a reference light source. The higher the number, the better a light source is at revealing the actual colours present at a surface or object.

Glare

The sensation produced by luminance's within the visual field that are sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort, or loss in visual performance and visibility.

Light trespass (nuisance)

Light that impacts on a surface outside of the area designed to be lit by a lighting installation. The correct legal term is nuisance.

Luminance

The physical measurement of the stimulus that produces the sensation of brightness measured by the luminous intensity reflected in a given direction. The unit is the candela per square metre (cd/m²). Luminance refers to the light given off from a source while illuminance refers to the amount of light hitting a surface.

Illuminance

Illuminance is the quantity of light, or luminous flux, falling on a unit area of a surface. It is sometimes designated by the symbol E. The unit is the lux (lx). Luminance refers to the light given off from a source while illuminance refers to the amount of light hitting a surface.

Maintained illuminance

The minimum light level over an area.

Maintenance factor

A correction applied to a lighting calculation to allow for the build-up of dirt on a luminaire and the depreciation of the lumen output of a lamp over time. 1=100% output, 0.9=90% etc.

LED

Lighting Emitting Diodes.

Colour temperature (K)

It is the value given to the colour of the light in degrees' kelvin. It can range from 1500K to 7000K, 1500k being warm/red to 7000K being cool/blue.

Luminaire

Combination of a light source, a housing, and electronics, with the purpose of providing light.

Sky glow

The brightening of the night sky caused by artificial lighting

10. APPENDIX E

10.1 Regulations and References

The National Planning Policy Framework (NPPF), 2021

Clean Neighbourhoods and Environment Act, 2005

The Environmental Protection Act, 1990

The Exterior Environment - Lighting Guide 6, 2016: Chartered Institution of Building Services Engineers (CIBSE)

Public Lighting Guide 04 Guidance on Undertaking Environmental Lighting Impact Assessments, 2013. Institution of Lighting Professionals (ILP)

CIE 126: Guidelines for Minimising Sky Glow, 1997

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

BS 5489-1, 2020 - Code of Practice for the Design of Road Lighting;

Well-lit Highways - Code of Practice for Highway Lighting Management - UK Lighting Board, 2004

The Exterior Environment - Lighting Guide 6, 2016: Chartered Institution of Building Services Engineers (CIBSE)

Well Maintained Roads – Code of Practice for Highway Maintenance Management – Roads Liaison Group, 2005;

Health and Safety at Work Act, 1974

BS 7671, Requirements for Electrical Installations

BS 4533, 1992, Luminaires - Section 102.3, Specification for Luminaires for Road and Street Lighting

BS EN 13201, Parts 2, 3 and 4, Road lighting

BS EN 60529, 1992, Specification for clarification of Degrees of Protection provided by Enclosures

Institution of Lighting Professionals: Competency Requirements for Lighting Design Staff, 2007

Guidance Notes for the Reduction of Obtrusive Light; GN01/21, 2021. Institution of Lighting Professionals (ILP)

Department of the Environment and Countryside commission document 'Lighting in the Countryside - Towards good practice'

ILP and CIBSE document 'Lighting the Environment - A guide to good urban lighting'