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# Abraham Moss Leisure Centre

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## External Lighting Calculation

Doc No: LP44107-BDP-XXX-XX-SH-E-60007

Issue: Stage 4a Tender Issue

Rev: T01

Date: April 2020



| Revision | Date       | Description | By | App |
|----------|------------|-------------|----|-----|
| T01      | April 2020 | Stage 3     | BS | AM  |

## Abraham Moss EXTERNAL

Installation :

Project number :

Customer : BDP

Processed by : Paul Williams

Date : 15.07.2019

The following values are based on exact calculations on calibrated lamps, luminaires and their arrangement. In practice, gradual divergences can occur.

Guarantee claims for luminaire data are excluded.

Relux and the luminaire manufacturers accept no liability for consequential damage and damage which is occasioned to the user or to third parties.

## 1 Luminaire data

### 1.1 Dextra Group PLC, DEXECO - OPUS 360 (OPU360 L150 OA)

#### 1.1.1 Data sheet

Manufacturer: Dextra Group PLC



#### OPU360 L150 OA lanterns with posts DEXECO - OPUS 360

Dexeco OPU360 L150 OA - IP65 360 degree column top mounted open area LED luminaire, 10472 luminaire lumens matt grey weather resistant paint finish. Diecast aluminium housing, 50-60mm spigot.

60-76mm spigot adaptors available if required.

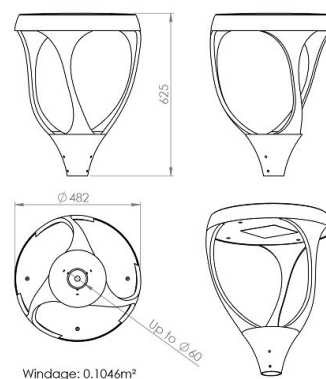
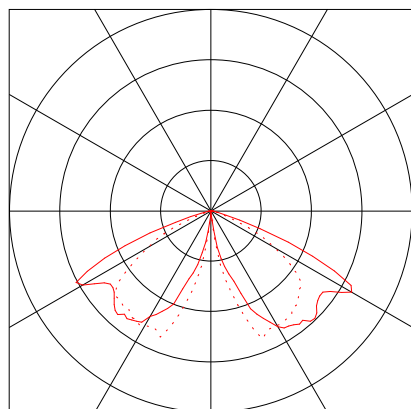
#### Luminaire data

Absolute Photometry  
Luminaire efficacy : 108.18 lm/W  
Classification : A30 ↓100.0% ↑0.0%  
CIE Flux Codes : 37 81 99 100 100  
UGR 4H 8H : 35.9 / 32.1  
Control gear : electronic ballast  
Power : 96.8 W  
Luminous flux : 10472 lm

#### Equipped with

Quantity : 1  
Designation : Dextra  
Colour : nw/4000K  
Colour reproduction : 2

Dimensions : Ø487 mm x 625 mm



## 1 Luminaire data

### 1.2 Dextra Group PLC, DEXTRA LIGHTING - OPUS... (OPU3L L102 C74 AS)

#### 1.2.1 Data sheet

Manufacturer: Dextra Group PLC



#### OPU3L L102 C74 AS projector DEXTRA LIGHTING - OPUS 3 LED FLOODLIGHT

OPU3L L102 C74 AS - Opus large sized LED floodlight. Asymmetric light distribution with 8031 luminaire lumens LED, high quality diecast construction, dark grey weather resistant finish, high grade aluminium reflector, IP65 ingress protection, toughened glass cover, adjustable saddle mounting bracket with angle set feature.

Options:

H - High Frequency Dimming (Analogue 1-10v)

A - Digital Addressable Lighting Interface (DALI)

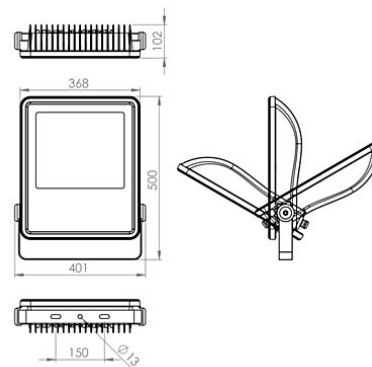
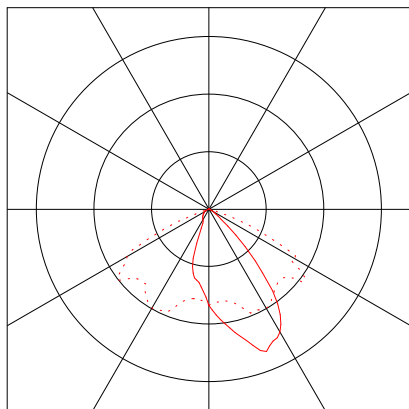
#### Luminaire data

|                      |                       |
|----------------------|-----------------------|
| Luminaire efficiency | : 100%                |
| Luminaire efficacy   | : 113.75 lm/W         |
| Classification       | : A50 ↓ 100.0% ↑ 0.0% |
| CIE Flux Codes       | : 54 88 100 100 100   |
| UGR 4H 8H            | : 26.7 / 31.3         |
| Control gear         | : electronic ballast  |
| Power                | : 70.6 W              |
| Luminous flux        | : 8031 lm             |

#### Equipped with

|                     |           |
|---------------------|-----------|
| Quantity            | : 1       |
| Designation         | : Dextra  |
| Power               | : 71 W    |
| Colour              | : 4000K   |
| Luminous flux       | : 8031 lm |
| Colour reproduction | : 2       |

Dimensions : 500 mm x 401 mm x 102 mm



## 1 Luminaire data

### 1.3 Dextra Group PLC, DEXTRA LIGHTING - AMENIT... (AMEX L16 ES C84)

#### 1.3.1 Data sheet

Manufacturer: Dextra Group PLC



#### **AMEX L16 ES C84 wall-mounted luminaire DEXTRA LIGHTING - AMENITY EXTERIOR LED**

AMEX L16 ES C84 - Amenity exterior 1600 lumen LED luminaire, surface mounted (wall or ceiling). IP65 rated, die cast aluminium body with eyelid, finished in silver powder coat paint, opal polycarbonate diffuser. Electronic LED driver, with optional 3 hour maintained integral emergency control gear.

Optional extras:

M3 - Emergency control gear (435 lumens)

ST3 - Self test

AT3 - DALI Autotest

S - Switch Dimming

D - Digital Dimming (DSI)

A - Digital Addressable Lighting Interface (DALI)

C - Bi-Level Dimming (Corridor Function). Will only dim the luminaire to 10% during absence and brightout, it will not turn the luminaire off.

R25E - R25 On/Off – High Frequency

R25C - R25 Bi-Level Dimming (manual switch off)

R25W - Reacta Wave Wireless On/Off or Bi-level dimming sensor

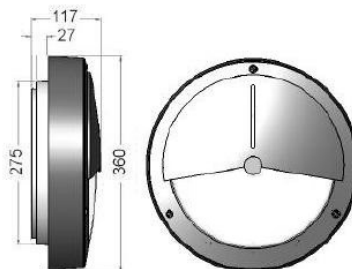
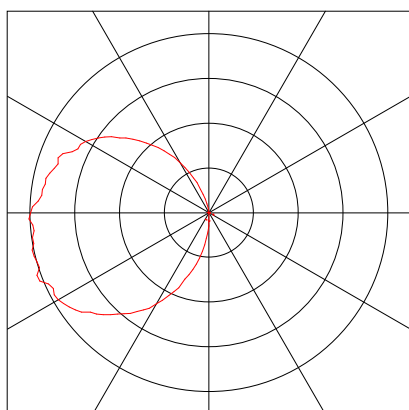
#### **Luminaire data**

|                      |                      |
|----------------------|----------------------|
| Luminaire efficiency | : 47.4%              |
| Luminaire efficacy   | : 61.16 lm/W         |
| Classification       | : C11 ↓56.7% ↑43.3%  |
| CIE Flux Codes       | : 16 41 71 57 48     |
| UGR 4H 8H            | : <10.0 / 17.1       |
| Control gear         | : electronic ballast |
| Power                | : 12.4 W             |
| Luminous flux        | : 758.4 lm           |

#### **Equipped with**

|                     |           |
|---------------------|-----------|
| Quantity            | : 1       |
| Designation         | : Dextra  |
| Power               | : 12 W    |
| Colour              | : 4000K   |
| Luminous flux       | : 1600 lm |
| Colour reproduction | : 1B      |

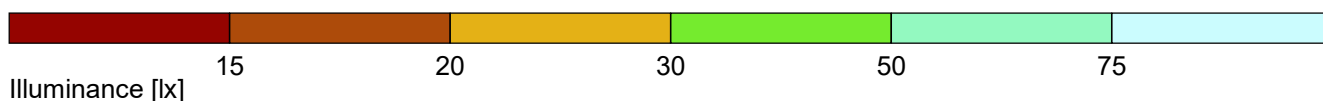
Dimensions : Ø360 mm x 106 mm



## 2 Exterior 1

### 2.1 Summary, Exterior 1

#### 2.1.1 Result overview, Disabled Car Park



#### General

Calculation algorithm used  
 Height of evaluation surface  
 Maintenance factor

Average indirect fraction  
 0.00 m  
 0.80

Total luminous flux of all lamps  
 Total power  
 Total power per area (7793.36 m<sup>2</sup>)

182445 lm  
 1615.4 W  
 0.21 W/m<sup>2</sup>

#### Illuminance

|                     |           |               |
|---------------------|-----------|---------------|
| Average illuminance | Eav       | 27.1 lx       |
| Minimum illuminance | Emin      | 9.1 lx        |
| Maximum illuminance | Emax      | 52.3 lx       |
| Uniformity Uo       | Emin/Em   | 1:3 (0.33)    |
| Diversity Ud        | Emin/Emax | 1:5.77 (0.17) |

#### Type No.\Make

- |   |    | <b>Dextra Group PLC</b> |                                           |
|---|----|-------------------------|-------------------------------------------|
| 1 | 7  | Order No.               | : OPU360 L150 OA                          |
|   |    | Luminaire name          | : DEXECO - OPUS 360                       |
|   |    | Equipment               | : 1 x Dextra 97 W / 10472 lm              |
| 2 | 11 | Order No.               | : OPU3L L102 C74 AS                       |
|   |    | Luminaire name          | : DEXTRA LIGHTING - OPUS 3 LED FLOODLIGHT |
|   |    | Equipment               | : 1 x Dextra 71 W / 8031 lm               |

Object : Abraham Moss EXTERNAL  
Installation :  
Project number :  
Date : 15.07.2019

## 2 Exterior 1

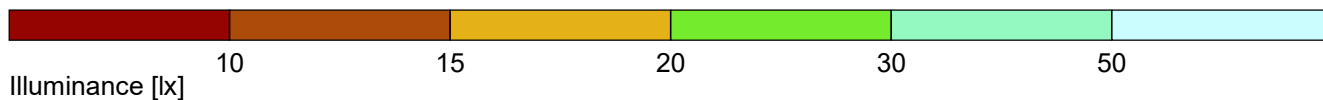
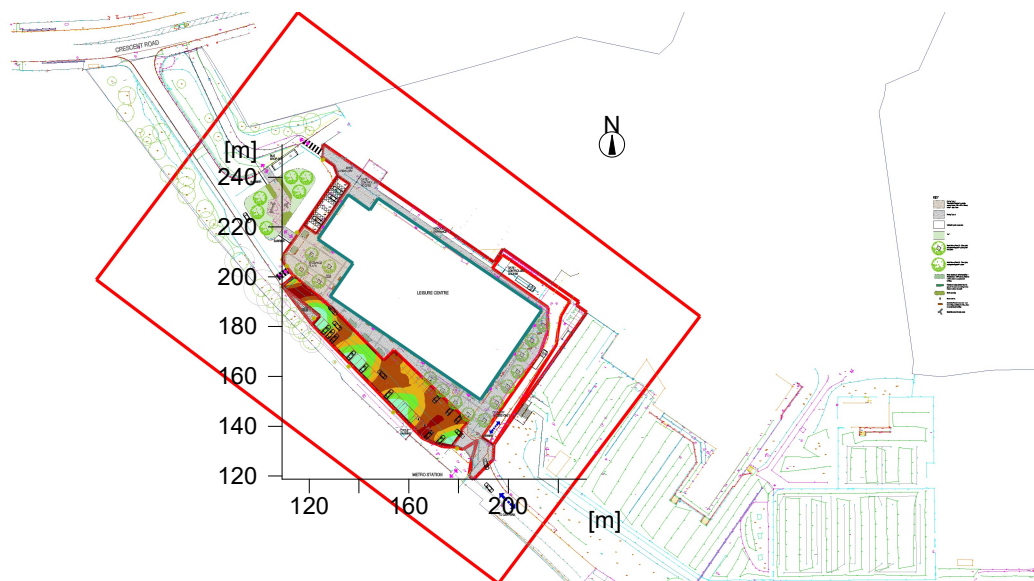
### 2.1 Summary, Exterior 1

#### 2.1.1 Result overview, Disabled Car Park

|   |                                                                                   |                |                                          |
|---|-----------------------------------------------------------------------------------|----------------|------------------------------------------|
| 3 | 13                                                                                | Order No.      | : AMEX L16 ES C84                        |
|   |  | Luminaire name | : DEXTRA LIGHTING - AMENITY EXTERIOR LED |
|   |                                                                                   | Equipment      | : 1 x Dextra 12 W / 1600 lm              |

## 2.1 Summary, Exterior 1

### 2.1.2 Result overview, Main Car Park



#### General

Calculation algorithm used  
 Height of evaluation surface  
 Maintenance factor

Average indirect fraction  
 0.00 m  
 0.80

Total luminous flux of all lamps  
 Total power  
 Total power per area (7793.36 m<sup>2</sup>)

182445 lm  
 1615.4 W  
 0.21 W/m<sup>2</sup>

#### Illuminance

|                     |           |               |
|---------------------|-----------|---------------|
| Average illuminance | Eav       | 17.9 lx       |
| Minimum illuminance | Emin      | 6.5 lx        |
| Maximum illuminance | Emax      | 47.8 lx       |
| Uniformity Uo       | Emin/Em   | 1:2.76 (0.36) |
| Diversity Ud        | Emin/Emax | 1:7.37 (0.14) |

#### Type No.\Make

- |   |    | <b>Dextra Group PLC</b> |                                           |
|---|----|-------------------------|-------------------------------------------|
| 1 | 7  | Order No.               | : OPU360 L150 OA                          |
|   |    | Luminaire name          | : DEXECO - OPUS 360                       |
|   |    | Equipment               | : 1 x Dextra 97 W / 10472 lm              |
| 2 | 11 | Order No.               | : OPU3L L102 C74 AS                       |
|   |    | Luminaire name          | : DEXTRA LIGHTING - OPUS 3 LED FLOODLIGHT |
|   |    | Equipment               | : 1 x Dextra 71 W / 8031 lm               |

Object : Abraham Moss EXTERNAL  
Installation :  
Project number :  
Date : 15.07.2019

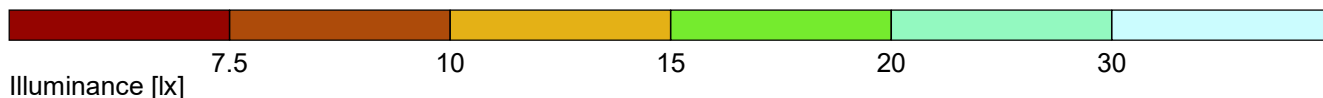
## 2.1 Summary, Exterior 1

### 2.1.2 Result overview, Main Car Park

|   |                                                                                   |                |                                          |
|---|-----------------------------------------------------------------------------------|----------------|------------------------------------------|
| 3 | 13                                                                                | Order No.      | : AMEX L16 ES C84                        |
|   |  | Luminaire name | : DEXTRA LIGHTING - AMENITY EXTERIOR LED |
|   |                                                                                   | Equipment      | : 1 x Dextra 12 W / 1600 lm              |

## 2.1 Summary, Exterior 1

### 2.1.3 Result overview, Delivery Access Route



#### General

Calculation algorithm used  
 Height of evaluation surface  
 Maintenance factor

Average indirect fraction  
 0.00 m  
 0.80

Total luminous flux of all lamps  
 Total power  
 Total power per area (7793.36 m<sup>2</sup>)

182445 lm  
 1615.4 W  
 0.21 W/m<sup>2</sup>

#### Illuminance

|                     |           |               |
|---------------------|-----------|---------------|
| Average illuminance | Eav       | 15.6 lx       |
| Minimum illuminance | Emin      | 7.7 lx        |
| Maximum illuminance | Emax      | 23.5 lx       |
| Uniformity Uo       | Emin/Em   | 1:2.04 (0.49) |
| Diversity Ud        | Emin/Emax | 1:3.07 (0.33) |

#### Type No. \ Make

- |   |    | <b>Dextra Group PLC</b> |                                           |
|---|----|-------------------------|-------------------------------------------|
| 1 | 7  | Order No.               | : OPU360 L150 OA                          |
|   |    | Luminaire name          | : DEXECO - OPUS 360                       |
|   |    | Equipment               | : 1 x Dextra 97 W / 10472 lm              |
| 2 | 11 | Order No.               | : OPU3L L102 C74 AS                       |
|   |    | Luminaire name          | : DEXTRA LIGHTING - OPUS 3 LED FLOODLIGHT |
|   |    | Equipment               | : 1 x Dextra 71 W / 8031 lm               |

Object : Abraham Moss EXTERNAL  
Installation :  
Project number :  
Date : 15.07.2019

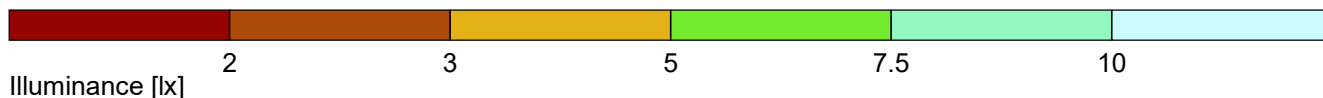
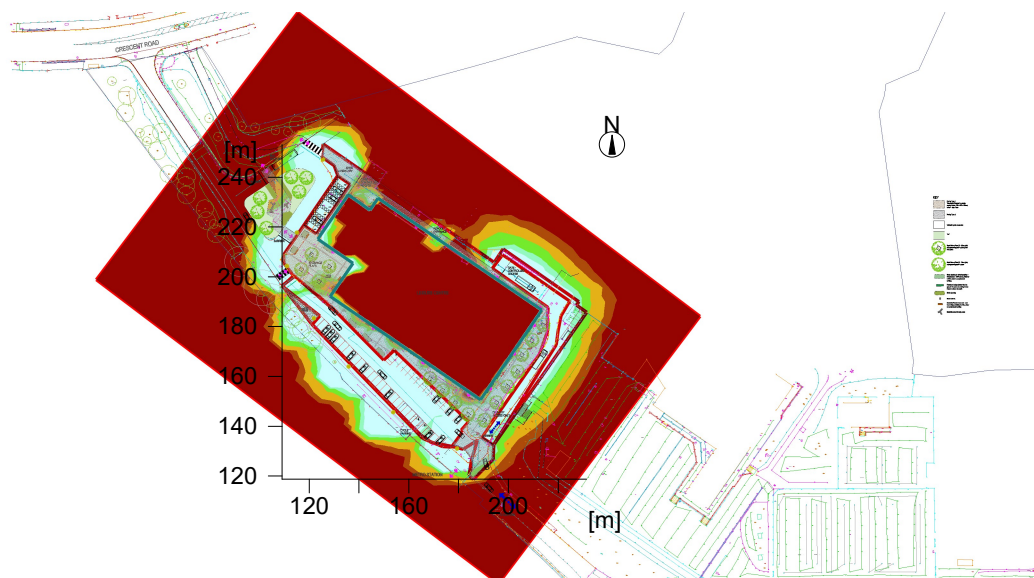
## 2.1 Summary, Exterior 1

### 2.1.3 Result overview, Delivery Access Route

|   |                                                                                   |                |                                          |
|---|-----------------------------------------------------------------------------------|----------------|------------------------------------------|
| 3 | 13                                                                                | Order No.      | : AMEX L16 ES C84                        |
|   |  | Luminaire name | : DEXTRA LIGHTING - AMENITY EXTERIOR LED |
|   |                                                                                   | Equipment      | : 1 x Dextra 12 W / 1600 lm              |

## 2.1 Summary, Exterior 1

### 2.1.4 Result overview, Overall Light Spill



#### General

Calculation algorithm used  
 Height of evaluation surface  
 Maintenance factor

Average indirect fraction  
 -0.00 m  
 0.80

Total luminous flux of all lamps  
 Total power  
 Total power per area (7793.36 m<sup>2</sup>)

182445 lm  
 1615.4 W  
 0.21 W/m<sup>2</sup>

#### Illuminance

|                     |           |             |
|---------------------|-----------|-------------|
| Average illuminance | Eav       | 4.4 lx      |
| Minimum illuminance | Emin      | 0 lx        |
| Maximum illuminance | Emax      | 47.9 lx     |
| Uniformity Uo       | Emin/Em   | 1:--- (---) |
| Diversity Ud        | Emin/Emax | 1:--- (---) |

#### Type No.\Make

- |   |    | <b>Dextra Group PLC</b> |                                           |
|---|----|-------------------------|-------------------------------------------|
| 1 | 7  | Order No.               | : OPU360 L150 OA                          |
|   |    | Luminaire name          | : DEXECO - OPUS 360                       |
|   |    | Equipment               | : 1 x Dextra 97 W / 10472 lm              |
| 2 | 11 | Order No.               | : OPU3L L102 C74 AS                       |
|   |    | Luminaire name          | : DEXTRA LIGHTING - OPUS 3 LED FLOODLIGHT |
|   |    | Equipment               | : 1 x Dextra 71 W / 8031 lm               |

Object : Abraham Moss EXTERNAL  
Installation :  
Project number :  
Date : 15.07.2019

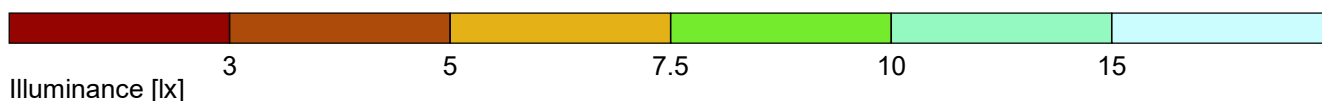
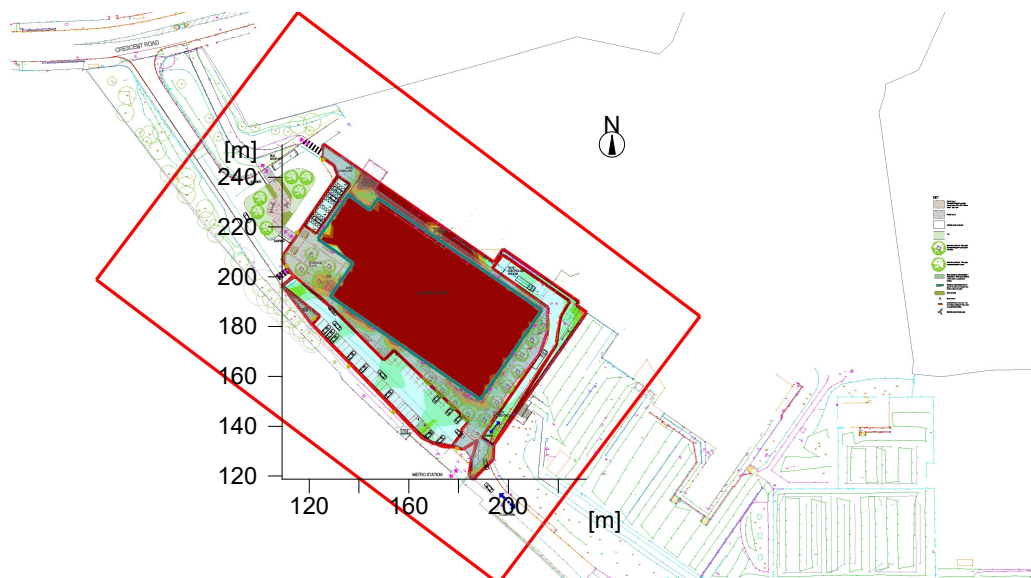
## 2.1 Summary, Exterior 1

### 2.1.4 Result overview, Overall Light Spill

|   |                                                                                   |                |                                          |
|---|-----------------------------------------------------------------------------------|----------------|------------------------------------------|
| 3 | 13                                                                                | Order No.      | : AMEX L16 ES C84                        |
|   |  | Luminaire name | : DEXTRA LIGHTING - AMENITY EXTERIOR LED |
|   |                                                                                   | Equipment      | : 1 x Dextra 12 W / 1600 lm              |

## 2.1 Summary, Exterior 1

### 2.1.5 Result overview, Evaluation area 1



#### General

Calculation algorithm used  
 Maintenance factor

Average indirect fraction  
 0.80

Total luminous flux of all lamps

130085 lm

Total power

1131.4 W

Total power per area (7793.36 m<sup>2</sup>)

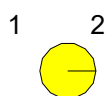
0.15 W/m<sup>2</sup> (1.75 W/m<sup>2</sup>/100lx)

#### Evaluation area 1

#### Reference plane 1.1

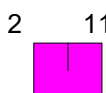
Horizontal  
 Em 8.28 lx  
 Emin 0 lx  
 Emin/Eav (Uo) ---  
 Emin/Emax (Ud) ---  
 Position 0.00 m

#### Type No.\Make



#### Dextra Group PLC

Order No. : OPU360 L150 OA  
 Luminaire name : DEXECO - OPUS 360  
 Equipment : 1 x Dextra 97 W / 10472 lm



Order No. : OPU3L L102 C74 AS  
 Luminaire name : DEXTRA LIGHTING - OPUS 3 LED FLOODLIGHT  
 Equipment : 1 x Dextra 71 W / 8031 lm

Object : Abraham Moss EXTERNAL  
Installation :  
Project number :  
Date : 15.07.2019

## 2.1 Summary, Exterior 1

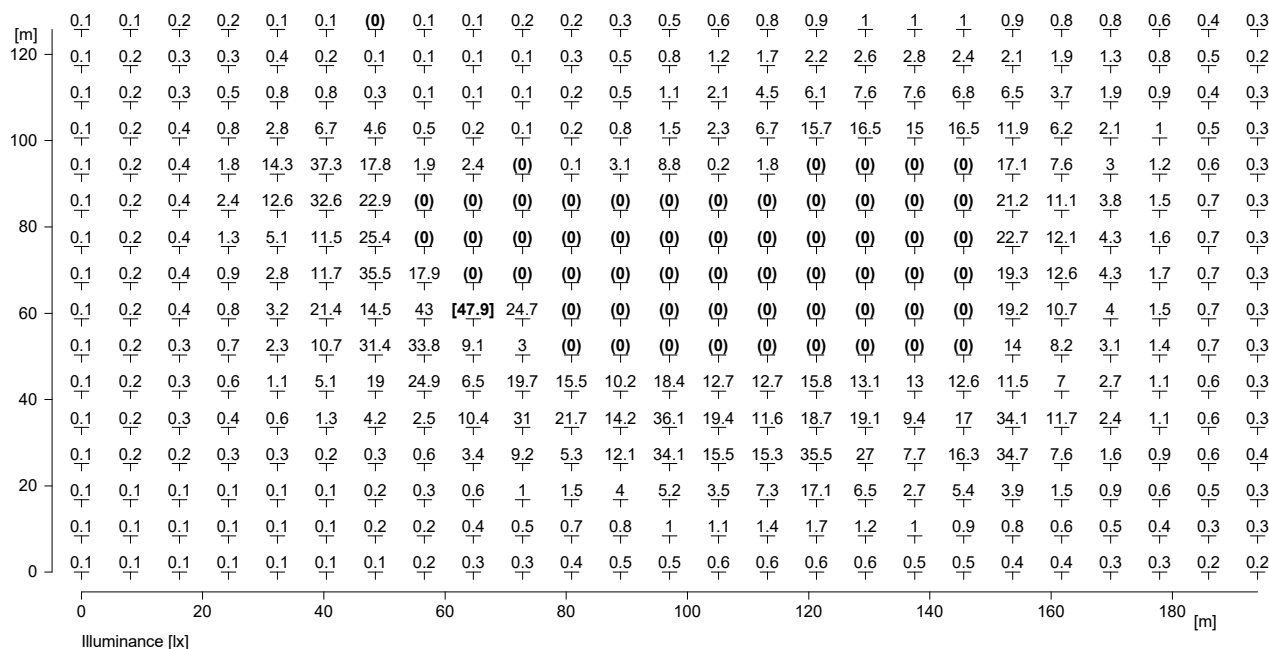
### 2.1.5 Result overview, Evaluation area 1

|   |                                                                                   |                |                                          |
|---|-----------------------------------------------------------------------------------|----------------|------------------------------------------|
| 3 | 13                                                                                | Order No.      | : AMEX L16 ES C84                        |
|   |  | Luminaire name | : DEXTRA LIGHTING - AMENITY EXTERIOR LED |
|   |                                                                                   | Equipment      | : 1 x Dextra 12 W / 1600 lm              |

## 2 Exterior 1

### 2.2 Calculation results, Exterior 1

#### 2.2.1 Table, Overall Light Spill (E)



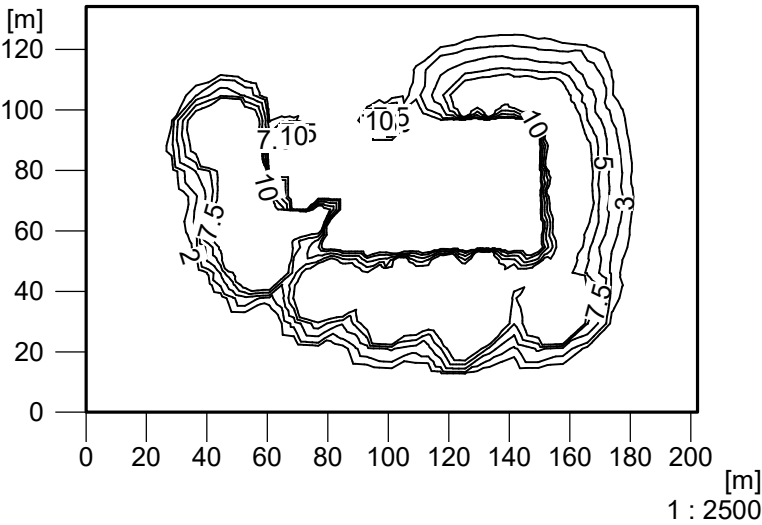
Height of the reference plane

Average illuminance  
Minimum illuminance  
Maximum illuminance  
Uniformity U<sub>o</sub>  
Diversity U<sub>d</sub>

: 0.00 m  
: 4.4 lx  
: 0 lx  
: 47.9 lx  
: ---  
: ---

2.2 Calculation results, Exterior 1

2.2.2 Isolines representation, Overall Light Spill (E)



Illuminance [lx]

|                               |           |           |
|-------------------------------|-----------|-----------|
| Height of the reference plane |           | : 0.00 m  |
| Average illuminance           | Eav       | : 4.4 lx  |
| Minimum illuminance           | Emin      | : 0 lx    |
| Maximum illuminance           | Emax      | : 47.9 lx |
| Uniformity Uo                 | Emin/Eav  | : ---     |
| Diversity Ud                  | Emin/Emax | : ---     |