



## External Lighting Strategy & Planning Statement

### For Building R120



**RAL-ONE-R120-XX-RP-E-0001 (P02)**

## Approval Record

### Revisions

| Ref   | Description           | By        | Date     |
|-------|-----------------------|-----------|----------|
| (P01) | Initial Issue         | M.Spencer | 09/10/20 |
| (P02) | Minor text amendments | M.Spencer | 14/10.20 |

### Quality Control

|              |                |                    |            |
|--------------|----------------|--------------------|------------|
| Prepared By: | A.Tune         | Tech. Eng          | 13/10/2020 |
| Checked By:  | Marcus Spencer | Technical Director | 14/10/2020 |
| Approved By: | Marcus Spencer | Technical Director | 14/10/2020 |

## 1. Contents

|  |   |
|--|---|
| 1. Contents .....  | 2 |
| 2. Introduction.....   | 3 |
| 3. The Development .....   | 3 |
| 4. Design Standards & Criteria .....   | 3 |
| 5. Lighting Strategy.....  | 4 |
| 6. Design Summary .....  | 6 |
| Appendix A -Supporting Documentation .....   | 6 |
| Figure 1 - Images from ILE Guidance Notes for the Reduction of Obtrusive Light .....               | 4 |
| Figure 2 - A Typical Building Mounted Fitting.....   | 4 |
| Figure 3 - A Typical Column Mounted Fitting .....  | 5 |
| Figure 4 - A Typical Bollard Light fitting.....  | 5 |
| Figure 5 - Sun rise – Sun set Cycle .....  | 6 |
| Table 1 - Proposed External Lighting Criteria .....  | 3 |
| Table 2 - Scale of External Lighting Levels .....  | 3 |
| Table 3 - Environmental Zones.....   | 3 |
| Table 4 - Obtrusive Light Limitations for Exterior Lighting Installations – General Observers..... | 4 |

This document has been prepared by ONE Creative Environments Limited for the sole use of our client (the "Client") and in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between ONE Creative Environments Limited and the Client. Any information provided by third parties and referred to herein has not been checked or verified by ONE Creative Environments Limited, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of ONE Creative Environments Limited.

## 2. Introduction

The aim of this document is to present and inform the Planning Department of the local authority in support of the main planning application for the proposed development.

This document provides a brief overview of the proposed external lighting arrangement currently being considered by the design team and maybe subject to change following further design development.

## 3. The Development

The development is known as Building R120 workshop building, located west of I13 and east of the visitor's center.

Consisting of the erection of R120 workshop with associated access, service yard and EV charging points.

## 4. Design Standards & Criteria

### Design Standards

The following design standards will be utilised during the course of the detailed design and construction:

- BS 5489-1:2013 – Code Practice for the design of road lighting
- CIBSE Lighting Guide 6 (LG6) 'The Outdoor Environment'
- ILE guidance notes for The Reduction of Obtrusive Lighting
- Building Regulations Part L
- Recommendations of Ecology Report

### Design Criteria

The following site specific design criteria as been established for the project, through reference to the above design standards and discussion and agreement with the client/end-user.

| Area                          | Proposed Lighting Levels (lux) | Uniformity | Minimum Colour Rendering (Ra) | Notes   |
|-------------------------------|--------------------------------|------------|-------------------------------|---|
| Car Park Spaces               | 10                             | 0.25       | 60                            | Via column mounted fittings                             |
| Car Park Roadways             | 15                             | 0.25       | 60                            | Via column mounted fittings                             |
| Service Yard                  | 15                             | 0.25       | 60                            | Via column mounted fittings & Building mounted fittings |
| Pathways & Building Perimeter | 15                             | 0.25       | 50                            | Via ground mounted bollards & Building mounted fittings |

Table 1 - Proposed External Lighting Criteria

| Condition         | Light Level in Lux |
|-------------------|--------------------|
| Sunlight          | 107,527            |
| Daylight          | 10,752.7           |
| Cloudy (daylight) | 1,075.3            |
| Dark Day          | 107.53             |
| Twilight          | 10.75              |
| Deep Twilight     | 1.08               |
| Full Moon         | 0.108              |
| Quarter Moon      | 0.0108             |

Table 2 - Scale of External Lighting Levels

### Light Pollution

For this project external lighting will be designed to minimise light pollution with sustainable integrity and philosophies as outlined in BREEAM credit POL4.

POL 4 Credit – “To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties”.

The design will be based on The Institute of Lighting Engineers (ILE) - Guidance Notes for the Reduction of Light Pollution.

The environmental zone for the development has been defined as E3 - “Suburban”

| Environmental Zone | Surrounding | Lighting Environment       | Examples  |
|--------------------|-------------|----------------------------|---|
| E0                 | Protected   | Dark                       | UNESCO Starlight Reserves, IDA Dark Sky Parks             |
| E1                 | Natural     | Intrinsically dark         | National Parks, Areas of Outstanding Natural Beauty etc   |
| E2                 | Rural       | Low district brightness    | Village or relatively dark outer suburban locations       |
| E3                 | Suburban    | Medium district brightness | Small town centres or suburban locations                  |
| E4                 | Urban       | High district brightness   | Town/city centres with high levels of night-time activity |

Table 3 - Environmental Zones

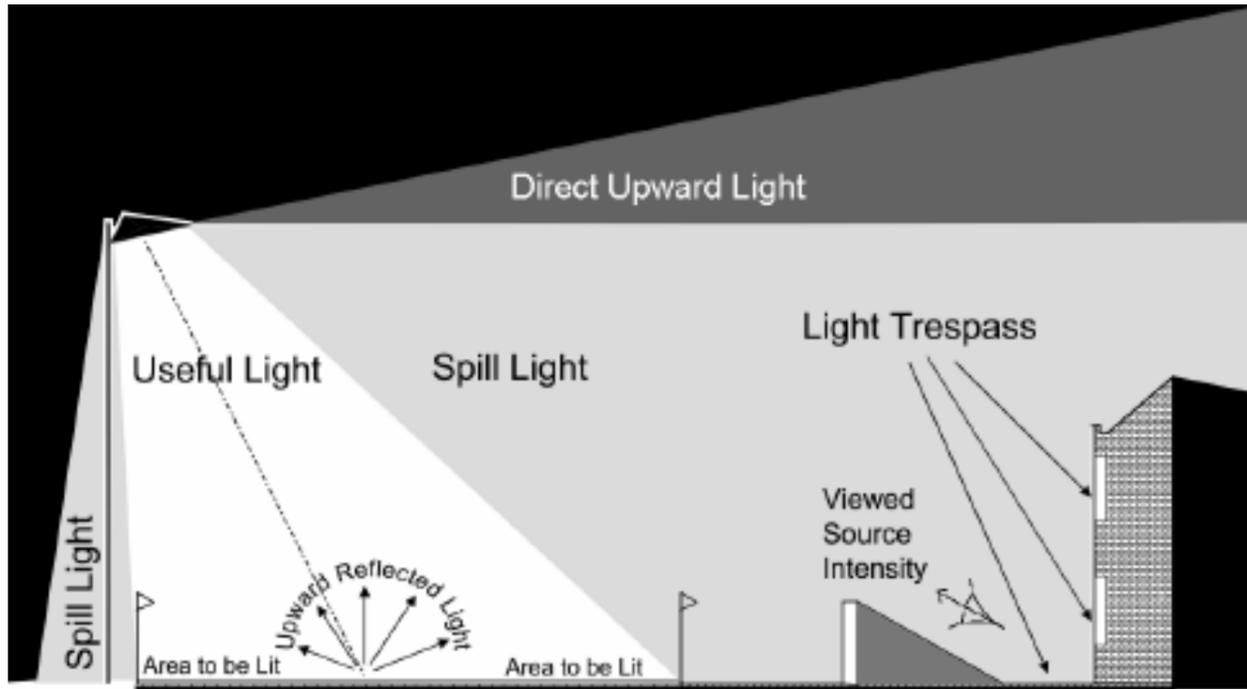


Figure 1 - Images from ILE Guidance Notes for the Reduction of Obtrusive Light

Any floodlight shall be designed and aligned to ensure that the upper limit of the main beam does not exceed 70 degrees from its downward vertical.

On the basis of the Environmental Zone 2, the below limits are defined in terms of obtrusive light.

| Environmental Zone | Sky Glow ULR [Max%] (1) | Light Intrusion (into Windows) $E_v$ [lux] |              | Luminaire Intensity $I$ [candelas] |              | Building Luminance Pre-curfew |
|--------------------|-------------------------|--|--------------|------------------------------------|--------------|-------------------------------|
|                    |                         | Pre- curfew                                | Post- curfew | Pre- curfew                        | Post- curfew | Average, $L$ [ $cd/m^2$ ]     |
| E0                 | 0                       | 0  | 0            | 0                                  | 0            | 0                             |
| E1                 | 0                       | 2  | 0 (1*)       | 2,500                              | 0            | 0                             |
| E2                 | 2.5                     | 5  | 1            | 7,500                              | 500          | 5                             |
| E3                 | 5                       | 10   | 2            | 10,000                             | 1,000        | 10                            |
| E4                 | 15                      | 25   | 5            | 25,000                             | 2,500        | 25                            |

Table 4 - Obtrusive Light Limitations for Exterior Lighting Installations – General Observers

## 5. Lighting Strategy

### Outline

The extent of the external lighting that is proposed is detailed below. The final quality and positions will be determined at the next stage of design (RIBA/BSRIA Stage 3 - Developed Design) following the granting of Planning Approval.

External lighting will be designed for maximum efficiency, using luminaires that will accentuate the building finishes and external landscaping as well as providing a safe and suitable working environment.

Lighting will be provided to the following principle areas:

- Main building
- Service yard and car parking areas

### Lighting Proposals

#### Main Building

The external areas of the main building will be provided with perimeter safety and security lighting. This will consist of wall mounted luminaires with integral emergency backup.

These fittings will be mounted at approx. 2.4 meters AFFL.

Typical fittings would IP65 rated, LED 4000k luminaire completed with opal polycarbonate optic and cast aluminium powder coated body.



Figure 2 - A Typical Building Mounted Fitting

### Service yard and car parking areas

The service yard and external car parking areas will be lit using a mix of column mounted LED luminaires along the roads and supplemented with bollard lighting on footpaths.

Column mounted fittings will be mounted on galvanized lighting columns root mounted in the ground, typically of 6 meters in height. LED fittings shall be 4000k colour.



Figure 3 - A Typical Column Mounted Fitting



Figure 4 - A Typical Bollard Light fitting

### Signage lighting

No external illuminated signage lighting is proposed at this time. Should there be a requirement at later stages of the design, this detail will be provided under a separate planning application.

### **Energy Efficiency**

Long life LED technology will be used throughout the external lighting scheme for reduced on-going maintenance and energy conservation

Further energy reduction maybe possible through the use of night-time reduction of light output via dimming, this will be considered in full at the next stage of design.

Luminance efficacy and colour rendering criteria will integrate similar sustainable philosophies to that outlined in BREEAM ENE3 credit.

ENE 3 Credit – “To recognise and encourage the specification of energy-efficient light fittings for external areas of the development”.

### **Security**

Due consideration will be made to integrating the external lighting scheme into the general security functions of the building. Particular attention will be given to eliminating undue glare that may have an adverse effect on any closed circuit television systems (CCTV).

### **Lighting Controls**

The lighting control system is an important element of the design and should be:

- Intuitive and easy to operate.
- Flexible and capable of being integrated into other control systems such as a Building Management System (BMS), if required.
- Controlled via an astronomical timeclock.
- Automatically adjust to the seasonal change to sunrise and sunset.

Therefore, control will be via an astronomical timeclock linked to a contactor to control the external lighting circuits. A manual over-ride switch will also be provided at an agreed location for user override.

The demand for external lighting will be determined automatically via the timeclock and time schedules inputted as required to match the user requirements.

Initial set-up of lighting schedules will be:

| Time Schedule | Description       | Status |
|---------------|-------------------|--------|
| 1             | Sunrise to Sunset | OFF    |
| 2             | Sunset to Sunrise | ON     |

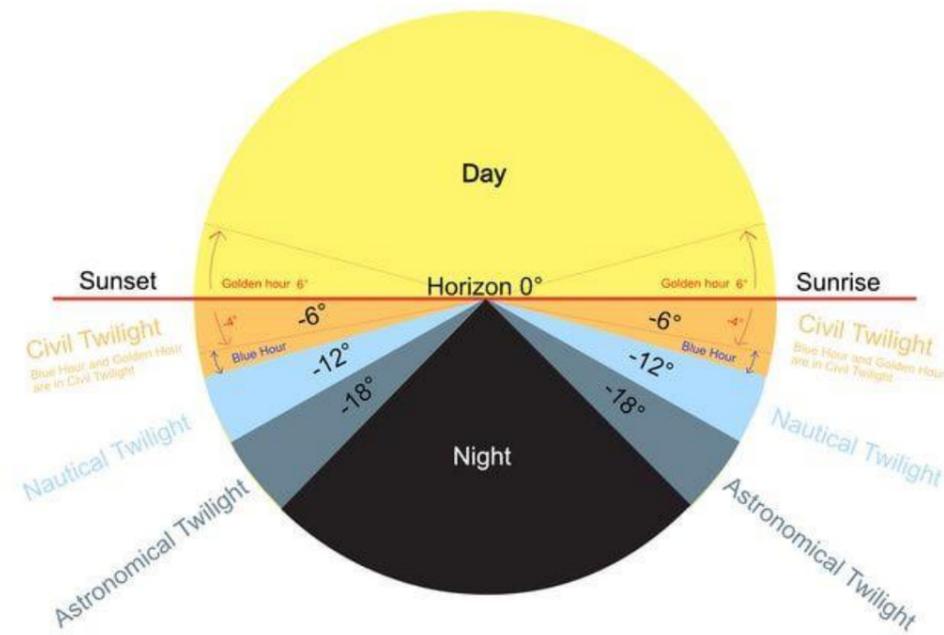


Figure 5 - Sun rise – Sun set Cycle

## Commissioning

To ensure the effective operation of the lighting system the installation shall be fully commissioned in accordance with CIBSE Commissioning Code L. This ensures that the installation aligns with the original design and is compliant in respects.

Full test and commissioning documentation will be issued as part of the handover process and relevant training given to the end user.

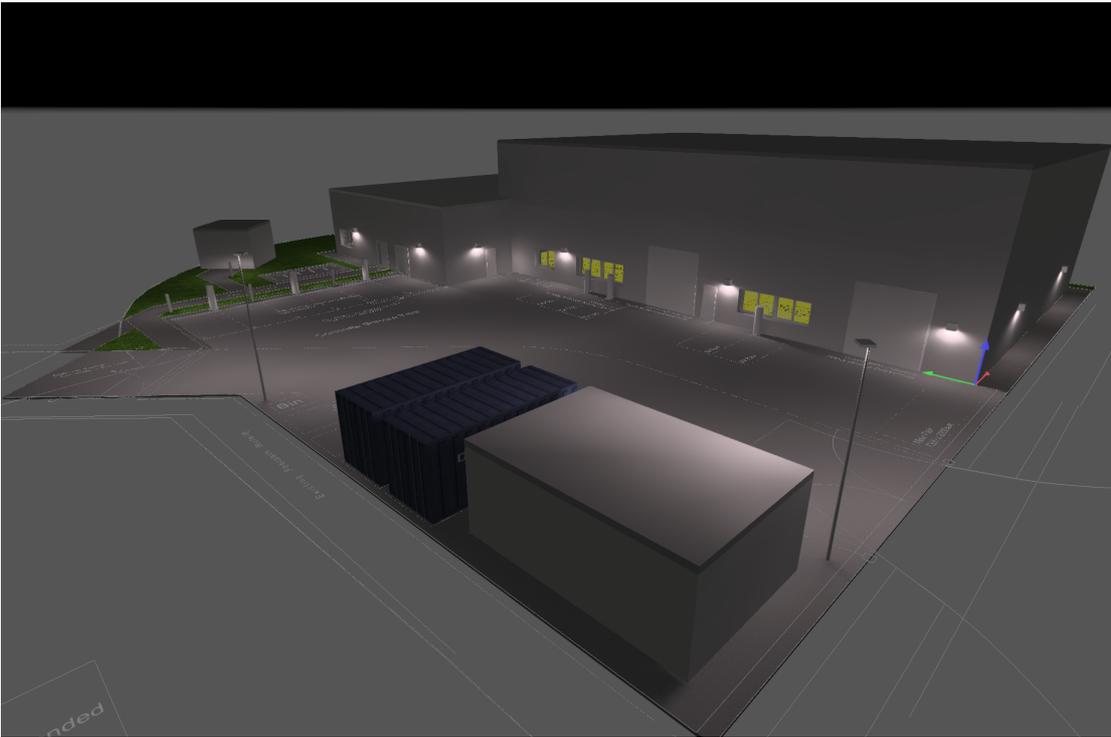
## 6. Design Summary

The proposed design provides a low energy lighting solution that delivers safe levels of illuminance in line with relevant guidance, whilst keeping light spill to a minimum. All necessary standards are complied with

- BS 5489-1:2013 – Code Practice for the design of road lighting ✓
- CIBSE Lighting Guide 6 (LG6) 'The Outdoor Environment' ✓
- ILE guidance notes for The Reduction of Obtrusive Lighting ✓
- Building Regulations Part L ✓

## Appendix A -Supporting Documentation

Lighting calculations in support of the design are included on the following pages.

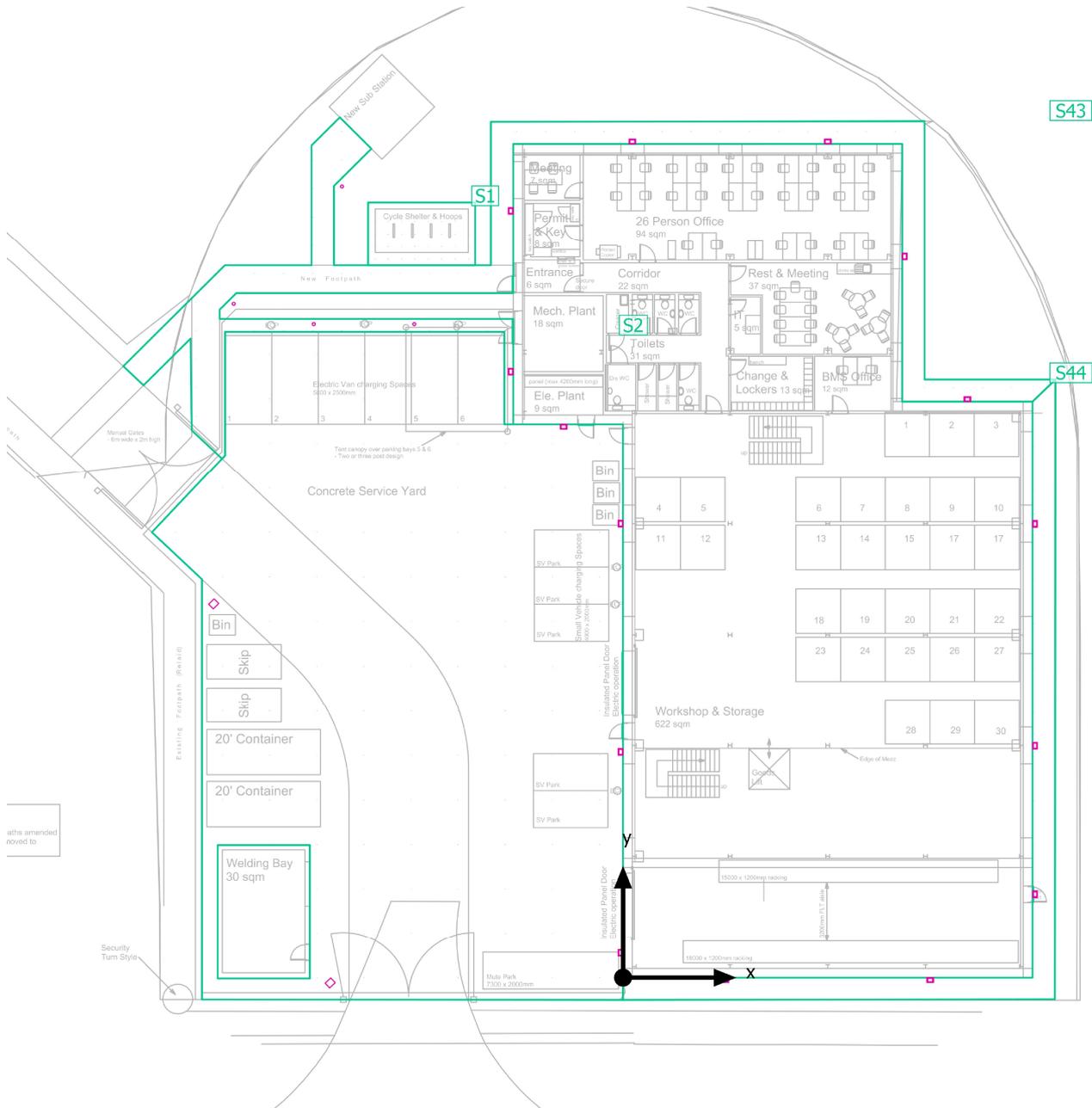


## RAL-ONE-R120-XX-CA-E-0001

R120 External lighting calculations.

R120

# Calculation objects



R120

## Calculation objects

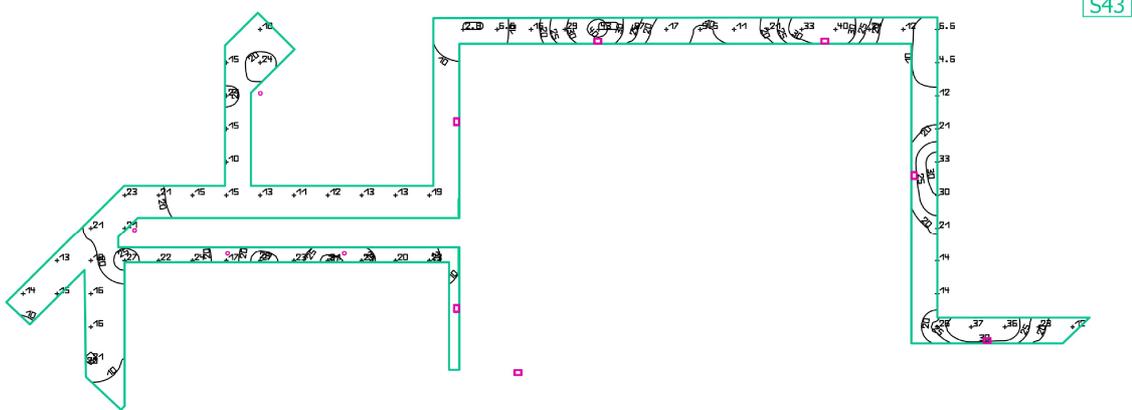
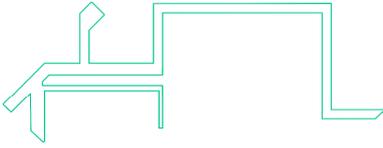
### Calculation surfaces

| Properties  | $\bar{E}$ | $E_{min}$ | $E_{max}$ | $g_1$ | $g_2$ | Index |
|---|-----------|-----------|-----------|-------|-------|-------|
| Cycle Shelter<br>Perpendicular illuminance<br>Height: 0.000 m         | 9.54 lx   | 6.04 lx   | 16.6 lx   | 0.63  | 0.36  | S1    |
| Concrete Service Yard<br>Perpendicular illuminance<br>Height: 0.000 m | 18.3 lx   | 0.00 lx   | 47.4 lx   | 0.00  | 0.00  | S2    |
| New Pathway (1)<br>Perpendicular illuminance<br>Height: 0.000 m       | 19.5 lx   | 2.84 lx   | 42.7 lx   | 0.15  | 0.067 | S43   |
| New Pathway (2)<br>Perpendicular illuminance<br>Height: 0.000 m       | 19.9 lx   | 5.54 lx   | 39.8 lx   | 0.28  | 0.14  | S44   |

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

R120

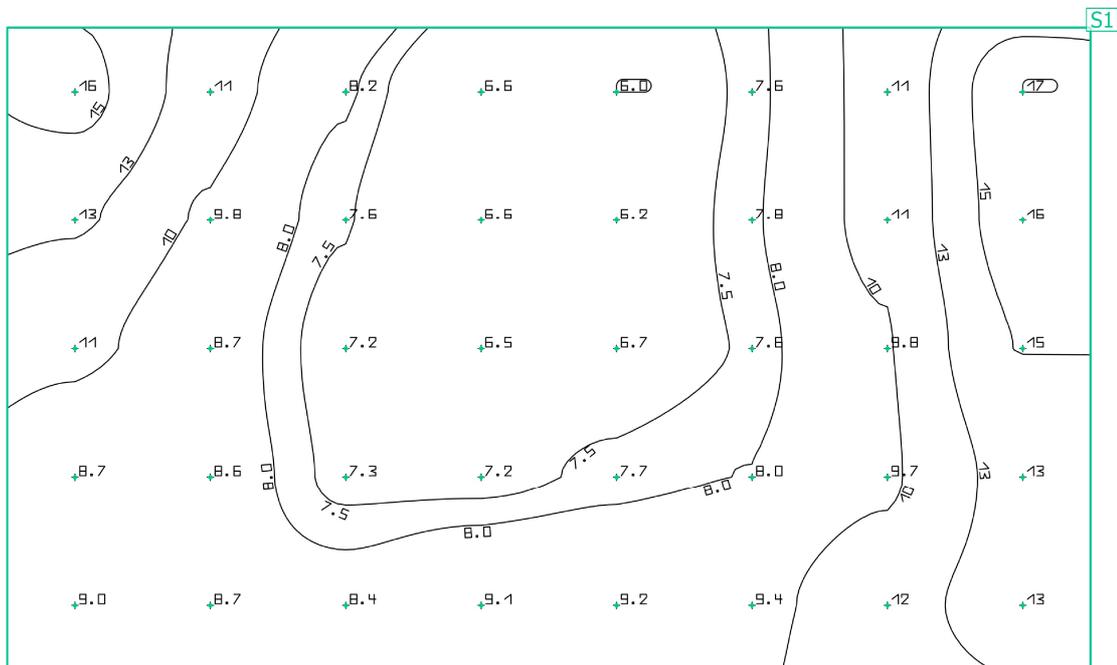
## New Pathway (1)



| Properties  | $\bar{E}$ | $E_{min}$ | $E_{max}$ | $g_1$ | $g_2$ | Index |
|---|-----------|-----------|-----------|-------|-------|-------|
| New Pathway (1)<br>Perpendicular illuminance<br>Height: 0.000 m | 19.5 lx   | 2.84 lx   | 42.7 lx   | 0.15  | 0.067 | S43   |

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

# R120 Cycle Shelter

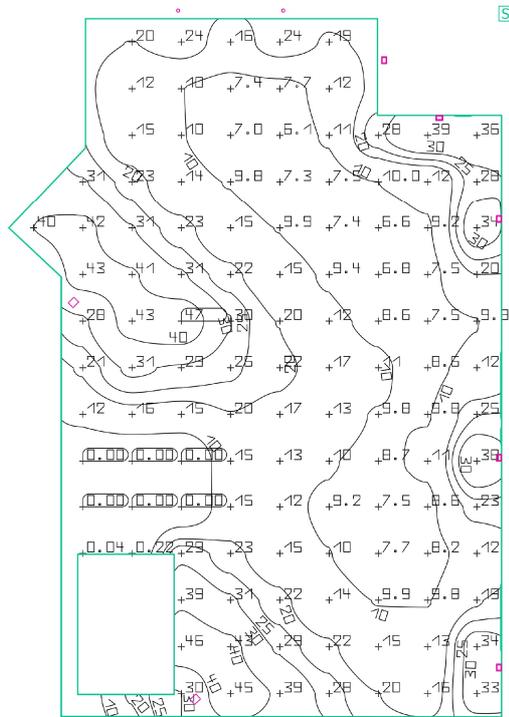


| Properties  | $\bar{E}$ | $E_{min}$ | $E_{max}$ | $g_1$ | $g_2$ | Index |
|---|-----------|-----------|-----------|-------|-------|-------|
| Cycle Shelter<br>Perpendicular illuminance<br>Height: 0.000 m | 9.54 lx   | 6.04 lx   | 16.6 lx   | 0.63  | 0.36  | S1    |

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

R120

# Concrete Service Yard

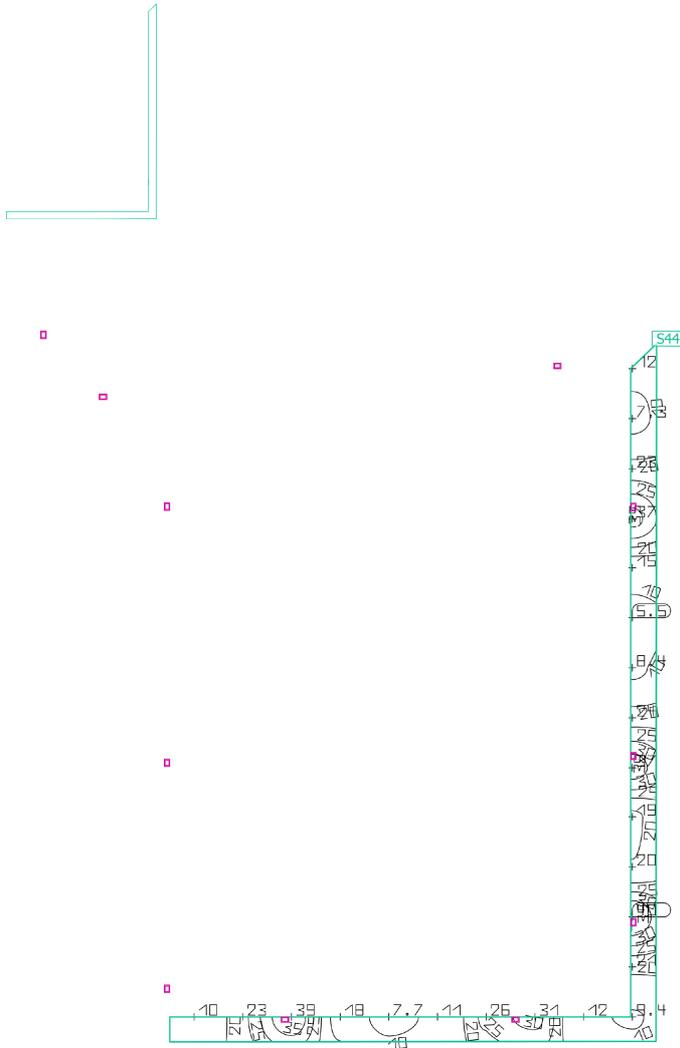


| Properties  | $\bar{E}$ | $E_{min}$ | $E_{max}$ | $g_1$ | $g_2$ | Index |
|---|-----------|-----------|-----------|-------|-------|-------|
| Concrete Service Yard<br>Perpendicular illuminance<br>Height: 0.000 m | 18.3 lx   | 0.00 lx   | 47.4 lx   | 0.00  | 0.00  | S2    |

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

R120

## New Pathway (2)



| Properties  | $\bar{E}$ | $E_{min}$ | $E_{max}$ | $g_1$ | $g_2$ | Index |
|---|-----------|-----------|-----------|-------|-------|-------|
| New Pathway (2)<br>Perpendicular illuminance<br>Height: 0.000 m | 19.9 lx   | 5.54 lx   | 39.8 lx   | 0.28  | 0.14  | S44   |

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)



**One Creative Environments Ltd**  
5 The Triangle, Wildwood Drive  
Worcester WR5 2QX

**one**

T: 01905 362300  
[www.one ltd.com](http://www.one ltd.com)