

E05236 – RBC Library Relocation External Lighting Strategy for Planning

HCC Property Services

Electrical Engineering Services

Information for Planning – External

Lighting Strategy

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E05236 – RBC Library Relocation External Lighting Strategy for Planning

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Contents

1	Executive Summary	4
2	Introduction.....	4
3	Scope of External Lighting Report	4
3.2	Site Location & Description	4
3.3	Objectives.....	5
4	Assessment methodology	5
4.1	Lighting Design Criteria.....	5
4.2	Legislation	6
4.3	National Policy Planning Policy Framework.....	6
4.4	Local Policy Reading Borough Local Plan (2019).....	6
5	Standards	6
5.1	Lighting Requirements	7
5.3	Recommended lighting level values	7
5.4	Strategy for Minimizing Obtrusive Light and Visual Impact of the lighting Scheme.....	7
5.5	Strategy for Luminaire Types	8
5.6	Lighting Strategy and Luminaire Controls.....	9
5.7	Lighting to External Stairs	9
5.8	Ramp Bespoke Handrail with Integral LED.....	10
5.9	Entrance Canopy	10
5.10	Angled Colonnades.....	11
5.11	Artwork – North wall	11
5.9	Tree Lighting	11
5.10	The Building mounted luminaires.....	12
6	EXTERNAL LIGHTING 6a – OUTPUT (PRE-CURFEW) & EXTERNAL LIGHTING 6b - SECURITY LIGHTING (POST-CURFEW).....	14
7	ARCHITECTURAL EXTERNAL LIGHTING PROPOSALS.....	18
8	EXTERNAL LIGHTING 6a OUTPUT (PRE-CURFEW) LIGHTING DESIGN.....	21
9	EXTERNAL LIGHTING 6a - OUTPUT (PRE-CURFEW) –	25
	MASTER TRESPASS/ SPILL LIGHT CALCULATIONS.....	25
10	EXTERIOR LIGHTING 6a OUTPUT (PRE- CURFEW) –	30
	LIGHTING CALCULATIONS.....	30
11	RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew) Calculation Results	31
	– Plan View c/w External Luminaire Locations	31
12	EXTERIOR LIGHTING 6a OUTPUT (PRE-CURFEW) –	37
	SKY GLOW CALCULATION.....	37
13	EXTERIOR LIGHTING 6a OUTPUT (PRE-CURFEW) –	39
	3D VIEWS	39
14	RBC CIVIC LIBRARY RELOCATION – EXTERNAL LIGHTING 6b SECURITY LIGHTING POST-CURFEW LIGHTING DESIGN.....	47
	RBC CIVIC LIBRARY RELOCATION EXTERNAL LIGHTING 6b – SECURITY LIGHTING (POST-CURFEW) –	48
	MASTER TRESPASS/ SPILL LIGHT CALCULATIONS.....	48
15	RBC CIVIC LIBRARY RELOCATION EXTERIOR LIGHTING 6b SECURITY LIGHTING (POST-CURFEW) – OVERALL LIGHTING CALCULATIONS.....	50
16	Proposed External Luminaire Types.....	51
17	Glare.....	53
18	Conclusions.....	54
19	Appendix A – Manufacturers Info.....	55
19.1	Manufacturers Data Sheets	56

1 Executive Summary

The following information outlines the strategy at planning stage for the proposed external lighting at Civic Library Relocation, 19 Bridge Street, Reading. RG21 2LR.

An appropriate lighting strategy for the site has been developed and assessment made of effects on the surrounding environment and neighboring properties.

The lighting scheme in this report is a lighting design strategy rather than a detailed design solution. It is recommended that the lighting strategy outlined in this report is adopted including criteria, luminaries, switching methods, lamp types etc. and developed into a more detailed design when undertaking the full external lighting design of the site.

An adequate and safe level of lighting will be provided for site tasks, public realm activities, amenity and security, whilst maintaining a minimal impact on the site surroundings, environment and neighboring properties.

This lighting strategy considers building-mounted external lighting, public realm lighting, amenity lighting, Artwork lighting and lighting to the shrub garden.

These proposals have been prepared with due note of the recommendations made within ILP Guidance Note 01: 2020 – Guidance notes for the reduction of obtrusive light.

For ease of understanding this report we have provided a Sky Glow calculation schedule together with lighting calculations and illustrations, that will clearly show compliance with the local authority requirements and can be utilised for the planning application.

2 Introduction

This report outlines the external lighting strategy for the new extension and considers the potential effects of the proposed extensions lighting installation on the surrounding areas. The report accompanies the planning application for the proposed RBC Civic Library Relocation project.

3 Scope of External Lighting Report

3.2 Site Location & Description

The Reading Civic Library Relocation project is located on Bridge Street and is in the heart of reading town centre, well connected to existing transport and footway infrastructure, with numerous town centre shops, etc. all within easy walking distance. The extension proposals seek full planning permission.

The Civic Customer Redesign and Library Relocation project looks to maximise the opportunity to redesign the main Civic Offices, creating a one public estate that introduces a cultural and service provision to our residents in one place, be it for support with Housing,

Registrars, Children and Adult Services, Community space as well as being our Central Library offer. The re-design of the front of house service provides opportunity to combine resources, space and services to maximise services from one location. The design will offer a clear new identity to the Central Library as well as the reception; it will be welcoming, accessible and clearly visible from the public realm. The inviting frontage of the building will feature quality design to attract people in, with one customer journey flowing through the space.

3.3 Objectives

The general objective of this report is to provide details of the proposed external lighting and assess the likely impact of the lighting scheme for businesses and general public surrounding Bridge Street and on the environment and surrounding areas.

The specific objectives of the proposed external lighting scheme, when fully designed, will be able:

- To limit light trespass pollution, sky glow and source intensity.
- To limit obtrusive light, spill light / light trespass and glare to neighboring land and properties
- To provide an external lighting strategy and level of illuminance that addresses site security and complies with the police initiative 'Secured by Design' approach.
- To provide a safe and adequate level of illuminance for the proposed exterior areas, consisting of entrances/ exits, Amenity areas, pedestrian walkways, cycle paths, shrub and mature tree area.
- To provide a safe level of illuminance for movement of goods and persons.
- To provide lighting to a new art wall.

4 Assessment methodology

An appropriate initial lighting scheme for the site has been assessed using Relux standard industry software. Any stated lighting outputs have been calculated with all the luminaires switched on.

From these initial calculations, lighting plots illustrating the illuminance levels throughout the site boundary have been produced so that the lighting scheme's impact can be assessed.

By completing the Sky Glow spreadsheet, we have then been able to ascertain the Pre-Curfew and Post Curfew levels of Light Trespass and Source Brightness. The site will fully comply with the Sky Glow requirement.

Refer to accompanying lighting information for details of full calculations which are included to back up the information. Also included are the full Sky Glow, light trespass and source intensity tables to show compliance.

4.1 Lighting Design Criteria

Relevant legislation, key guidance documents and design standards will be indicated as part of this lighting report, which will form the basis of the detailed lighting design.

4.2 Legislation

- Clean Neighborhoods and Environment Act
- The Clean Neighborhoods and Environment Act 2005 (CNEA) amended.
- Section 79 of the Environmental Protection Act 1990

Since 6th April 2006, artificial light can be considered a statutory nuisance unless it is from exempt premises.

If a light nuisance is considered by a local authority to exist, the local authority must serve a notice on the person responsible requiring the abatement of the nuisance, and/or restricting or prohibiting its recurrence.

4.3 National Policy Planning Policy Framework

The National Planning Policy Framework (NPPF) was revised on the 24th of July 2018 and subsequently updated on 19th February 2019 and 19th June 2019. This supersedes the existing policy within the previous NPPF (March 2012). The revised NPPF includes several references to the need to consider the effects of artificial lighting.

4.4 Local Policy Reading Borough Local Plan (2019)

- The Reading Borough Local Plan was adopted in November 2019 and guides development in Reading up to 2036.
- CC7: Design and the Public Realm: The development will be of high design quality that maintains that enhances the character and appearance of the area of Reading in which it is located.
- CC8: Safeguarding Amenity: The Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of Artificial lighting.
- EN16: Pollution and Water Resources: The Development will only be permitted where it would not be damaging the environment and sensitive receptors through land, noise, or light pollution.

5 Standards

- BS EN 13201-1:2014 Road Lighting, Part 1 Guidelines on selection of lighting classes: specifies the lighting classes set out in EN 13201-1 and gives guidelines on the selection of the most appropriate class for a given situation.
- BS EN 13201-2:2015 Road lighting - Performance requirements: Defines performance requirements which are specified as lighting classes for road lighting aiming at the visual needs of road users, and it considers environmental aspects of road lighting.

- BS EN 5489-1:2013 Code of Practice for the design of road lighting – Part 1: Lighting of roads and public amenity areas: This document provides specific guidance on selecting lighting classes that will help design more energy efficient road lighting schemes. It gives the most up-to-date recommendations for general principles of road lighting including aesthetic, technical aspects, operation and maintenance.
- BS EN 12464-2:2014 Light and lighting - Lighting of workplaces Part 2: Outdoor work: This document outlines requirements for lighting outdoor workplaces, focusing primarily on visual comfort and performance.
- CIBSE (2016) Lighting Guide LG6 – The Outdoor Environment: presents lighting solutions to basic visual problems and individual characteristics of outdoor lighting applications.

5.1 Lighting Requirements

All external lighting will be designed in accordance with the following lighting standards and guidance, as a minimum.

- BS EN 12464-2:2014; Light and lighting – Lighting of workplaces Part 2: Outdoor work.
- BS EN 5489-1:2013; Code of Practice for the design of road lighting – Part 1: Lighting of roads and public amenity areas.
- BS EN 13201-1:2015 Road Lighting, Part 1 Guidelines on selection of lighting classes.
- BS EN 13201-2:2015 Road Lighting, Part 2 Performance Requirements.
- CIBSE (2016) Lighting Guide LG6 – The Outdoor Environment.

5.2 The Proposed Lighting Scheme

The lighting scheme detailed in this report is a lighting design strategy rather than a detailed design solution.

5.3 Recommended lighting level values

Lighting levels will be in accordance with SLL Code for Lighting, BS12464-2 and ILP Guidance Note 01-2020 – Guidance note for the reduction of obtrusivelight/ light trespass.

5.4 Strategy for Minimizing Obtrusive Light and Visual Impact of the lighting Scheme.

Careful consideration will be given to highlighting the structure but reducing any obtrusive light during the night and the visual impact of the lighting scheme during the day, whilst maintaining an adequate level of illuminance for safe movement to the new amenity area and general access route of the site. Particular attention will be paid to minimizing any intrusion, glare or sky glow produced by the scheme by controlling and targeting the lighting to specific areas of the new external façade and surrounding points of interest at the site, including but not limited to artwork and trees.

The external bespoke handrails complete with integral IP65 LED lighting units and have been chosen to be as inconspicuous as possible but will be utilised to illuminate the main

stair treads and ramp area. The handrail complete with LED luminaire will be utilised to illuminate new corporate glazed signage, the handrail will generally be galvanized steel or grey coloured. All the LED luminaires will have 0% upward light ratio, and all necessary measures to reduce the visibility of the light source. The string section of 2no. external stairs will be illuminated from either side with LED recessed lights to provide lighting across the stair tread and stair riser to enable safe accessible use.

The external canopy internal frames will be illuminated by inground uplighters. These luminaires have been selected to have good light control and tight cut off beam angle to reduce light spillage and skyglow and to purely illuminate the internal façade of the canopy.

The external canopy angled colonnades internal frames will be illuminated by linear recessed IP68 LED extrusion tape housed in a aluminum profile. By having the LED extrusion recessed into the building fabric, the effect on the façade will be good light control and tight cut off beam angle to reduce light spillage and skyglow and to purely illuminate the internal angled colonnade façade.

The external existing vegetation shrubbed area to the front right-hand side of the building will be remodeled, new shrubs are to be planted around the existing mature tree. Within the shrubbed area new external LED lighting will be provided by in ground spike and spotlight luminaires that will illuminate the new tree trunk. The luminaires are to be orientated and directed towards the tree trunk, away from the main road making them less intrusive and minimising glare.

A new LED corporate sign is to be provided to replace the existing corporate logo located within the shrubbed area to the front and left of the building looking from Bridge Street.

Building mounted luminaires have been proposed to illuminate the artwork to the north wall. The surface mounted IP65 rated LED luminaire will be installed with a recess of the fabric to provide and illuminate the artwork via downlighting.

The fire exit pass door to the front of the building adjacent to the revolving door will be provided with a bollard, which will also be utilised for access control field accessory as well as providing lighting to fire exit. Other new fire exits will be provided with a wall mounted LED downlights complete with 3 Hour emergency battery inverters to enable safe movement away from the building and pathways around the building, which have a flat glass to reduce visibility of the light source and have 0% upward light component.

Consideration has been given to the extent of illuminance falling on the building façade and the visual impact of the building from a distance, whilst maintaining safe light levels for pedestrian circulation during the hours of darkness, and for security.

5.5 Strategy for Luminaire Types

The site shall be lit using LED luminaries throughout.

Building mounted LED luminaires will be utilized around the building for amenity and security purposes.

LED luminaires will be utilized throughout, which will provide good colour rendering to improve visibility and provide a safer environment in line with a 'secured by design'

approach. Using LED luminaires will provide an energy efficient solution, and Part L and BREEAM compliance. The proposed luminaires, or equal and approved, have been selected as they have been designed to be anti-light pollution and low glare with good levels of efficiency and low upward light ratio.

All the luminaires are IP54/ 68 rated and impact resistant. For specific details, refer to supplementary information that accompanies this report.

5.6 Lighting Strategy and Luminaire Controls

Lighting controls will be utilized to ensure energy saving and minimized impact on the surrounding areas.

The public realm lighting, (staircase/ ramp signage lighting, tree lighting) will be photocell and astronomical timeclock controlled, with individual override switches for each staircase, entrance canopy and colonnade recessed LED strip lights, Tree lighting and Art wall with consideration given to a duplicate set of switch controls located within the building. Time periods will be set to facilitate council requirements use for the required days/times.

An override facility will be installed should staircase and ramp lighting outside normal time periods be required.

Building mounted lighting for amenity and security will have timeclock and photocell control, with lights coming on at dusk for amenity and security use, and going off at a pre-determined time, which will be agreed.

Photocells are to be used as a primary control on all amenity and lighting so that no luminaires will be left on during daylight hours. In addition, several programmable 7-day time clocks will be wired into the control system so that the amenity lighting circuits can be programmed to turn on/off as and when they are needed to suit the development activities.

All lighting shall be provided with DALI dimmable lighting controls or similar and approved to enable lighting levels to be set to pre-curfew and post curfew light levels.

5.7 Lighting to External Stairs

LIGHTUP ORBIT 80mm diameter LED recessed wall stair light to be installed to the existing concrete stair string, the luminaire is made of stainless steel, the IP66 36 lm Asymmetrical LED luminaire utilises a 3W – 4.2W LED (dependent on staircase), the built-in LEDs are covered by a sodium- calcium tempered glass. The built-in reflector means that the light is output asymmetrical to provide lighting at low level along the stair tread.

These luminaires also have controlled directional light with zero upward light output to reduce light pollution, light spill and discomfort glare. These recessed wall mounted brick lights will have a colour temperature of 3000⁰K.

The functional luminaire is connected directly to the 230V mains supply so there is no need for a remote transformer.

The recessed stair lights/ recessed circular LED's, will be positioned to keep light spill beyond the stair boundary to a minimum.

The existing public realm will also benefit from the borrowed light from the existing column pedestrian walkway lighting.

The luminaires accompanying this report. will be controlled via astronomical timeclock and override switch to come on at dusk and go off at predetermined time at night. And will also be wired back to a remote static inverter within the building for emergency lighting purposes.

The luminaires as proposed by IGuzzini:

- LIGHTUP ORBIT IP66 (See EL-5/ (W) luminaire type indicated in section 6.1 below)

5.8 Ramp Bespoke Handrail with Integral LED

This bespoke handrail will be provided in either brushed stainless or powder coated finishes. This handrail is suitable for external use. The bespoke engineered handrail with integral IP65 3.7W LED lighting units will be utilised for the illumination of main staircase handrail & ramp/ ramp signage.

The LED system will provide discreet and uniform downward distribution. The design features and the use of LED lights, allows it to architecturally enhance the environment where it is installed, and LED provides the essential safety requirements for pedestrians.

The bespoke handrails with integral LED's and Super tough IK10 polycarbonate luminaire optics and anodised aluminium heat sink, the handrail luminaire optics enables controlled directional light with zero upward light output to reduce light pollution, light spill and discomfort glare. The bespoke handrails with integral LED's, will be positioned to keep light spill beyond the stair boundary to a minimum, with IP67 protection class, the luminaire is suitable for the outdoor environment, as per IGuzzini symmetrical/ asymmetrical LED luminaire.

The luminaires as proposed by IGuzzini:

- Underscore INOUT (16mm Version) IP68 (See EL-6/ (U) luminaire type indicated in section 6.1 below)

The existing ramp and staircases will also benefit from the borrowed light from the existing column pedestrian walkway lighting.

The luminaires accompanying this report. will be controlled via mayflower photocell, astronomical timeclock, and override switch to come on at dusk and go off at predetermined time at night. And will also be wired back to a remote static inverter within the building for emergency lighting purposes.

5.9 Entrance Canopy

The pedestrian entrance canopy columns will be provided with recessed

in ground 200mm diameter circular 12W warm white monochrome LED uplighter comprising IP66 enclosure the luminaires will be recessed within the concrete slab and adjacent to the canopy columns These in ground uplights will provide a pencil cylindrical cone of light to the sides of the canopy and canopy soffit by utilising the luminaire lamp tight beam angle and will have a colour temperature of 3000°K.

The luminaires as proposed by IGuzzini:

- Lightup IP66 (See EL-1/ (LU) luminaire type indicated in section 6.1 below)

5.10 Angled Colonnades

To the side of pedestrian entrance canopy there are colonnades that rise to high level, each colonnade will be illuminated with a recessed IP68 3.7W warm white monochrome LED strip luminaire complete with profile will be located within the rebated angled colonnade structure. These in LED strip lights will provide a soft wash of light vertically along the opposite side of each colonnade. The LED strip will have a colour temperature of 3000°K.

The luminaires as proposed by IGuzzini:

- Underscore INOUT (16mm Version) IP68 (See EL-2/ (U) luminaire type indicated in section 6.1 below)

5.11 Artwork – North wall

The north wall façade will be provided with artwork. The artwork will have a coverage area of circa 4000mm x 4000mm. a recess will be created at the top of 4000mm x 4000mm artwork section of approximately 100mm – 150mm. This recess will house a new recess surface mounted linear LED luminaire to downlight the sculpture and provide an even and subtle distribution of lighting across the artwork. The lighting to the artwork will be illuminated using and aluminum IP66 11.5W linear warm white monochrome LED luminaire complete with grazing optic. The luminaire will have a colour temperature of 3000°K.

The luminaires as proposed by IGuzzini:

- Linealuce Mini 27R IP66 (See EL-3/ (L) luminaire type indicated in section 6.1 below)

5.9 Tree Lighting

The refurbished shrub garden to the front of the civic library will be provided with a ground embedded 11W warm white monochrome LED ground spotlight complete with Opti-beam

optic and ground spike. Each spotlight will be strategically located on either side to illuminate the tree trunk. The spotlight will be provided with close optic control so that minimal spill light is generated. These in ground mounted spotlights will have a colour temperature of 3000⁰K.

The luminaires as proposed by IGuzzini:

- Palco INOUT IP66 (See EL-4/ (P2) luminaire type indicated in section 6.1 below)

The luminaires accompanying this report will be controlled via photocell, timeclock and override switch to come on at dusk and go off at predetermined time at night.

5.10 The Building mounted luminaires

Building-mounted wall luminaires are proposed for the new fire exits around the building to allow safe evacuation away from the building, these will generally comprise a combination of wall mounted cylinder downlighters complete with integral 3 hour emergency battery pack, these wall mounted aluminum IP65 11W LED cylinder downlights. These wall mounted downlights will provide a cylindrical cone of light to the floor and have a colour temperature of 3000⁰K.

The luminaires as proposed by CLS:

- Enola Round M IP65 Downlight (See EL 7 luminaire type indicated in section 6.1 below)

The luminaires accompanying this report. will be controlled via photocell, timeclock and override switch to come on at dusk and go off at predetermined time at night.

6. Assessment of the impact of the overall lighting scheme (Pre-curfew & Post-curfew)

Drawings and the accompanying manufacturer's calculations and data sheets, show the lighting scheme for the:

- Ground floor – Main stair/ ramp lighting
- Ground floor – Entrance Canopy & Colonnade lighting
- Ground floor – Tree lighting and signage lighting
- Ground floor – North Wall Artwork lighting

With the illuminance levels shown throughout the site and at the boundaries. The calculation model was prepared using industry standard software, Relux. It shows that adequate levels of lighting have been achieved on the site with minimal effect on the surrounding area, as required by the various standards.

6. EXTERNAL LIGHTING 6a – OUTPUT (PRE-CURFEW) & EXTERNAL LIGHTING 6b - SECURITY LIGHTING (POST-CURFEW)

Definition & Explanations in relation to Master calculation sheet for Skyglow, Light trespass and Source Intensity.

Sky glow Calculation – Sky glow occurs when light is shed upwards, either directly by light sources such as street lamps or floodlights or when reflected from the ground or other surfaces. Dust or water vapour in the air scatter the light to give an orange glow above our towns and cities, which obscures stars in the night sky and the problem is spreading into rural areas as artificial lighting at night increases.

This upward light is for all the luminaires proposed for the lighting scheme at all times (i.e., pre & post curfew) and the resultant calculation should be within the maximum figure stated for the type of external lighting environment. For our proposed development and its location, we have designated the RBC Civic Library Relocation project as E4 as dictated by BS 12464-2, which represents high district brightness areas, such as town centres and commercial areas for the basis of our design assessment.

Light Trespass – Light trespass is a more localised issue, which occurs where artificial light sources are visible beyond the areas they are supposed to light. Often associated with poorly aimed floodlights or over lighting of areas, light trespass can disturb and annoy people, who may find their bedrooms lit to the extent that they cannot sleep.

This is the amount of extraneous light leaving the building (where external lighting has been installed) from all the light sources on that elevation. The vertical illuminance is recorded on the face/ side of each adjacent building for each elevation. Pre and post curfew Lux values are identified as used against the maximum pre and post maximum lux criteria.

Source Intensity – Glare occurs when a source of artificial light is so much brighter than the area around it that it causes discomfort and inability to see – something that is very dangerous to road users. A common example is the effect of main beam headlights on an oncoming car when driving along a dark road, but it can also be caused by fixed lighting installations, such as a floodlight that directly face an observer. Visual clutter occurs where important lights such as traffic signals are viewed against a competing background that reduces their visual impact. The effect is worse if the competing lights are coloured.

All external luminaires installed should not exceed brightness levels. i.e. for either pre or post curfew times.

4.5 Obtrusive light

To safeguard and enhance the night time environment it is necessary to control obtrusive light (also known as light pollution), which can present physiological and ecological problems to surroundings and people.

The limits of obtrusive light for exterior lighting installations, to minimize problems for people, flora and fauna, are given in Table 2 and for road users in Table 3.

Table 2 — Maximum obtrusive light permitted for exterior lighting installations

Environmental zone	Light on properties		Luminaire intensity		Upward light ratio	Luminance	
	E_v lx		I cd		R_{UL} %	L_b cd·m ⁻²	L_s cd·m ⁻²
	Pre-curfew ^a	Post-curfew	Pre-curfew	Post-curfew		Building facade	Signs
E1	2	0	2 500	0	0	0	50
E2	5	1	7 500	500	5	5	400
E3	10	2	10 000	1 000	15	10	800
E4	25	5	25 000	2 500	25	25	1 000
where E1 represents intrinsically dark areas, such as national parks or protected sites; E2 represents low district brightness areas, such as industrial or residential rural areas; E3 represents medium district brightness areas, such as industrial or residential suburbs; E4 represents high district brightness areas, such as town centres and commercial areas; E_v is the maximum value of vertical illuminance on properties in lx; I is the light intensity of each source in the potentially obtrusive direction in cd; R_{UL} is the proportion of the flux of the luminaire(s) that is emitted above the horizontal, when the luminaire(s) is (are) mounted in its (their) installed position and attitude, and given in %; L_b is the maximum average luminance of the facade of a building in cd·m⁻²; L_s is the maximum average luminance of signs in cd·m⁻². ^a In case no curfew regulations are available, the higher values shall not be exceeded and the lower values should be taken as preferable limits.							

For users of transport systems for the relevant viewing positions in the path of travel the threshold increment shall not exceed 15 % based on the actual adaptation level. If the adaptation level is not known and no road lighting is provided, an adaptation luminance of 0,1 cd/m² shall be applied.

Table 3 — Maximum values of threshold increment from non-road lighting installations

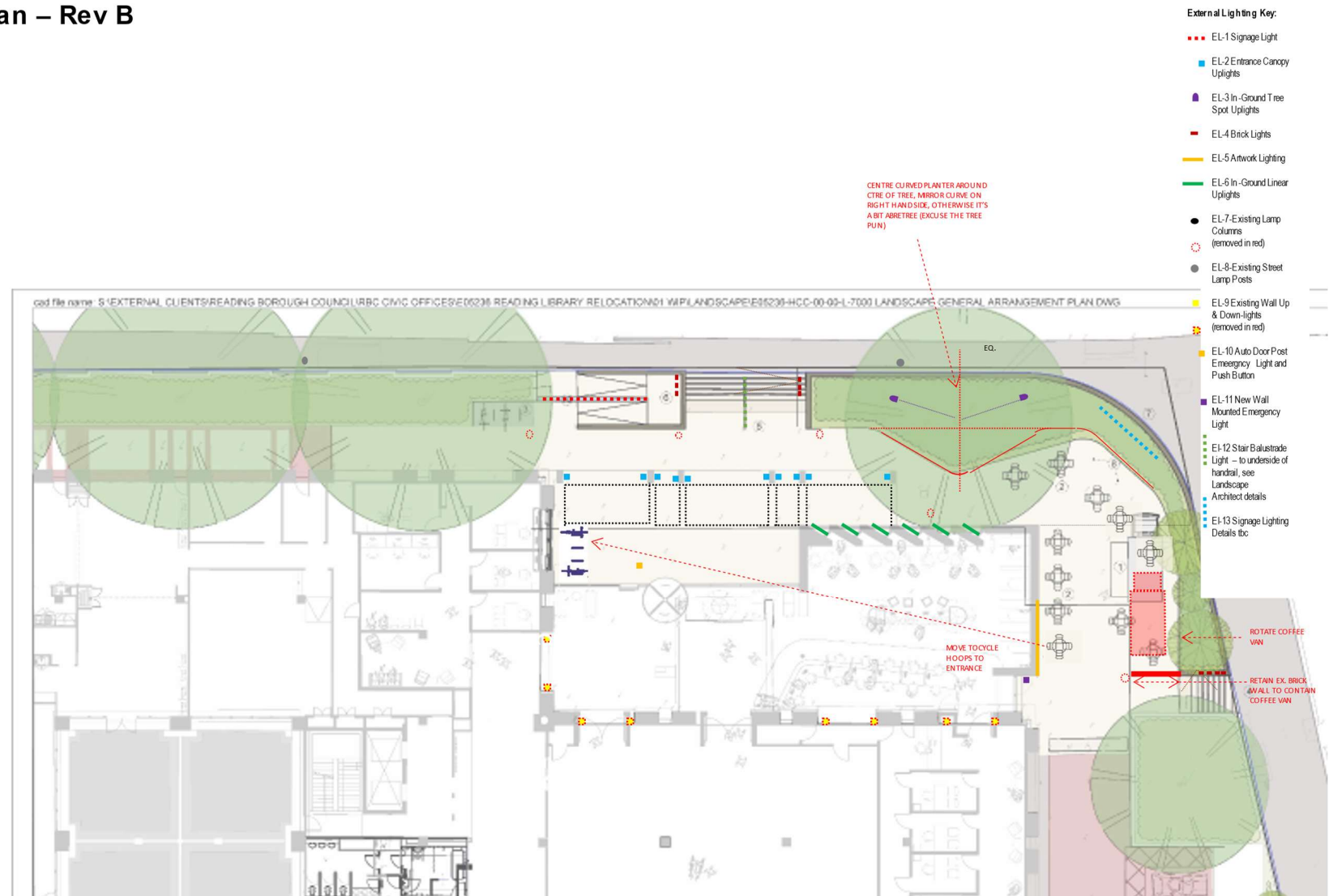
Light technical parameter	Road lighting classes ^{a, b}			
	No road lighting	ME5	ME4 / ME3	ME2 / ME1 ^f
Threshold increment (TI) ^{c, d, e}	15 % based on adaptation luminance of 0,1 cd·m ⁻²	15 % based on adaptation luminance of 1 cd·m ⁻²	15 % based on adaptation luminance of 2 cd·m ⁻²	15 % based on adaptation luminance of 5 cd·m ⁻²
NOTE During the life of this standard, the designations are likely to change from ME, CE, S to M, C, P.				
^a Road lighting classes as given in EN 13201-2. ^b If CE-class or S-class has to be applied, adaptation level of luminance should be used according to CEN/TR 13201-1:2004, Table 3 or equivalent national standards. ^c TI calculation as given in EN 13201-3. ^d Limits apply where users of transport systems are subject to a reduction in the ability to see essential information. Values given are for relevant positions and for viewing directions in the path of travel. ^e Table 5.2 in CIE 150:2003 gives corresponding values for the veiling luminance L_v . ^f The adaptation luminance values are taken from CIE 150:2003, Table 2.4.				

7. ARCHITECTURAL EXTERNAL LIGHTING PROPOSALS

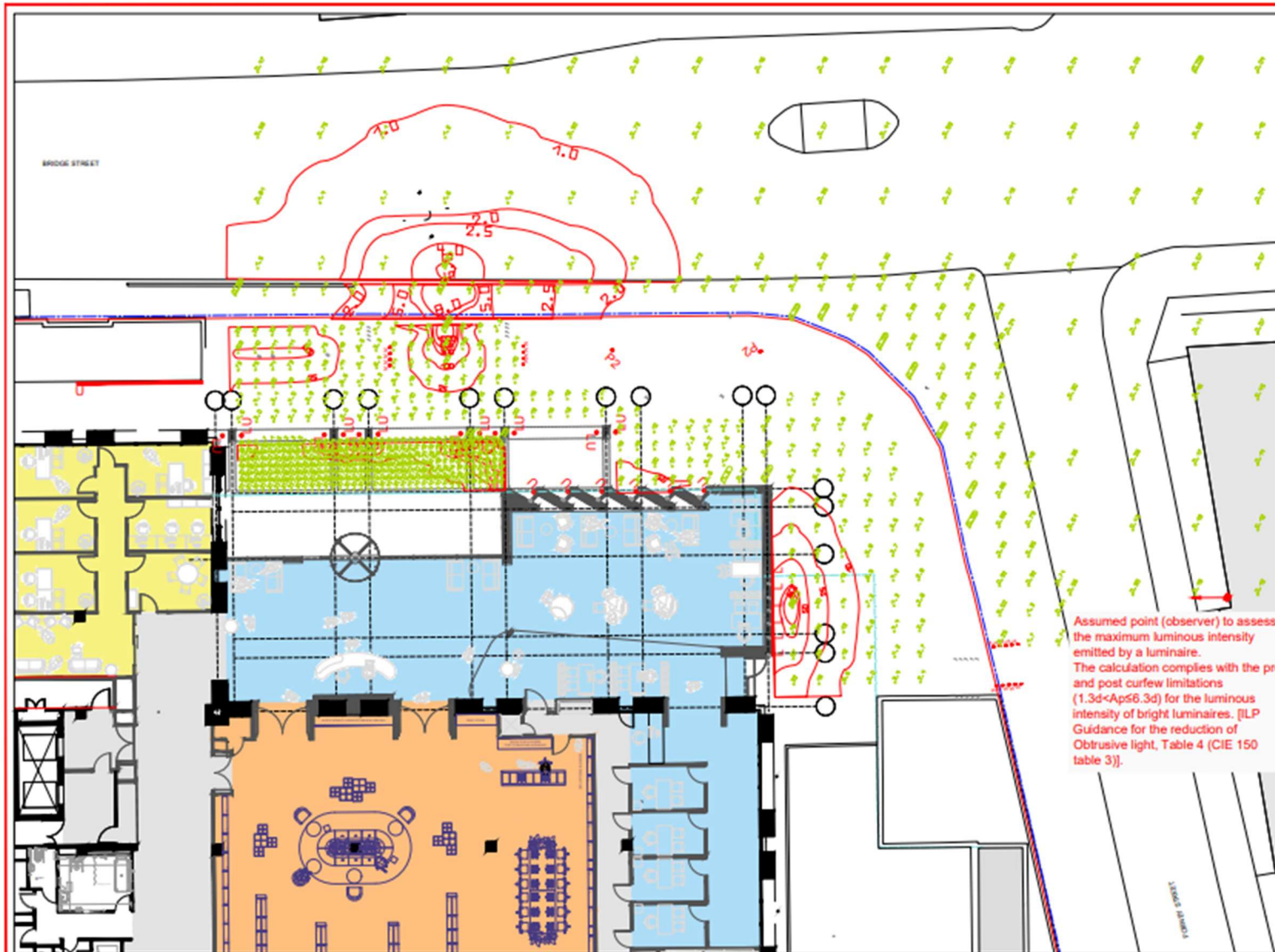
Manufacturers External Lighting Calculations

Ground Floor Architectural External Lighting Proposal (Pre-curfew & Post-curfew)

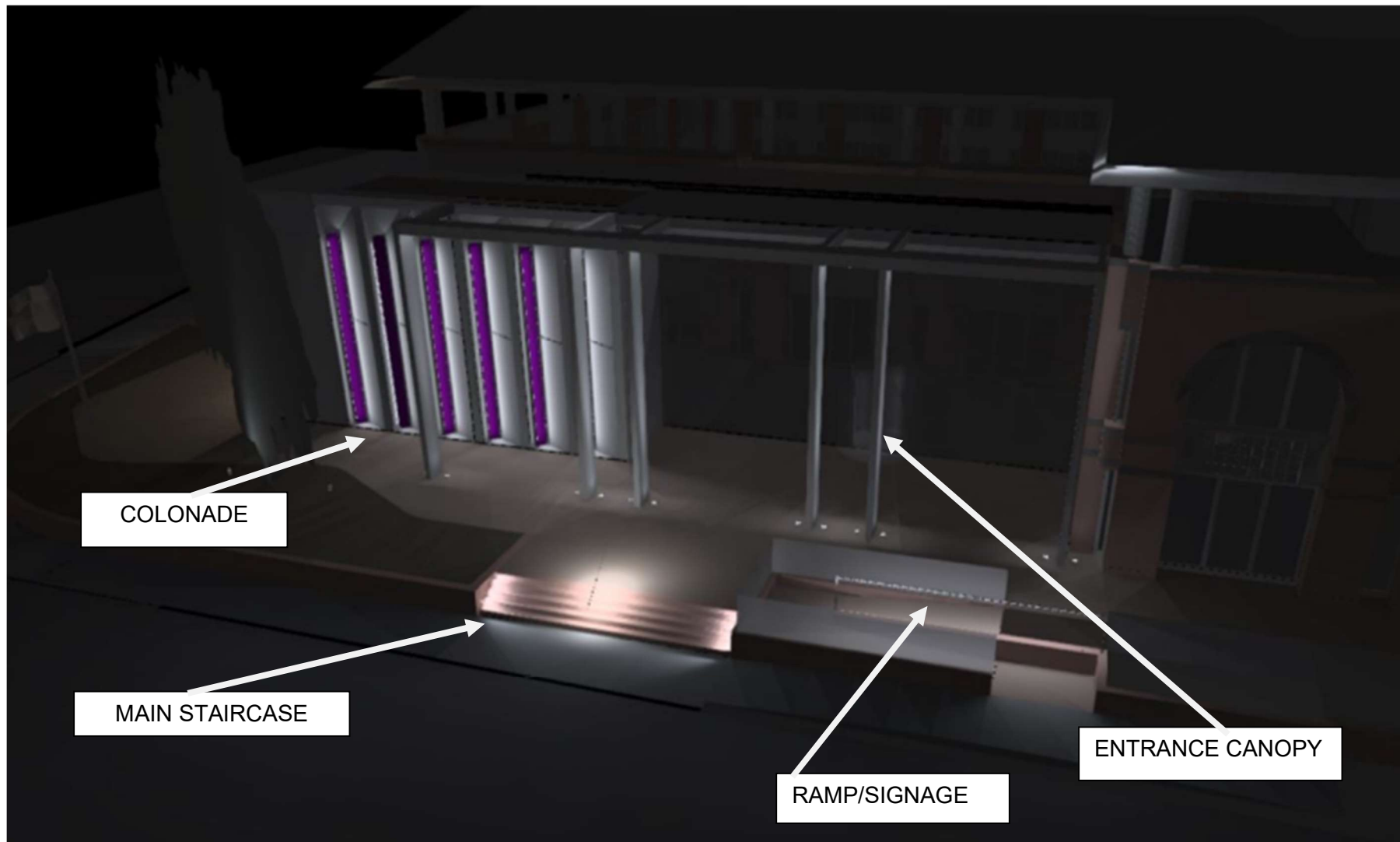
Proposed Lighting Plan – Rev B



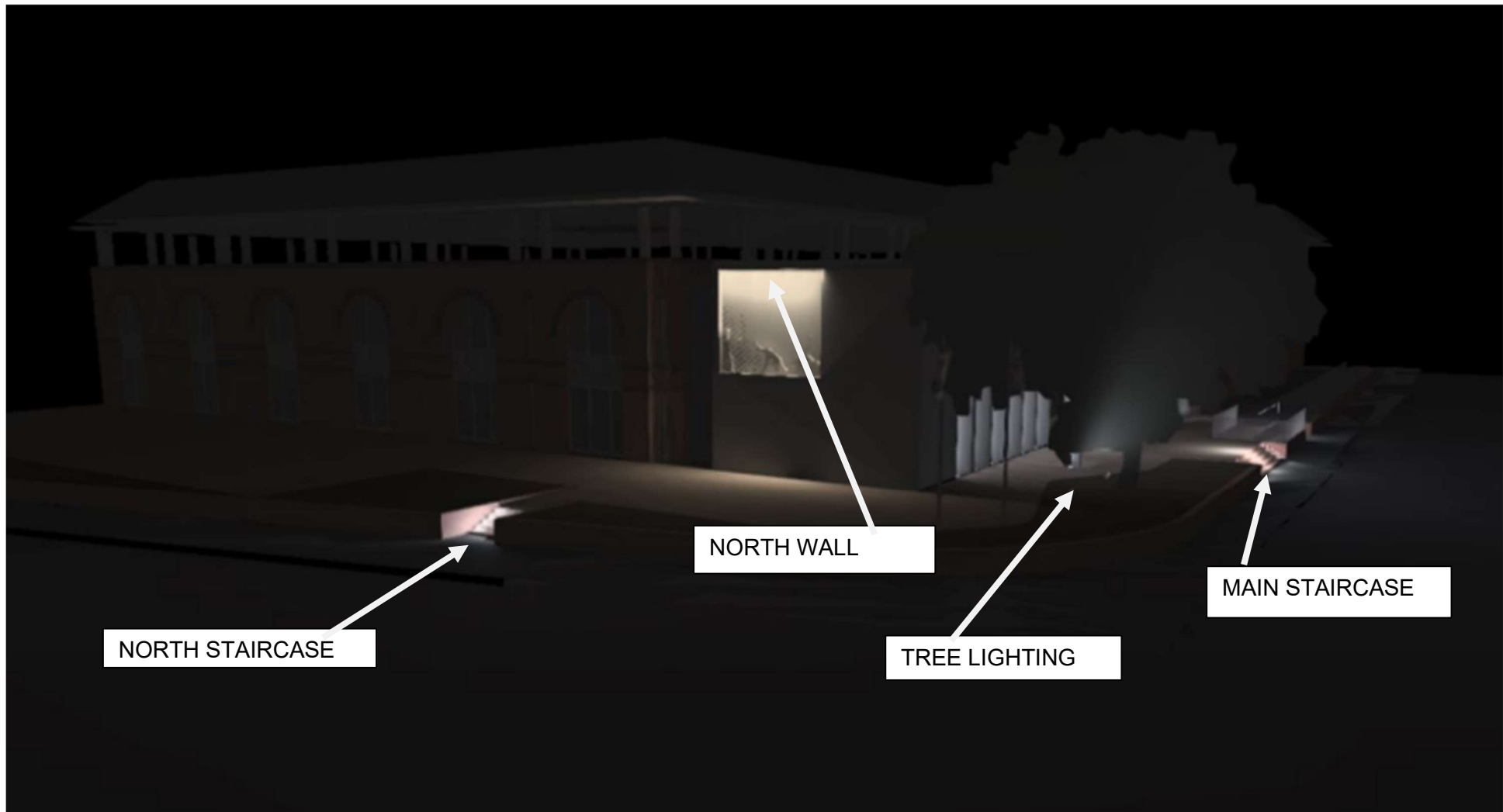
8. EXTERNAL LIGHTING 6a OUTPUT (PRE-CURFEW) LIGHTING DESIGN



Plan View – External Lighting 6a - Output (Pre-Curfew) - Showing calculation boundary zone box and horizontal lines that represent the adjacent properties. These vertical illuminance faces are used in calculation of the Isolux layout show the light trespass.



RBC Civic Library Relocation – 3D view - Exterior Lighting 6a output (Pre-curfew)



RBC Civic Library Relocation – 3D view - Exterior Lighting 6a output (Pre-curfew)

9. EXTERNAL LIGHTING 6a - OUTPUT (PRE-CURFEW) – MASTER TRESPASS/ SPILL LIGHT CALCULATIONS

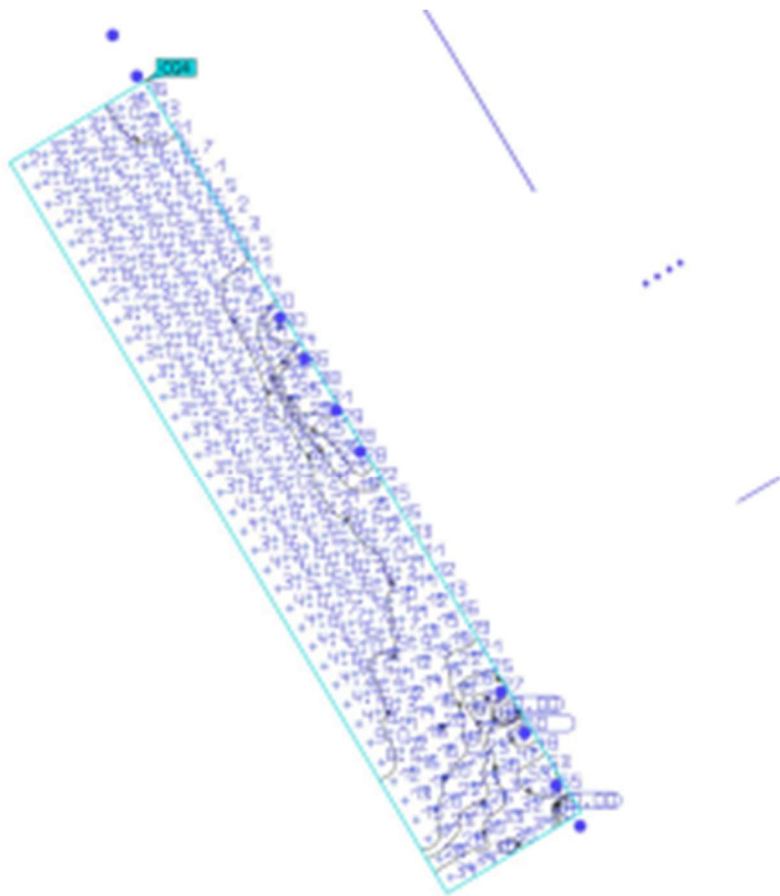
We have provided DIALUX calculations which show Isolux lines at ground level from the whole installation based on the reduced output pre curfew lighting level.

A copy of the Isolux contour map that shows overall plan of the external lighting levels across the site of the ground floor, the map shows the light spill levels down to 1 lux, in relation with adjacent properties when operating between the pre curfew hours of 07.00hrs and 23.00 hrs.

It can be seen from the Isolux distribution that the lighting levels will comfortably comply with the requirements of BS 12464-2 i.e., 10 Lux.

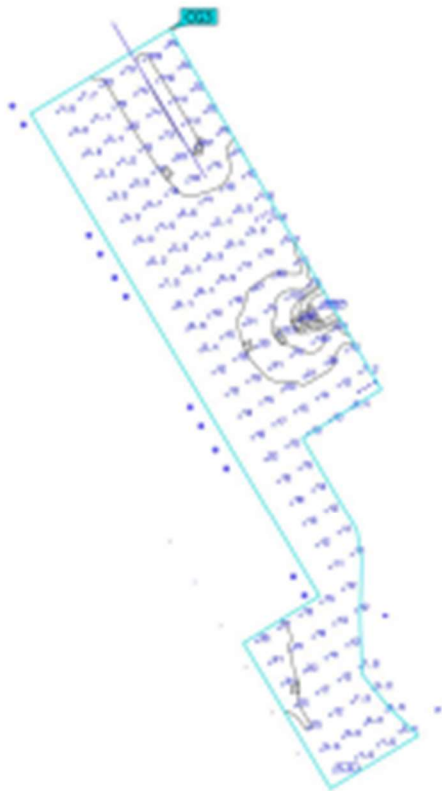
An Isolux contour map showing light spillage/ light trespass to 1 Lux.

RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
Calculation Results – Spill Light/ Light Trespass Entrance Under Entrance Canopy & Colonnade



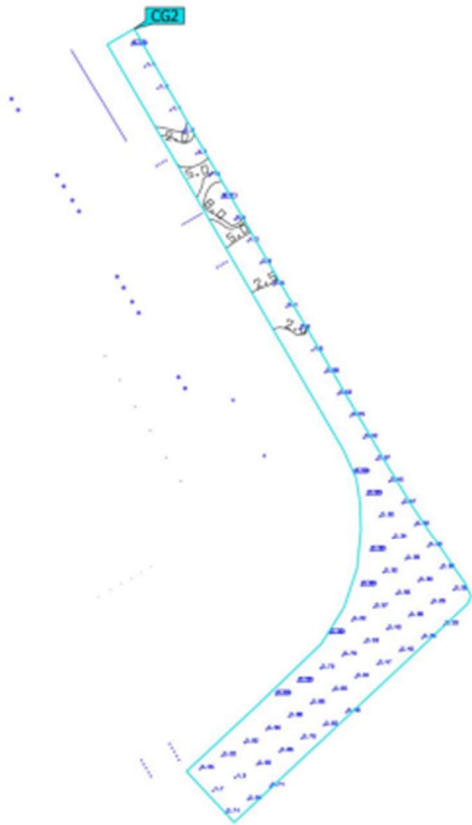
Properties	E	Emin	Emax	Uo (g)	g²	Index
Under entrance canopy Perpendicular Illuminance Height: 0.900 m	12.2 lx	0.00 lx	59.7 lx	0.00	0.00	CG4

RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
Calculation Results – Spill Light/ Light Trespass West Elevation



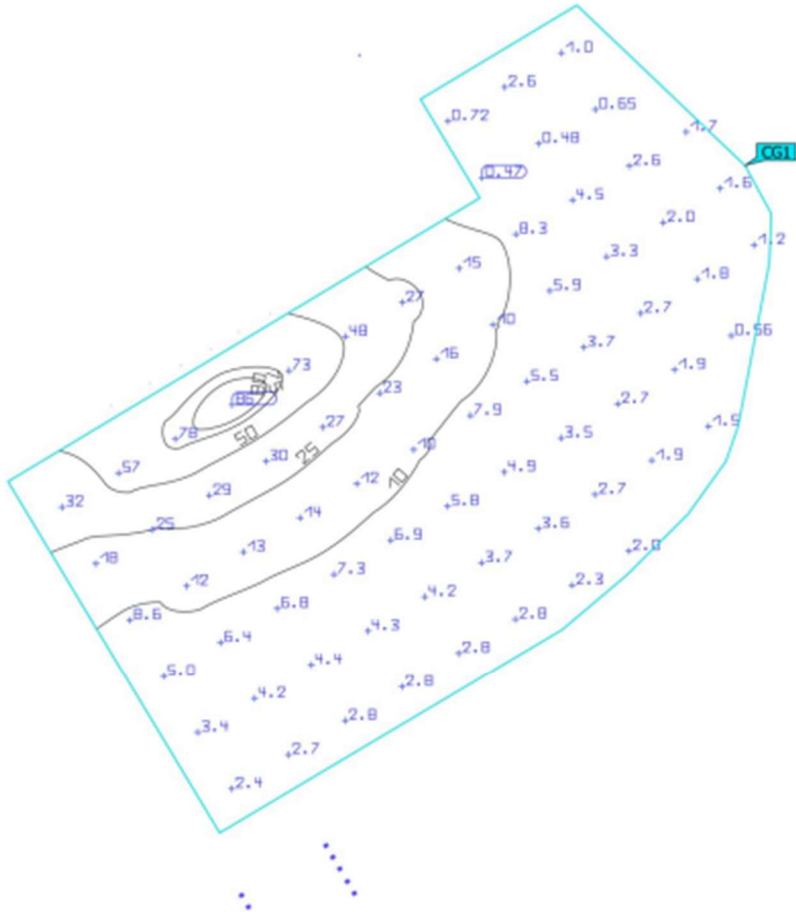
Properties	E	Emin	Emax	Uo (gr)	g2	Index
Outdoor walkways Perpendicular illuminance Height: 0.900 m	40.7 lx	1.29 lx	1897 lx	0.032	0.001	CG3

RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
 Calculation Results – Spill Light/ Light Trespass North West Elevation



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Adjacent surrounding premise Perpendicular illuminance Height: 0.170 m	1.11 lx	0.00 lx	8.94 lx	0.00	0.00	CG2

RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
 Calculation Results – Spill Light/ Light Trespass North Elevation



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Outdoor seating area Perpendicular illuminance Height: 0.867 m	11.7 lx	0.47 lx	86.1 lx	0.040	0.005	CG1

10. EXTERIOR LIGHTING 6a OUTPUT (PRE- CURFEW) – LIGHTING CALCULATIONS

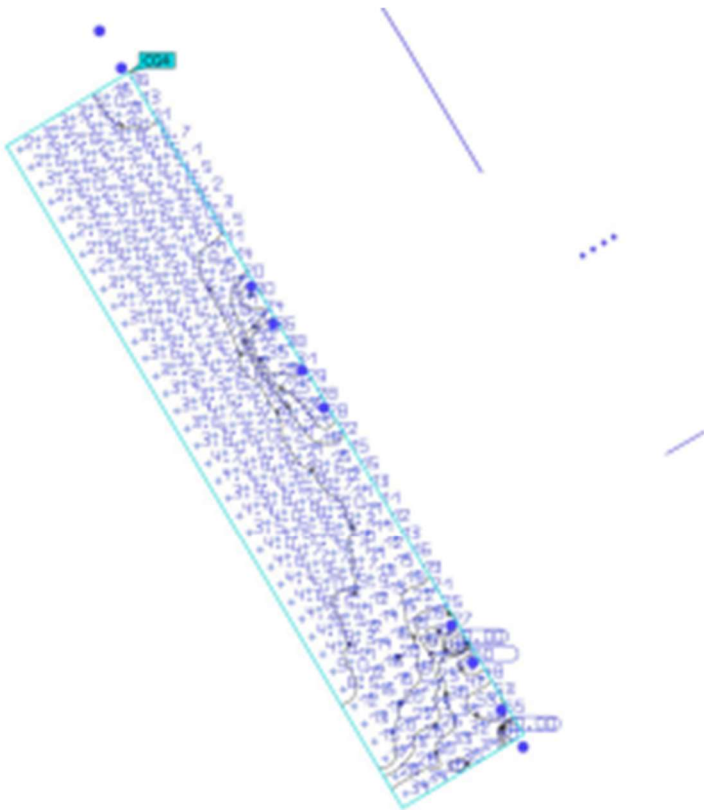
Drawings and the accompanying manufacturer's calculations and data sheets, show the pre -curfew lighting scheme for the:

Ground floor – Entrance Canopy lighting
Ground floor – Colonnade Lighting
Ground floor – Tree Lighting
Ground floor – Art Wall Lighting
Ground floor – Ramp/ Signage
Ground floor – Staircase/ Handrail Lighting

With the illuminance levels shown throughout the site and at the boundaries. The calculation model was prepared using industry standard software, Relux. It shows that adequate levels of lighting have been achieved on the site with minimal effect on the surrounding area, as required by the various standards.

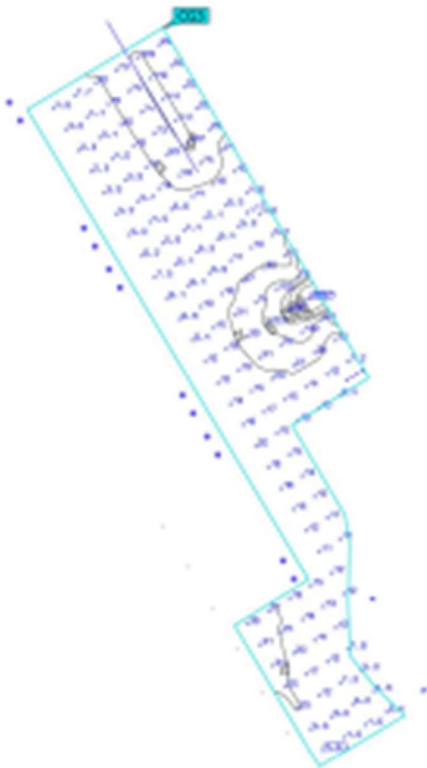
11. RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre-Curfew) Calculation Results
– Plan View c/w External Luminaire Locations

RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
 Calculation Results – Under Entrance Canopy & Colonnade Lighting Level



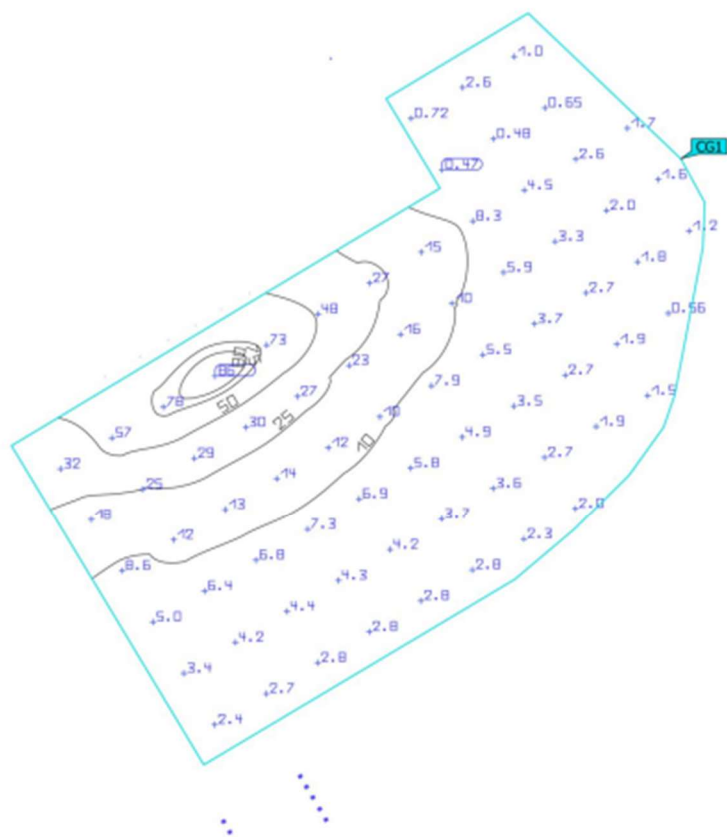
Properties	E	Emin	Emax	Uo (g)	g²	Index
Under entrance canopy Perpendicular illuminance Height: 0.900 m	12.2 lx	0.00 lx	59.7 lx	0.00	0.00	CG4

RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
 Calculation Results – Public Realm Lighting Level



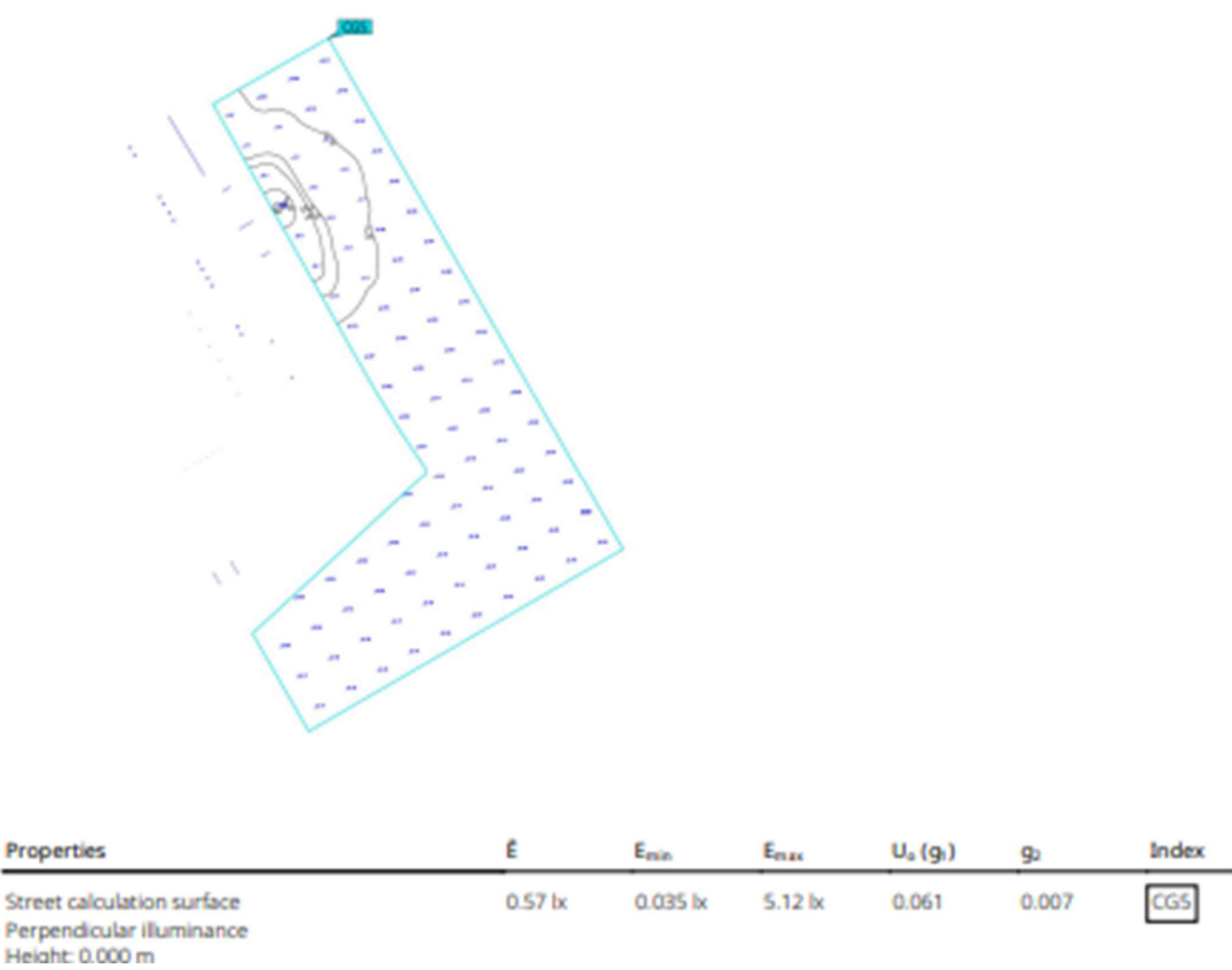
Properties	E	Emin	Emax	Uo (g)	g²	Index
Outdoor walkways Perpendicular illuminance Height: 0.900 m	40.7 lx	1.29 lx	1897 lx	0.032	0.001	CG3

RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew) Calculation Results – Seating Area Infront of Art wall Lighting Level



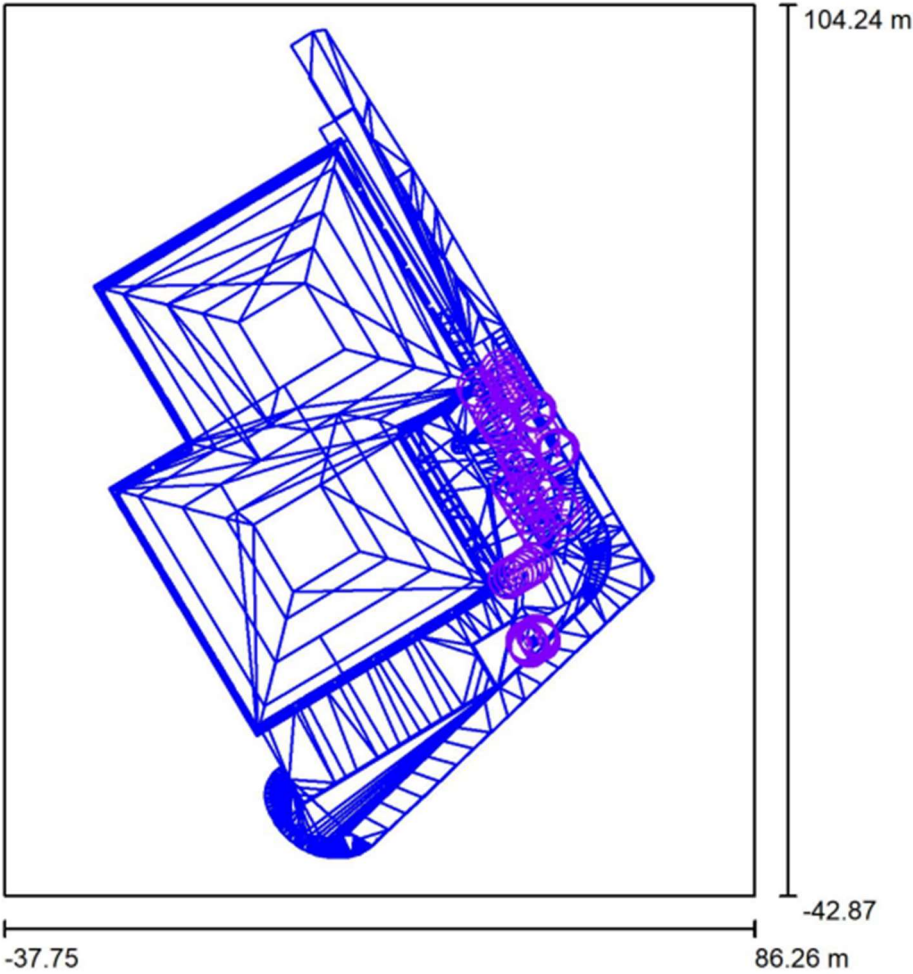
Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Outdoor seating area Perpendicular illuminance Height: 0.867 m	11.7 lx	0.47 lx	86.1 lx	0.040	0.005	CG1

RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
 Calculation Results – Street Lighting In front of Main Staircase Level (Lux)



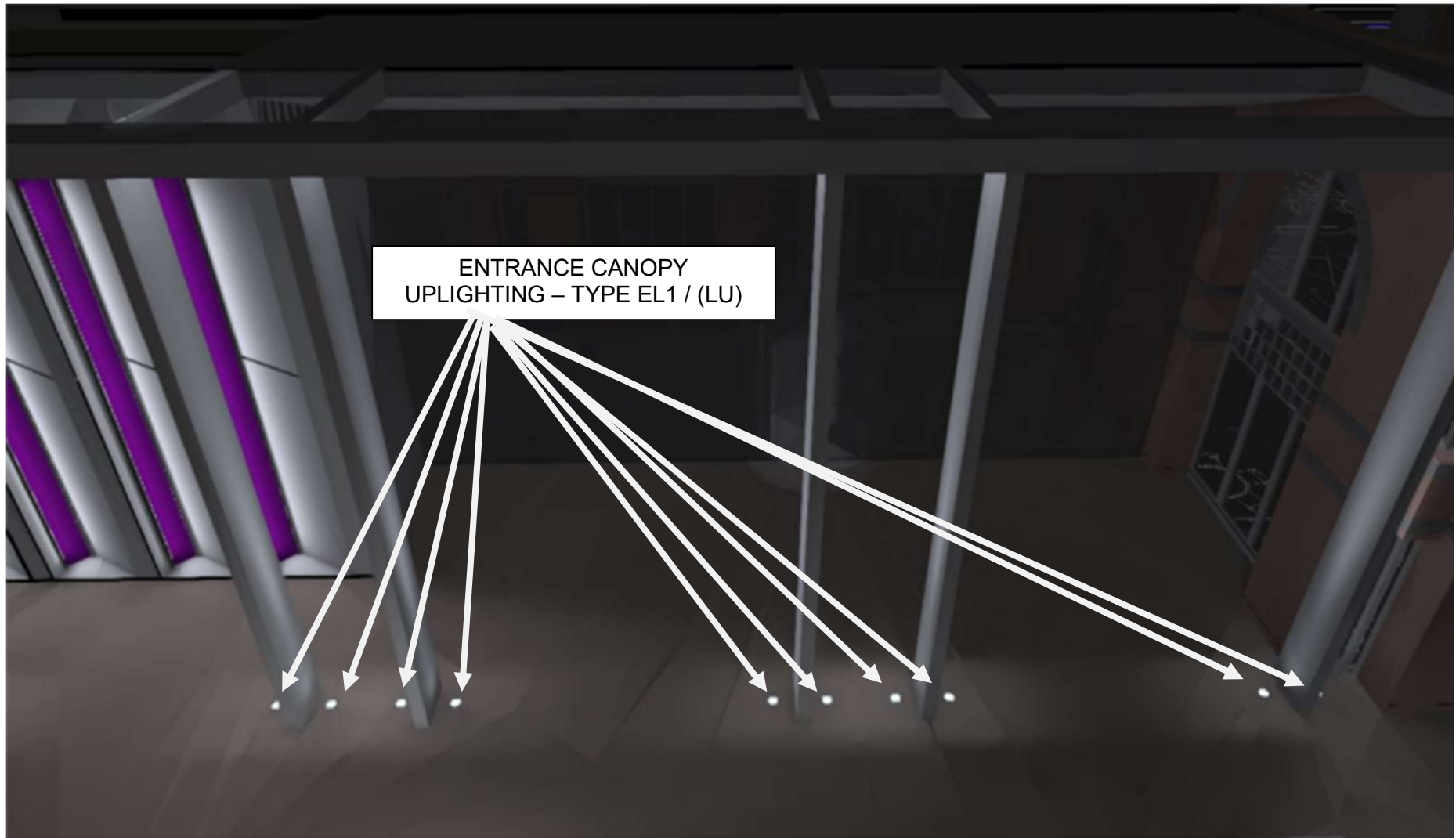
12. EXTERIOR LIGHTING 6a OUTPUT (PRE-CURFEW) – SKY GLOW CALCULATION

RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
Calculation Results – Sky Glow Calculation



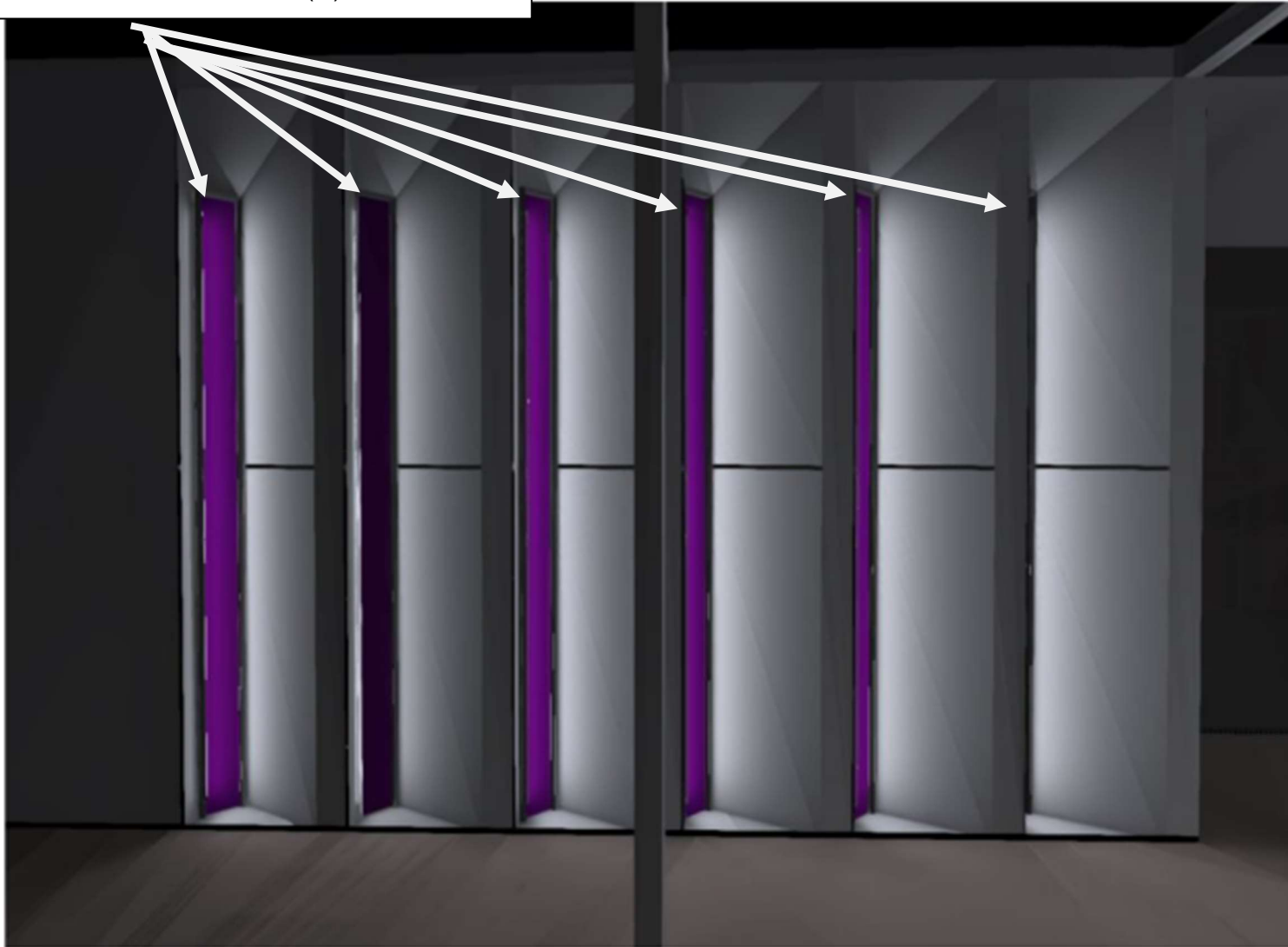
Maintenance factor: 0.80, ULR (Upward Light Ratio): 15.0%

13. EXTERIOR LIGHTING 6a OUTPUT (PRE-CURFEW) – 3D VIEWS

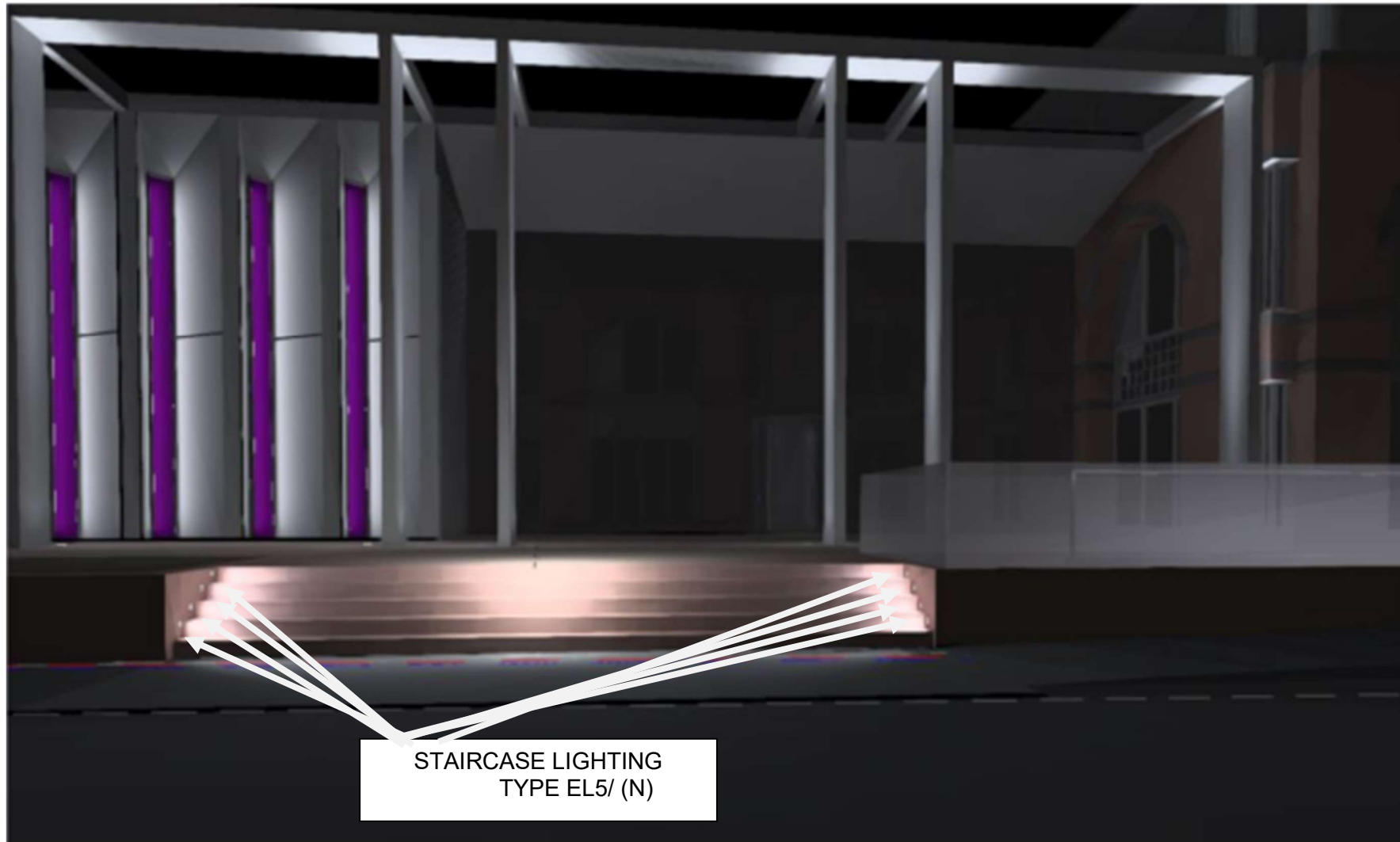


**RBC Civic Library Relocation - Exterior Lighting 6a Output (Pre- Curfew)
Calculation Results – 3D Illuminance View - Looking at the Entrance Columns**

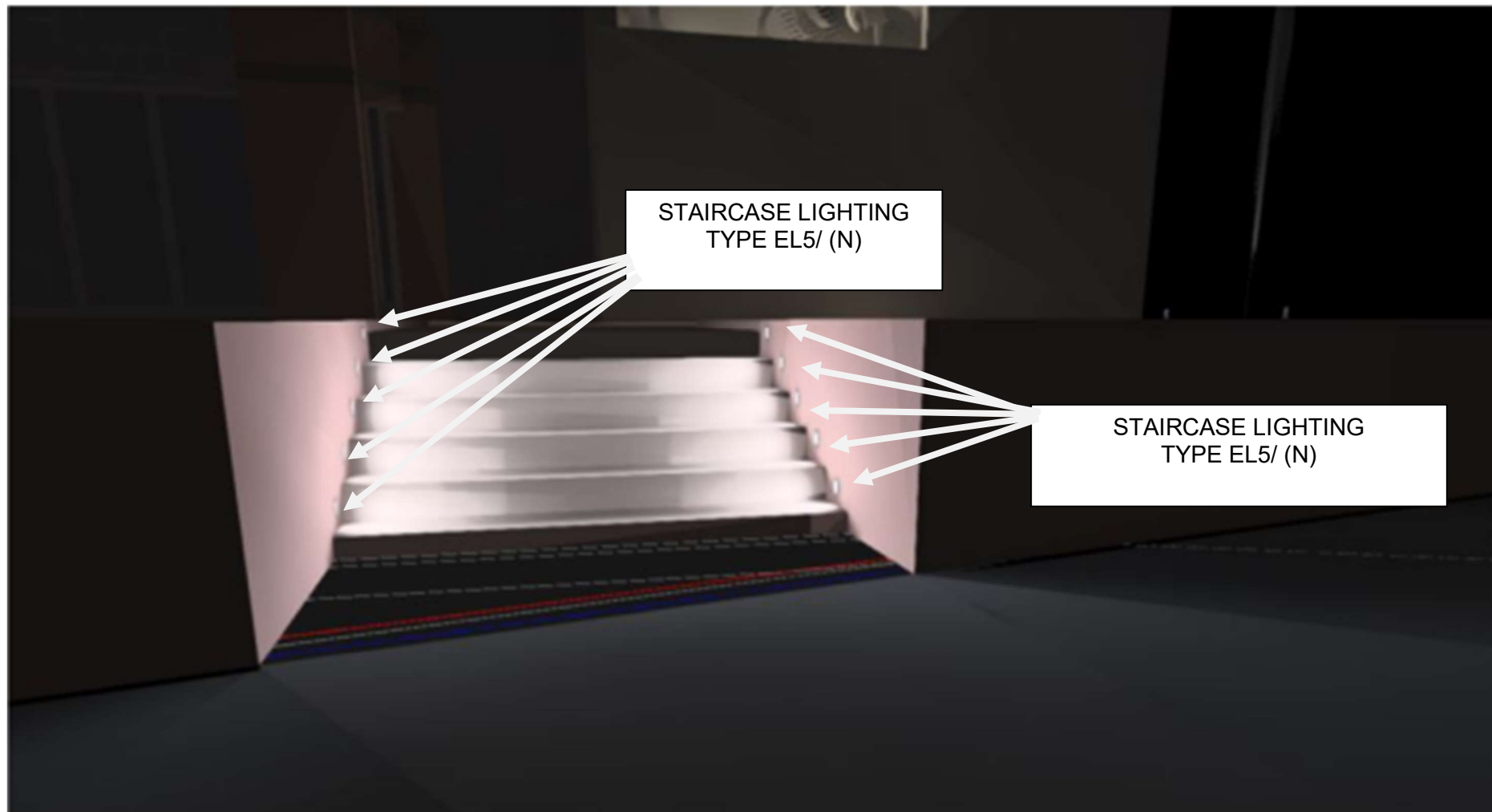
COLONNADE REBATE LIGHTING
TYPE EL2/ (U)



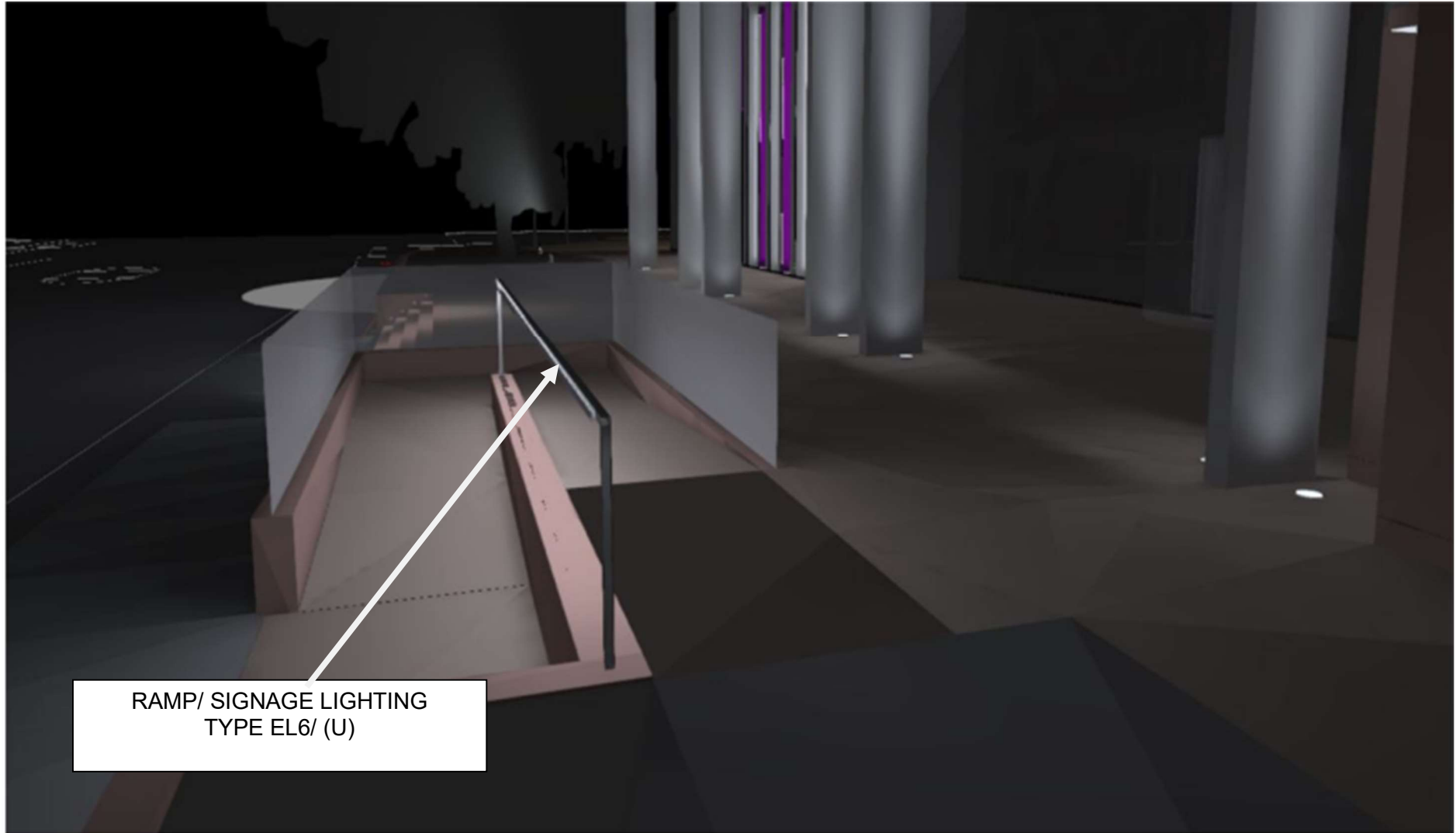
RBC Civic Library Relocation - Exterior Lighting 6a Output (Pre- Curfew)
Calculation Results – 3D Illuminance View - Looking at the Colonnades.



RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
Calculation Results – 3D Illuminance View - Looking Main Entrance Staircase & Front Elevation



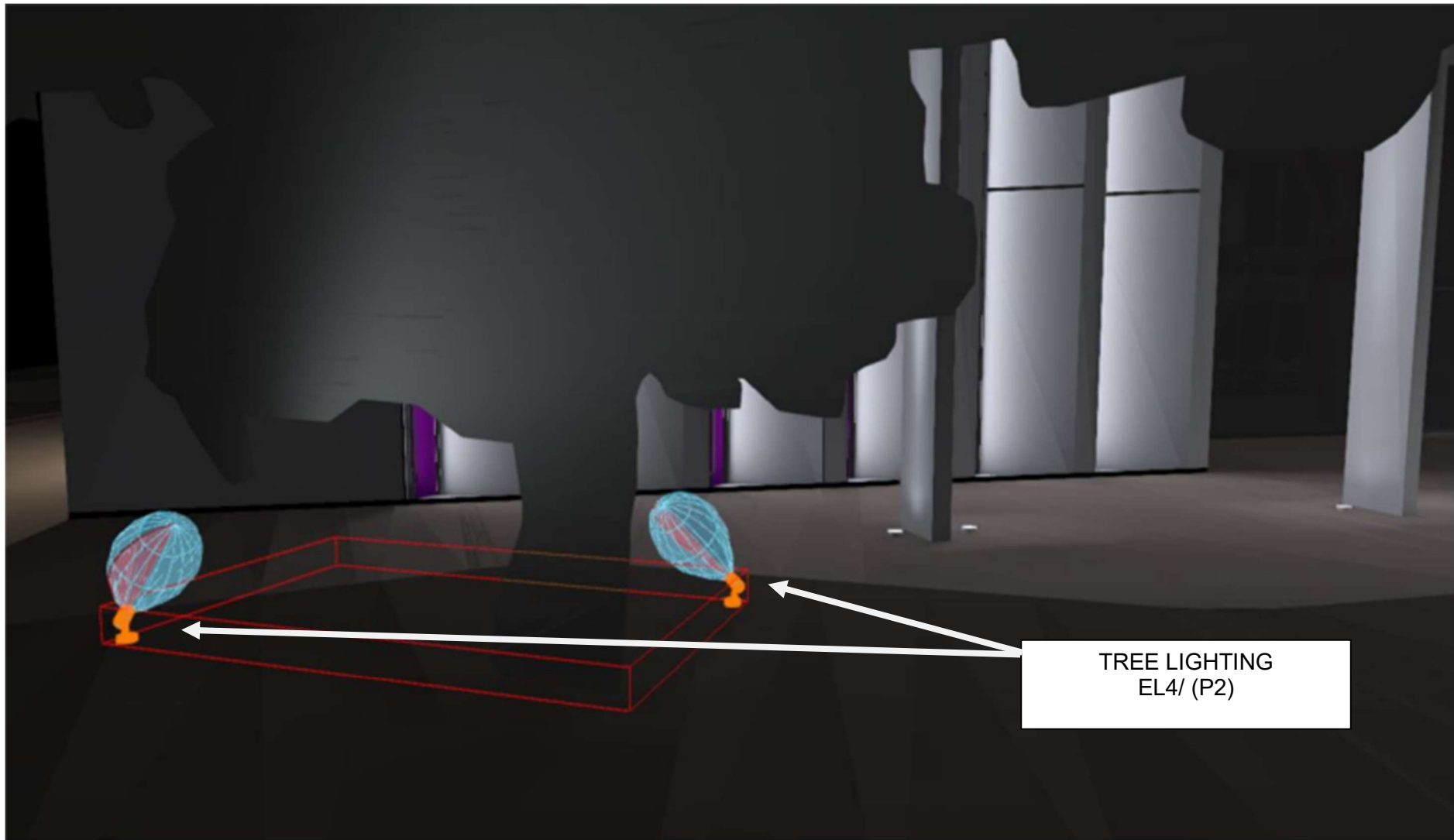
RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
Calculation Results – 3D Illuminance View - Looking Secondary staircase In Front of Art Wall



RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
First Floor Walkway Lighting View – 3D Illuminance – Looking at the Ramp/ Signage lighting



**RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
Second Floor Walkway Lighting View – 3D Illuminance – Looking at the Art Wall**



RBC Civic Library Relocation – Exterior Lighting 6a Output (Pre- Curfew)
Third Floor Walkway & Terrace Lighting View – 3D Illuminance – Looking at the Tree Lighting

14. RBC CIVIC LIBRARY RELOCATION – EXTERNAL LIGHTING 6b SECURITY LIGHTING POST-CURFEW LIGHTING DESIGN

RBC CIVIC LIBRARY RELOCATION EXTERNAL LIGHTING 6b – SECURITY LIGHTING (POST-CURFEW) – MASTER TRESPASS/ SPILL LIGHT CALCULATIONS

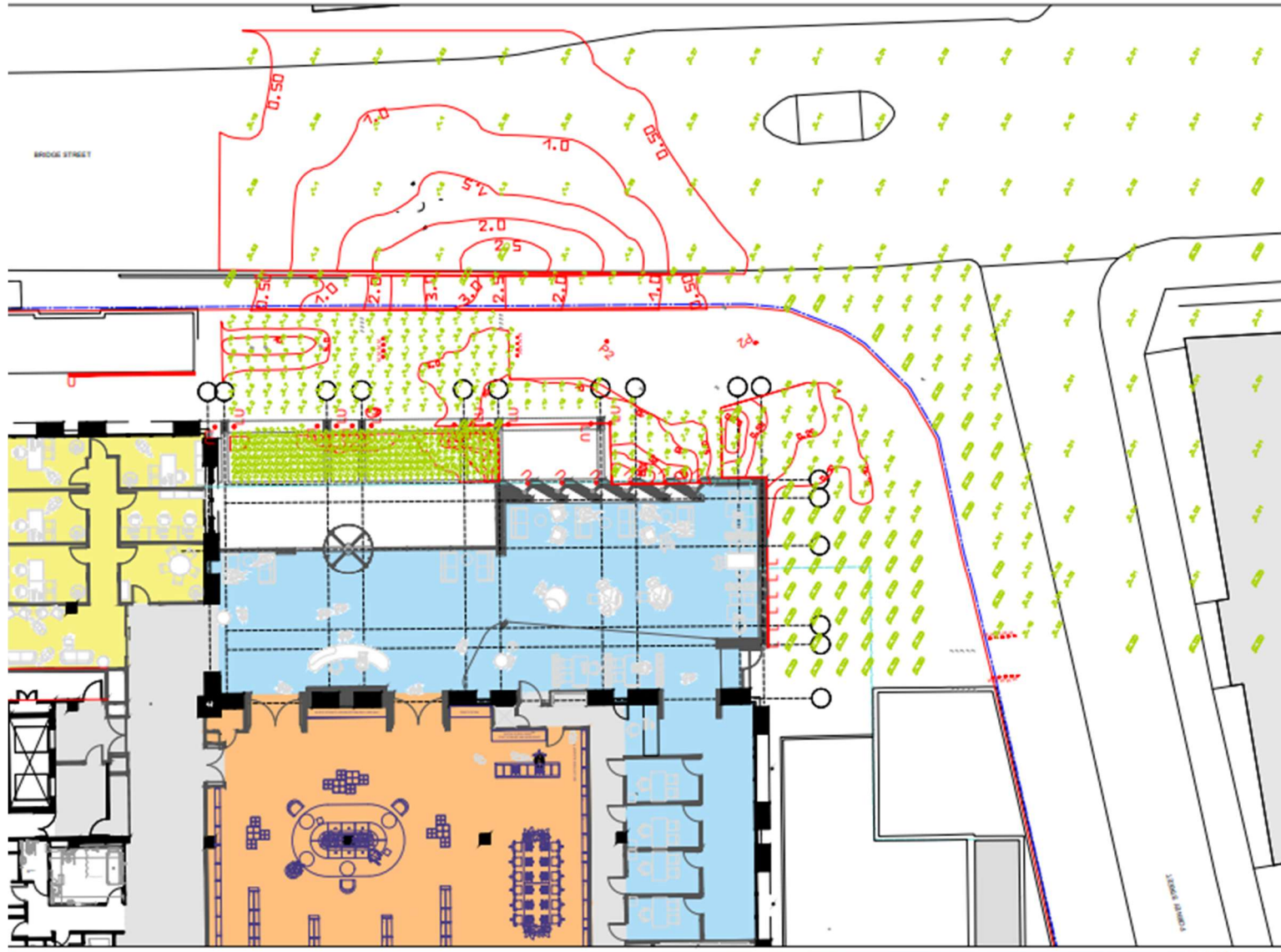
We have provided DIALUX calculations which show Isolux lines at ground level from the whole installation based on the reduced output lighting level (post-curfew)

A copy of the Isolux contour map that shows overall plan of the external lighting levels across the site of the ground floor, the map shows the light spill levels down to 1 lux, in relation with adjacent properties when operating between the post curfew hours of 23.00hrs and 07.00 hrs.

It can be seen from the Isolux distribution that by switching off the lighting in strategic locations and hence reducing the overall light level post curfew light levels will comfortably comply with the requirements of BS 12464-2

An Isolux contour map showing light spillage/ light trespass to 1 Lux.

All lighting will be provided with Dali lighting control and will be strategically.



RBC Civic Library Relocation Plan View – External Lighting 6b – Security Lighting (Post-Curfew) - Showing calculation boundary zone box This Isolux layout shows the light trespass. It can be seen that in security lighting mode the 1 lux Isolux is now closer to the premises due to the lower light level not radiating as far as with the output pre-curfew model.

15. RBC CIVIC LIBRARY RELOCATION EXTERIOR LIGHTING 6b SECURITY LIGHTING (POST-CURFEW) – OVERALL LIGHTING CALCULATIONS

The layout drawing and the accompanying manufacturer's calculations and data sheets, show the post -curfew lighting scheme for the:

Ground floor – Overall public realm lighting.

With the illuminance levels shown throughout the site and at the boundaries. The calculation model was prepared using industry standard software, DIALUX. It shows that adequate levels of lighting have been achieved on the site with minimal effect on the surrounding area, as required by the various standards.

All luminaires to be LED type provided with DALI control gear, which will allow luminaires to be dimmed to any prescribed level but within the environmental zone E4 maximum limit of 25 lux.

16. Proposed External Luminaire Types

- EL- 1 Entrance Column Uplight (**Ref. LU**)
- EL- 2 Colonnade Lighting (**Ref. U**)
- EL- 3 Art wall Lighting (**Ref. L**)
- EL- 4 Tree Lighting (**Ref. P2**)
- EL- 5 Step Lighting (**Ref. W**)
- EL- 6 Handrail & Ramp Lighting (**Ref. U**)
- EL-
- EXL-Existing Lamp Posts

Proposed Specified External luminaires.

REF.	QUANTITY	ARTICLE NUMBER	ARTICLE NAME	EQUIPMENT
EL1 (LU) CANOPY	12	E141 +X203.04	LIGHTUP 200mm Ø Recessed floor luminaire c/w adjustable super spot optic & Dali dimmable control gear	3000 ⁰ K Monochrome warm white LED's 432 lm system 11.9W LED 36.3 Lm/ W
EL2 (U) COLONNADE	18 (External Elevation Only)	E417 & E424	UNDERScore INOUT Wall surface top bend 16mm version LED c/w High linear profile & DALI & PWM Dimmer control	3000 ⁰ K Monochrome warm white LED's 273 lm system 3.7W LED 73.7 Lm/ W
EL3 (L) ART WALL	6	UE82.15	LINEALUCE Mini 27R Wall mounted c/w Wall grazing spot optic.	3000 ⁰ K Monochrome warm white LED's 886 lm system 11.5W LED 77 Lm/ W
EL4 (P2) TREE LTG.	2	EH94 + X272	PALCO INOUT Ground spike spotlight LED c/w integrated electronic control & flood optic.	3000 ⁰ K Monochrome warm white LED's 665 lm system 10.9W LED 61 Lm/ W
EL5 (W) STAIR LTG.	18	E103 + X215	LIGHTUP ORBIT 80mm Ø Recessed floor orbit c/w wall wash optic & Dali constant current PSU	3000 ⁰ K Monochrome warm white LED's 148 - 200 lm system 3W – 4.2W LED 47.6 Lm/ W
EL6 (U) HANDRAIL/ RAMP SIGNAGE	2	E417 & E424	UNDERScore INOUT Handrail & Signage surface top bend 16mm version LED c/w linear profile & DALI & PWM Dimmer control	3000 ⁰ K Monochrome warm white LED's 273 lm system 3.7W LED 73.7 Lm/ W
EL7 AMENITY LTG.	2			

17 Glare

The measures taken to avoid glare area as follows:

- Luminaires to be specified to be as 3000°K colour temperature (this helps reduce the blue component at the shorter wavelength part of the spectrum). A lower correlated colour temperature (CCT) generally, but not always corresponds to a relatively low proportion of blue wavelengths in the visible spectrum, as CCT increases the appearance becomes a cooler blueish- white colour.
- As LED's to be provided will have precise optical control, which will aid the luminaires spectral distribution and will aid animals who also possess a circadian clock that regulates aspects of their activity and physiology on a cycle that usually approximates 24 hours. We have restricted the upward light component for almost all luminaires on the installation to avoid confusing patterns of light, those with upward light will have a pencil beam, which illuminate any spill light.

18 Conclusions

It can be seen from the summary sheet located within the Appendix that the sky glow calculation for the proposed luminaires for the external lighting scheme passes as it falls below that of the maximum of 15% threshold for an E4 external lighting scheme based on the current requirements of BS 12464-2.

It can be seen from the report that the Light trespass calculations for the proposed external lighting luminaires all pass the E4 Environmental requirements. It may be prudent however to ensure that all luminaires are DALI dimmable controlled which will enable all proposed external lighting lux levels to be amended to security level. Post curfew should the need arise. This will mean some luminaires are switched off using the DALI dimmable lighting control post curfew to ensure post curfew lighting limits are compliant. Lighting levels will be reduced to security level but still remain safe for public access, egress and safe movement along the public realm.

It can be seen that the source intensity for all proposed external luminaires is compliant.

By adopting the lighting strategy including criteria, luminaries, lighting control and switching methods etc. outlined in this report it can be concluded that:

- Lighting levels at the site boundary will be as regulated by the current standards.
- The proposed luminaires and the provided lighting levels should not cause excessive glare to neighbouring properties.
- The majority of the luminaries will not be directly visible to neighbouring properties.
- The effect on the night sky and ecology should be minimal inside the site and zero outside the site.
- The lighting scheme will be energy efficient utilizing luminaires with high efficiency LED light sources, combined with efficient lighting controls.
- An adequate and safe level of lighting can be provided for site tasks, amenity and security, whilst maintaining a minimal impact on the site surroundings, environment and neighbouring properties.

We trust that we have provided sufficient information to allow you to proceed with this project.

19 Appendix A – Manufacturers Info.

19.1 Manufacturers Data Sheets

• CANOPY LIGHTING - EL-1 (LU) LIGHTUP - 200mm Ø Recessed floor luminaire

Light Up

Design IGuzzini

IGuzzini

Last information update: October 2023

Product configuration: E141+X203.04

E141: Recessed floor luminaire Earth D=200mm - Warm White - Adjustable Super Spot optic - DALI
X203.04: Plastic casing for installation on floors + end cap - Black



Product code

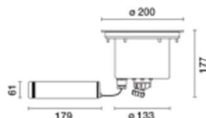
E141: Recessed floor luminaire Earth D=200mm - Warm White - Adjustable Super Spot optic - DALI

Technical description

Recessed luminaire applicable to the floor or ground, designed for fitting monochrome white LED sources, for illumination, adjustable optic, with DALI dimmable incorporated electronic control gear. The round frame has a diameter D=200 mm; the body and frame are made of AISI 304 stainless steel with sodium-calcium extra clear glass, thickness 15 mm. Stainless steel body coated with black paint. The luminaire is secured to the outer casing by means of two TORX-type screws that ensure proper anchoring. Inclusive of LED circuit, methacrylate lens and black plastic cover. The luminaire is supplied with an external orientation system (patent pending), without having to open the product, inclusive of double graduated scale: 0-30° with respect to horizontal plane and ±90° with respect to vertical axis. Black plastic (PPS) external box containing the power supply unit. The product is wired using an A2 stainless steel cable gland, with type A07RNF 4x1 mm² outgoing power cord having L=1200 mm. The cable is equipped with an anti-transpiration device (IP68) consisting of a silicone seal placed on the power cable and housed inside the power supply box. The outer casing for installation can be ordered separately from the plastic optical assembly. The assembly made up of the frame, optical assembly and outer casing guarantees 5000 kg resistance to static loads. Maximum glass surface temperature is lower than 40°C.

Installation

The product is secured to the outer casing by means of two TORX-type screws. The luminaire can be installed recessed, floor-standing, using an outer casing or on the ground.



Colour
Steel (13)

Weight (Kg)
3.4

Mounting

Floor recessed|ground recessed

Wiring

Product inclusive of 220-240 VAC DALI dimmable electronic control gear positioned in a separate box from the optical assembly and with outgoing cable.

Notes

IP68 degree of protection on the product and cable when using IP68 connectors * The product is not suitable for installation in swimming pools and fountains. Overvoltage protection: 4KV Common mode, 3,5KV differenzial mode

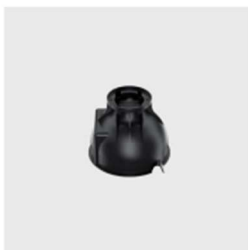
Complies with EN60598-1 and pertinent regulations



Complete immersion for limited periods, not suitable for use in swimming pools or fountains.



The lighting fixtures were designed and tested to withstand a static load of up to 50000 N and to resist drive-over stress by vehicles with tires. The fixtures cannot be used in lanes subjected to horizontal stresses due to acceleration, braking and / or changes of direction.



Accessory code

X203.04: Plastic casing for installation on floors + end cap - Black

Technical description

Made of plastic (polypropylene). Inclusive of front cap with system for extracting the cables and double cable entry.

Installation

Floor-standing (concrete)

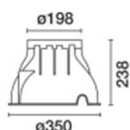
Colour
Black (04)

Weight (Kg)
1.38

Mounting

ground surface|Floor recessed|ground recessed

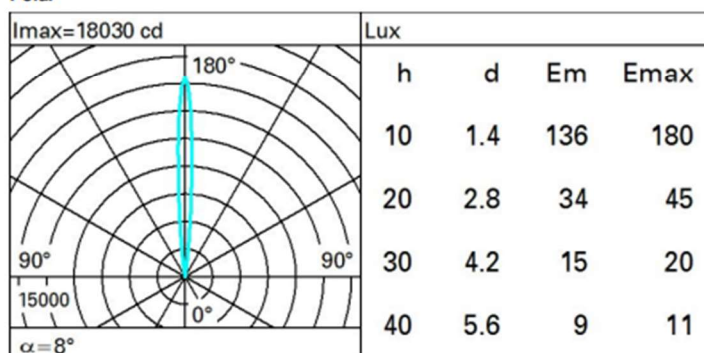
Complies with EN60598-1 and pertinent regulations



Technical data

Im system:	432	Life Time LED 2:	44,000h - L80 - B10 (Ta 40°C)
W system:	11.9	Ballast losses [W]:	4.1
Im source:	830	Lamp code:	LED
W source:	7.8	Number of lamps for optical assembly:	1
Luminous efficiency (lm/W, real value):	36.3	ZVEI Code:	LED
Im in emergency mode:	-	Number of optical assemblies:	1
Total light flux at or above an angle of 90° [Lm]:	432	Intervallo temperatura ambiente:	from -25°C to 45°C.
Light Output Ratio (L.O.R.) [%]:	52	Power factor:	See installation instructions
Beam angle [°]:	8°	Inrush current:	10 A / 200 µs
CRI (minimum):	80	Maximum number of luminaires of this type per miniature circuit breaker:	B10A: 18 luminaires B16A: 30 luminaires C10A: 31 luminaires C16A: 51 luminaires
Colour temperature [K]:	3000	Overvoltage protection:	5kV Common mode & 4kV Differential mode
MacAdam Step:	2	Control:	DALI-2
Life Time LED 1:	85,000h - L80 - B10 (Ta 25°C)		

Polar



UGR diagram

Corrected UGR values (at 830 lm bare lamp luminous flux)										
Reflect.:										
ceiling	0.70	0.70	0.50	0.50	0.30	0.70	0.70	0.50	0.50	0.30
walls	0.50	0.30	0.50	0.30	0.30	0.50	0.30	0.50	0.30	0.30
work pl.	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Room dim	viewed crosswise					viewed endwise				
x y										
2H 2H	-3.6	-1.6	-3.2	-1.3	-1.0	-3.6	-1.6	-3.2	-1.3	-1.0
3H 3H	-3.6	-2.6	-3.3	-2.3	-2.0	-3.6	-2.6	-3.2	-2.2	-1.9
4H 4H	-3.6	-3.0	-3.3	-2.7	-2.4	-3.6	-2.9	-3.2	-2.6	-2.3
6H 6H	-3.7	-3.3	-3.3	-3.0	-2.7	-3.6	-3.2	-3.2	-2.9	-2.6
8H 8H	-3.8	-3.2	-3.4	-2.9	-2.5	-3.7	-3.1	-3.3	-2.8	-2.5
12H 12H	-3.9	-3.1	-3.5	-2.7	-2.4	-3.8	-3.0	-3.4	-2.7	-2.3
4H 2H	-3.6	-2.9	-3.2	-2.6	-2.3	-3.6	-3.0	-3.3	-2.7	-2.4
3H 3H	-3.8	-3.0	-3.4	-2.7	-2.3	-3.8	-3.0	-3.5	-2.7	-2.3
4H 4H	-4.1	-2.7	-3.7	-2.3	-1.9	-4.1	-2.7	-3.7	-2.3	-1.9
6H 6H	-4.4	-2.6	-3.9	-2.1	-1.6	-4.4	-2.6	-3.9	-2.1	-1.6
8H 8H	-4.5	-2.6	-4.0	-2.1	-1.6	-4.5	-2.6	-4.0	-2.1	-1.6
12H 12H	-4.6	-2.7	-4.1	-2.2	-1.7	-4.6	-2.7	-4.1	-2.2	-1.7
8H 4H	-4.5	-2.6	-4.0	-2.1	-1.6	-4.5	-2.6	-4.0	-2.1	-1.6
6H 6H	-4.5	-3.0	-4.0	-2.5	-2.0	-4.5	-3.0	-4.0	-2.5	-2.0
8H 8H	-4.4	-3.4	-3.9	-2.9	-2.4	-4.4	-3.4	-3.9	-2.9	-2.4
12H 12H	-4.2	-3.8	-3.7	-3.3	-2.8	-4.2	-3.8	-3.7	-3.3	-2.8
12H 4H	-4.6	-2.7	-4.1	-2.2	-1.7	-4.6	-2.7	-4.1	-2.2	-1.7
6H 6H	-4.4	-3.4	-3.9	-2.9	-2.4	-4.4	-3.4	-3.9	-2.9	-2.4
8H 8H	-4.2	-3.8	-3.7	-3.3	-2.8	-4.2	-3.8	-3.7	-3.3	-2.8
Variations with the observer position at spacing:										
S = 1.0H	3.0 / -5.1					3.0 / -5.1				
1.5H	5.5 / -14.3					5.5 / -14.3				
2.0H	7.5 / -46.9					7.5 / -46.9				

• COLONNADE LIGHTING - EL- 2 (U) - UNDERSCORE INOUT - Surface Top Bend 16mm Version LED

Underscore InOut

Design iGuzzini

iGuzzini

Last information update: October 2023

Product configuration: E417

E417: Top-Bend 16mm version - Warm white Led - 24Vdc - L=754mm



Product code

E417: Top-Bend 16mm version - Warm white Led - 24Vdc - L=754mm

Technical description

Luminaire for indoor and outdoor architectural linear lighting – with warm white monochrome Leds – on a 24Vdc flexible white circuit, length L=754mm. The led circuit is completely IP68 encapsulated with a white (outside) and milky finish (over light emission) high performance polymer sheath: this material allows the device to be installed and used even at extreme temperatures: -30°C +45°C. Underscore InOut TOP-BEND can be used to create straight lines on flat and curved surfaces. Even, spotfree lighting is guaranteed along the entire strip profile up to the end parts. On both ends (not the head), the product is supplied with a cable L=80mm with IP68 male and female connectors fitted with an anti-detachment locknut. The product is supplied with stainless steel wires to stop the body from misshaping as this may damage the led circuit. Easy to install and a robust design for difficult environments (for example, it is salt water, UV and solvent resistant). Minimum curving radius 250mm for 16mm TOP-BEND versions. The luminaire technical characteristics conform to EN 60598-1 standards and particular requirements.

Installation

Surface-mounted (ceiling and wall) using accessories to be ordered separately. The installation accessories available include end-low aluminium profiles with slots (L=104mm) and intermediate-low aluminium profiles with no slots (L=998mm to be cut to size) that are used to secure the linear Underscore InOut, with its side exit for the cable with connector. Aluminium low clips (L=40mm) and AISI 316 stainless steel low clips (L=40mm) ideal for curved sections are available. High linear aluminium profiles (L=1000-2000mm) are available and high aluminium and AISI 316 stainless steel clips (L=40mm) that hide the cables with the connectors in the bottom part.

Colour

White (01)

Weight (Kg)

0.3

Mounting

wall arm|wall surface|ceiling surface

Wiring

24Vdc ±5% LED circuit. Constant voltage ballasts to be ordered separately, both IP20 and IP67 are available and suitable for outdoor installation. DALI 120W 24V dimming interface available (code no. MWP3) or DALI/DMX/1-10V 12÷48Vdc 4-channel dimming interface available with 6A per channel, (code no. 9639) suitable for both RGB Led and white Led versions. The ballast and led strip are connected via cables with IP68 female connectors (L=115-1550-3050-5050mm) or IP68 male connectors (L=115-1500mm).

Notes

Underscore InOut can be powered in series up to a maximum length of L=7004mm. The product is not suitable for installation in swimming pools and fountains. The lengths indicated can have a tolerance of +/- 4mm compared to the nominal length.

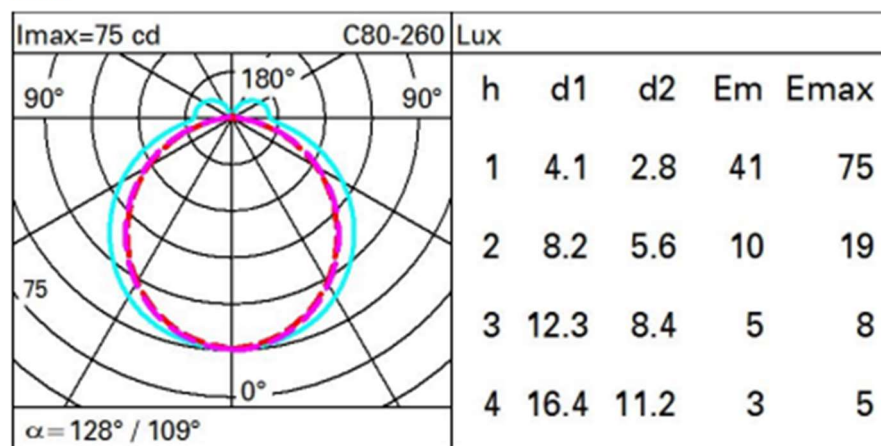
Complies with EN60598-1 and pertinent regulations



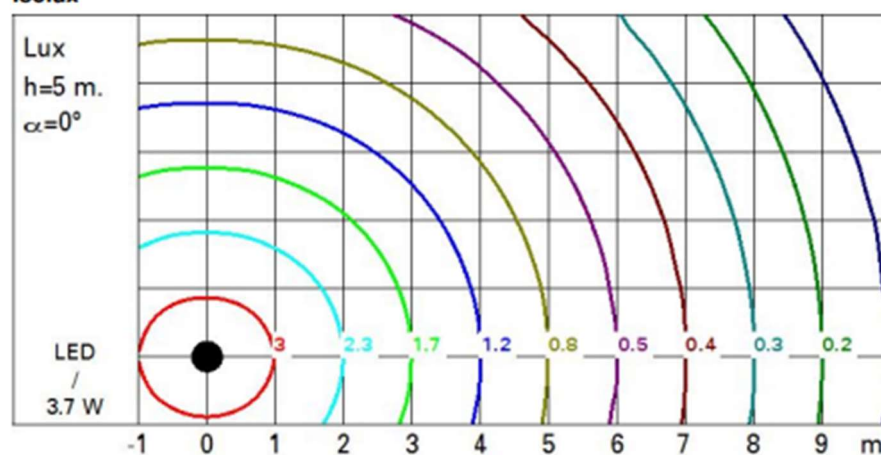
Technical data

Im system:	273	Life Time LED 1:	84,000h - L80 - B10 (Ta 25°C)
W system:	3.7	Life Time LED 2:	84,000h - L80 - B10 (Ta 40°C)
Im source:	-	Ballast losses [W]:	0
W source:	-	Voltage [Vin]:	24
Luminous efficiency (lm/W, real value):	73.7	Lamp code:	LED
Im in emergency mode:	-	Number of lamps for optical assembly:	1
Total light flux at or above an angle of 90° [Lm]:	35	ZVEI Code:	LED
Light Output Ratio (L.O.R.) [%]:	100	Number of optical assemblies:	1
CRI (minimum):	80	Intervallo temperatura ambiente:	from -30°C to 45°C.
Colour temperature [K]:	2800	LED current [mA]:	10
MacAdam Step:	3	Control:	PWM

Polar



Isolux



Last information update: October 2023

Product configuration: E417

E417: Top-Bend 16mm version - Warm white Led - 24Vdc - L=754mm

**Product code**

E417: Top-Bend 16mm version - Warm white Led - 24Vdc - L=754mm

Technical description

Luminaire for indoor and outdoor architectural linear lighting – with warm white monochrome Leds – on a 24Vdc flexible white circuit, length L=754mm. The led circuit is completely IP68 encapsulated with a white (outside) and milky finish (over light emission) high performance polymer sheath: this material allows the device to be installed and used even at extreme temperatures: -30°C +45°C. Underscore InOut TOP-BEND can be used to create straight lines on flat and curved surfaces. Even, spotfree lighting is guaranteed along the entire strip profile up to the end parts. On both ends (not the head), the product is supplied with a cable L=80mm with IP68 male and female connectors fitted with an anti-detachment locknut. The product is supplied with stainless steel wires to stop the body from misshaping as this may damage the led circuit. Easy to install and a robust design for difficult environments (for example, it is salt water, UV and solvent resistant). Minimum curving radius 250mm for 16mm TOP-BEND versions. The luminaire technical characteristics conform to EN 60598-1 standards and particular requirements.

Installation

Surface-mounted (ceiling and wall) using accessories to be ordered separately. The installation accessories available include end-low aluminium profiles with slots (L=104mm) and intermediate-low aluminium profiles with no slots (L=998mm to be cut to size) that are used to secure the linear Underscore InOut, with its side exit for the cable with connector. Aluminium low clips (L=40mm) and AISI 316 stainless steel low clips (L=40mm) ideal for curved sections are available. High linear aluminium profiles (L=1000-2000mm) are available and high aluminium and AISI 316 stainless steel clips (L=40mm) that hide the cables with the connectors in the bottom part.

Colour

White (01)

Weight (Kg)

0.3

Mounting

wall arm|wall surface|ceiling surface

Wiring

24Vdc $\pm 5\%$ LED circuit. Constant voltage ballasts to be ordered separately, both IP20 and IP67 are available and suitable for outdoor installation. DALI 120W 24V dimming interface available (code no. MWP3) or DALI/DMX/1-10V 12÷48Vdc 4-channel dimming interface available with 6A per channel, (code no. 9639) suitable for both RGB Led and white Led versions. The ballast and led strip are connected via cables with IP68 female connectors (L=115-1550-3050-5050mm) or IP68 male connectors (L=115-1500mm).

Notes

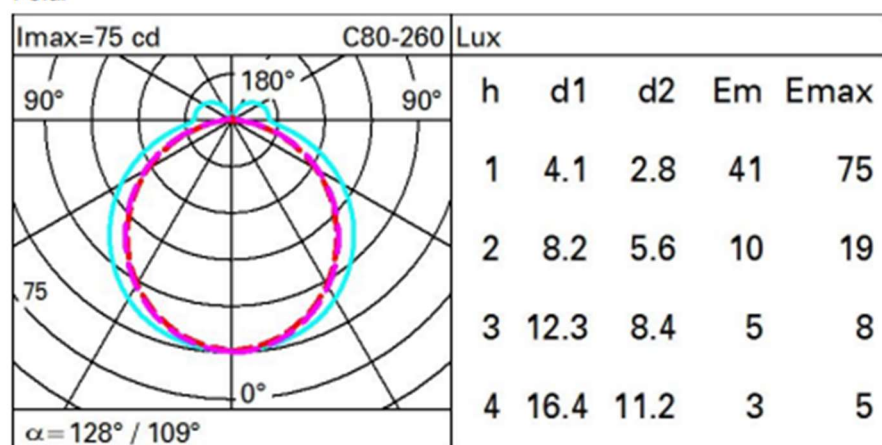
Underscore InOut can be powered in series up to a maximum length of L=7004mm. The product is not suitable for installation in swimming pools and fountains. The lengths indicated can have a tolerance of ± 4 mm compared to the nominal length.

Complies with EN60598-1 and pertinent regulations

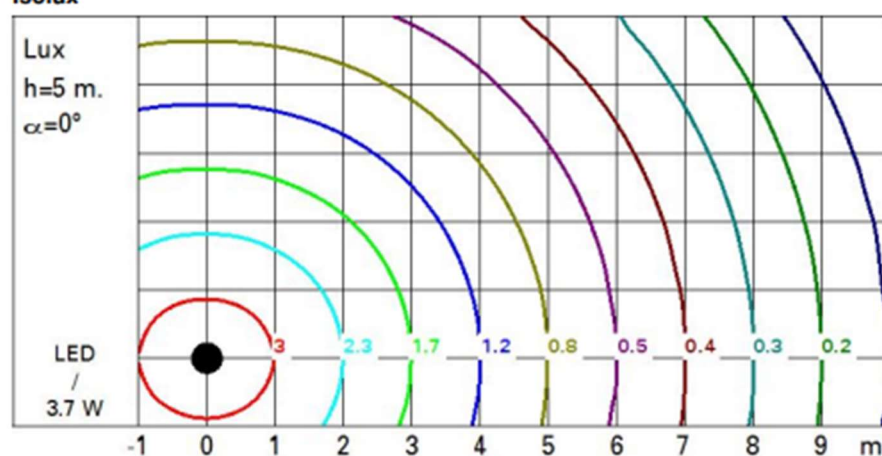
**Technical data**

lm system:	273	Life Time LED 1:	84,000h - L80 - B10 (Ta 25°C)
W system:	3.7	Life Time LED 2:	84,000h - L80 - B10 (Ta 40°C)
lm source:	-	Ballast losses [W]:	0
W source:	-	Voltage [Vin]:	24
Luminous efficiency (lm/W, real value):	73.7	Lamp code:	LED
lm in emergency mode:	-	Number of lamps for optical assembly:	1
Total light flux at or above an angle of 90° [Lm]:	35	ZVEI Code:	LED
Light Output Ratio (L.O.R.) [%]:	100	Number of optical assemblies:	1
CRI (minimum):	80	Intervallo temperatura ambiente:	from -30°C to 45°C.
Colour temperature [K]:	2800	LED current [mA]:	10
MacAdam Step:	3	Control:	PWM

Polar



Isolux



- **EL- 2 (U) LED Linear High Profile**

High linear profile - L=1000

Design IGuzzini

IGuzzini

Last information update: February 2023



Accessory code

X129: High linear profile - L=1000

Technical description

Surface-mounted High linear profile L=1000mm, with a housing for a cable with a hidden Underscore connector. Made of anodised aluminium.

Installation

Wall or ceiling installation using the special slots under the profile. Secure using screw anchors for concrete, cement and solid brick.

Colour

Aluminium (12)

Weight (Kg)

0.3

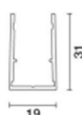
Mounting

wall arm|wall surface|ceiling surface

Notes

For Underscore InOut, 16mm TOP-BEND, in all lengths. Allows the cable with the Underscore connector to be hidden in the bottom part of the profile.

Complies with EN60598-1 and pertinent regulations



IK10

ART WALL - EL- 3 (L) - LINEALUCE Mini 27R - Wall Mounted c/w Wall Grazing Spot Optic.

Linealuce

Design Jean-Michel
Wilmette

IGuzzini

Last information update: October 2023

Product configuration: UE82.15

UE82.15: Mini 27R - Wall/Ceiling-mounted - Warm White - 48 Vdc - L=920mm - Wall Grazing Spot optic - Grey



Product code

UE82.15: Mini 27R - Wall/Ceiling-mounted - Warm White - 48 Vdc - L=920mm - Wall Grazing Spot optic - Grey

Technical description

Direct light linear luminaire, designed to use monochrome LED lamps. The product can be installed using pairs of arms, ceiling/ground/wall-mounting bases, stakes, and pendant rods and cables (to be ordered separately). The body is made of extruded aluminium and includes die-cast aluminium end caps with 50/60 Shore A silicone seals. It is subjected to a multi-step, pre-treatment process, in which the main phases are degreasing, fluorozirconation (a protective surface film) and sealing (with a nano-structured silane layer). The following painting stage consists of a primer and a liquid acrylic paint, cured at 150°C, with a high level of weather and UV ray resistance. The top of the optical assembly is closed by a 5mm thick transparent glass screen, fixed with silicone. Complete with Warm White multi-LED circuit. Both the 48Vdc control card (available in a DMX version and a DALI version) and the power supply must be purchased separately. Supplied with a connector with an IP68 threaded locknut. The products have a double connector (male/female) to allow pass-through wiring and continuous line applications. The product is supplied with a closure cover (UV-resistant) that covers the cables and protects against dirt and UV rays. Fitted with an Opti Beam Lens optical system with a Wall Grazing Spot optic. All external screws used are made of A2 stainless steel.

Installation

Installation accessories can be purchased separately, including arms for wall installations at a height of less than 3m, arms for wall installations at a height of more than 3m, bases for ceiling or wall-mounted installations, stakes, and pendant rods and cables.

Colour

Grey (15)

Weight (Kg)

1.12

Mounting

wall arm/wall surface/ceiling surface

Wiring

Ceiling, wall, surface, stake and pendant installation.

Notes

Supplied with a connector with an IP68 threaded locknut. The products have a double connector (male/female) to allow pass-through wiring and continuous line applications. Both the control card and power supply are remote and must be purchased separately.

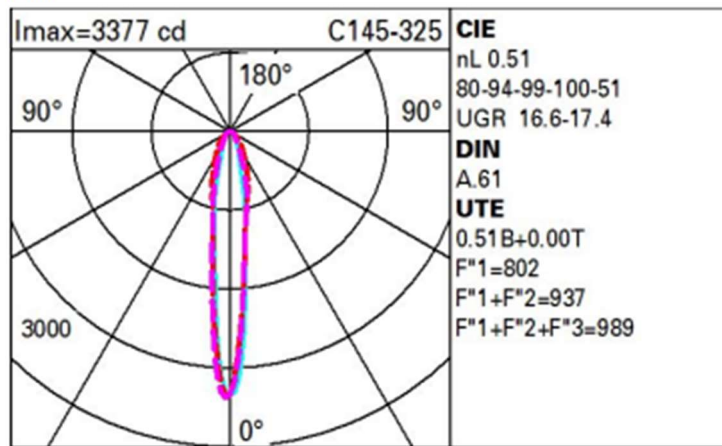
Complies with EN60598-1 and pertinent regulations



Technical data

lm system:	886	Life Time LED 1:	100,000h - L85 - B10 (Ta 25°C)
W system:	11.5	Life Time LED 2:	100,000h - L85 - B10 (Ta 40°C)
lm source:	1720	Ballast losses [W]:	2.6
W source:	8.9	Voltage [Vin]:	48
Luminous efficiency (lm/W, real value):	77	Lamp code:	LED
lm in emergency mode:	-	Number of lamps for optical assembly:	1
Total light flux at or above an angle of 90° [Lm]:	0	ZVEI Code:	LED
Light Output Ratio (L.O.R.) [%]:	52	Number of optical assemblies:	1
CRI (minimum):	80	Intervallo temperatura ambiente:	from -30°C to 50°C.
Colour temperature [K]:	3000	Control:	PWM
MacAdam Step:	3		

Polar



- **TREE LIGHTING - EL-4 (P2) PALCO INOUT - Ground Spike Spotlight LED**

Palco InOut

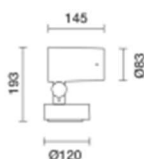
Design Artec Studio

|Guzzini|

Last information update: October 2023

Product configuration: EH94

EH94: Spotlight with base - Warm White Led - integrated electronic control gear - Flood optic

**Product code**

EH94: Spotlight with base - Warm White Led - integrated electronic control gear - Flood optic

Technical description

Spotlight designed to use LED lamps and a Flood optic. The optical assembly and base is made of EN1706AC 46100LF aluminium alloy and subjected to a multi-step, pre-treatment process, in which the main phases are degreasing, fluorozirconation (a protective surface film) and sealing (with a nano-structured silane layer). The following painting stage consists of a primer and a liquid acrylic paint, cured at 150°C, with a high level of weather and UV ray resistance. 5 mm thick tempered sodium-calcium closing glass. Double adjustability allows a 360° rotation about the vertical axis and 90° tilting relative to the horizontal plane. Mechanical aiming locks for rotation on both the vertical axis and horizontal plane. Complete with a monochrome LED circuit and an Opti Beam Reflector optic system. The product includes a PG13.5 cable gland. Electronic On/Off ballast integrated in product. Option of using optic accessories assembled via an accessory holder frame. All external screws used are made of A2 stainless steel.

Installation

Floor, wall, ceiling or ground-installed via pole or stake.

Colour

White (01) | Black (04) | Grey (15) | Rust Brown (F5)

Weight (Kg)

1.9

Mounting

mounting
wall surface|ground spike

Wiring

Double PG.

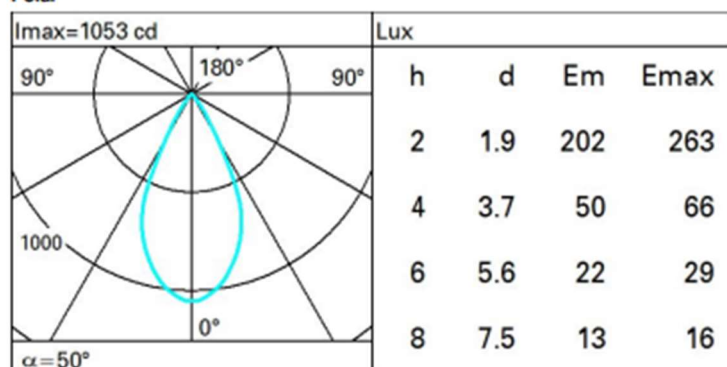
Complies with EN60598-1 and pertinent regulations



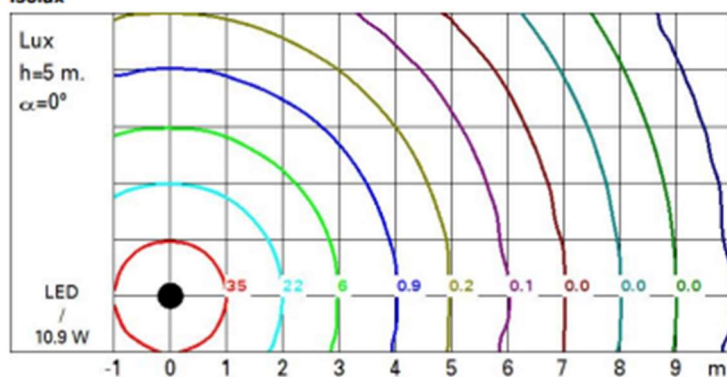
Technical data

lm system:	665	Life Time LED 2:	80,000h - L80 - B10 (Ta 40°C)
W system:	10.9	Ballast losses [W]:	1.8
lm source:	950	Lamp code:	LED
W source:	9.1	Number of lamps for optical assembly:	1
Luminous efficiency (lm/W, real value):	61	ZVEI Code:	LED
lm in emergency mode:	-	Number of optical assemblies:	1
Total light flux at or above an angle of 90° [Lm]:	0	Intervallo temperatura ambiente:	from -20°C to 50°C.
Light Output Ratio (L.O.R.) [%]:	70	Lifetime of product at ambient operating temperature:	≥ 50.000h Ta=40°C
Beam angle [°]:	50°	Power factor:	See installation instructions
CRI (minimum):	80	Inrush current:	5 A / 50 µs
Colour temperature [K]:	3000	Maximum number of luminaires of this type per miniature circuit breaker:	B10A: 18 luminaires B16A: 30 luminaires C10A: 31 luminaires C16A: 51 luminaires
MacAdam Step:	2	Overvoltage protection:	4kV Common mode & 2kV Differential mode
Life Time LED 1:	69,000h - L80 - B10 (Ta 25°C)	Control:	On/off

Polar



Isolux



UGR diagram

Corrected UGR values (at 950 lm bare lamp luminous flux)												
Reflect.:		viewed crosswise					viewed endwise					
ceiling	work pl.	0.70	0.70	0.50	0.50	0.30	0.70	0.70	0.50	0.50	0.30	
walls		0.50	0.30	0.50	0.30	0.30	0.50	0.30	0.50	0.30	0.30	
floor		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
dim		viewed crosswise					viewed endwise					
x	y											
2H	2H	14.2	14.8	14.5	15.0	15.2	14.2	14.8	14.5	15.0	15.2	
	3H	14.1	14.6	14.4	14.9	15.1	14.1	14.6	14.4	14.9	15.1	
	4H	14.0	14.5	14.3	14.8	15.1	14.0	14.5	14.3	14.8	15.1	
	6H	13.9	14.4	14.3	14.7	15.0	13.9	14.4	14.3	14.7	15.0	
	8H	13.9	14.3	14.2	14.6	15.0	13.9	14.3	14.2	14.6	15.0	
4H	2H	13.8	14.3	14.2	14.6	14.9	13.9	14.3	14.2	14.6	14.9	
	3H	14.0	14.5	14.3	14.8	15.1	14.0	14.5	14.3	14.8	15.1	
	4H	13.9	14.3	14.2	14.6	15.0	13.9	14.3	14.2	14.6	15.0	
	6H	13.8	14.1	14.2	14.5	14.9	13.8	14.1	14.2	14.5	14.9	
	8H	13.7	14.0	14.1	14.4	14.8	13.7	14.0	14.1	14.4	14.8	
8H	2H	13.6	13.9	14.1	14.3	14.8	13.6	13.9	14.1	14.3	14.8	
	3H	13.6	13.8	14.0	14.3	14.7	13.6	13.8	14.0	14.3	14.7	
	4H	13.6	13.9	14.1	14.3	14.8	13.6	13.9	14.1	14.3	14.8	
	6H	13.5	13.8	14.0	14.2	14.7	13.5	13.8	14.0	14.2	14.7	
	8H	13.5	13.7	14.0	14.2	14.7	13.5	13.7	14.0	14.2	14.7	
12H	2H	13.4	13.6	13.9	14.1	14.6	13.4	13.6	13.9	14.1	14.6	
	3H	13.6	13.8	14.0	14.3	14.7	13.6	13.8	14.0	14.3	14.7	
	4H	13.5	13.7	14.0	14.2	14.7	13.5	13.7	14.0	14.2	14.7	
	6H	13.4	13.6	13.9	14.1	14.6	13.4	13.6	13.9	14.1	14.6	
	8H	13.4	13.6	13.9	14.1	14.6	13.4	13.6	13.9	14.1	14.6	
Variations with the observer position at spacing:												
S =		1.0H	5.7	-12.4			5.7	-12.4				
		1.5H	8.5	-16.2			8.5	-16.2				
		2.0H	10.5	-20.3			10.5	-20.3				

- STAIR LIGHTING - EL-5 (W) - LIGHTUP - 80mm Ø Recessed Floor Orbit c/w Wall Wash Optic

Light Up

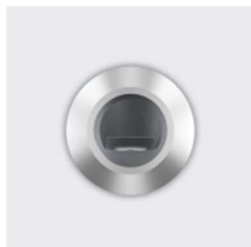
Design iGuzzini

iGuzzini

Last information update: October 2023

Product configuration: E103+500mA

E103: Floor recessed Orbit D=80mm - Wall Washer optic



Product code

E103: Floor recessed Orbit D=80mm - Wall Washer optic

Technical description

Recessed luminaire that can be installed in walls and floors. It is designed to use white monochrome LED lamps, powered with a continuous current of 350/500mA per luminaire. The D = 80 mm round frame has hidden screws, an AISI 304 stainless steel body and frame and an extra-clear, sodium - calcium tempered glass cover. The luminaire is fixed to the outer casing using special locking seals that hold it in place. The unit comes complete with LED circuit. The product's wiring system features an A2 stainless steel cable gland with a 1800 mm long H05RNF type 2x1 mm² output power cable. The cable is equipped with an anti-transpiration device (IP68) that consists of a silicone-coated joint located on the power cable. Two types of outer casing are available for installation and both can be ordered separately from the plastic optic assembly. The glass unit, optical assembly and outer casing together guarantee a maximum static load resistance of 2000 kg. The maximum surface temperature of the glass is less than 40°. Luminaire protected against polarity inversion.

Installation

The product is fixed to the outer casing using special locking seals with toolfree installation. The unit can be recessed in floors or walls using the outer casing for installation. It can also be installed in counter walls using special spring accessories to be ordered separately.

Colour

Steel (13)

Weight (Kg)

1.28

Mounting

wall recessed|Floor recessed|ground recessed

Wiring

Ballasts available: 350/500mA traditional and watertight IP67 versions. The product comes complete with a 1800 mm long H05RNF type 2x1 mm² output power cable and an electronic plate with a 350/500mA Max LED. Ballast to be ordered separately.

Notes

IP68 rating on both the product and the cable using IP68 connectors * The product is not suitable for installation in swimming pools and fountains.

Complies with EN60598-1 and pertinent regulations



IK09

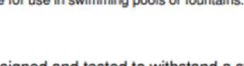


2000 kg

IP66

IP68

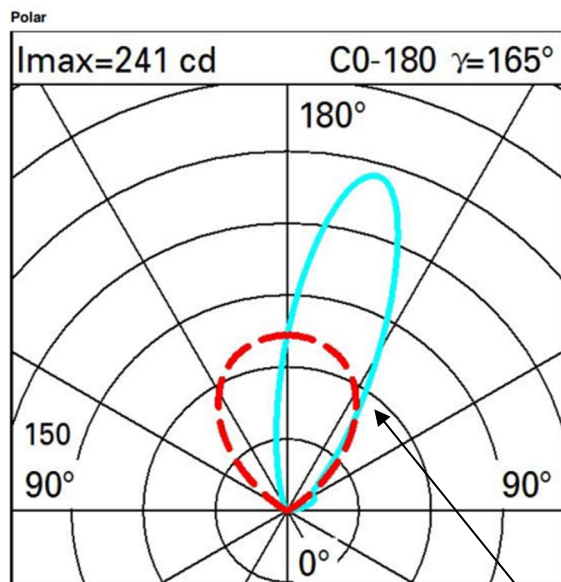
Complete immersion for limited periods, not suitable for use in swimming pools or fountains.



The lighting fixtures were designed and tested to withstand a static load of up to 20000 N and to resist drive-over stress by vehicles with tires. The fixtures cannot be used in lanes subjected to horizontal stresses due to acceleration, braking and / or changes of direction.

Technical data

Im system:	200	MacAdam Step:	2
W system:	4.2	Life Time LED 1:	100,000h - L90 - B10 (Ta 25°C)
Im source:	500	Ballast losses [W]:	0
W source:	4.2	Lamp code:	LED
Luminous efficiency (lm/W, real value):	47.6	Number of lamps for optical assembly:	1
Im in emergency mode:	-	ZVEI Code:	LED
Total light flux at or above an angle of 90° [Lm]:	200	Number of optical assemblies:	1
Light Output Ratio (L.O.R.) [%]:	40	Intervallo temperatura ambiente:	from -25°C to 35°C.
CRI (minimum):	80	LED current [mA]:	500
Colour temperature [K]:	3000		



DISTIBUTION WITH WALL WASH OPTIC

- HANDRAIL & RAMP SIGNAGE LIGHTING - EL-6 (U) - UNDERSCORE INOUT - Surface Top Bend 16mm Version LED**

Underscore InOut

Design iGuzzini

iGuzzini

Last information update: October 2023

Product configuration: E417

E417: Top-Bend 16mm version - Warm white Led - 24Vdc - L=754mm



Product code

E417: Top-Bend 16mm version - Warm white Led - 24Vdc - L=754mm

Technical description

Luminaire for indoor and outdoor architectural linear lighting – with warm white monochrome Leds – on a 24Vdc flexible white circuit, length L=754mm. The led circuit is completely IP68 encapsulated with a white (outside) and milky finish (over light emission) high performance polymer sheath: this material allows the device to be installed and used even at extreme temperatures: -30°C +45°C. Underscore InOut TOP-BEND can be used to create straight lines on flat and curved surfaces. Even, spotfree lighting is guaranteed along the entire strip profile up to the end parts. On both ends (not the head), the product is supplied with a cable L=80mm with IP68 male and female connectors fitted with an anti-detachment locknut. The product is supplied with stainless steel wires to stop the body from misshaping as this may damage the led circuit. Easy to install and a robust design for difficult environments (for example, it is salt water, UV and solvent resistant). Minimum curving radius 250mm for 16mm TOP-BEND versions. The luminaire technical characteristics conform to EN 60598-1 standards and particular requirements.

Installation

Surface-mounted (ceiling and wall) using accessories to be ordered separately. The installation accessories available include end-low aluminium profiles with slots (L=104mm) and intermediate-low aluminium profiles with no slots (L=998mm to be cut to size) that are used to secure the linear Underscore InOut, with its side exit for the cable with connector. Aluminium low clips (L=40mm) and AISI 316 stainless steel low clips (L=40mm) ideal for curved sections are available. High linear aluminium profiles (L=1000-2000mm) are available and high aluminium and AISI 316 stainless steel clips (L=40mm) that hide the cables with the connectors in the bottom part.

Colour

White (01)

Weight (Kg)

0.3

Mounting

wall arm|wall surface|ceiling surface

Wiring

24Vdc ±5% LED circuit. Constant voltage ballasts to be ordered separately, both IP20 and IP67 are available and suitable for outdoor installation. DALI 120W 24V dimming interface available (code no. MWP3) or DALI/DMX/1-10V 12÷48Vdc 4-channel dimming interface available with 6A per channel, (code no. 9639) suitable for both RGB Led and white Led versions. The ballast and led strip are connected via cables with IP68 female connectors (L=115-1550-3050-5050mm) or IP68 male connectors (L=115-1500mm).

Notes

Underscore InOut can be powered in series up to a maximum length of L=7004mm. The product is not suitable for installation in swimming pools and fountains. The lengths indicated can have a tolerance of +/- 4mm compared to the nominal length.

Complies with EN60598-1 and pertinent regulations



IK10

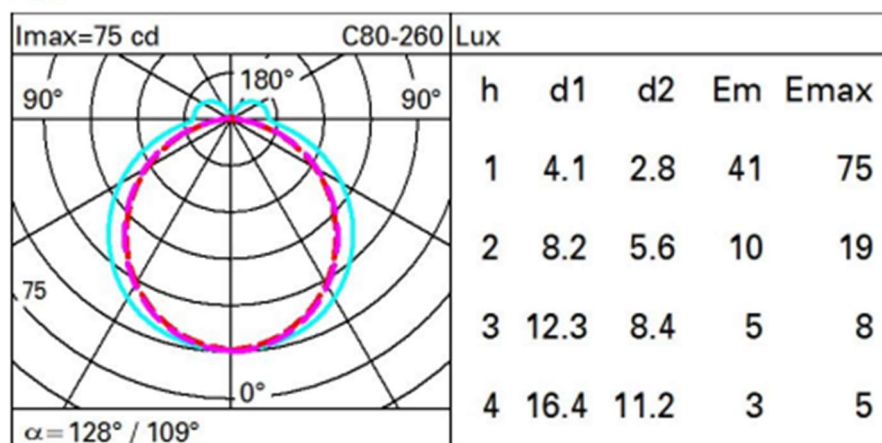
IP68



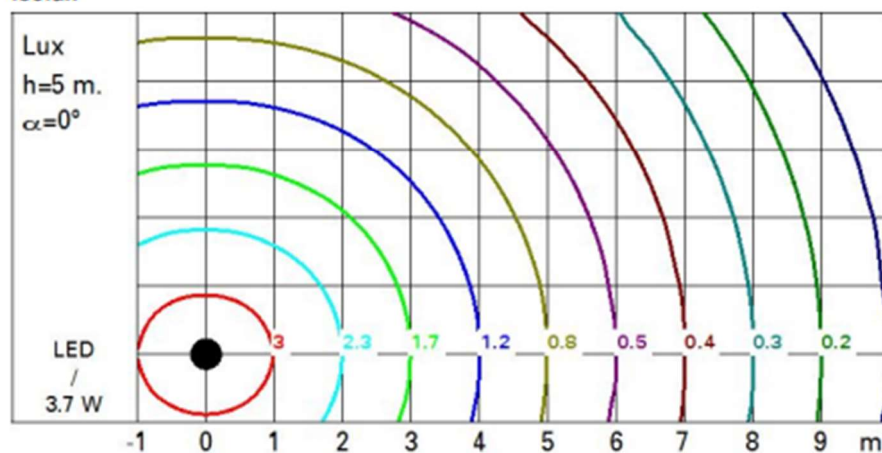
Technical data

lm system:	273	Life Time LED 1:	84,000h - L80 - B10 (Ta 25°C)
W system:	3.7	Life Time LED 2:	84,000h - L80 - B10 (Ta 40°C)
lm source:	-	Ballast losses [W]:	0
W source:	-	Voltage [Vin]:	24
Luminous efficiency (lm/W, real value):	73.7	Lamp code:	LED
lm in emergency mode:	-	Number of lamps for optical assembly:	1
Total light flux at or above an angle of 90° [Lm]:	35	ZVEI Code:	LED
Light Output Ratio (L.O.R.) [%]:	100	Number of optical assemblies:	1
CRI (minimum):	80	Intervalllo temperatura ambiente:	from -30°C to 45°C.
Colour temperature [K]:	2800	LED current [mA]:	10
MacAdam Step:	3	Control:	PWM

Polar



Isolux



- EL- 7 Wall Mounted Cylinder Down Light

OUTDOOR | WALL LIGHTS 611

ENOLA ROUND S
WL, single

OCF









450lm / 500lm
3000K / 4000K



11.5
75
5.5

IP 65 IK08 30° L70>90

100-240V -50/60Hz | 500mA
Total wattage: 0W
Material: aluminium/glass

ENOLA ROUND M
WL, single

OCF







860lm / 960lm
3000K / 4000K



75
75

IP 65 IK08 30° L70>90

220-240V -50/60Hz | 500mA
Total wattage: 11W
Material: aluminium/glass

ENOLA ROUND L
WL, single

OCF







3000lm / 3700lm
3000K / 4000K



75
175
14

IP 65 IK08 30° L70>90

220-240V -50/60Hz | 900mA
Total wattage: 36W
Material: aluminium/glass

Complete Lighting Services Limited
Beckdown House, Southern Road, Basingstoke, Hants, RG21 3JZ
Tel: 01256 811680 Fax: 01256 811681 email: enquiries@completeslighting.co.uk



1003422 450/500lm 3000/4000K

Options: 450/500lm | 3000/4000K | CR90
Prod. no. 1003422

1003423 860/960lm 3000/4000K

Options: 860/960lm | 3000/4000K | CR90
Prod. no. 1003423

1003440 3000/3700lm 3000/4000K

Options: 3000/3700lm | 3000/4000K | CR90
Prod. no. 1003440

1 Luminaire data



1.1 Complete Lighting Services Limited, Type EL3-ENOLA Wall mounte... (!CLS -1003423)

1.1.1 Data sheet

Manufacturer: Complete Lighting Services Limited

!CLS -1003423 Type EL3-ENOLA Wall mounted down light

Luminaire data

Luminaire efficiency : 103.667%
Luminaire efficacy : 92.55 lm/W
Classification : A70 ↓100.0% ↑0.0%
CIE Flux Codes : 94 99 100 100 104
UGR 4H 8H : <10.0 / <10.0
Power : 11 W
Luminous flux : 1018 lm

Equipped with

Quantity : 1
Designation : LED
Power : 11 W
Colour :
Luminous flux : 982 lm

Dimensions : Ø150 mm x 160 mm

