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External Lighting Study to include Ecological mitigation measures as referenced in Bat report to accompany a planning application for mixed-use residential scheme, Broomhill Road, Tallaght, Dublin 24.

Prepared by:
Environmental Design Partnership Consulting Engineers.

For:
Garyaron Homes.

Revision	Date	Prepared By	Checked By / Approved By
Issue 1	26/08/2021	G.Quinn	J. Fogarty C.Eng. F.ConsEI.
Issue 2	19/10/2021	G.Quinn	J. Fogarty C.Eng. F.ConsEI.
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	Title	Senior Engineer	Senior Partner

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1.0 Introduction.

Garyaron Homes intends to apply to An Bord Pleanála for a 5 year planning permission for a Strategic Housing Development scheme on lands at Broomhill Road, Tallaght, Dublin 24, D24 XA52 and Unit 51, Broomhill Road, Tallaght, Dublin 24, D24E124 on a site of approximately 1.4 ha.

The proposed development will consist of: (a) the demolition (total area approx. 4,319.9 sqm) of the existing buildings on site and the existing front boundary treatment; and (b) the construction of a new residential and mixed use scheme of 242 no. apartment units in 5 no. blocks (Blocks A to E) ranging from 4 to 7 storeys in height as follows:

- Block A (5 storeys) comprising 40 no. apartments (4 no. 1 bed, 31 no. 2 bed and 5 no. 3 bed units)
- Block B and C (7 storeys) comprising 102 no. apartments (45 no. 1 bed and 57 no. 2 bed units)
- Block D (5 - 7 storeys) comprising 36 no. apartments (16 no. 1 bed and 20 no. 2 bed units)
- Block E (4 - 5 storeys) comprising 64 no. apartments (31 no. 1 bed and 33 no. 2 bed units)

Block D will accommodate a Childcare Facility/creche of approx. 465sqm at ground floor level.

The proposal will also provide for a café of approx. 50.9 sqm at the ground floor of Block C. Residential amenity areas will be provided in the form of a reception of approx. 125.1sqm, resident lounge of approx. 45sqm, a letting office of approx. 11.8sqm, a rentable room/studio space of 39sqm, a public gym of approx. 128.5sqm and a public co-working space of approx. 128.4sqm, all at the ground floor level of Blocks B & C.

Each residential unit will be afforded with private open space in the form of a balcony or terrace. Communal open space of 1,797.4sqm is proposed in the form of 2no. roof top terraces at Blocks D and E, courtyard space at ground level, outdoor seating and planting and pedestrian and cyclist links. Public open space of 1,400sqm is also proposed in the form of outdoor seating, paved areas, a lawn area, play areas and an outdoor seating area to the front of the proposed café at Block C.

A total of 136no. car parking spaces are provided at ground floor level, including 7 no. Accessible spaces at surface level; and 426 no. bicycle spaces (Visitor and Resident in bike stands and secure stacked bike spaces) are proposed.

The development shall be served via a new vehicular access point from Broomhill Road. Upgrade works are proposed to the vehicular access point to facilitate the proposed development and to provide for improved access and egress for the overall development. New pedestrian and cyclist access points will be provided on to Broomhill Road from the site.

The associated site and infrastructural works include provision for water services; foul and surface water drainage and connections; attenuation proposals; permeable paving; all landscaping works; boundary treatment; internal roads and footpaths; waste storage areas and electrical services and all associated site development works.

Executive Summary.

The following design and report outline a comprehensive scheme that will provide adequate safe lighting for vehicular and pedestrian traffic outside of normal daylight operating times.
Particular attention and application of modern lighting equipment and techniques will ensure high levels of reliability minimum maintenance servicing and running costs.

Detailed professional design of the proposed lighting scheme will ensure full compliance with the Bat Report and recommendations, the scheme will be computer modelled to allow a most accurate assessment of pre installation proofing/performance.

1.1 Mandatory compliance and performance.

The lighting scheme will provide a minimum compliance standard of;

The Chartered Institution of Building Services Engineers guides and recommendations for external lighting systems.
Class P3 of IS EN 13201 for subsidiary roads with S/P ratio of 1.5 applied (7.5 lux average, 1.5 lux

minimum).
The Electrical Technical Council of Ireland requirements for electrical installation.
Compliance with the ecological bat report and recommendations for impact mitigation.

The lighting design will also provide adequate lighting to facilitate pedestrian access throughout the site and walkways while also limiting and controlling unwanted glare and overspill thus eliminating lighting pollution to the surrounding environment.

1.2 Artificial Lighting Design Impact Mitigation Measures.

Detailed selection of optimum lighting and control equipment to facilitate individual selection and control of each light fitting allowing centralised control of illumination levels for defined locations and zones of influence with particular reference to the Ecological bat report and recommendations.

1.3 Two types of Luminaire are proposed.

***Luminaire Type 1*:** Lighting Bollards for pathways.

Luminaire Type 2: Lighting Columns for roadways.

1.4 Lighting. (Columns)

Lighting columns not exceeding 4 metres in height will provide lighting to the site roadways.
The lighting columns are positioned as indicated on the accompanying drawing and close to the existing public roadway but within the Broomhill Road site boundary.

The Lighting columns will not exceed 4 metres in height and have a restricted horizontal output not exceeding 90 Degrees horizontal from the working plane,

The specifics characteristics of the lighting columns luminaries are;

Light output ratio 100 %. Downward, resulting in avoidance of direct upward light output
Eliminating light pollution and interference with bat population and their flight paths.
The colour temperature will not exceed 2,200. Kelvin, reducing the broad wave spectrum and adverse influence on Bat population.

1.5 Path and walkway Lighting. (Bollards).

Lighting Bollards not exceeding 1.1 metre in height will provide lighting to the various Paths and walkways within the Broomhill road site.
The lighting Bollards will be positioned as indicated on the accompanying drawing on the proposed paths and walkways within the Broomhill Road development site.

The specifics characteristics of the lighting Bollard luminaries are;

Light output ratio 100 %. Downward, allowing tight cut off and avoidance of direct upward light output, eliminating light pollution and interference with bat population and their flight paths.
The colour temperature will not exceed 2,200. Kelvin, reducing the broad wave spectrum and adverse influence on Bat population.

1.6 Roof Terraces Lighting.

The roof terrace lighting will be sufficient to provide safe passage as required during times of use.
The Chartered Institution of Building Services Engineers guides and recommendations for external lighting systems.
The Electrical Technical Council of Ireland requirements for electrical installation.
Compliance with the ecological bat report and recommendations for impact mitigation.
The Lighting columns will not exceed 2metres in height and have a restricted horizontal output not exceeding 90 Degrees horizontal from the working plane,

The specifics characteristics of the lighting columns luminaries shall be;

Light output ratio 100 %. Downward, resulting in avoidance of direct upward light output
Eliminating light pollution and interference with bat population and their flight paths.
The colour temperature will not exceed 2,200. Kelvin, reducing the broad wave spectrum and adverse influence on Bat population. Careful selection and positioning of light fittings shall eliminate unwanted glare and overspill to the surrounding environment.
Emergency lighting will be provided complete with directional signs and shall comply with the appropriate standard IS3217;2013.

1.7 Controllability.

During detailed design stage consideration will be given to making the light fittings both columns and bollards to be individually addressable and dimmable from a centralised lighting control system. The centralised control system will allow balancing and commissioning of the entire lighting scheme by providing remote individual selection of any or all light fittings and localised dimming or curfew set back adjustment of specific areas and zones.
The system will be automatic and adjust to daylight availability and curfew setback facilities.

1.8 Lighting Design Drawing.

The attached engineers drawing indicate the location and number of the Roadway and walkway lighting fittings.
The location of fittings indicates the ideal positioning of the fittings to achieve an average level of illuminance that is acceptable and compliant with the requirements of the various guides and recommendations.
It should be noted that the results indicated are maximum output and do not suggest the level of applied illumination as the light outputs can be adjusted from 100% down to 20% of output during commissioning and set up.

1.9 Commissioning and Set-up.

The complete scheme will be commissioned and calibrated to engineer's satisfaction to provide adequate illumination and optimum mitigation achievements.

1.10 Conclusions.

The proposed external lighting scheme will produce optimum lighting levels complying with all mandatory requirements and the Ecological bat report and mitigation recommendations.
The scheme energy consumption will be highly efficient and in keeping with the sustainable energy

design strategy of the complete development.
The attached excerpts are from our Dialux analysis and modelling, this is the method used to confirm our exact positioning of all light fittings minimising light spillage and calculating initial light output while final commissioning is completed on site to confirm compliance performance results recorded and witnessed by consulting engineers.

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1.11 Luminaire
Type 1 - Bollards

FA170 Bollard A-series

- Housing made from aluminum. Finish: polyester powder coating, silver-gray (RAL 9007/DB 702), other colors upon request.
- Housing made from extruded aluminum profile 200 mm x 80 mm, wall thickness 4 mm. The length of the luminaire is 178 mm. Closure in the lower part of the luminaire by the lighting surface made of safety glass (ESG). In the optically inactive part, the glass cover is printed with a black ceramic finish. Safety glass is 4 mm, with 93% light transmission. IK08.The glass cover is held in place by means of 4 screws against the support element, which holds the LED lighting unit by means of a surrounding silicone gasket. In so doing, a protection rating of IP66 is achieved. The support element is equipped with a cooling profile, which holds one LED light unit. If mounted horizontally the emission of light above gamma 90 is impossible (no light emission).

  LED Lighting Unit:

  - LED board in metal core (1.6 mm thick).
    Fitted with 8 LEDs (singlechip).
    Color temperature: warm white (2,200 K) CRI ≥70.
  - 1 Lens block with 8 lenses made from highly-transparent Plexiglas (PMMA), secured on the aluminium support plate by means of 2 M 2.5 mm screws. A black cover conceals the screws.
- Emission characteristics for street, path, and area lighting - AP06,
- Driver unit built inside the luminaire has various interface options such as DALI, 1/10V or stand-alone. 200 mA up to max. 700 mA.
- With no programming or with 1/10V interface, the fusing on the primary-side is at 6 kV. With a DALI interface or stand alone, the fusing on the primary-side is at 10 kV.
- Luminaire protection class I or II.
- The luminaire has a protection rating of IP66 / IP20 (pole door).
- Degree of shock resistance IK08.
- No emitting above gamma 90° (no light emission).
- All fittings are made of AISI 316 stainless steel (1.4401).
- Luminaire is shipped prewired and cabled (as far as the pole clamp).
- Pole: made of extruded aluminum profile 200x80 mm, wall thickness 4 mm, with flush-mounted pole door: height 300 mm, width 150 mm.
- Clamp is in protection class II in accordance with DIN VDE 0660-505 and DIN 43628. Access lines up to cross section: 3x5x10 mm². Clamp includes 2x6A fuses (D01). The fuses are to be tested by an electrician and replaced if necessary.
- The light bollard is secured through a flange plate on the inside and flush by means of four M10 screws on the ground or on a foundation. It can optionally be delivered with a flange plate or in elongated form for a buried base.
- The seals are made of silicone.
- Surface finish: polyester powder-coating in the following process: alkaline degreasing, chemical stripping and chromating, each treatment followed by a double rinsing with demineralized water, subsequent drying and coating with polyester powder (30 minute annealing at 180° C – 200° C). Average layer thickness is 80µ.
- Weight: 10 kg for the light bollard + 1.5 kg for the anchor cage + 9.5 for the buried base.
- Area exposed to wind: 0.2 m^2.
- The luminaire is in compliance with regulation EN 60598-1:2015 + A1:2018.
- The manufacturer has been certified in compliance with EN ISO 9001:2015 e EN ISO 14001:2015.

1.12 Luminaire Type 2 – Column Mounted Luminaires

Twilight

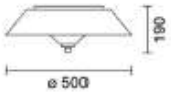
Design IGuzzini **IGuzzini**

Last information update: May 2019

Pole-mounted system for urban and residential parks and gardens.

Product code
EM49

Technical description
Outdoor luminaire with an elliptical optic, designed to use LED lamps. Version with cut-off that eliminates skyward flux dispersion. The optical assembly and the pole attachment system are 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 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. Diffuser made of shockproof, UV-stabilised injection moulded polycarbonate. Complete with circuit fitted with Amber coloured monochrome LEDs. Optical assembly consisting of an anodized super-pure aluminium upper reflector, a methacrylate lens and a lower reflector made of metallised PC. Replaceable LEDs and driver. MIDDLE OF THE NIGHT selv driver with automatic internal temperature control system. All external screws are made of stainless steel.



Installation
The spotlight can be installed with a pole-top mounting on poles with ø 60mm and 76mm end part using X102 and X126 accessories. Secured to the pole by two bolts.

Dimension (mm)
Ø500x190

Colour
Grey (15)

Mounting
pole-top

Wiring
The product is supplied wired with a 500mm long outlet cable (2x1mm).

Notes
Overvoltage protection: 10kV Common Mode, 6kV Differential Mode

Complies with EN60598-1 and pertinent regulations

IK10 IP66

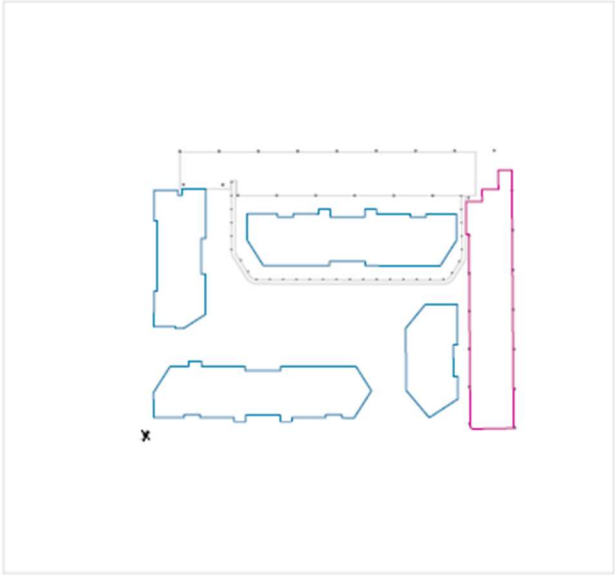
Product configuration: EM49

Product characteristics
Total lighting output [Lm]: 2880
Total power [W]: 31.3
Luminous efficacy [Lm/W]: 92
Life Time: 51,000h - L90 - B10 (Ta 25°C)
Life Time: 40,000h - L90 - B10 (Ta 40°C)
Ambient temperature range: from -40°C to 40°C.
Total luminous flux at or above an angle of 90° [Lm]: 0
Emergency luminous flux [Lm]: /
Voltage [V]: -
Life Time: 100,000h - L80 - B10 (Ta 25°C)
Life Time: 100,000h - L80 - B10 (Ta 40°C)
Number of optical assemblies: 1

Optical assembly Characteristics Type 1
Light Output Ratio (L.O.R.) [%]: 100
Lamp code: LED
ZVEI Code: LED
Nominal power [W]: /
Nominal luminous [Lm]: /
Lamp maximum intensity [cd]: /
Beam angle [°]: 95° / 117°
Number of lamps for optical assembly: 1
Socket: /
Ballast losses [W]: 4.3
Colour temperature [K]: 2200
CRI: 65
Wavelength [Nm]: /
MacAdam Step: /

2.0 Dialux Results

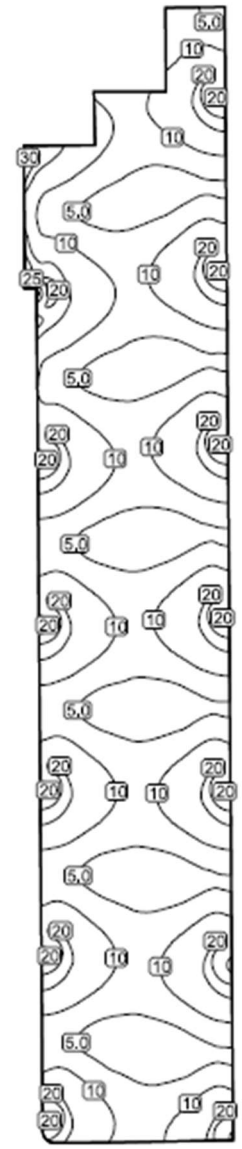
Road 2 / Perpendicular illuminance (adaptive)



Light loss factor: 0.80

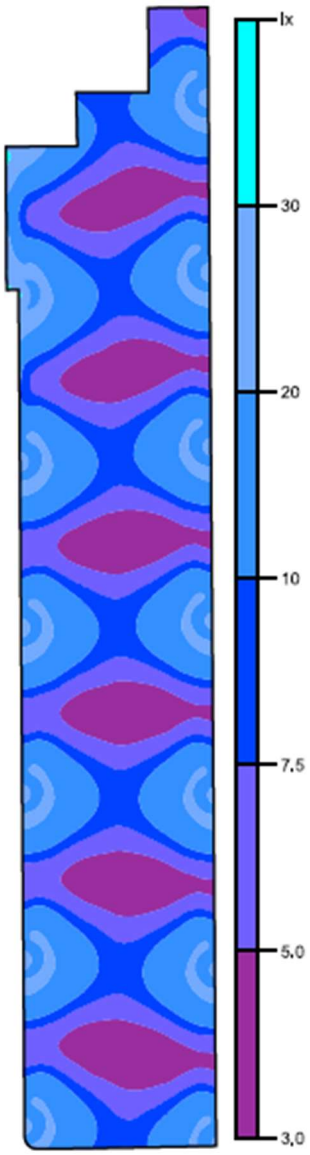
Road 2: Perpendicular illuminance (adaptive) (Surface)
Light scene: Light scene 1
Average: 10.0 lx, Min: 3.17 lx, Max: 33.3 lx, Min/average: 0.32, Min/max: 0.095

Isolines [lx]



Scale: 1 : 500

False colors [lx]



Scale: 1 : 500

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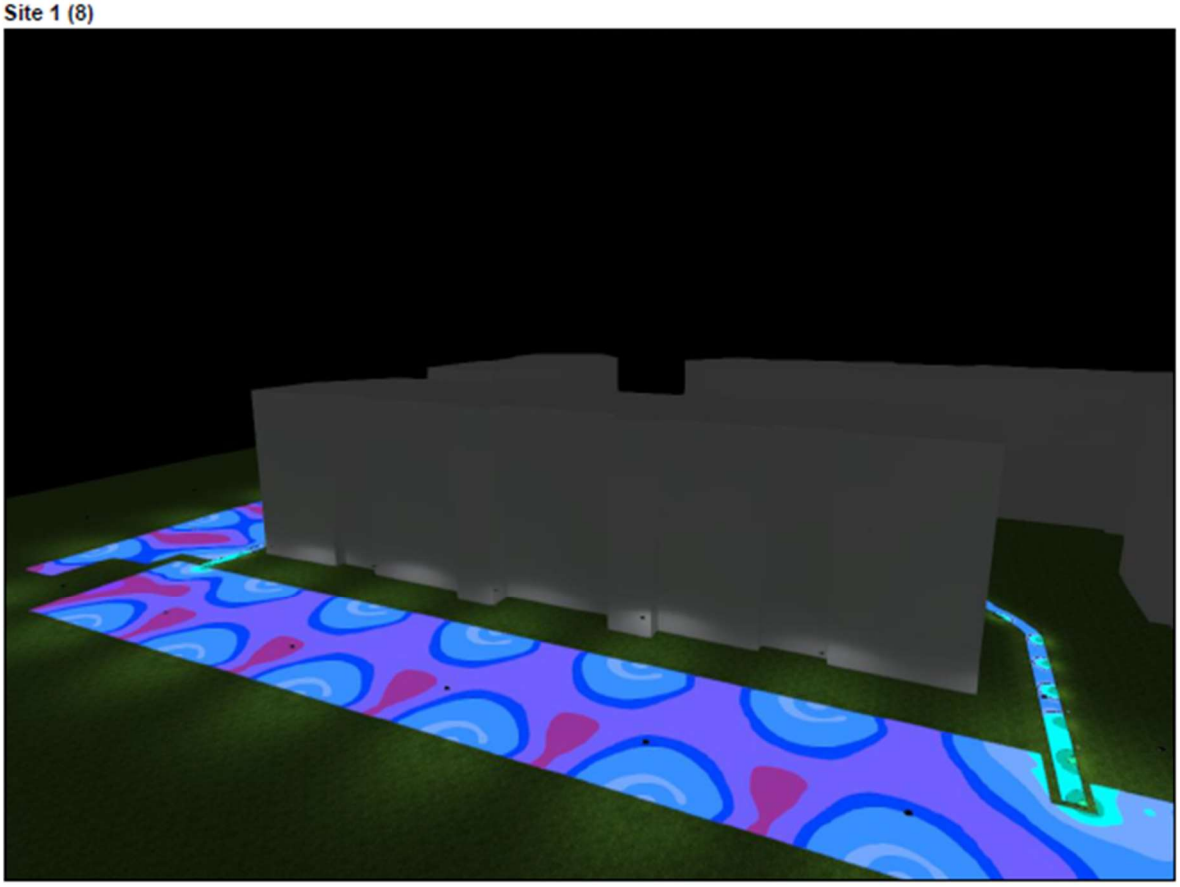
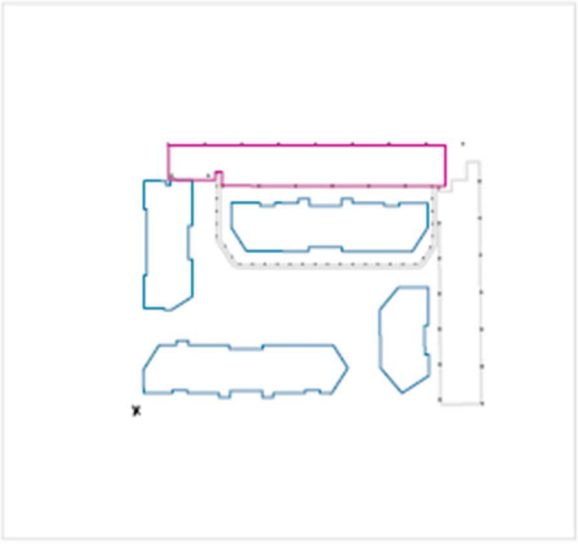
Broomhill Road

Site 1 (8)



Road 1 / Perpendicular illuminance (adaptive)



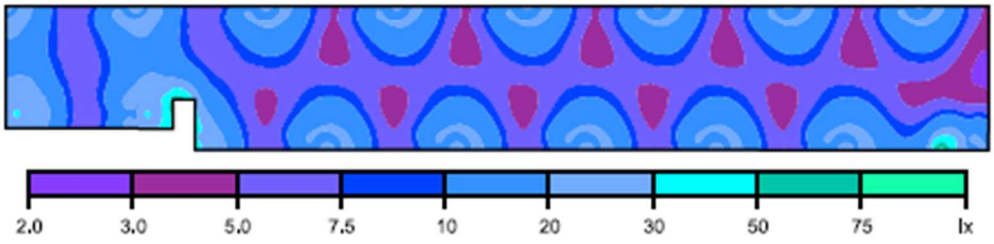
Light loss factor: 0.80

Road 1: Perpendicular illuminance (adaptive) (Surface)
Light scene: Light scene 1
Average: 10.8 lx, Min: 2.55 lx, Max: 80.8 lx, Min/average: 0.24, Min/max: 0.032

Isolines [lx]

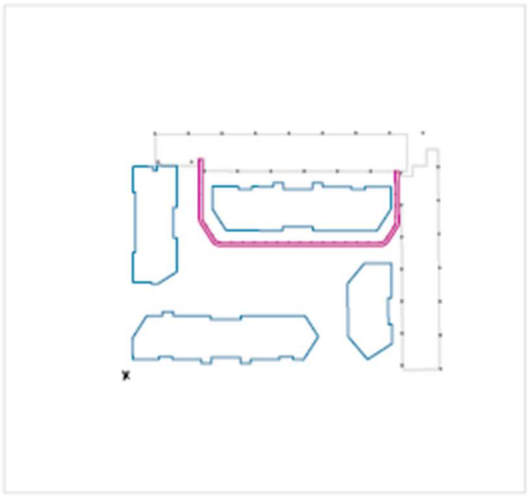
Scale: 1 : 750

False colors [lx]



Scale: 1 : 750

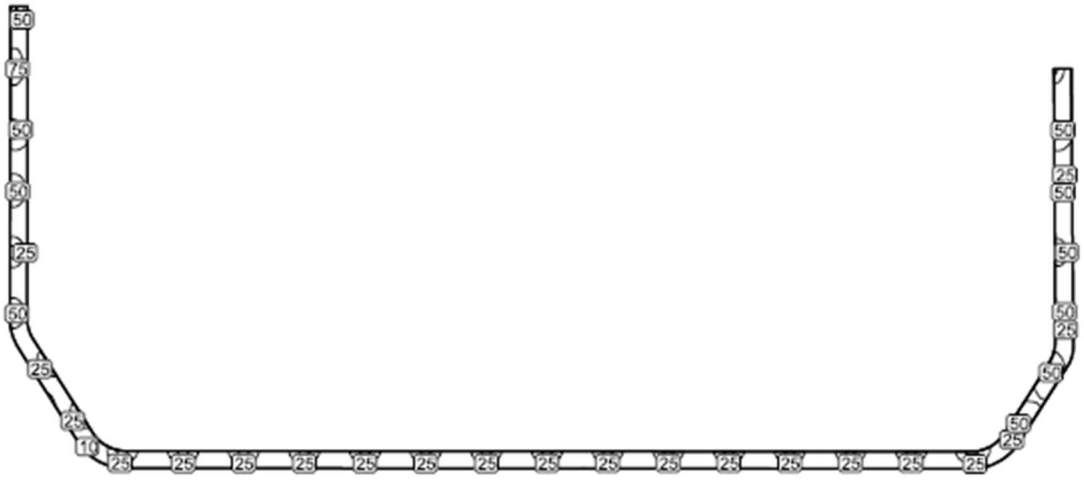
Path 1 / Perpendicular illuminance (adaptive)



Light loss factor: 0.80

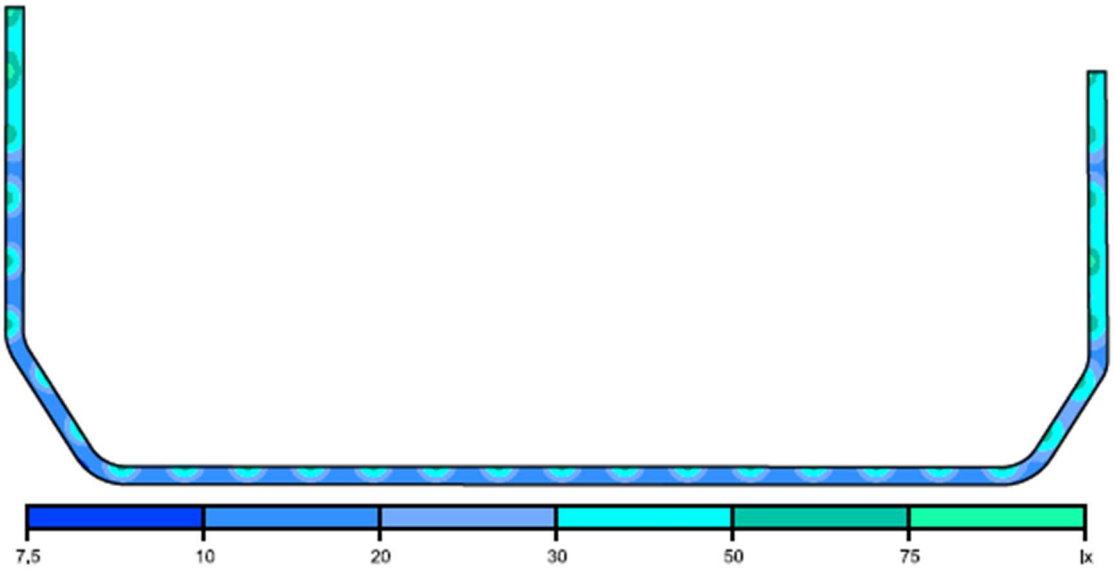
Path 1: Perpendicular illuminance (adaptive) (Surface)
Light scene: Light scene 1
Average: 27.2 lx, Min: 8.44 lx, Max: 89.6 lx, Min/average: 0.31, Min/max: 0.094

Isolines [lx]



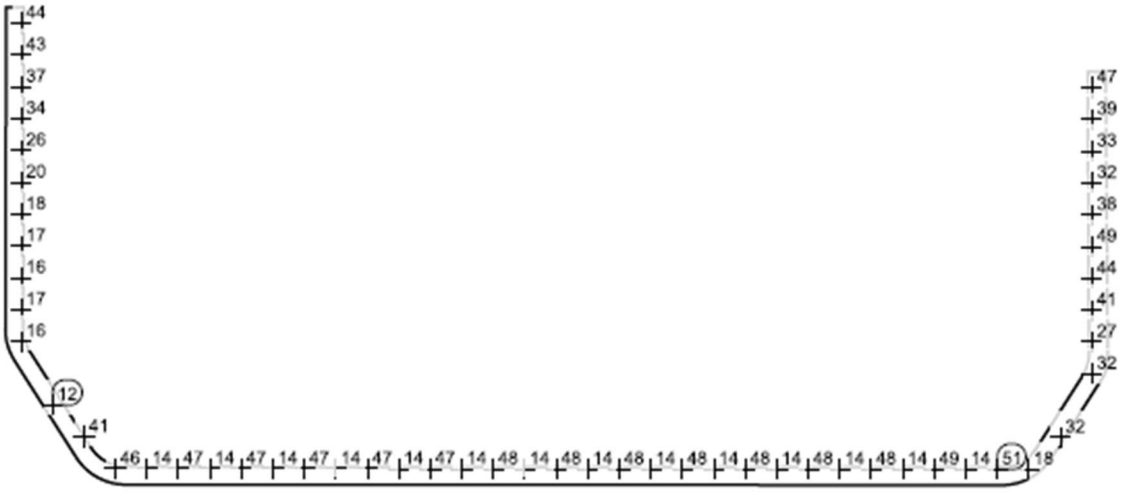
Scale: 1 : 500

False colors [lx]



Scale: 1 : 500

Value grid [lx]



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