

The logo for OCSC (O'Connor Sutton Cronin) is positioned in the upper left. The letters 'OCSC' are large, bold, and green. Below them, the full name 'O'CONNOR SUTTON CRONIN' is written in a smaller, black, sans-serif font, followed by 'MULTIDISCIPLINARY CONSULTING ENGINEERS' in an even smaller font. The background of the top half of the page features a large, green, semi-circular graphic containing a detailed aerial map of an urban area, likely Clonburris, showing streets, buildings, and green spaces.

**OCSC**

O'CONNOR SUTTON CRONIN  
MULTIDISCIPLINARY CONSULTING ENGINEERS

**S1065: CLONBURRIS KISHOGE SITE 5, PART 10**

# **SITE LIGHTING REPORT**

**For**  
**South Dublin County Council**

**25 February 2025**

## NOTICE

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## DOCUMENT CONTROL & HISTORY

| OCSC<br>Job No:<br>S1065 | Project Code | Originator | Zone Volume | Level | File Type | Role Type | Number | Status / Suitability Code | Revision |
|--------------------------|--------------|------------|-------------|-------|-----------|-----------|--------|---------------------------|----------|
|                          | S1065        | OCSC       | XX          | XX    | RP        | E         | 0001   | S4                        | P03      |

| Rev. | Status | Authors | Checked | Authorised | Issue Date |
|------|--------|---------|---------|------------|------------|
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| P02  | S4     | YD      | CM      | DB         | 12/02/2025 |
| P03  | S4     | YD      | CM      | DB         | 25/02/2025 |

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# 1 INTRODUCTION

This report outlines the design criteria and key considerations for the lighting scheme within the proposed development at Clonburris, Co. Dublin.

It has been prepared to accompany a planning application by South Dublin County Council to An Bord Pleanála.

The report considers the preliminary lighting design as developed by O'Connor Sutton Cronin (OCSC) and should be read in conjunction with OCSC drawing no. S1065-OCSC-XX-XX-DR-E-0001 and S1065-OCSC-XX-XX-DR-E-0002.

The external lighting within the proposed development area will be managed and maintained by the South Dublin County Council. The drawings and calculations submitted are to demonstrate the lux level averages across the development are meeting the standard set out by SDCC for road lighting.

All proposed lighting has been designed and specified to comply fully with the Council's standard specification document.

Details of the luminaires proposed, on which the detailed design has been based, are contained in the appendices to this document.

The predicted performance of the external lighting installations has been assessed in detail using Lighting Simulation software. The Lighting Simulation software used was LIGHTING REALITY.

Standards and guidelines in relation to the lighting design are:

- BS 5489-1-2013 Design of road lighting of roads and public amenity areas. Code of practice (Published on : 31<sup>st</sup> May 2020 by BSI Standards Limited 2020)
- I.S. EN 13201-2-2015 Road lighting - Performance requirements (Published on: 31<sup>st</sup> Jan 2016 by BSI Standards Limited 2016)
- South Dublin County Council Public Lighting Specification

The electrical services for the external lighting installation will be designed in accordance with NSAI National Rules for Electrical Installations.

## 2 PROPOSED DEVELOPMENT

The Proposed development will consist of a Social and Affordable Housing Development on undeveloped lands referred to as Site 5 within the SDZ Planning Schemed boundary, adjoining the R136 and Thomas Omer Way Roads and Kishoge Community College, Clonburris, Co. Dublin.

The proposed development will be separated as Site A and B, which will be located within different planning scheme area sub-sector and different land use zoning.

The proposed development should consist of c.236 residential units, with a mix of three bedroom houses, two and three-bedroom houses, two and three-bedroom duplexes, one and two-bedroom apartments. Additionally, the development should include car parking spaces with electric vehicle charging points, visitor cycle parking, and ESB Substation, high-quality amenity spaces, landscape works, SUDs measures, and all associated site development works.



**Figure 1 – Proposed Site Location**



***Figure 2 – Proposed Site Layout***

### 3 THE DESIGN

#### EXTERNAL LIGHTING:

The external lighting has been designed in the best possible way for visual comfort, protect biodiversity and operational suitability, and shall be specified in accordance with the appropriate maintained illuminance levels recommended by the following documents:

- EN13201-2-2015 Lighting Classes for external lighting. (Published on: 31<sup>st</sup> Jan 2016 by BSI Standards Limited 2016)
- BS EN 12464-2 Outdoor workplaces (Published on: 31<sup>st</sup> Jan 2014 by BSI Standards Limited 2014)
- BS 5489-1-2020 Design of road lighting of roads and public amenity areas. Code of practice (Published on : 31<sup>st</sup> May 2020 by BSI Standards Limited 2020)
- BS EN 13201-2 Lighting Classes for external lighting. (Published on: 31<sup>st</sup> Jan 2016 by BSI Standards Limited 2016)
- CIBSE Lighting Guide 6 - The Outdoor environment (Published on: Jan 2016 by CIBSE publications)
- Institute of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light. (Published on: Jan 2020 by Institution of Lighting Professionals publications)
- South Dublin County Council Public Lighting Specification
- GUIDE ON THE LIMITATION OF THE EFFECTS OF OBTRUSIVE LIGHT FROM OUTDOOR LIGHTING INSTALLATIONS, 2ND EDITION

Lighting design shall ensure that:

- all night-time lighting is concentrated in the appropriate areas.
- upward lighting is minimised.
- light pollution is minimised.
- energy consumption is minimised.
- To enhance security

#### BIODIVERSITY STRATEGY

Please refer to the Biodiversity chapter of the EIAR for further information. It is widely recognised that artificial lighting can have detrimental effects on nocturnal animals, therefore, the development lighting strategy has considered the following: -

**Do not over light** - Where relevant guidance gives a range of illumination levels the lowest one which is appropriate shall be utilised.

**Luminance distribution** - The spread of light shall be kept near to or below the horizontal where possible.

**Minimise UV light** - Selected luminaires shall emit minimal UV light. This can be achieved by selecting LED luminaires.

**Colour temperature of lamps** - All light sources shall be 3000K maximum.

**Lighting controls** - Consideration shall be made to when lighting is operational to reduce detrimental impacts on nocturnal animals.

## DETAILED STRATEGY

The lighting strategy has been designed to complement each individual space. Figure 3 below is the proposed typology lighting strategy plan for the Clonburris Site 5 Site A and Site B Residential Development.



**Figure 3 – Proposed Typology Lighting Plan for Site A**



**Figure 4 – Proposed Typology Lighting Plan for Site B**

### **Zone 1 – Primary Roads and Major Roads**

The primary road and the major roads are the roads network that links all the units within the development site to the Thomas Omer Way and R136. The lighting strategy for the primary roads is to provide sufficient lighting for safety of the vehicle users, cyclists and pedestrians that will be on the roads. The lighting installed in this area is designed as a column mounted. The zone 1 area light fittings are existing fittings and were designed in accordance with SDCC guidance and recommendation.

### **Zone 2– Residential Road Entrance**

The lighting strategy for the residential entrance is to allow for a safe transition from the P1 class lighting levels of the main road to the residential road's classification of P4 and to allow for sufficient light on the roadway for drivers to focus on the roads for safe driving within the vicinity of the residential houses/duplexes.

### **Zone 3 – Residential Roads**

The lighting strategy for the residential roads is to design to P4 classification to reduce the impact of the lighting on the residential buildings but to focus on the roads for safe driving within the development.

The streetlights in these areas will be placed on lighting column at a height of 6m.

The lighting strategy shall endeavour to reduce the light intrusion into the windows in accordance with the ILP Guidance Notes for the Reduction of **Obtrusive** Light.

#### **Zone 4– Pedestrian Walkway**

The lighting strategy for the pedestrian walkway is to design to P4 classification to provide sufficient lighting for safety, whilst also ensuring an attractive night-time environment to allow users to navigate the main routes safely.

External lighting columns will be situated along the main pedestrian areas to focus on the safe navigation across the main footpaths, whilst not over lighting the surrounding area.

The relevant lighting classes have been determined by using CEN/TR 13201-1:2015 The following table outlines the allocated classes based on the development typology plans outlined within section.

All luminaires shall also be LED to ensure that UV light is minimised, and the lamps colour temperature shall not exceed 3000k which shall further assist in encouraging biodiversity.

#### **Zone 5-Pedestrian Crossing**

The lighting strategy for the pedestrian crossing is to design to C5 classification to provide sufficient lighting for safety, whilst also ensuring an attractive night-time environment to allow users to navigate the main routes safely.

| Zone Type<br>(Based on development typology plans) | Allocated Class<br>(Based on CEN/TR 13201-1:2015) |
|----------------------------------------------------|---------------------------------------------------|
| Zone 1 (Primary Roads)                             | P1                                                |
| Zone 2 (Residential Entrance)                      | P3                                                |
| Zone 3 (Residential Roads)                         | P4                                                |
| Zone 4 (Pedestrian Walkway)                        | P4                                                |
| Zone 5 (Pedestrian Crossings)                      | C5                                                |

***Figure 5 – Proposed Typology Lighting for the project***

## **LUMINAIRES**

For a list of luminaires used please refer to appendix B of this report.

All luminaires are 3000K colour temperature. The desired lighting design may also be achieved by other luminaires and the final lighting installation may use other luminaires, with modified positioning and aiming to achieve the same result. Manufacturers' stated performance characteristics are subject to change. Other changes may be agreed with SDCC Road Lighting Department as the works progress on site.

## LIGHT SPILL INTO RESIDENTIAL UNITS

In the residential area fittings close to the residential units are to have appropriately low levels of light spill into the units. It was concluded that the levels were appropriately low. As an E3 zone a lux average level below 2 lux would be considered appropriate.

Table 2: Environmental zones

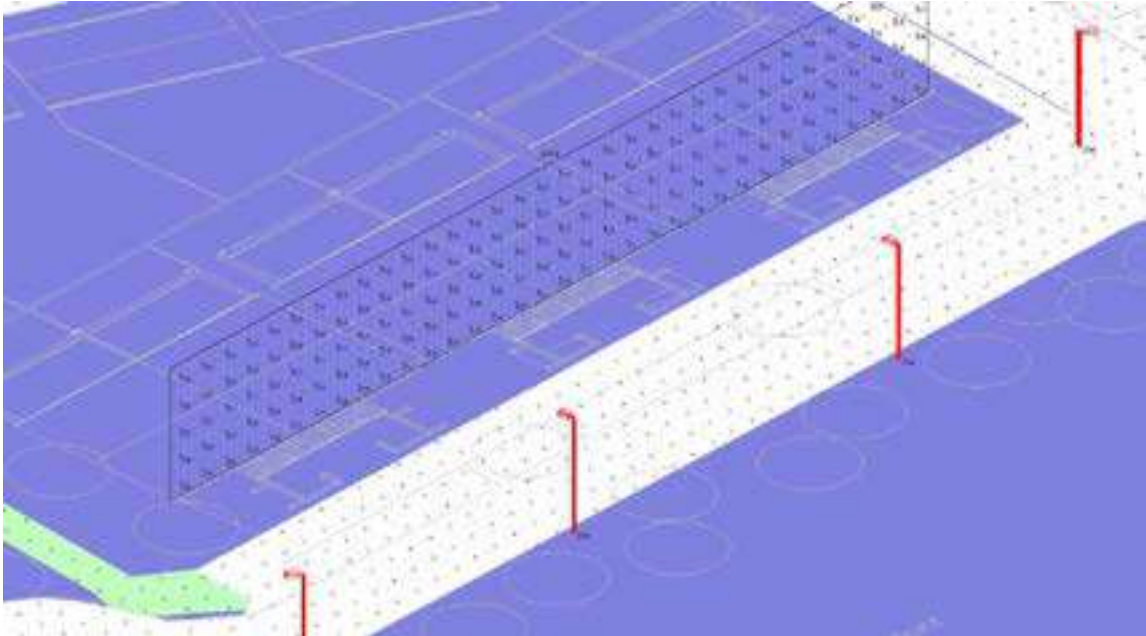
| Zone | Surrounding | Lighting environment                    | Examples                                                                                                       |
|------|-------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------|
| E0   | Protected   | Dark (SQM 20.5+)                        | Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places                             |
| E1   | Natural     | Dark (SQM 20 to 20.5)                   | Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc. |
| E2   | Rural       | Low district brightness (SQM ~15 to 20) | Sparsely inhabited rural areas, village or relatively dark outer suburban locations                            |
| E3   | Suburban    | Medium district brightness              | Well inhabited rural and urban settlements, small town centres of suburban locations                           |
| E4   | Urban       | High district brightness                | Town / City centres with high levels of night-time activity                                                    |

**TABLE – CIE 150 Zone Categorization (2017)**

Table 3 (CIE 150 table 2); Maximum values of vertical illuminance on properties.

| Light technical parameter                   | Application conditions | Environmental zone |          |      |       |       |
|---------------------------------------------|------------------------|--------------------|----------|------|-------|-------|
|                                             |                        | E0                 | E1       | E2   | E3    | E4    |
| Illuminance in the vertical plane ( $E_v$ ) | Pre-curfew             | n/a                | 2 lx     | 5 lx | 10 lx | 25 lx |
|                                             | Post curfew            | n/a                | <0.1 lx* | 1 lx | 2 lx  | 5 lx  |

**TABLE – CIE 150 Intrusive light (2017)**



**Figure 6 – Example vertical grid for obtrusive lighting**

| Illuminance (lux)     |        |
|-----------------------|--------|
| Eav                   | = 0.58 |
| Emin                  | = 0.00 |
| E <sub>max</sub>      | = 3.23 |
| Emin/E <sub>max</sub> | = 0.00 |
| Emin/Eav              | = 0.00 |

**Figure 7 – Results for the obtrusive lighting lux levels**

## 4 SUMMARY

As part of the development application, this external lighting strategy report outlines the preferred lighting options for Clonburris Site 5 Site A and B Residential Development, Clonburris Co. Dublin., including the proposed secondary streets and shared surfaces, pedestrian and cycle links and public open spaces.

This document also described the control measures considered to ensure compliance with the following documents:

- EN13201-2-2015 Lighting Classes for external lighting. (Published on: 31<sup>st</sup> Jan 2016 by BSI Standards Limited 2016)
- BS EN 12464-2 Outdoor workplaces (Published on: 31<sup>st</sup> Jan 2014 by BSI Standards Limited 2014)
- BS 5489-1-2020 Design of road lighting of roads and public amenity areas. Code of practice (Published on : 31<sup>st</sup> May 2020 by BSI Standards Limited 2020)
- BS EN 13201-2 Lighting Classes for external lighting. (Published on: 31<sup>st</sup> Jan 2016 by BSI Standards Limited 2016)
- CIBSE Lighting Guide 6 - The Outdoor environment (Published on: Jan 2016 by CIBSE publications)
- Institute of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light. (Published on: Jan 2020 by Institution of Lighting Professionals publications)
- South Dublin County Council Public Lighting Specification

## 5 APPENDIX A – SITE DRAWING

1. DUTCH SIGNAL SHALL COMPLY WITH BENEFUSN 5008-2-13-4 LATEST EDITION & SHALL BE SINGLE WALL, COLOURED RED & MANUFACTURED FROM HIGH DENSITY POLYETHYLENE. THE MINIMUM EXTERNAL DIMENSION OF THE DUCT SHALL BE 307mm BY 102mm. THE THICKNESS OF THE POLYETHYLENE SHEET OF THE DUCT SHALL BE STAMPED WITH THE WORDS "PUBLIC LIGHTING" OR ALTERNATIVELY, "STREET LIGHTING" IN SHAW-WALTON CODE LETTERS. AT ONE METRE INTERVALS, THE DUCT SHALL BE LAID WITH THIS LEGEND FACING UPWARDS. DUCT SHALL BE LAID IN A STRAIGHT LINE CLOSE TO THE LINE OF THE CULUM LOCATIONS & SHALL CONTAIN A MINIMUM OF 100mm COVER FOR THE DUCT.
2. A MINIMUM DEPTH OF 450mm COVER IS REQUIRED IN URBAN PATHWAYS & A MINIMUM COVER OF 600mm IS REQUIRED FOR GRASS MARGINS, PEDESTRIAN WAYS, LANEWAYS & GATEWAY ENTRANCES & A MINIMUM DEPTH OF 750mm IS REQUIRED AT ROAD CROSSINGS OR IN CARRIAGEWAYS.
3. ALL EQUIPMENT TO BE SUITABLY PIPED FOR THE ENVIRONMENT THEY ARE BEING INSTALLED.
4. FOR SCHEDULES OF EQUIPMENT SEE SPECIFICATION.
5. THE COMPLETE INSTALLATION TO BE CO-ORDINATED WITH ALL OTHER SERVICES.

|     |                                                                                     |                              |
|-----|-------------------------------------------------------------------------------------|------------------------------|
| MCP |  | PUBLIC LIGHTING MICROPILLAR  |
| MP  |  | ESB MINI PILLAR              |
| A   |  | 6M POLE MOUNTED LIGHT TYPE A |
| B   |  | 6M POLE MOUNTED LIGHT TYPE B |
| C   |  | 6M POLE MOUNTED LIGHT TYPE C |
| D   |  | 6M POLE MOUNTED LIGHT TYPE D |
|     |  | 1M HIGH LED BOLLARD LIGHT    |
| PL  |  | 100mm PUBLIC LIGHTING DUCT   |
| LV  |  | 50mm LV DUCT                 |
|     |  | PUBLIC LIGHTING CHAMBER      |



- | Rev No. | Date     | Revision Note         | Dwn by | Chkd by |
|---------|----------|-----------------------|--------|---------|
| P01     | 28.11.24 | SUITABLE FOR PLANNING | A.S.   | Y.D.    |
| P02     | 14.02.25 | REVISED FOR PLANNING  | A.S.   | Y.D.    |
| P03     | 25.02.25 | REVISED FOR PLANNING  | Y.D.   | Y.D.    |
|         |          |                       |        |         |
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Dublin London Belfast Galway Cork Birmingham

Project: CLONBURRIS KSG5

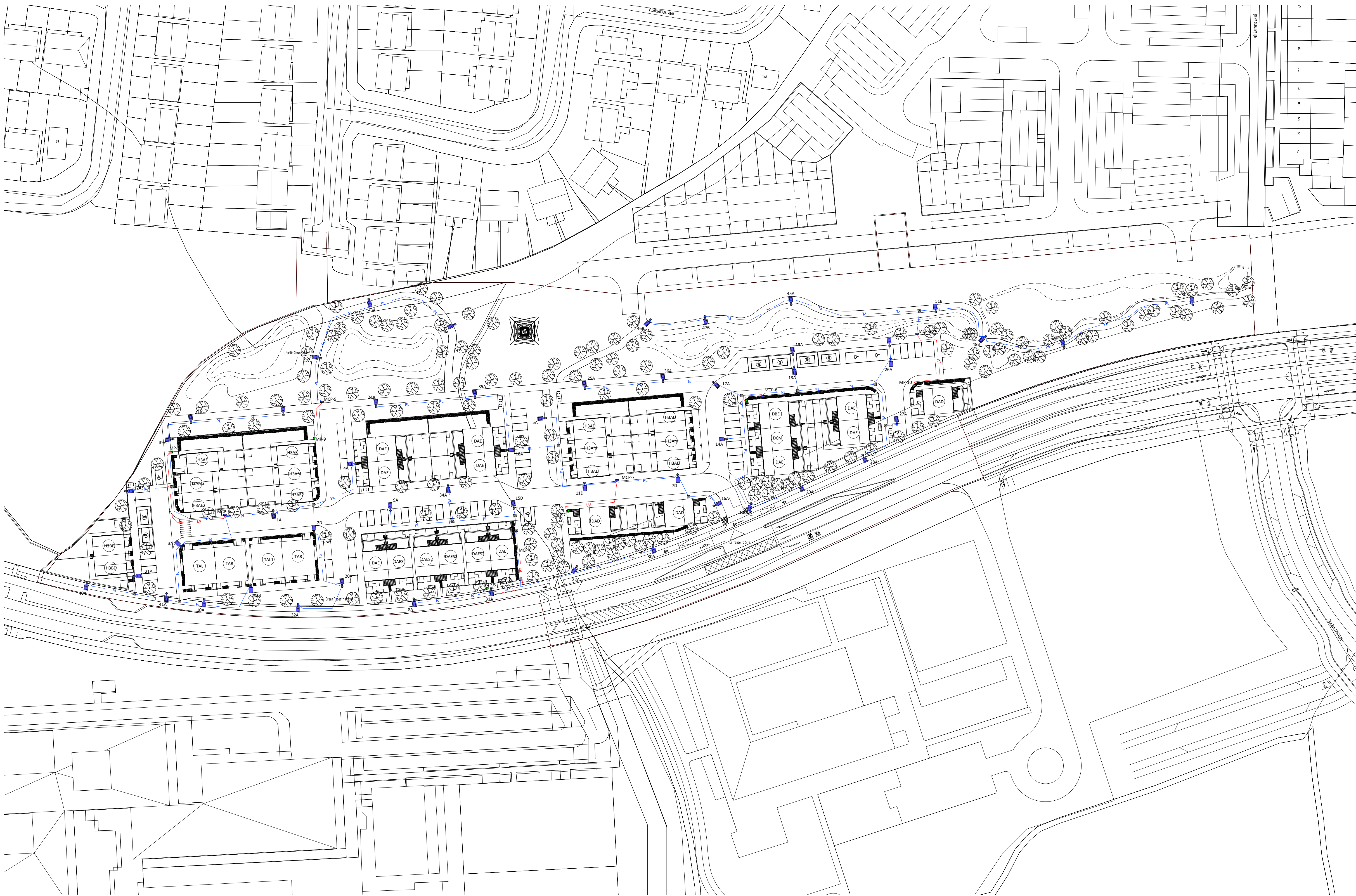
| Code           | Originator | Zone             | Level | Type         | Role | Number        | Status | Revision       |
|----------------|------------|------------------|-------|--------------|------|---------------|--------|----------------|
| S1065          | OCSC       | XX               | XX    | DR           | E    | 0001          | S4     | P03            |
| Date: 17.06.24 |            | Scale @ A0 1:500 |       | Drn by: A.S. |      | Chkd by: Y.D. |        | Aprvd by: C.M. |

DRAWING NOTES:

- DUCTING SHALL COMPLY WITH BS EN 50266-1-2-3-4 LATEST EDITION & SHALL BE SINGLE WALL, COLOURED RED & MANUFACTURED FROM HIGH DENSITY POLYETHYLENE. THE NOMINAL EXTERNAL DIAMETER OF THE DUCT SHALL BE 107mm WITH A MINIMAL WALL THICKNESS OF 5mm. EACH LENGTH OF DUCT SHALL BE STAMPED WITH THE WORDS "PUBLIC LIGHTING" OR ALTERNATIVELY "STREET LIGHTING" IN 18mm BLACK LETTERING AT 0 DEGREES, AT ONE METRE INTERVALS. DUCT SHALL BE Laid WITH THIS LEGEND FACING UPWARDS. DUCT SHALL BE AID IN A STRAIGHT LINE CLOSE TO THE LINE OF THE COLUMN LOCATIONS & SHALL CONTAIN A CONTINUOUS DRAWN WIRE OF 80% STRENGTH.
- A MINIMUM DEPTH OF 450mm COVER IS REQUIRED IN URBAN PATHWAYS & A MINIMUM OF 600mm COVER IS REQUIRED FOR GRASS MARGINS, PEDESTRIAN WAYS, LANEWAYS & GATEWAY ENTRANCES & A MINIMUM DEPTH OF 750mm IS REQUIRED AT ROAD CROSSINGS OR IN CARRIAGEWAYS.
- ALL EQUIPMENT TO BE SUITABLY IP RATED FOR THE ENVIRONMENT THEY ARE BEING INSTALLED.
- FOR SCHEDULES OF EQUIPMENT SEE SPECIFICATION.
- THE COMPLETE INSTALLATION TO BE CO-ORDINATED WITH ALL OTHER SERVICES.

LEGEND OF SYMBOLS:

- MCP PUBLIC LIGHTING MICROPIRLAR
- MP ESB MINI PILLAR
- A 6M POLE MOUNTED LIGHT TYPE 1-AXIA 3.1 50025 23W
- B 6M POLE MOUNTED LIGHT TYPE 2-AXIA 3.1 5293 20W
- C 6M POLE MOUNTED LIGHT TYPE 3-AXIA 3.1 5293 45W
- D 6M POLE MOUNTED LIGHT TYPE 4-AXIA 3.1 5293 45W
- 1M HIGH LED BOLLARD LIGHT
- PL 100mm PUBLIC LIGHTING DUCT
- LV 50mm LV DUCT
- PUBLIC LIGHTING CHAMBER



- THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DESIGN TEAM DRAWINGS AND SPECIFICATIONS.
- FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS. DO NOT SCALE THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
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| Rev No. | Date     | Revision Note         | Drn by | Chkd by |
|---------|----------|-----------------------|--------|---------|
| P01     | 28.11.24 | SUITABLE FOR PLANNING | A.S.   | Y.D.    |
| P02     | 14.02.25 | REVISED FOR PLANNING  | A.S.   | Y.D.    |
| P03     | 25.02.25 | REVISED FOR PLANNING  | Y.D.   | Y.D.    |
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| Rev No. | Date | Revision Note | Drn by | Chkd by |
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|                                                                             |                          |
|-----------------------------------------------------------------------------|--------------------------|
| Client: SDCC                                                                | Project: CLONBURRIS KSG5 |
| Title: ELECTRICAL SITE B                                                    |                          |
| SITE PLAN                                                                   |                          |
| Code   Originator   Zone   Level   Type   Role   Number   Status   Revision |                          |
| S1065   OCSC   XX   XX   DR   E   0002   S4   P03                           |                          |
| Date: 17.06.24 Scale @ A0 1:500 Drn by: A.S. Chkd by: Y.D. Aprvd by: C.M.   |                          |

## 6 APPENDIX B –SITE A CALCULATION REPORT WITH LUMINAIRE DATASHEETS-

DATE: 25 February 2025  
DESIGNER: SF  
PROJECT No: KSG5  
PROJECT NAME: KSG5, Site A



**Site A Public Lighting Calculation**

PREPARED BY: YAGIZ DEMIR

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

| ID | Grid Name                     | X         | Y         | X' Length | Y' Length | X' Spacing | Y' Spacing |  |
|----|-------------------------------|-----------|-----------|-----------|-----------|------------|------------|--|
| 1  | Grid 1                        | 704544.59 | 732801.32 | 271.37    | 271.93    | 1.36       | 1.36       |  |
| 2  | Entrance to Site A            | 704788.95 | 732989.97 | 23.25     | 16.38     | 1.01       | 0.82       |  |
| 3  | Instrusive Light house Fac... | 704653.98 | 732985.88 | 50.75     | 7.00      | 1.49       | 1.40       |  |
| 4  | Intrusive Light House fac...  | 704713.56 | 733021.97 | 76.03     | 7.00      | 1.49       | 1.40       |  |
| 5  | Intrusive Light House fac...  | 704619.02 | 732932.91 | 42.39     | 7.00      | 1.01       | 1.00       |  |
| 6  | Entrance to Site A            | 704647.25 | 732807.76 | 3.15      | 5.13      | 1.05       | 1.03       |  |

Luminaires

Luminaire A Data



|                      |                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------|
| Supplier             | Schröder                                                                                     |
| Type                 | AXIA 3.1 50025 Integrated lenses 16 OSLON SQUARE GIANT@450mA                                 |
| Lamp(s)              | 16 OSLON SQUARE GIANT@450mA WW 730 230V 1x01-11-802 - DRIVER_                                |
| LampFlux(klm)/Colour | 3.07 3000K/70                                                                                |
| File Name            | AXIA 3.1 50025 16 OSLON SQUARE GIANT 450mA WW 730 230V 571871 Integrated lenses 230V TF .ldt |
| Maintenance Factor   | 0.85                                                                                         |
| Imax70,80,90(cd/klm) | 669.8, 147.4, 10.7                                                                           |
| No. in Project       | 33                                                                                           |

Luminaire B Data



|                      |                                                                                            |
|----------------------|--------------------------------------------------------------------------------------------|
| Supplier             | Schröder                                                                                   |
| Type                 | AXIA 3.1 5293 Integrated lenses 16 OSLON SQUARE GIANT@400mA                                |
| Lamp(s)              | 16 OSLON SQUARE GIANT@400mA WW 730 230V 1x01-11-802 - DRIVER_                              |
| LampFlux(klm)/Colour | 2.76 3000K/70                                                                              |
| File Name            | AXIA 3.1 5293 16 OSLON SQUARE GIANT 400mA WW 730 20W 439822 Integrated lenses 230V TF .ldt |
| Maintenance Factor   | 0.85                                                                                       |
| Imax70,80,90(cd/klm) | 617.9, 19.7, 0.0                                                                           |
| No. in Project       | 5                                                                                          |

Luminaire C Data



|                      |                                                                                            |
|----------------------|--------------------------------------------------------------------------------------------|
| Supplier             | Schröder                                                                                   |
| Type                 | AXIA 3.1 5293 Integrated lenses 16 OSLON SQUARE GIANT@870mA                                |
| Lamp(s)              | 16 OSLON SQUARE GIANT@870mA WW 730 230V 1x01-37-044 - DRIVER_                              |
| LampFlux(klm)/Colour | 5.41 3000K/70                                                                              |
| File Name            | AXIA 3.1 5293 16 OSLON SQUARE GIANT 870mA WW 730 45W 439822 Integrated lenses 230V TF .ldt |
| Maintenance Factor   | 0.85                                                                                       |
| Imax70,80,90(cd/klm) | 617.9, 19.7, 0.0                                                                           |
| No. in Project       | 2                                                                                          |

Layout

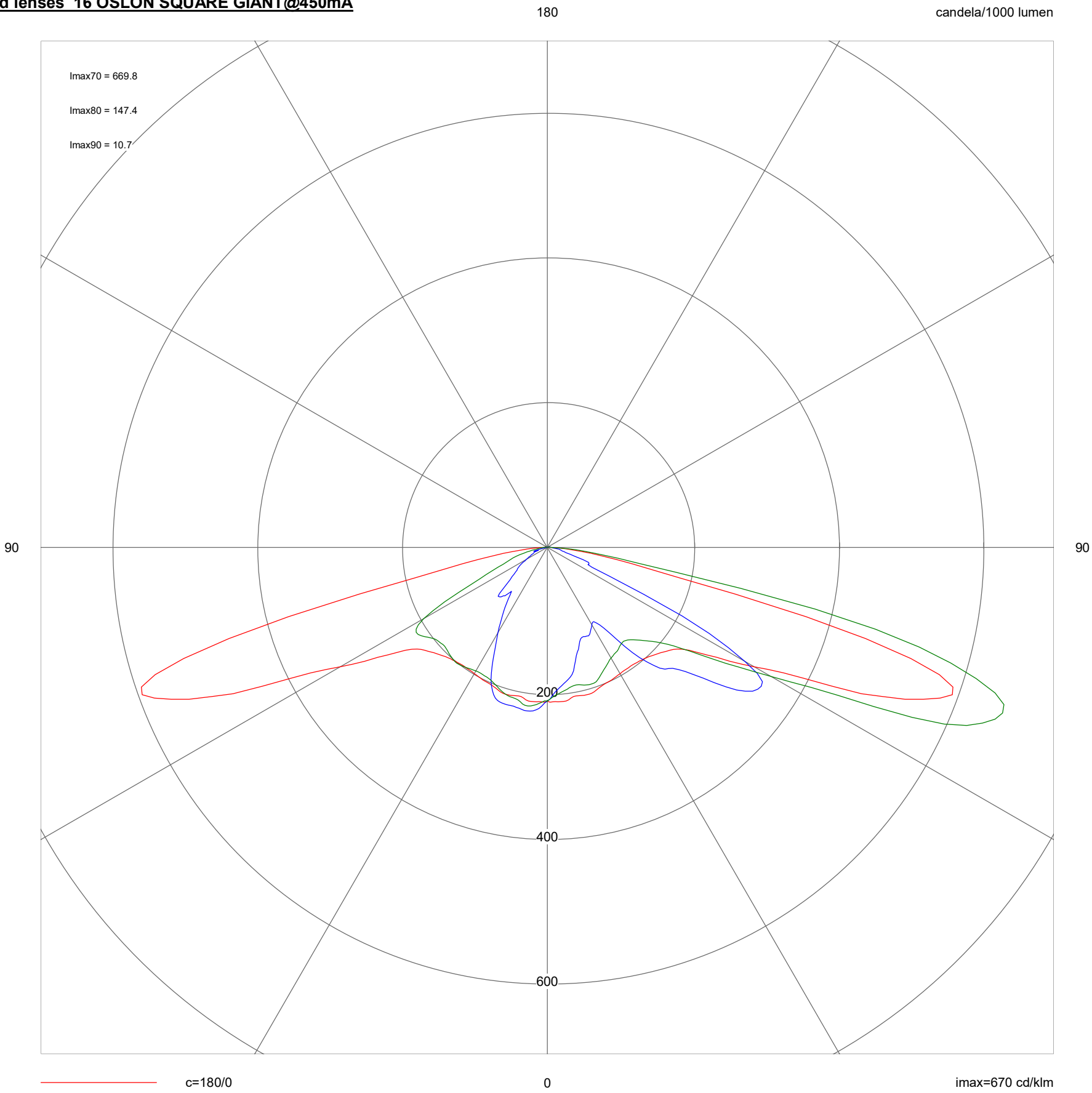
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| 1  | A    | 704721.29 | 732887.81 | 6.00   | 317.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 2  | A    | 704579.77 | 732994.86 | 6.00   | 348.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 3  | A    | 704617.53 | 732842.43 | 6.00   | 235.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 4  | A    | 704649.42 | 733014.63 | 6.00   | 355.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 5  | A    | 704695.71 | 732969.14 | 6.00   | 90.00  | 0.00 | 0.00 | 0.50      |          |          |          |

Layout Continued

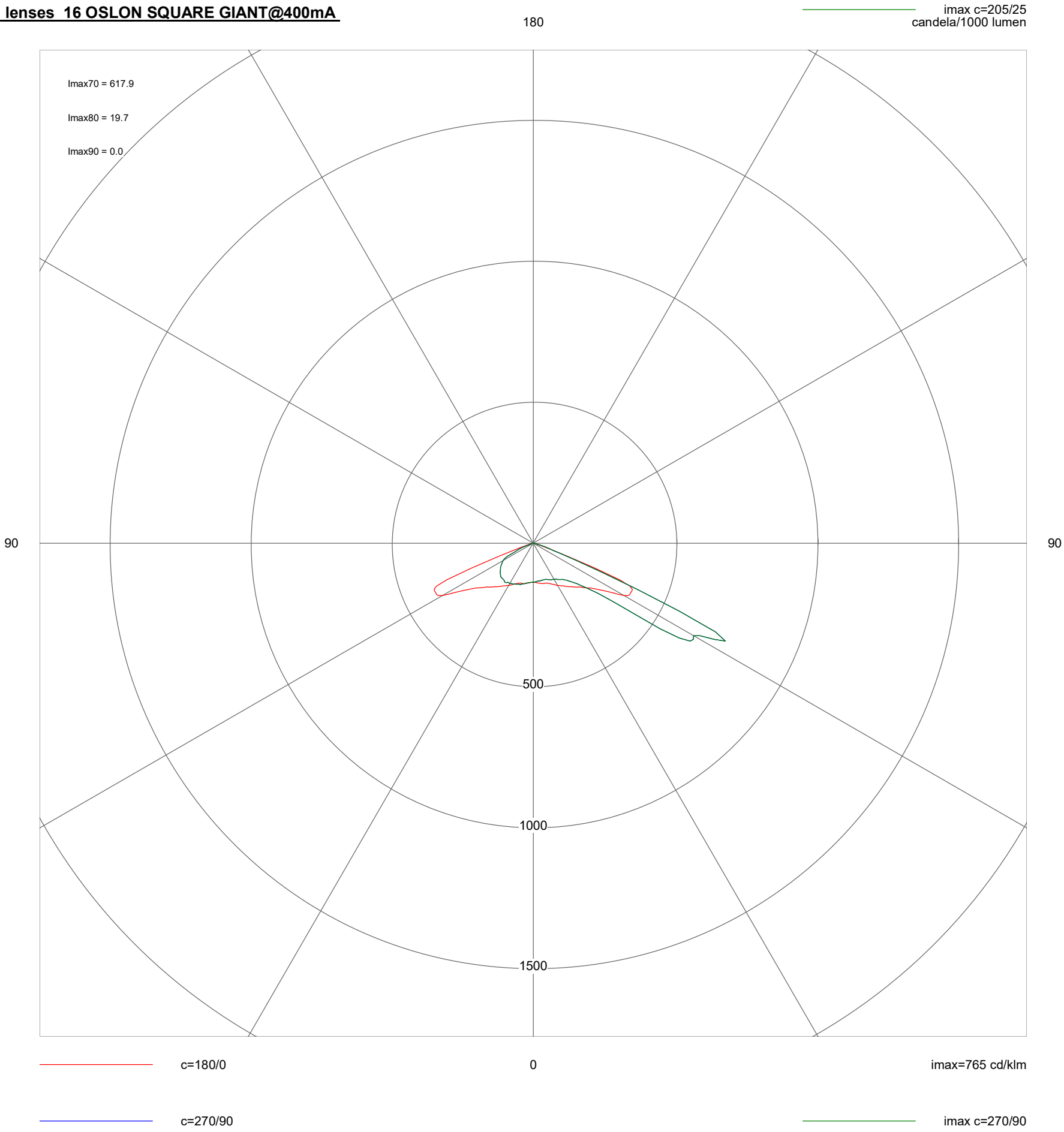
| ID | Type | X         | Y         | Height | Angle  | Tilt | Cant | Out-<br>reach | Target<br><br>X | Target<br><br>Y | Target<br><br>Z |
|----|------|-----------|-----------|--------|--------|------|------|---------------|-----------------|-----------------|-----------------|
| 6  | A    | 704630.65 | 732888.52 | 6.00   | 175.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 7  | A    | 704679.66 | 732951.04 | 6.00   | 230.00 | 3.00 | 0.00 | 0.50          |                 |                 |                 |
| 8  | A    | 704696.05 | 732940.25 | 6.00   | 125.00 | 2.50 | 0.00 | 0.50          |                 |                 |                 |
| 9  | A    | 704657.87 | 732941.18 | 6.00   | 90.00  | 2.50 | 0.00 | 0.50          |                 |                 |                 |
| 10 | A    | 704656.13 | 732955.98 | 6.00   | 315.00 | 2.50 | 0.00 | 0.50          |                 |                 |                 |
| 11 | A    | 704632.63 | 732980.45 | 6.00   | 85.00  | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 12 | A    | 704707.67 | 732998.50 | 6.00   | 350.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 13 | A    | 704661.10 | 733042.53 | 6.00   | 176.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 14 | A    | 704648.97 | 732823.01 | 6.00   | 225.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 15 | A    | 704645.25 | 732814.33 | 6.00   | 268.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 16 | A    | 704624.25 | 732851.48 | 6.00   | 205.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 17 | A    | 704700.71 | 732932.99 | 6.00   | 349.00 | 2.50 | 0.00 | 0.50          |                 |                 |                 |
| 18 | A    | 704704.84 | 732963.31 | 6.00   | 350.00 | 2.50 | 0.00 | 0.50          |                 |                 |                 |
| 19 | B    | 704705.64 | 732975.90 | 6.00   | 312.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 20 | A    | 704663.97 | 732970.18 | 6.00   | 90.00  | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 21 | B    | 704639.08 | 732934.39 | 6.00   | 173.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 22 | A    | 704645.08 | 732970.09 | 6.00   | 123.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 23 | A    | 704600.63 | 732992.23 | 6.00   | 262.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 24 | A    | 704755.22 | 732985.47 | 6.00   | 62.00  | 2.50 | 0.00 | 0.50          |                 |                 |                 |
| 25 | B    | 704620.37 | 732874.66 | 6.00   | 177.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 26 | A    | 704667.81 | 732833.36 | 6.00   | 315.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 27 | A    | 704789.21 | 732962.55 | 6.00   | 337.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 28 | C    | 704796.21 | 732996.03 | 6.00   | 10.00  | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 29 | B    | 704787.86 | 732975.61 | 6.00   | 157.00 | 5.00 | 0.00 | 0.50          |                 |                 |                 |
| 30 | A    | 704754.34 | 732914.29 | 6.00   | 313.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 31 | C    | 704812.30 | 732990.41 | 6.00   | 140.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 32 | A    | 704624.80 | 732901.75 | 6.00   | 123.00 | 2.50 | 0.00 | 0.50          |                 |                 |                 |
| 33 | A    | 704689.05 | 732851.67 | 6.00   | 315.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 34 | A    | 704709.57 | 732869.90 | 6.00   | 317.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 35 | A    | 704725.11 | 732989.05 | 6.00   | 170.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 36 | B    | 704641.77 | 732954.52 | 6.00   | 169.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 37 | A    | 704774.02 | 732934.42 | 6.00   | 320.00 | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 38 | A    | 704703.46 | 733010.47 | 6.00   | 65.00  | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 39 | A    | 704726.46 | 732998.70 | 6.00   | 90.00  | 0.00 | 0.00 | 0.50          |                 |                 |                 |
| 40 | A    | 704676.56 | 733023.17 | 6.00   | 65.00  | 0.00 | 0.00 | 0.50          |                 |                 |                 |

Polar Diagrams

Luminaire A AXIA 3.1 50025 Integrated lenses 16 OSLON SQUARE GIANT@450mA

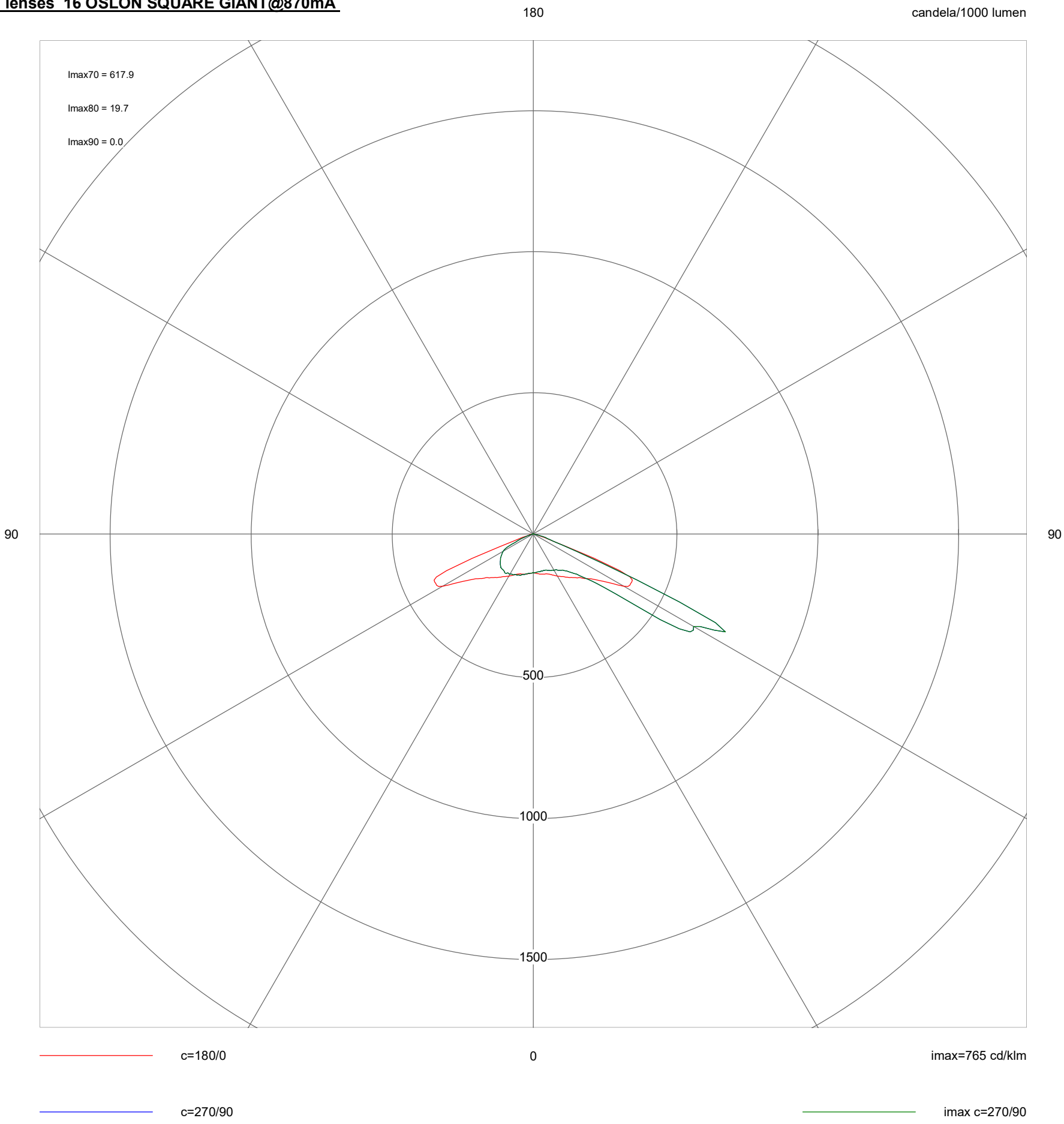


Luminaire B AXIA 3.1 5293 Integrated lenses 16 OSLON SQUARE GIANT@400mA



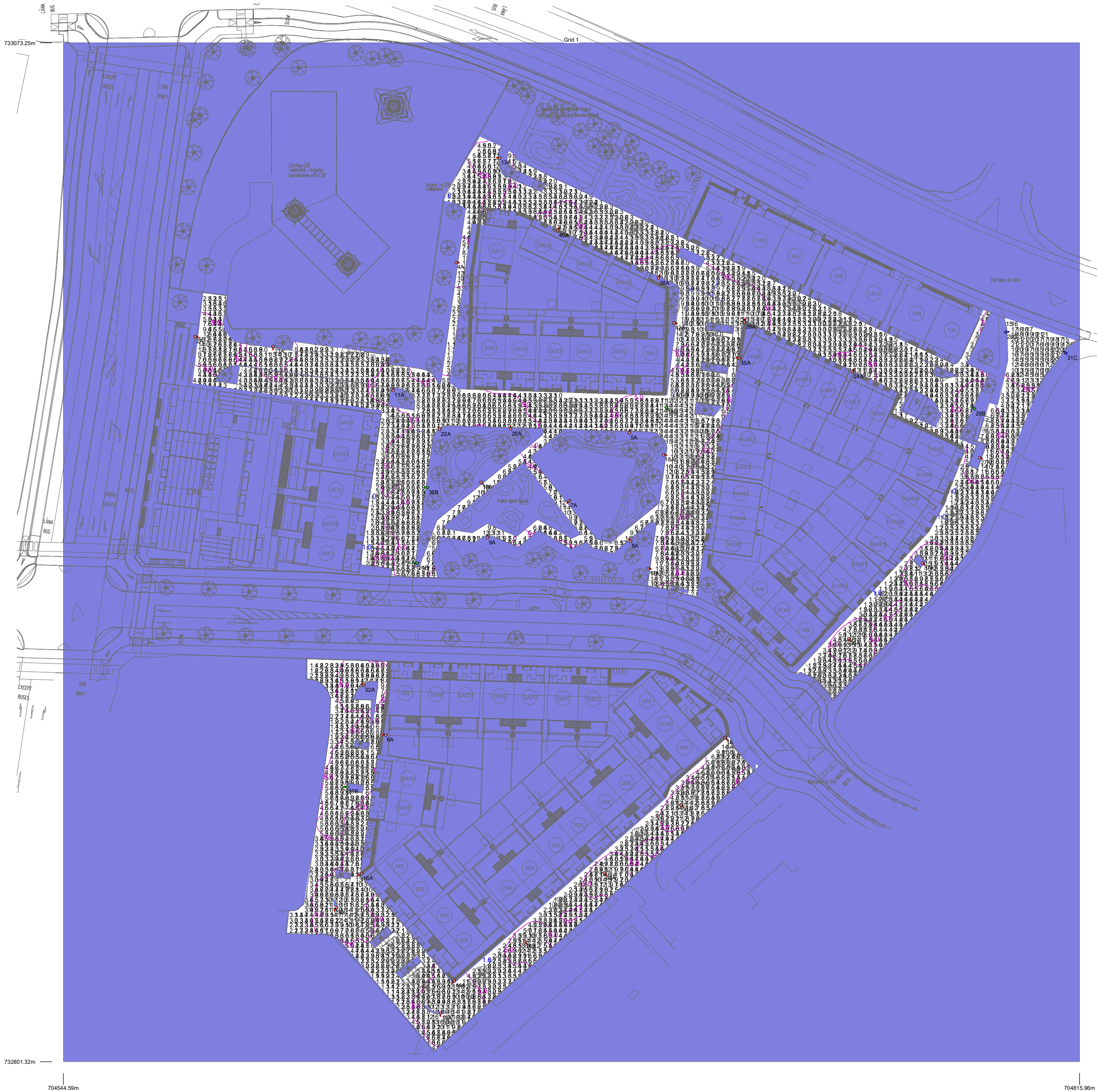
Polar Diagrams Continued

Luminaire C AXIA 3.1 5293 Integrated lenses 16 OSLON SQUARE GIANT@870mA



Horizontal Illuminance (lux)

Grid 1

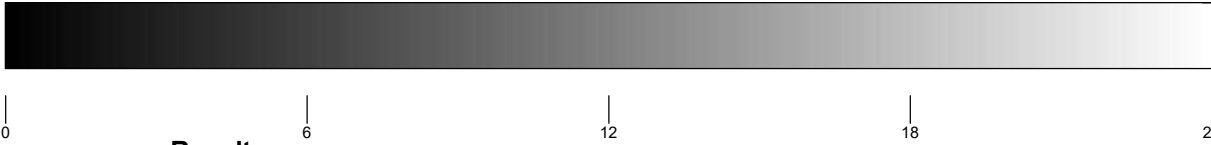
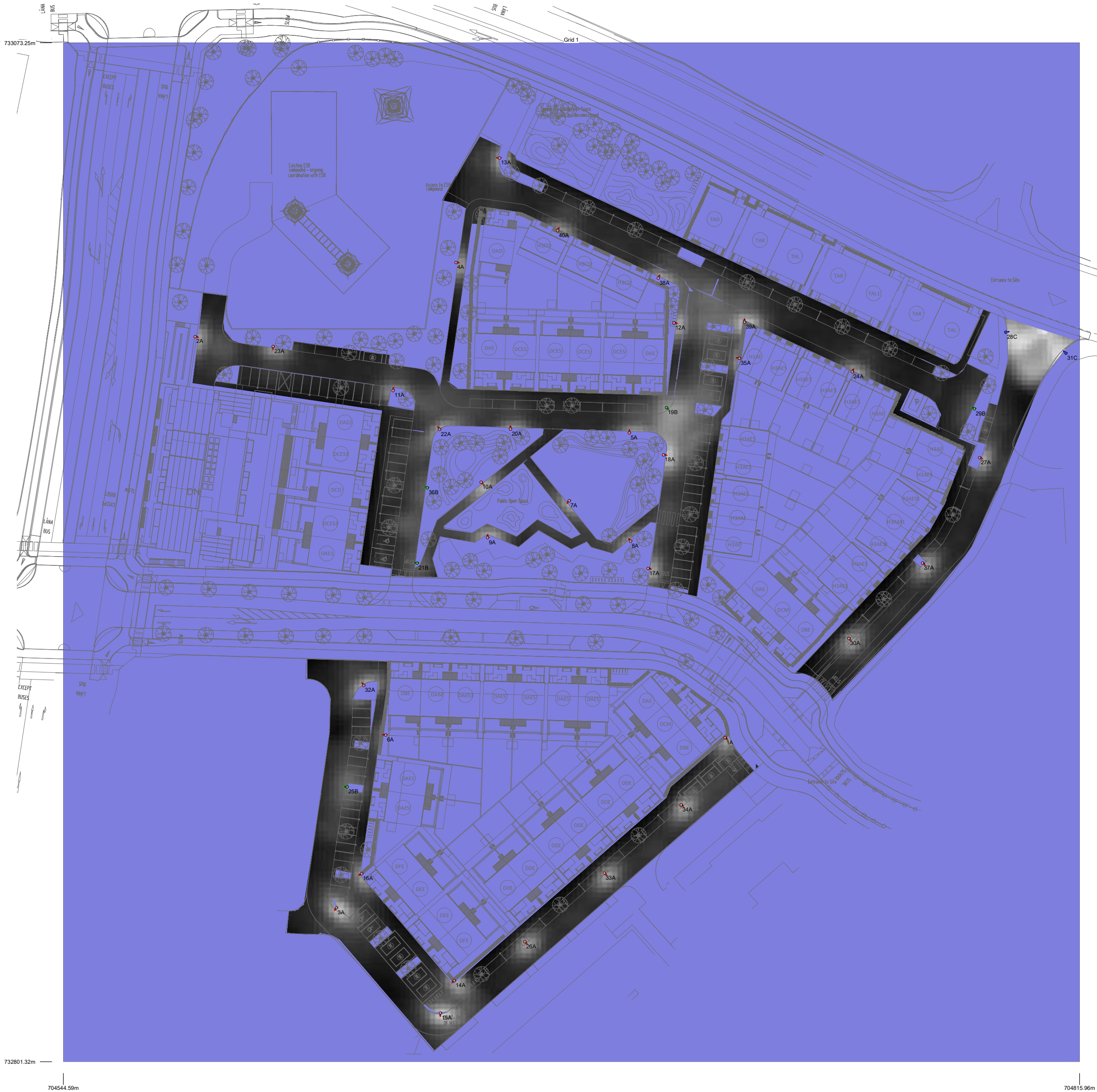


Results

|           |       |
|-----------|-------|
| Eav       | 5.85  |
| Emin      | 1.05  |
| Emax      | 21.37 |
| Emin/Emax | 0.05  |
| Emin/Eav  | 0.18  |
|           |       |

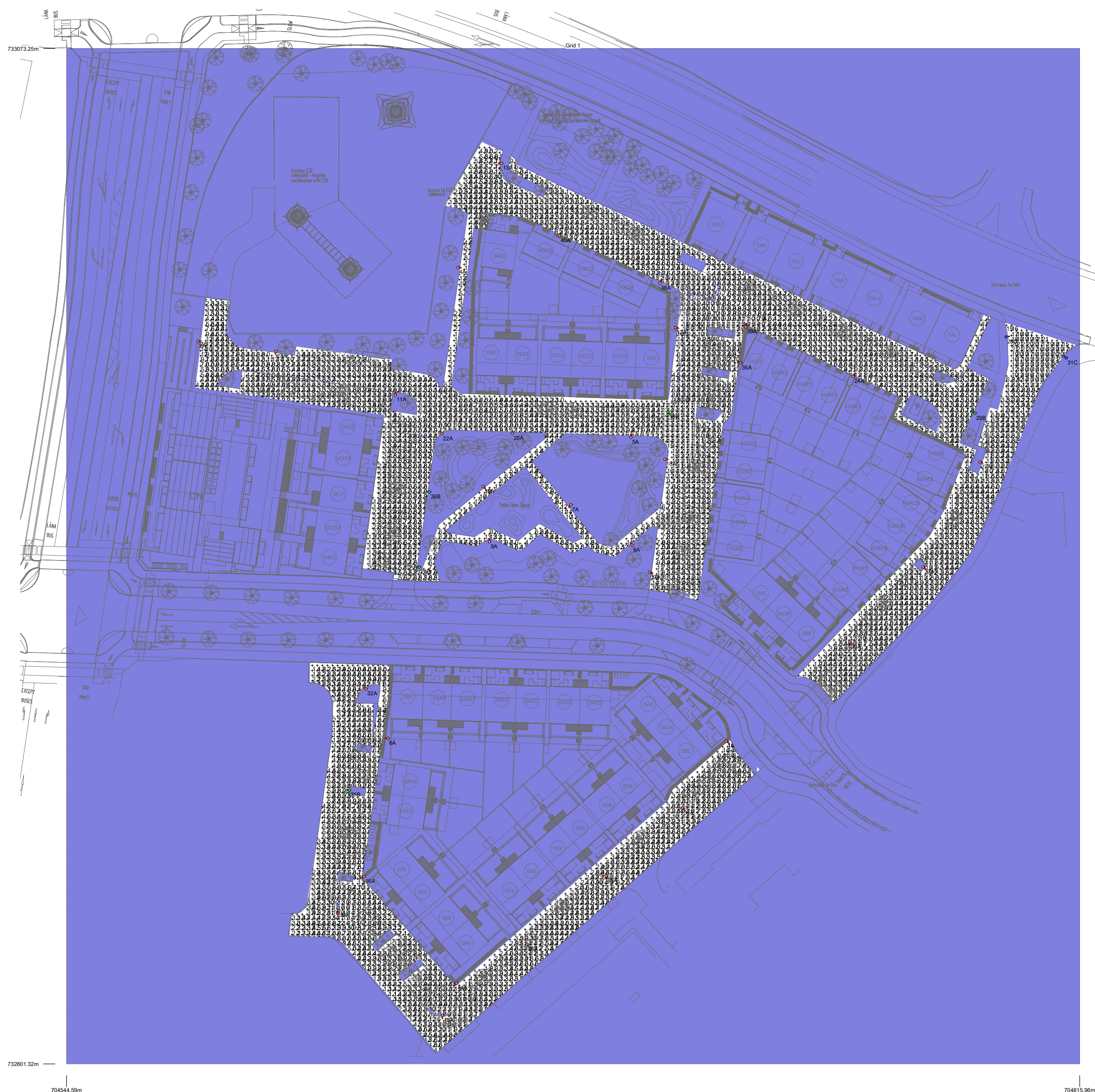
Horizontal Illuminance (lux)

Grid 1



| Results   |       |
|-----------|-------|
| Eav       | 5.85  |
| Emin      | 1.05  |
| Emax      | 21.37 |
| Emin/Emax | 0.05  |
| Emin/Eav  | 0.18  |
|           |       |

Grid 1

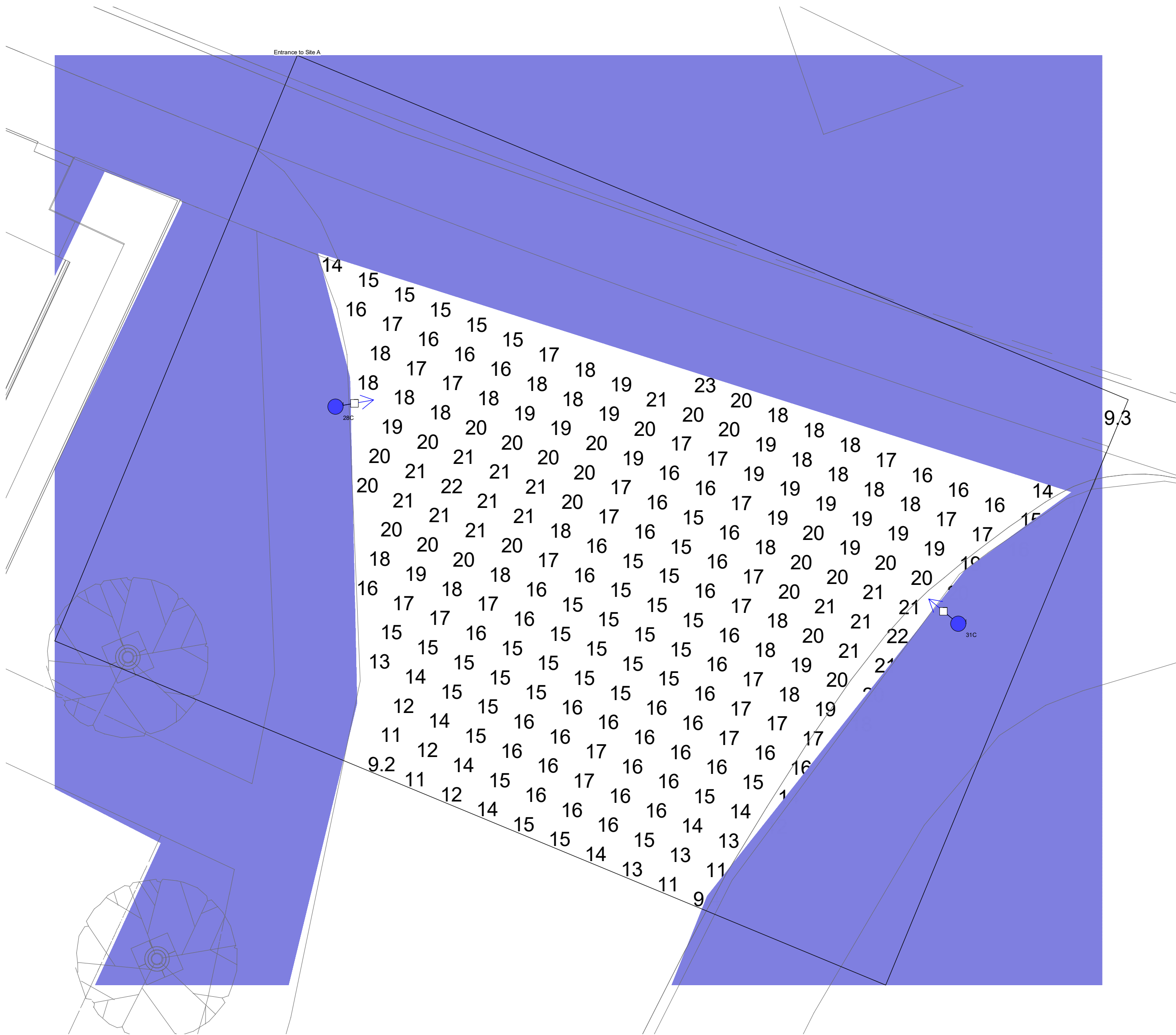


## Results

|                       |       |
|-----------------------|-------|
| Eav                   | 5.85  |
| Emin                  | 1.05  |
| E <sub>max</sub>      | 21.37 |
| Emin/E <sub>max</sub> | 0.05  |
| Emin/Eav              | 0.18  |
|                       |       |

Horizontal Illuminance (lux)

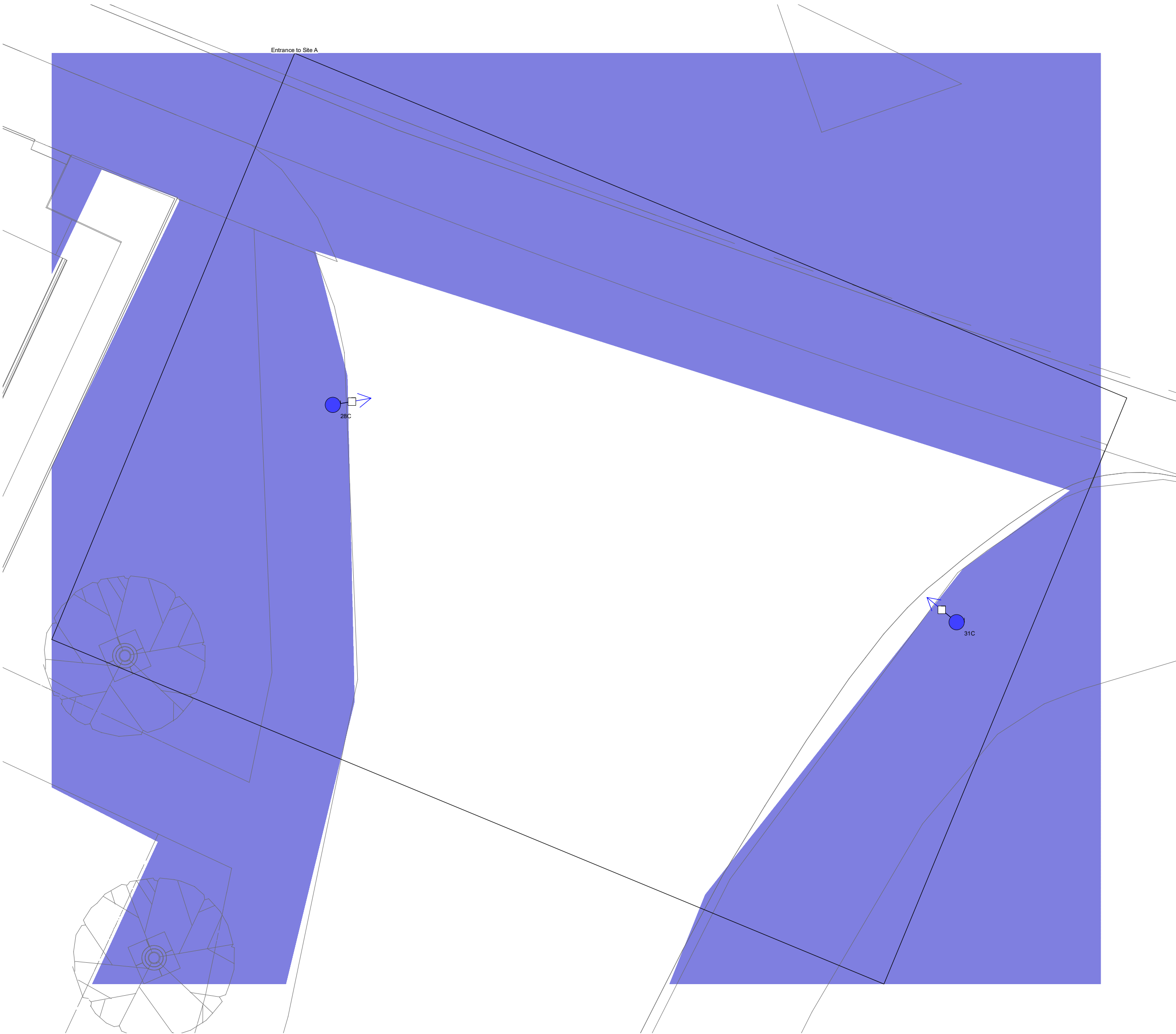
Entrance to Site A



| Results   |       |
|-----------|-------|
| Eav       | 16.98 |
| Emin      | 9.16  |
| Emax      | 23.01 |
| Emin/Emax | 0.40  |
| Emin/Eav  | 0.54  |
|           |       |

Horizontal Illuminance (lux)

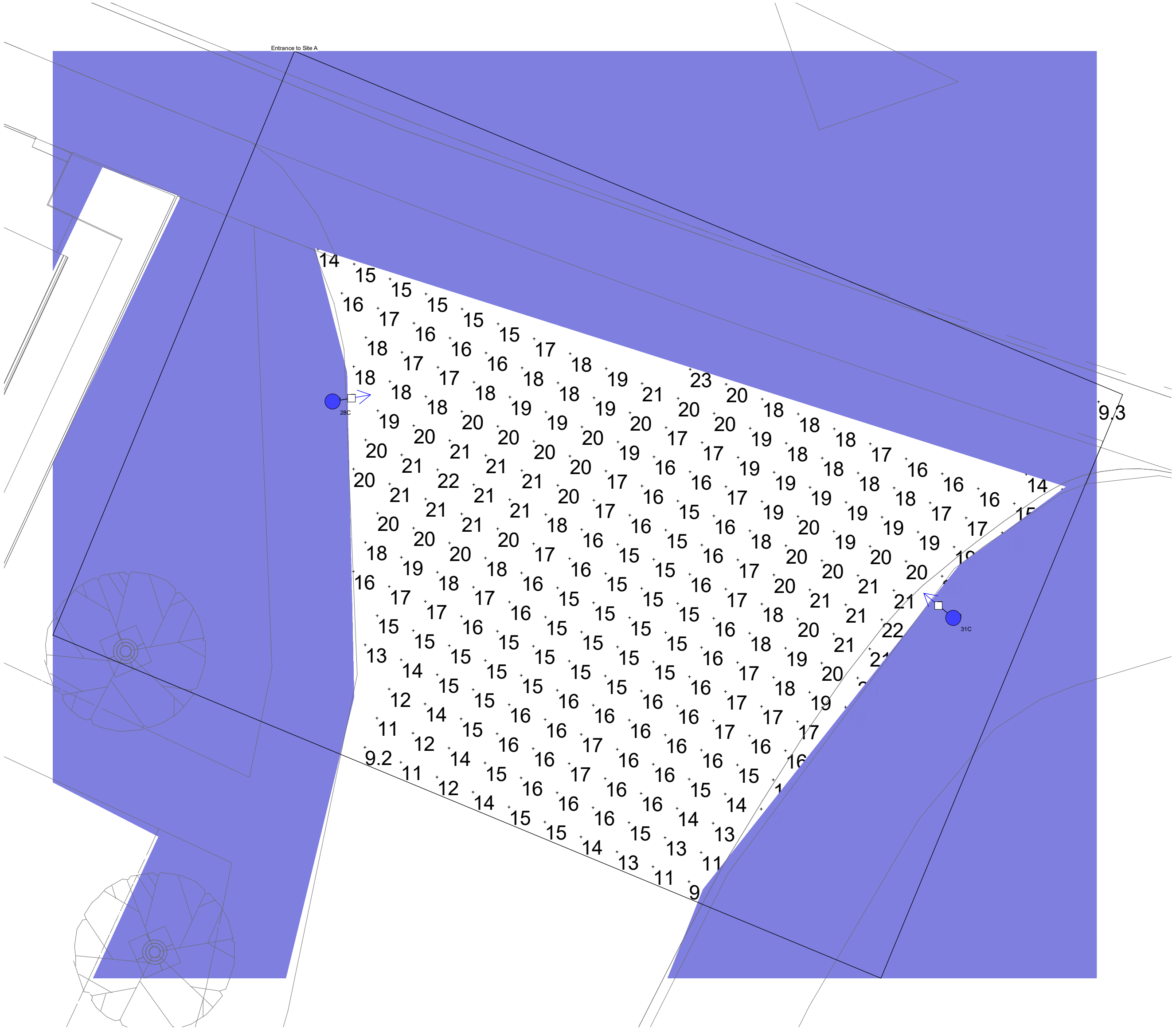
Entrance to Site A



| Results   |       |
|-----------|-------|
| Eav       | 16.98 |
| Emin      | 9.16  |
| Emax      | 23.01 |
| Emin/Emax | 0.40  |
| Emin/Eav  | 0.54  |
|           |       |

Horizontal Illuminance (lux)

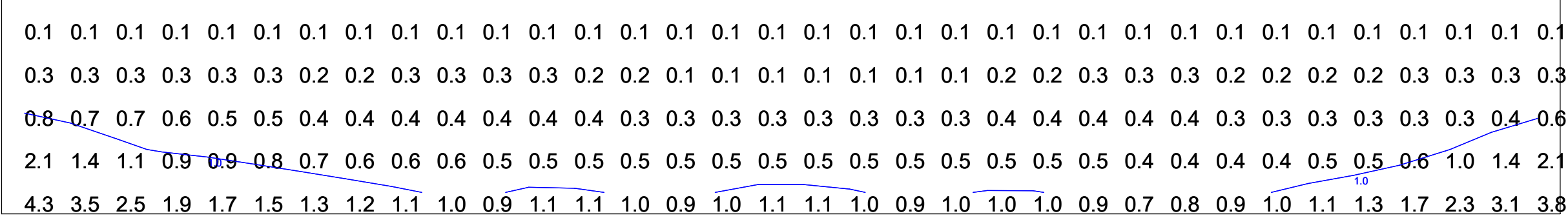
Entrance to Site A



| Results   |       |
|-----------|-------|
| Eav       | 16.98 |
| Emin      | 9.16  |
| Emax      | 23.01 |
| Emin/Emax | 0.40  |
| Emin/Eav  | 0.54  |
|           |       |

**Illuminance (lux)**

Intrusive Light house Facade



**Results**

|           |      |
|-----------|------|
| Eav       | 0.58 |
| Emin      | 0.05 |
| Emax      | 4.32 |
| Emin/Emax | 0.01 |
| Emin/Eav  | 0.09 |
|           |      |

Intrusive Light House facade



|                       |      |
|-----------------------|------|
| Eav                   | 0.70 |
| Emin                  | 0.03 |
| E <sub>max</sub>      | 4.39 |
| Emin/E <sub>max</sub> | 0.01 |
| Emin/Eav              | 0.05 |
|                       |      |

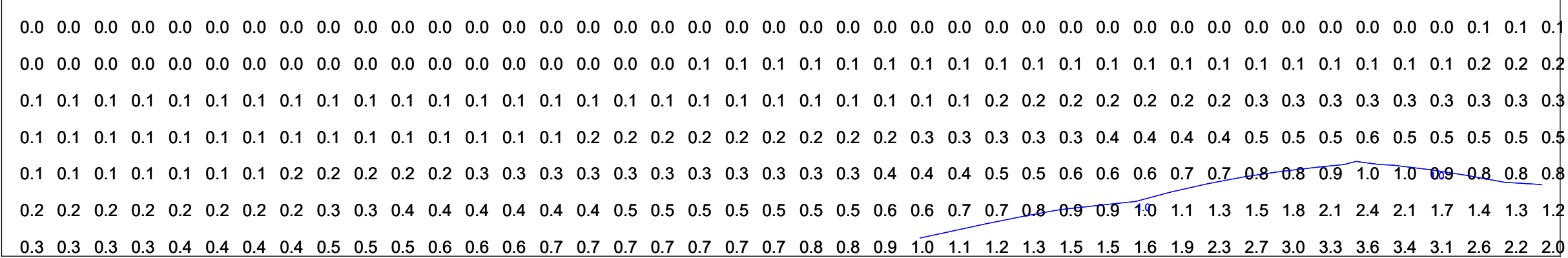
Intrusive Light House facade

[illegible]

|                       |      |
|-----------------------|------|
| Eav                   | 0.70 |
| Emin                  | 0.03 |
| E <sub>max</sub>      | 4.39 |
| Emin/E <sub>max</sub> | 0.01 |
| Emin/Eav              | 0.05 |
|                       |      |

Illuminance (lux)

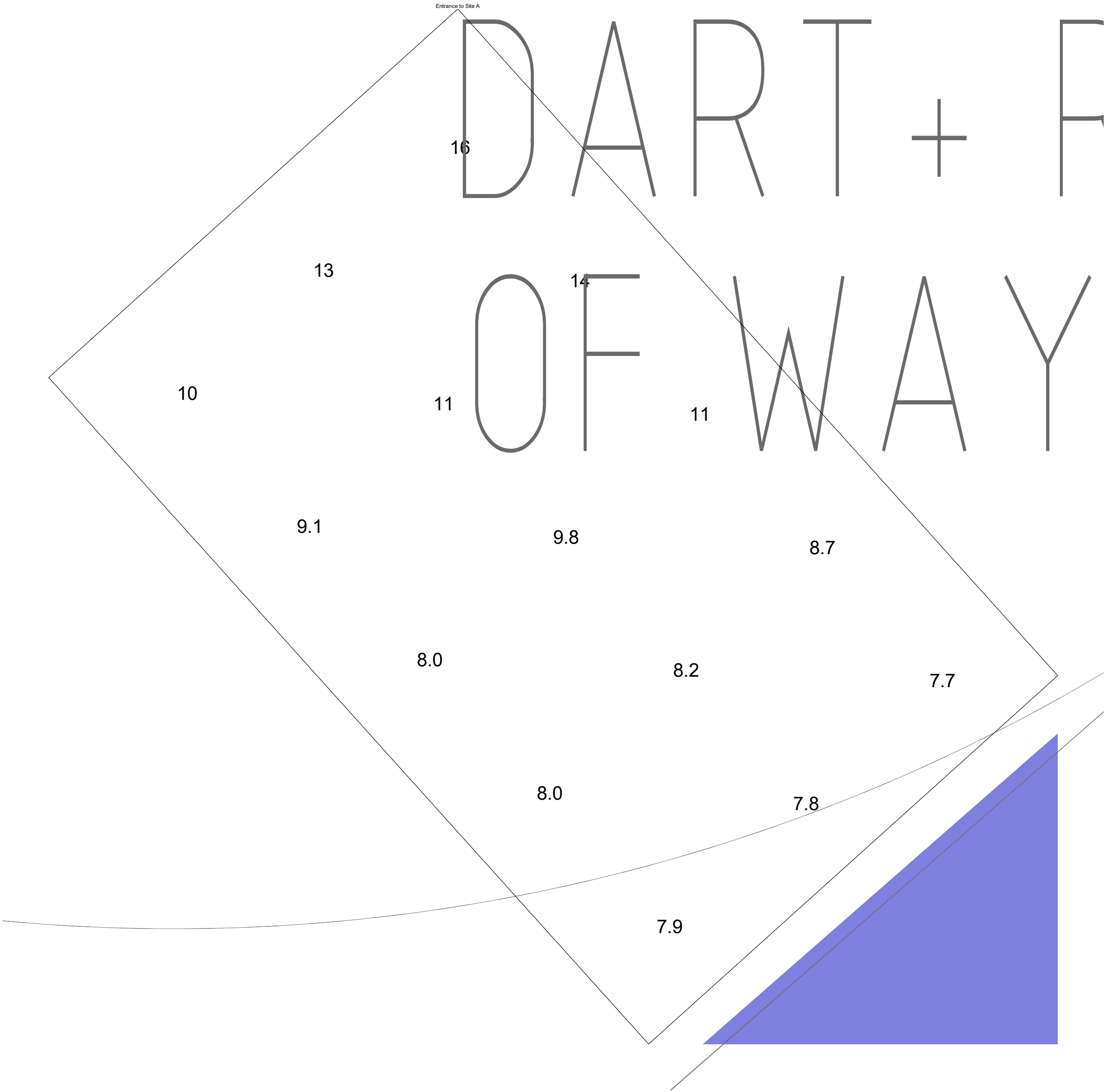
Intrusive Light House facade



| Results   |      |
|-----------|------|
| Eav       | 0.42 |
| Emin      | 0.03 |
| Emax      | 3.61 |
| Emin/Emax | 0.01 |
| Emin/Eav  | 0.07 |
|           |      |

Horizontal Illuminance (lux)

Entrance to Site A



| Results   |       |
|-----------|-------|
| Eav       | 10.04 |
| Emin      | 7.65  |
| Emax      | 16.32 |
| Emin/Emax | 0.47  |
| Emin/Eav  | 0.76  |
|           |       |

## 7 APPENDIX C -SITE B CALCULATION REPORT WITH LUMINAIRE DATASHEETS-

**DATE:** 28 November 2024  
**DESIGNER:** SF  
**PROJECT No:** S1065  
**PROJECT NAME:** Clonburris East Side

**LIGHTING  
REALITY**

## **East Side Lighting Calculation**

**PREPARED BY:** YAGIZ DEMIR

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

| ID | Grid Name                    | X         | Y         | X' Length | Y' Length | X' Spacing | Y' Spacing |
|----|------------------------------|-----------|-----------|-----------|-----------|------------|------------|
| 1  | Resi Road                    | 704841.05 | 732987.48 | 365.95    | 115.08    | 1.79       | 1.69       |
| 2  | Site B Entrance              | 705068.52 | 733022.06 | 14.17     | 10.06     | 0.57       | 0.40       |
| 3  | Zebra Crossing               | 705058.07 | 733034.73 | 4.42      | 6.78      | 1.47       | 1.36       |
| 4  | Zebra Crossing               | 705016.79 | 733031.37 | 4.42      | 6.78      | 1.47       | 1.36       |
| 5  | Zebra Crossing               | 704996.79 | 733030.12 | 4.42      | 6.78      | 1.47       | 1.36       |
| 6  | Zebra Crossing               | 704928.02 | 733023.19 | 4.42      | 6.78      | 1.47       | 1.36       |
| 7  | Intrusive Light House Facade | 704888.48 | 733015.43 | 20.86     | 7.00      | 0.83       | 0.28       |
| 8  | Intrusive Light House Facade | 704889.62 | 733004.27 | 43.46     | 5.00      | 1.74       | 0.20       |
| 9  | Intrusive Light House Facade | 704993.18 | 733040.98 | 16.23     | 7.00      | 1.48       | 1.40       |
| 10 | Intrusive Light House Facade | 705056.51 | 733062.42 | 19.54     | 7.00      | 1.40       | 1.40       |

Luminaires

Luminaire A Data



|                      |                                                                                 |
|----------------------|---------------------------------------------------------------------------------|
| Supplier             | Schröder                                                                        |
| Type                 | AXIA 3.1 50025 Integrated lenses 16 OSLO N SQUARE GIANT@450mA                   |
| Lamp(s)              | 16 OSLO N SQUARE GIANT@450mA WW 730 230V 1x01-11-802 - DRIVER_                  |
| LampFlux(klm)/Colour | 3.07 3000K/70                                                                   |
| File Name            | AXIA 3.1 50025 16 OSLO N SQUARE GIANT T 450mA WW 730 23W 571871 Integrated I... |
| Maintenance Factor   | 0.80                                                                            |
| Imax70,80,90(cd/klm) | 669.8, 147.4, 10.7                                                              |
| No. in Project       | 38                                                                              |

Luminaire B Data



|                      |                                                                              |
|----------------------|------------------------------------------------------------------------------|
| Supplier             | Schröder                                                                     |
| Type                 | AXIA 3.1 5293 Integrated lenses 16 OSLO N SQUARE GIANT@400mA                 |
| Lamp(s)              | 16 OSLO N SQUARE GIANT@400mA WW 730 230V 1x01-11-802 - DRIVER_               |
| LampFlux(klm)/Colour | 2.76 3000K/70                                                                |
| File Name            | AXIA 3.1 5293 16 OSLO N SQUARE GIANT 400mA WW 730 20W 439822 Integrated I... |
| Maintenance Factor   | 0.80                                                                         |
| Imax70,80,90(cd/klm) | 617.9, 19.7, 0.0                                                             |
| No. in Project       | 8                                                                            |

Luminaire C Data



|                      |                                                                              |
|----------------------|------------------------------------------------------------------------------|
| Supplier             | Schröder                                                                     |
| Type                 | AXIA 3.1 5293 Integrated lenses 16 OSLO N SQUARE GIANT@870mA                 |
| Lamp(s)              | 16 OSLO N SQUARE GIANT@870mA WW 730 230V 1x01-37-044 - DRIVER_               |
| LampFlux(klm)/Colour | 5.41 3000K/70                                                                |
| File Name            | AXIA 3.1 5293 16 OSLO N SQUARE GIANT 870mA WW 730 45W 439822 Integrated I... |
| Maintenance Factor   | 0.80                                                                         |
| Imax70,80,90(cd/klm) | 617.9, 19.7, 0.0                                                             |
| No. in Project       | 1                                                                            |

Luminaire D Data



|                      |                                                                              |
|----------------------|------------------------------------------------------------------------------|
| Supplier             | Schröder                                                                     |
| Type                 | AXIA 3.1 5293 Integrated lenses 16 OSLO N SQUARE GIANT@870mA                 |
| Lamp(s)              | 16 OSLO N SQUARE GIANT@870mA WW 730 230V 1x01-37-044 - DRIVER_               |
| LampFlux(klm)/Colour | 5.41 3000K/70                                                                |
| File Name            | AXIA 3.1 5293 16 OSLO N SQUARE GIANT 870mA WW 730 45W 439822 Integrated I... |
| Maintenance Factor   | 0.80                                                                         |
| Imax70,80,90(cd/klm) | 617.9, 19.7, 0.0                                                             |
| No. in Project       | 4                                                                            |

## Layout

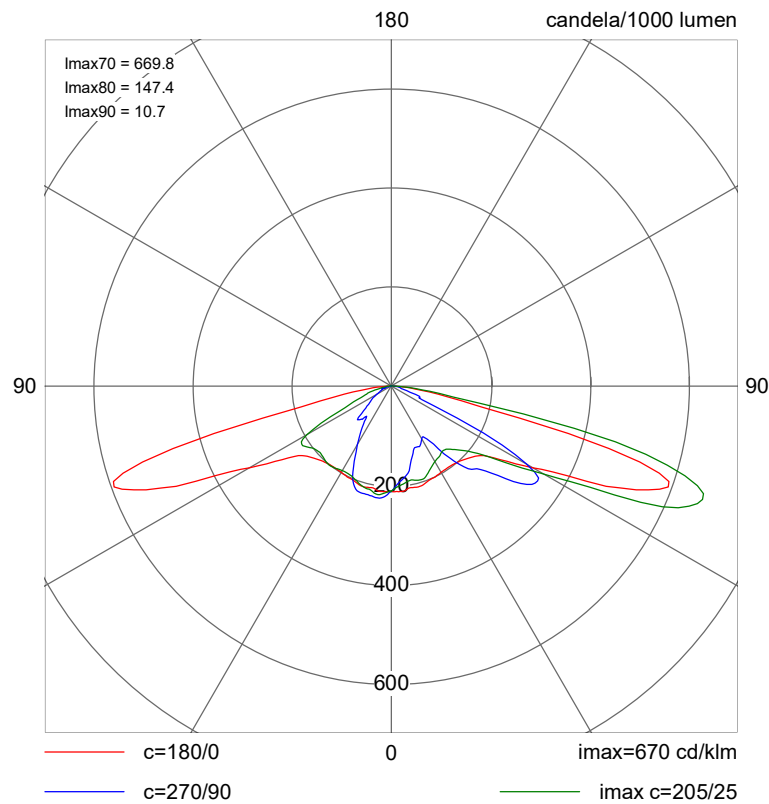
| ID | Type | X         | Y         | Height | Angle  | Tilt | Cant | Out-reach | Target X | Target Y | Target Z |
|----|------|-----------|-----------|--------|--------|------|------|-----------|----------|----------|----------|
| 1  | A    | 704913.86 | 733028.70 | 6.00   | 276.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 2  | D    | 704932.60 | 733021.48 | 6.00   | 95.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 3  | A    | 704888.65 | 733016.83 | 6.00   | 130.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 4  | A    | 704946.47 | 733044.80 | 6.00   | 183.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 5  | A    | 705010.74 | 733059.96 | 6.00   | 188.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 6  | A    | 705066.84 | 733030.08 | 6.00   | 26.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 7  | D    | 705053.46 | 733041.01 | 6.00   | 278.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 8  | A    | 704966.25 | 732999.93 | 6.00   | 275.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 9  | A    | 704958.22 | 733028.65 | 6.00   | 95.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 10 | A    | 704895.85 | 732999.78 | 6.00   | 270.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 11 | D    | 705022.88 | 733038.42 | 6.00   | 278.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 12 | A    | 704869.38 | 733035.58 | 6.00   | 5.00   | 0.00 | 0.00 | 0.50      |          |          |          |
| 13 | A    | 705093.11 | 733077.04 | 6.00   | 275.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 14 | A    | 705070.94 | 733053.16 | 6.00   | 181.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 15 | D    | 705000.42 | 733029.53 | 6.00   | 96.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 16 | C    | 705078.91 | 733031.43 | 6.00   | 224.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 17 | A    | 705066.45 | 733073.45 | 6.00   | 315.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 18 | A    | 704996.42 | 733049.04 | 6.00   | 5.00   | 0.00 | 0.00 | 0.50      |          |          |          |
| 19 | A    | 705092.69 | 733081.17 | 6.00   | 95.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 20 | A    | 704942.17 | 733004.28 | 6.00   | 95.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 21 | A    | 704871.59 | 733007.05 | 6.00   | 5.00   | 0.00 | 0.00 | 0.50      |          |          |          |
| 22 | A    | 705019.17 | 733010.57 | 6.00   | 230.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 23 | A    | 704892.29 | 733058.48 | 6.00   | 90.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 24 | A    | 704953.39 | 733064.22 | 6.00   | 90.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 25 | A    | 705022.49 | 733069.95 | 6.00   | 90.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 26 | A    | 705125.68 | 733079.63 | 6.00   | 275.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 27 | A    | 705127.91 | 733057.45 | 6.00   | 95.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 28 | A    | 705116.82 | 733048.23 | 6.00   | 295.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 29 | A    | 705094.69 | 733038.01 | 6.00   | 300.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 30 | A    | 705044.33 | 733017.32 | 6.00   | 290.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 31 | A    | 704991.64 | 733003.49 | 6.00   | 275.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 32 | A    | 704927.37 | 732998.26 | 6.00   | 270.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 33 | B    | 704916.32 | 733001.51 | 6.00   | 95.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 34 | A    | 704977.64 | 733037.85 | 6.00   | 274.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 35 | A    | 704987.28 | 733067.02 | 6.00   | 90.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 36 | A    | 705050.38 | 733072.39 | 6.00   | 95.00  | 0.00 | 0.00 | 0.50      |          |          |          |

**Layout Continued**

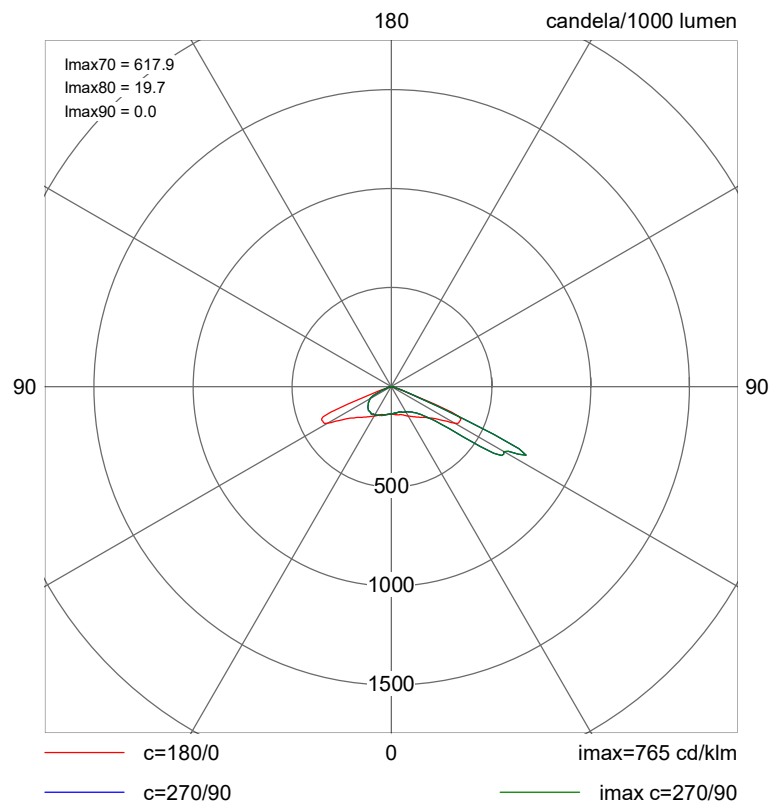
| ID | Type | X         | Y         | Height | Angle  | Tilt | Cant | Out-reach | Target X | Target Y | Target Z |
|----|------|-----------|-----------|--------|--------|------|------|-----------|----------|----------|----------|
| 37 | A    | 704920.15 | 733061.21 | 6.00   | 95.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 38 | A    | 705125.34 | 733084.18 | 6.00   | 95.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 39 | A    | 704885.03 | 733048.96 | 6.00   | 185.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 40 | A    | 704856.43 | 733005.49 | 6.00   | 260.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 41 | A    | 704881.22 | 733001.07 | 6.00   | 265.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 42 | A    | 704935.44 | 733082.04 | 4.00   | 165.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 43 | A    | 704952.16 | 733099.90 | 4.00   | 290.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 44 | B    | 704978.69 | 733093.08 | 4.00   | 205.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 45 | A    | 705091.94 | 733097.81 | 4.00   | 95.00  | 0.00 | 0.00 | 0.50      |          |          |          |
| 46 | B    | 705044.41 | 733093.46 | 4.00   | 235.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 47 | B    | 705065.01 | 733094.52 | 4.00   | 285.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 48 | B    | 705157.57 | 733087.42 | 4.00   | 245.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 49 | B    | 705179.84 | 733082.33 | 4.00   | 115.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 50 | B    | 705199.63 | 733089.58 | 4.00   | 115.00 | 0.00 | 0.00 | 0.50      |          |          |          |
| 51 | B    | 705142.03 | 733095.40 | 4.00   | 95.00  | 0.00 | 0.00 | 0.50      |          |          |          |

## Polar Diagrams

### Luminaire A AXIA 3.1 50025 Integrated lenses 16 OSLON SQUARE GIANT@450mA

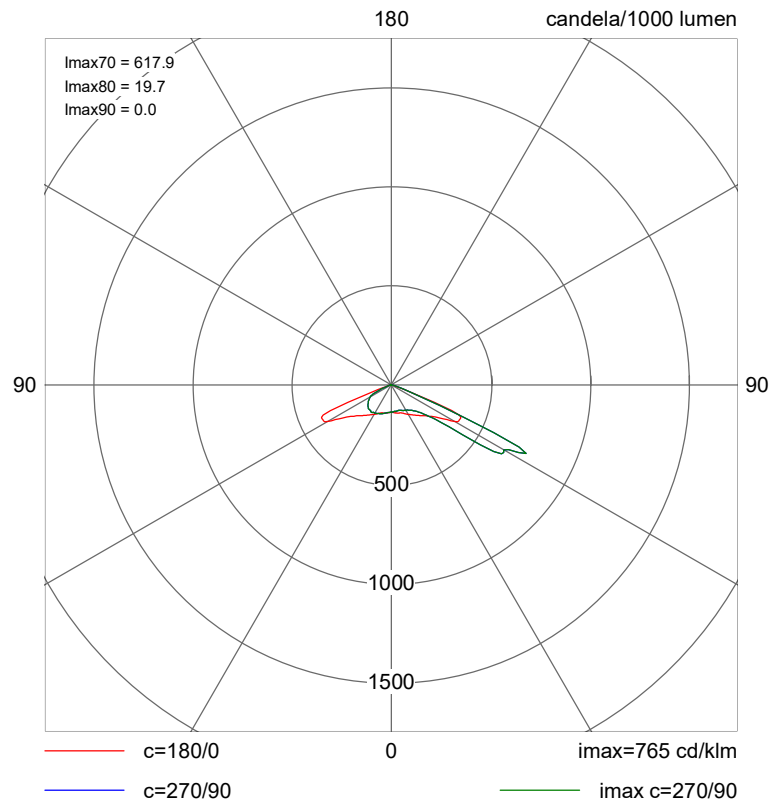


### Luminaire B AXIA 3.1 5293 Integrated lenses 16 OSLON SQUARE GIANT@400mA

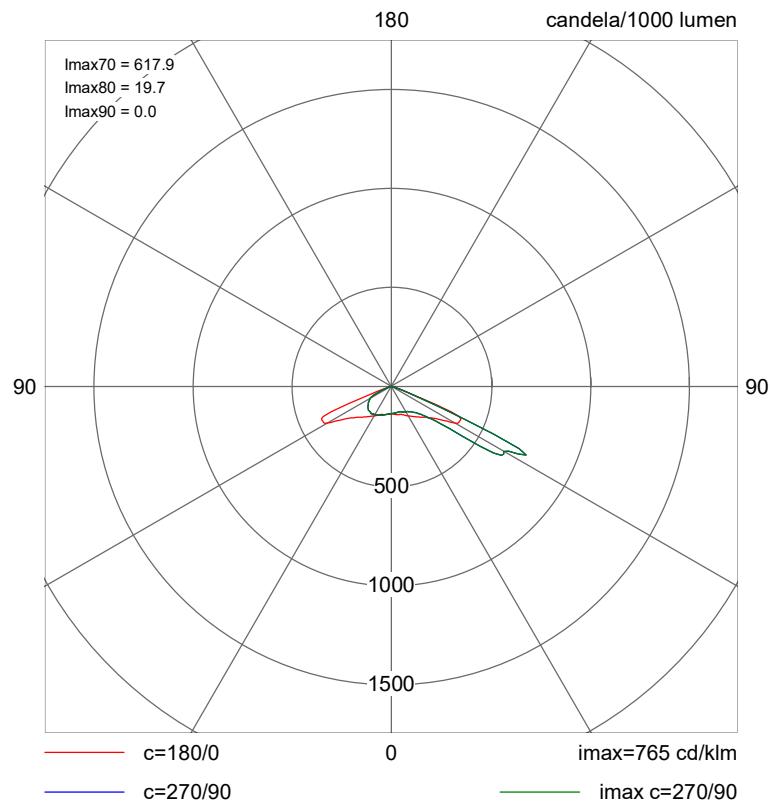


### Polar Diagrams Continued

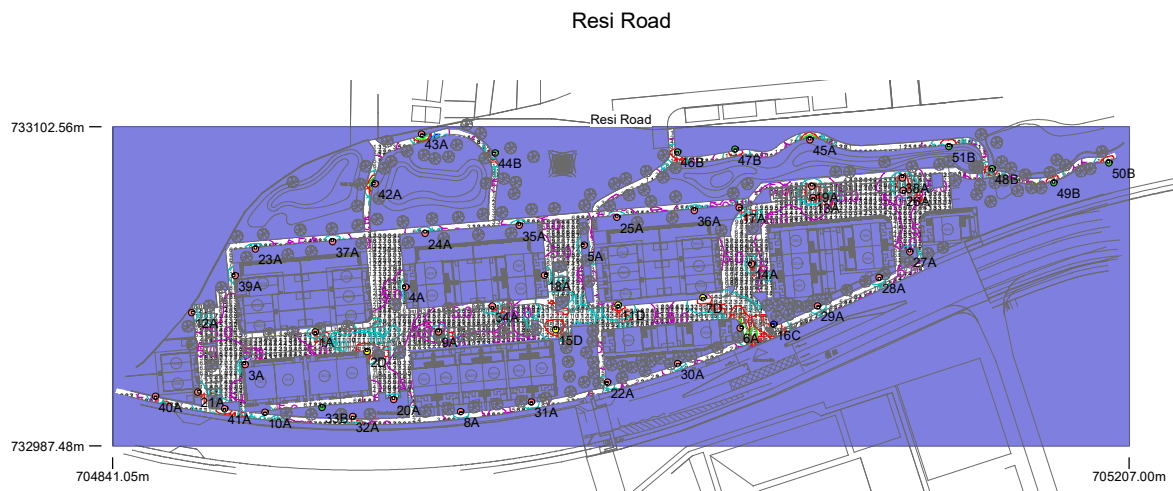
#### Luminaire C AXIA 3.1 5293 Integrated lenses 16 OSLON SQUARE GIANT@870mA



#### Luminaire D AXIA 3.1 5293 Integrated lenses 16 OSLON SQUARE GIANT@870mA



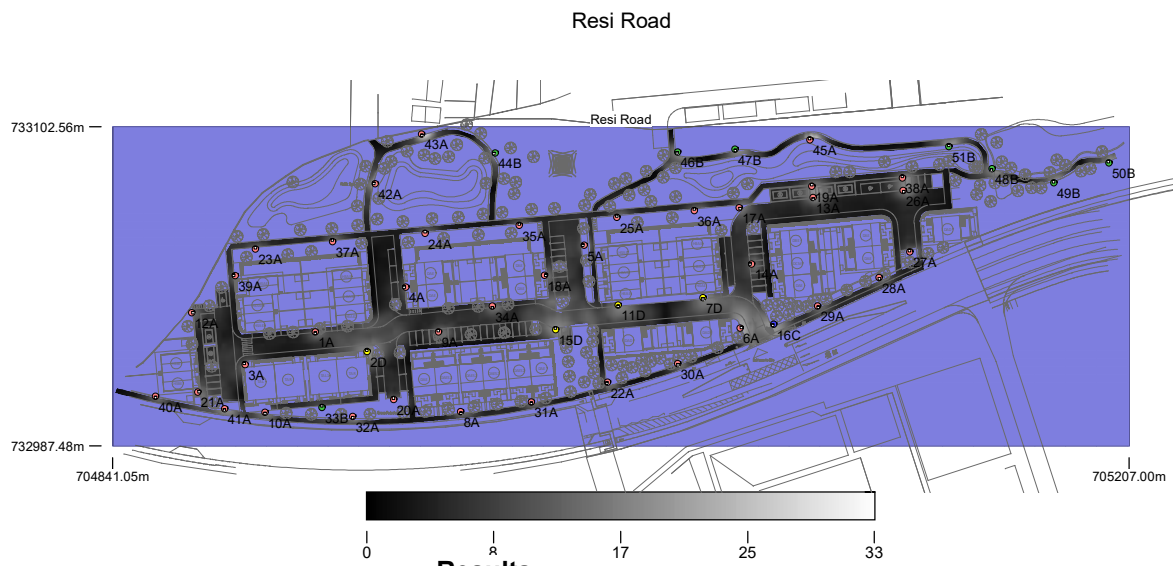
## Horizontal Illuminance (lux)



### Results

|                       |       |
|-----------------------|-------|
| Eav                   | 7.13  |
| Emin                  | 1.07  |
| E <sub>max</sub>      | 27.74 |
| Emin/E <sub>max</sub> | 0.04  |
| Emin/Eav              | 0.15  |
|                       |       |

## Horizontal Illuminance (lux)



### Results

|           |       |
|-----------|-------|
| Eav       | 7.13  |
| Emin      | 1.07  |
| Emax      | 27.74 |
| Emin/Emax | 0.04  |
| Emin/Eav  | 0.15  |
|           |       |

## Horizontal Illuminance (lux)

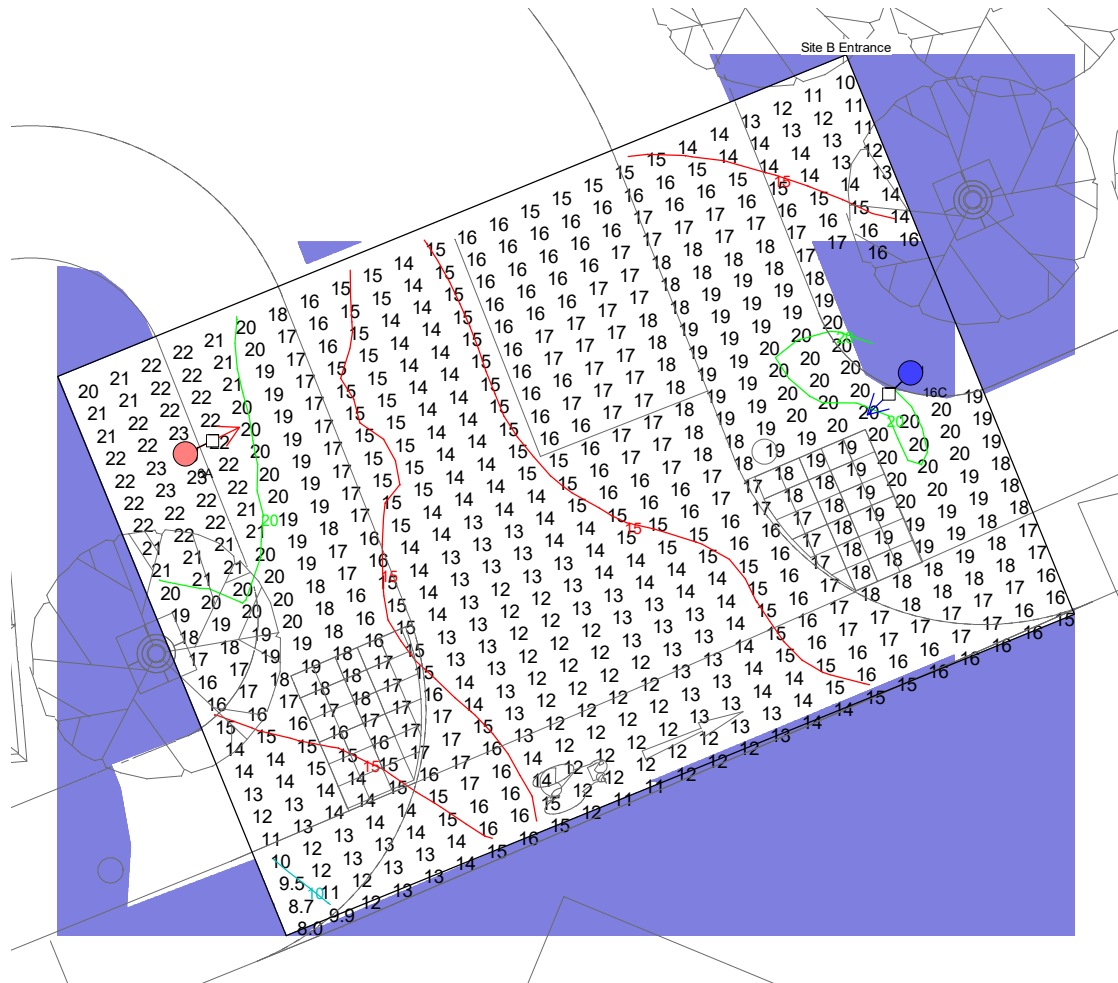


### Results

|                                    |       |
|------------------------------------|-------|
| Eav                                | 7.13  |
| Emin                               | 1.07  |
| E <sub>max</sub>                   | 27.74 |
| E <sub>min</sub> /E <sub>max</sub> | 0.04  |
| E <sub>min</sub> /E <sub>av</sub>  | 0.15  |
|                                    |       |

## Horizontal Illuminance (lux)

Site B Entrance

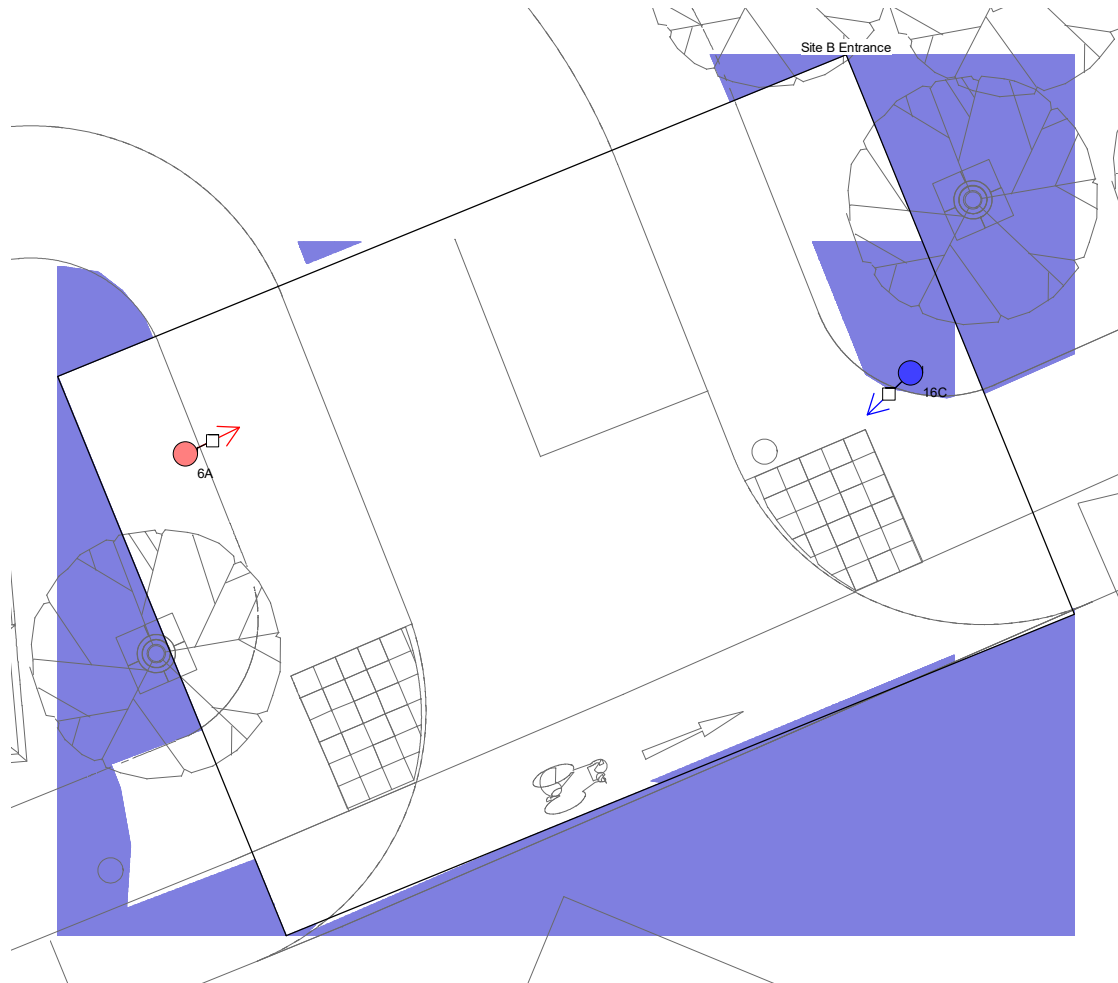


### Results

|           |       |
|-----------|-------|
| Eav       | 16.14 |
| Emin      | 7.95  |
| Emax      | 22.91 |
| Emin/Emax | 0.35  |
| Emin/Eav  | 0.49  |
|           |       |

## Horizontal Illuminance (lux)

Site B Entrance

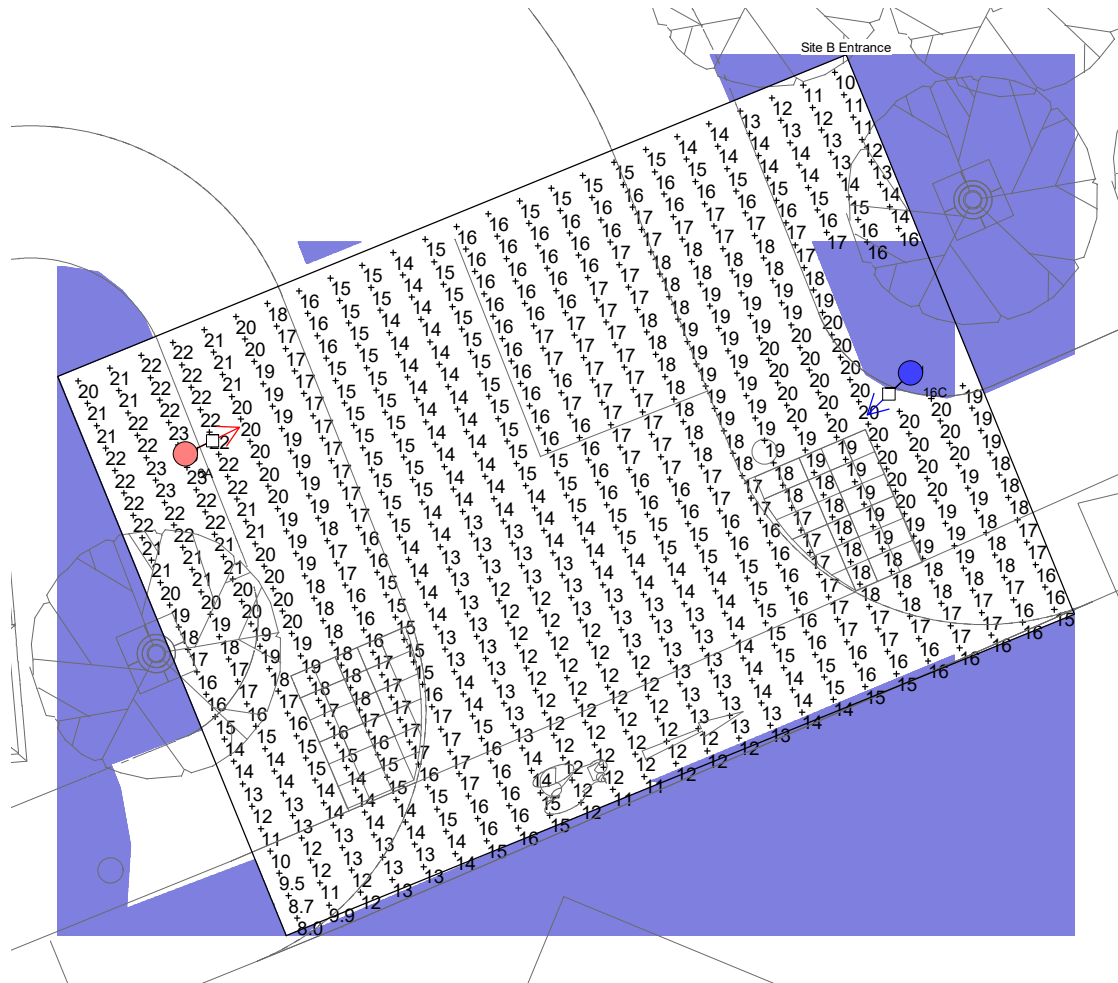


### Results

|                                    |       |
|------------------------------------|-------|
| Eav                                | 16.14 |
| Emin                               | 7.95  |
| E <sub>max</sub>                   | 22.91 |
| E <sub>min</sub> /E <sub>max</sub> | 0.35  |
| E <sub>min</sub> /E <sub>av</sub>  | 0.49  |
|                                    |       |

## Horizontal Illuminance (lux)

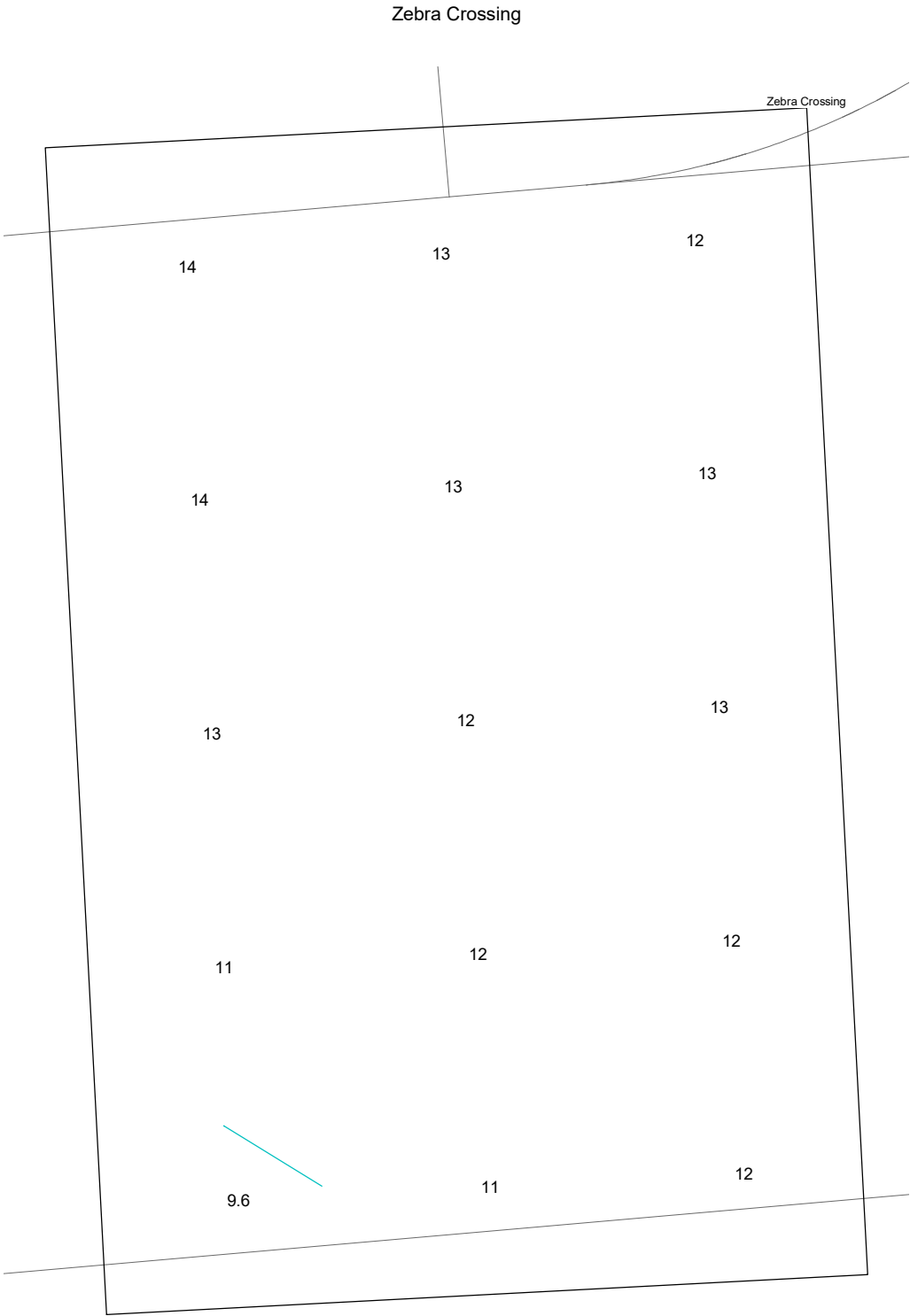
Site B Entrance



### Results

|           |       |
|-----------|-------|
| Eav       | 16.14 |
| Emin      | 7.95  |
| Emax      | 22.91 |
| Emin/Emax | 0.35  |
| Emin/Eav  | 0.49  |
|           |       |

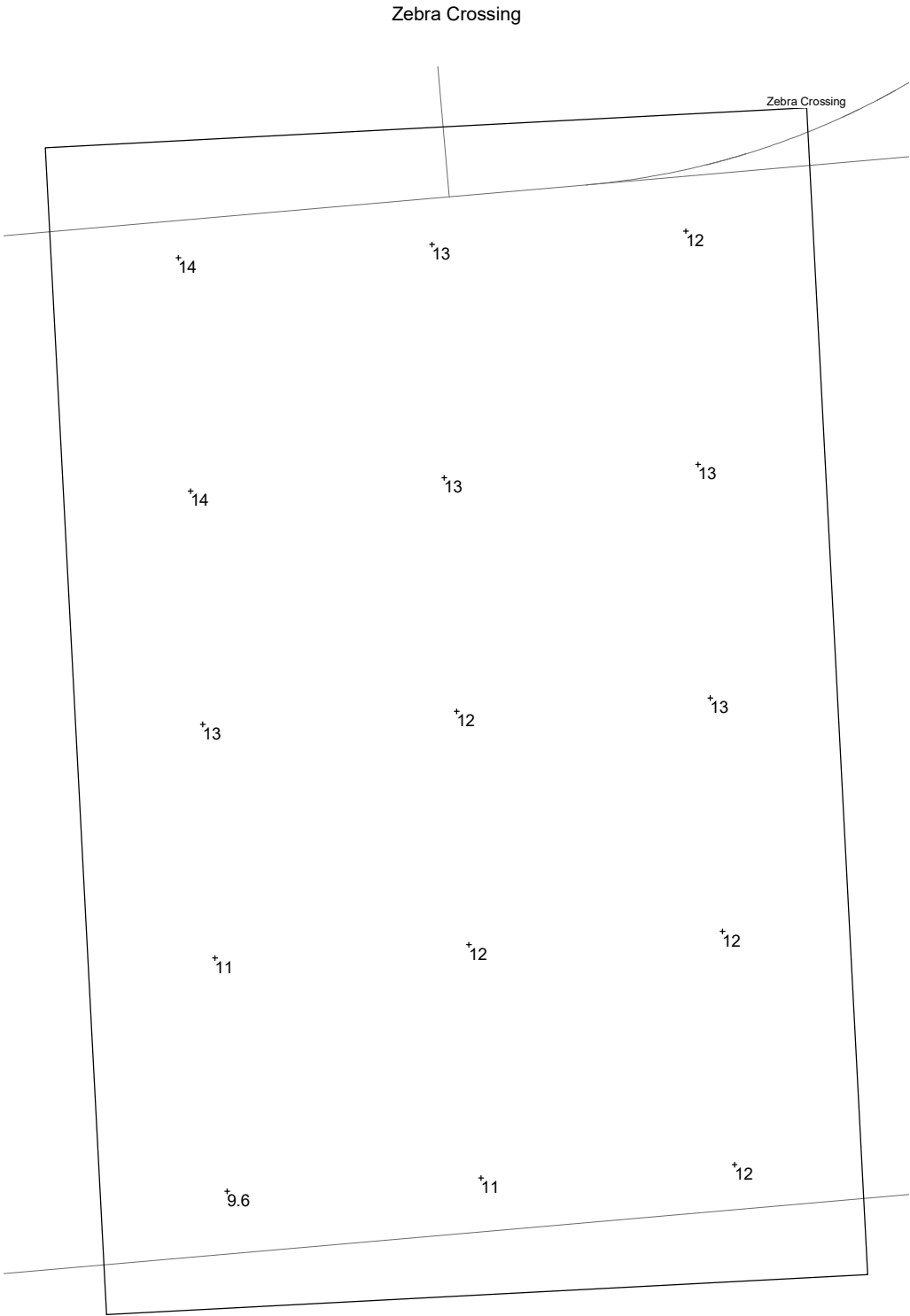
**Horizontal Illuminance (lux)**



**Results**

|           |       |
|-----------|-------|
| Eav       | 12.15 |
| Emin      | 9.57  |
| Emax      | 13.61 |
| Emin/Emax | 0.70  |
| Emin/Eav  | 0.79  |
|           |       |

**Horizontal Illuminance (lux)**

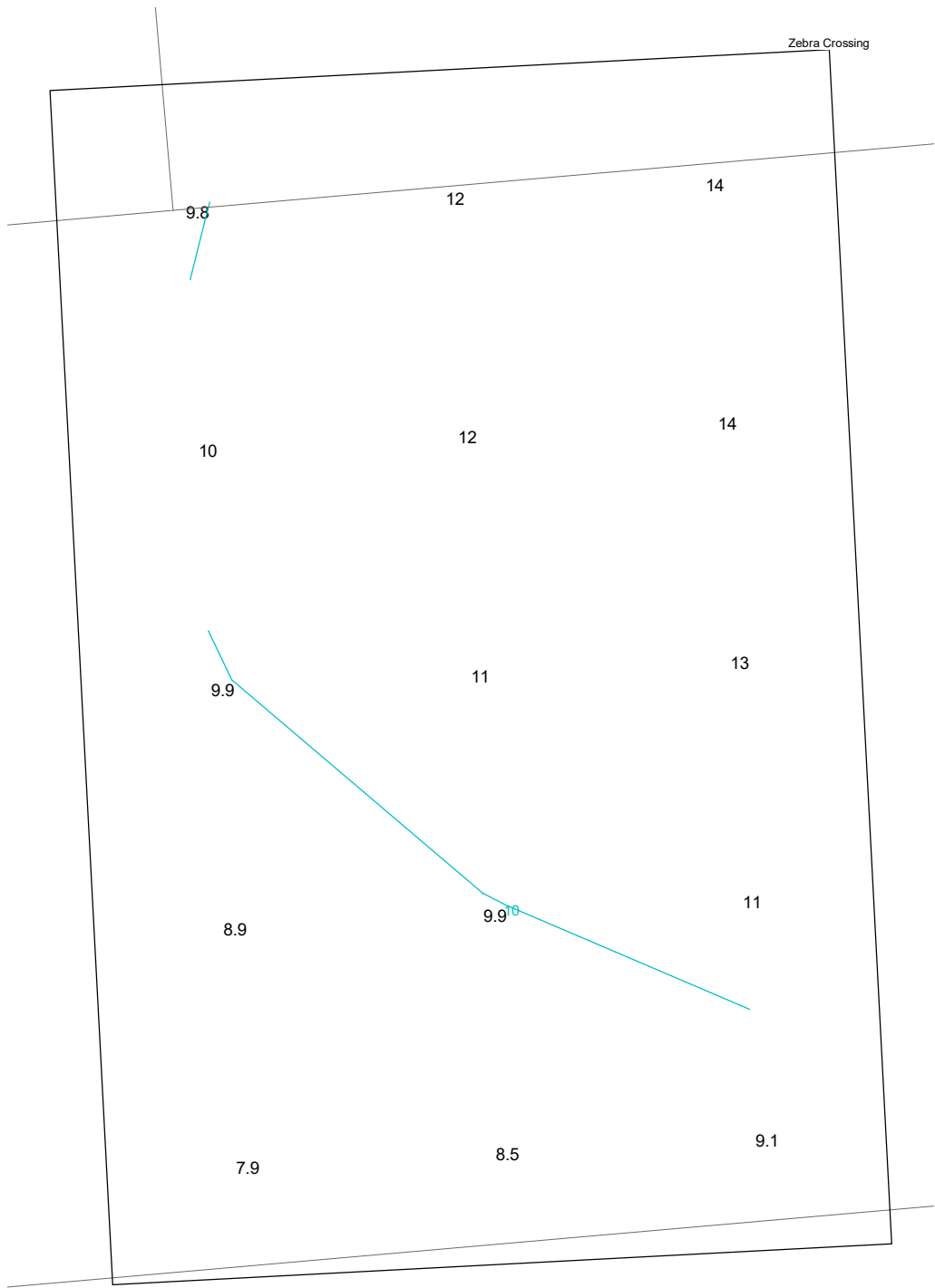


**Results**

|           |       |
|-----------|-------|
| Eav       | 12.15 |
| Emin      | 9.57  |
| Emax      | 13.61 |
| Emin/Emax | 0.70  |
| Emin/Eav  | 0.79  |
|           |       |

**Horizontal Illuminance (lux)**

Zebra Crossing

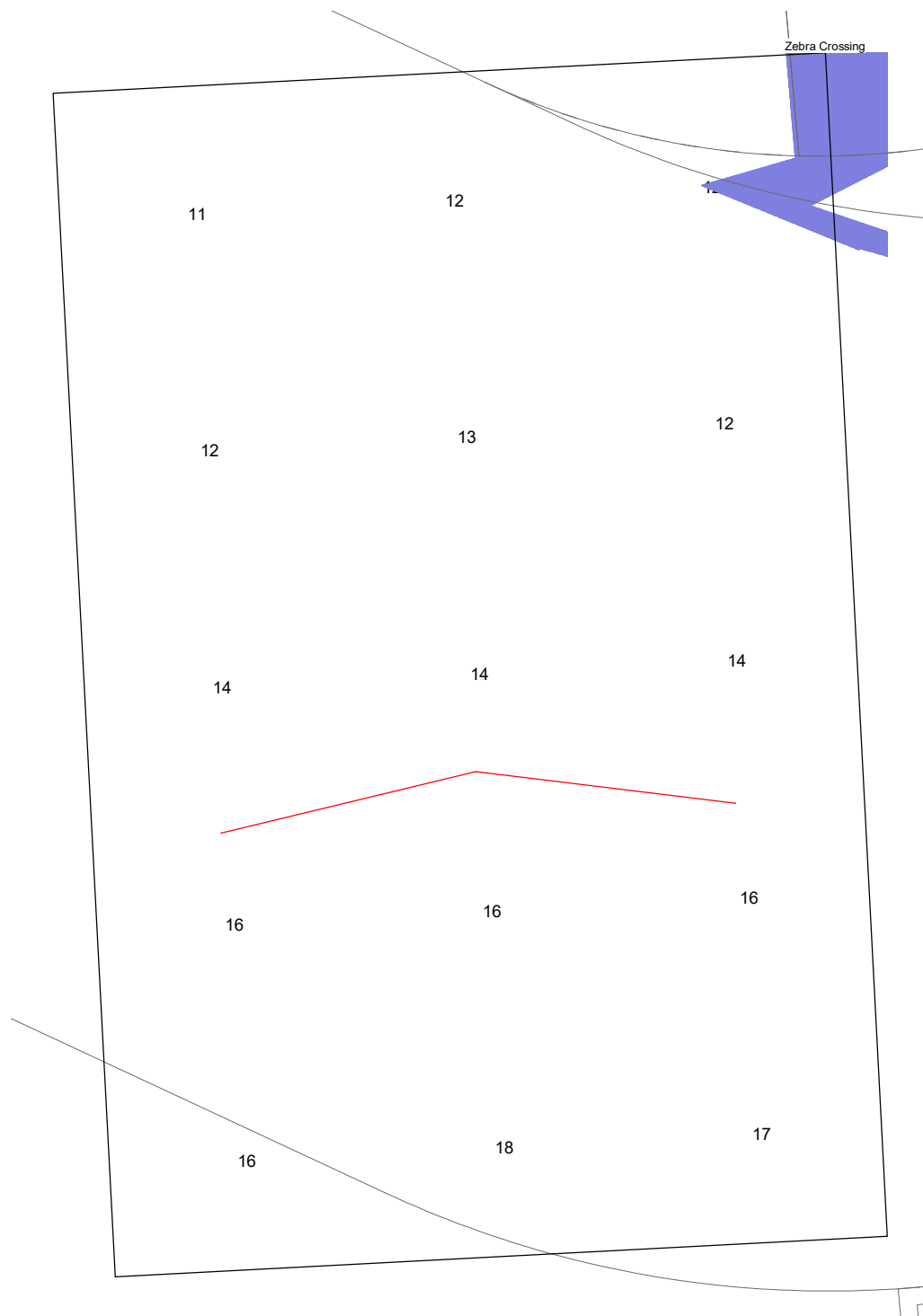


**Results**

|           |       |
|-----------|-------|
| Eav       | 10.87 |
| Emin      | 7.92  |
| Emax      | 14.46 |
| Emin/Emax | 0.55  |
| Emin/Eav  | 0.73  |
|           |       |
|           |       |

## Horizontal Illuminance (lux)

Zebra Crossing

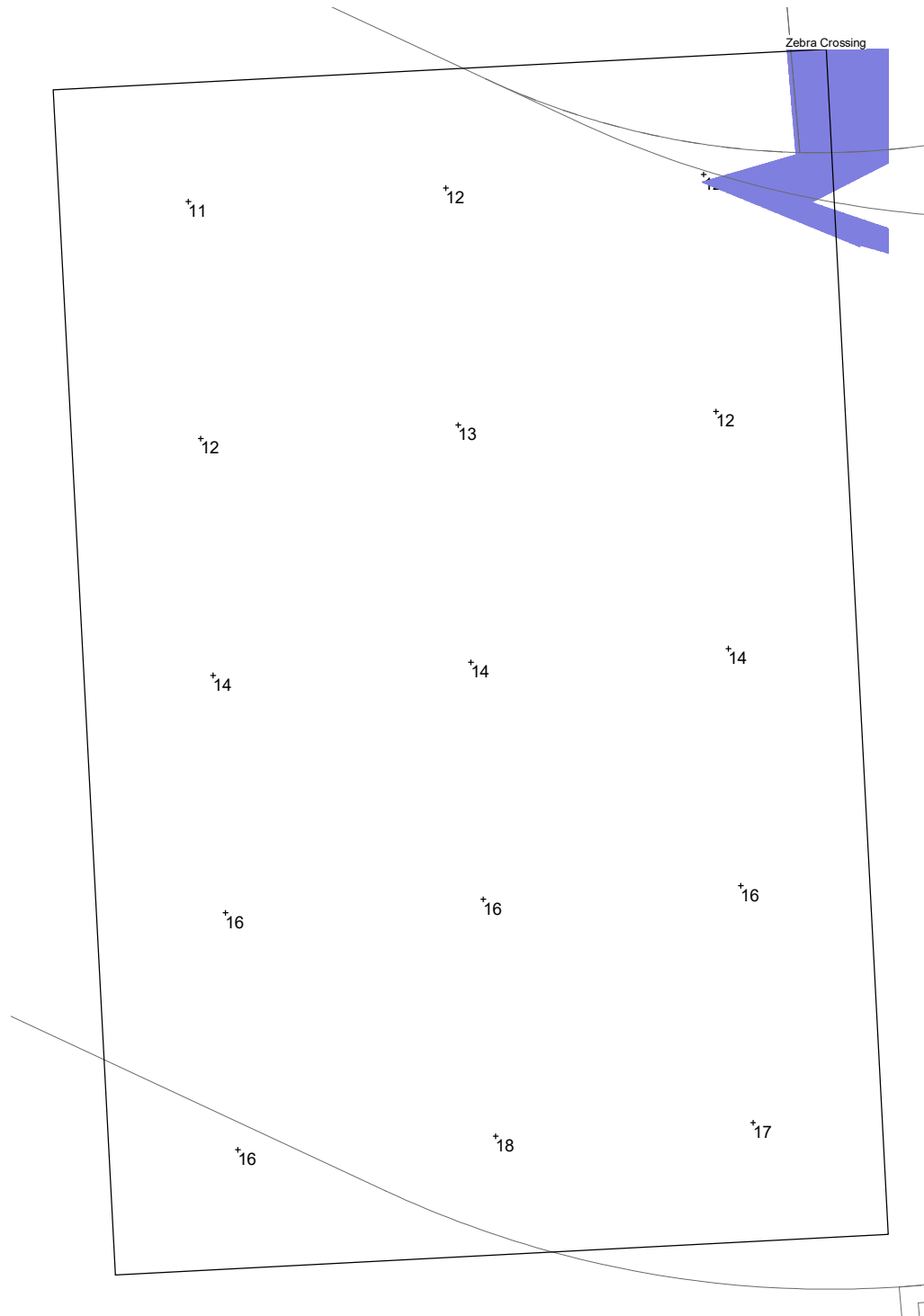


### Results

|                                    |       |
|------------------------------------|-------|
| Eav                                | 14.20 |
| Emin                               | 11.32 |
| E <sub>max</sub>                   | 17.75 |
| E <sub>min</sub> /E <sub>max</sub> | 0.64  |
| E <sub>min</sub> /E <sub>av</sub>  | 0.80  |
|                                    |       |

## Horizontal Illuminance (lux)

Zebra Crossing

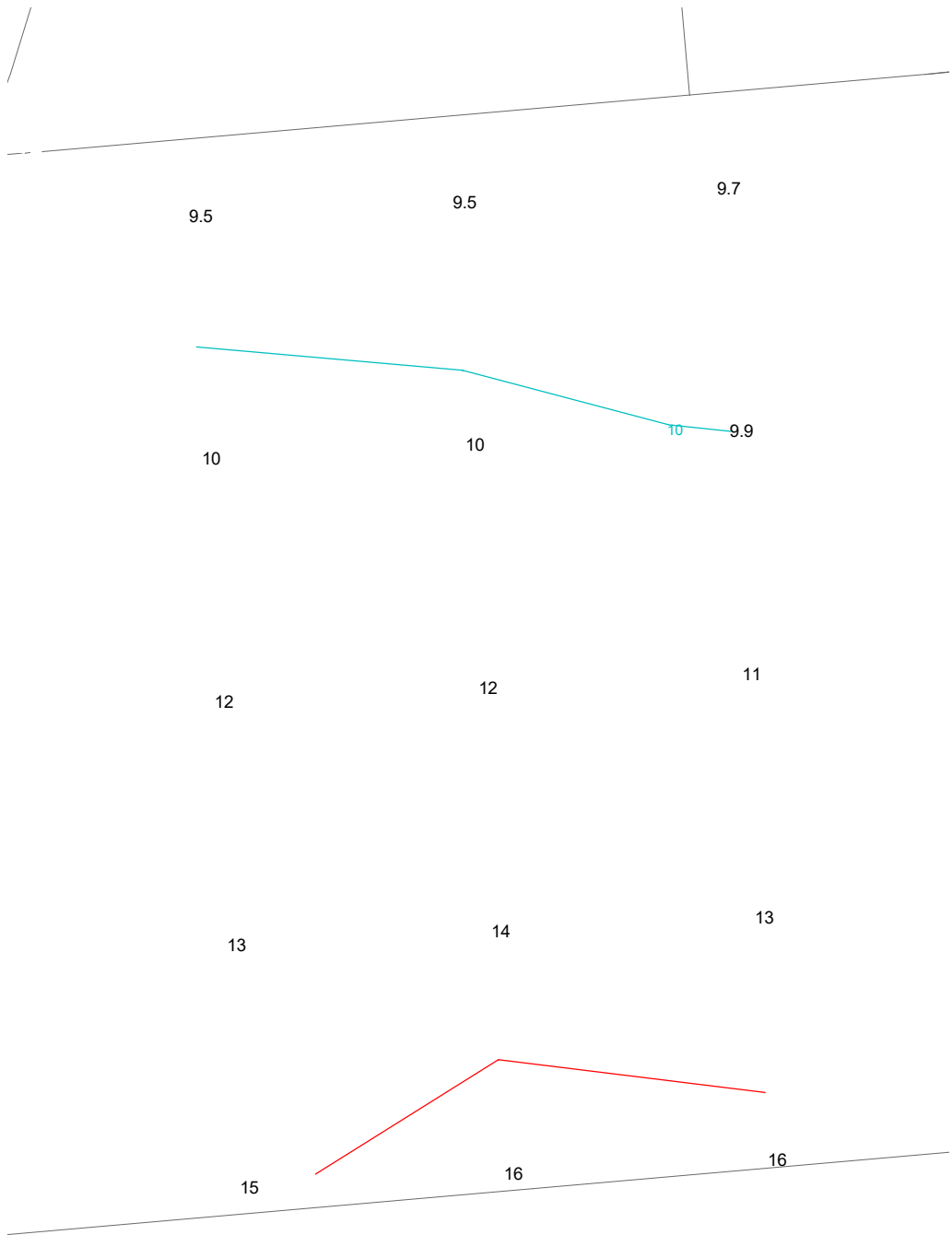


### Results

|                       |       |
|-----------------------|-------|
| Eav                   | 14.20 |
| Emin                  | 11.32 |
| E <sub>max</sub>      | 17.75 |
| Emin/E <sub>max</sub> | 0.64  |
| Emin/Eav              | 0.80  |
|                       |       |

**Horizontal Illuminance (lux)**

Zebra Crossing

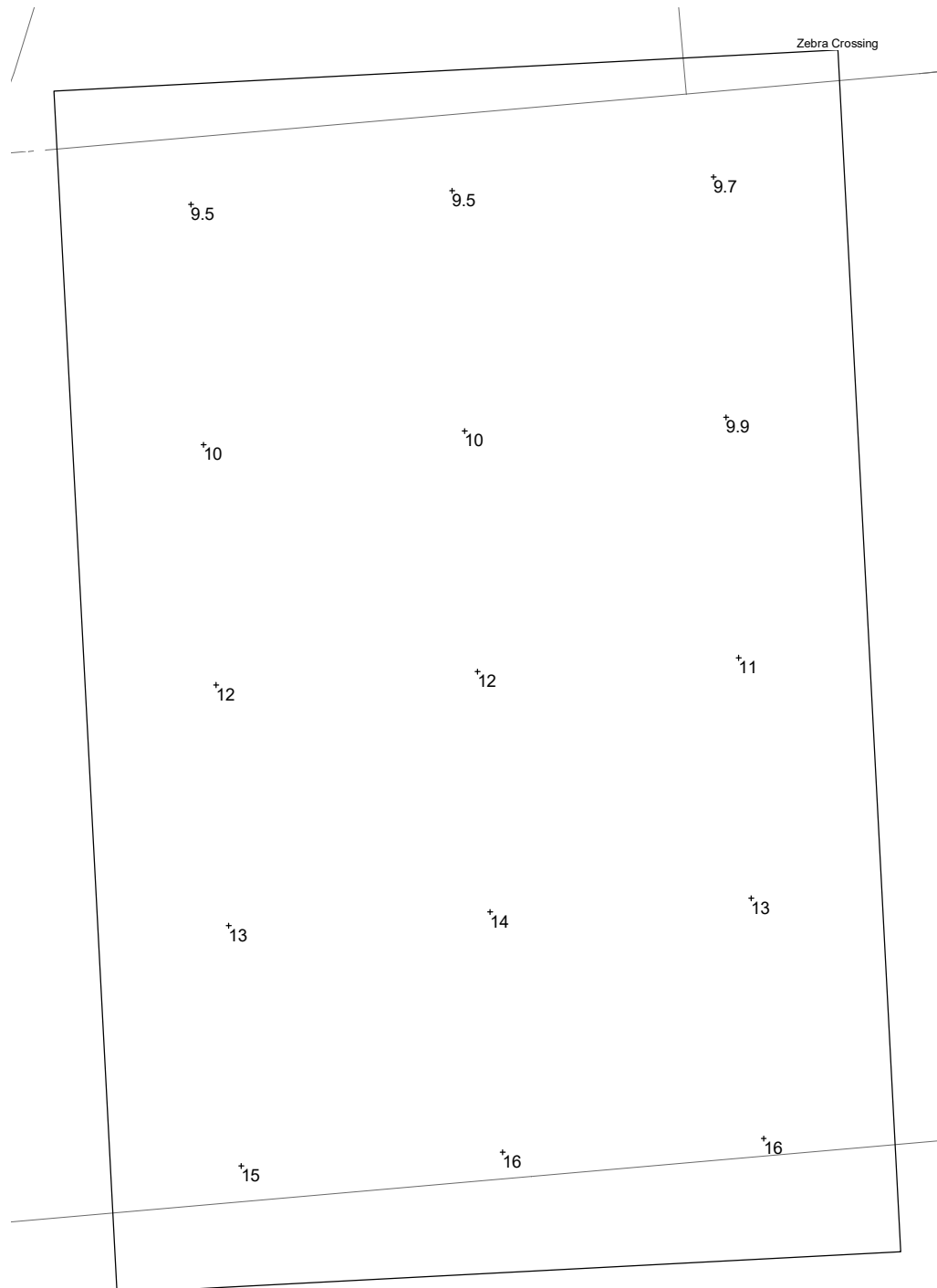


**Results**

|           |       |
|-----------|-------|
| Eav       | 12.02 |
| Emin      | 9.50  |
| Emax      | 15.79 |
| Emin/Emax | 0.60  |
| Emin/Eav  | 0.79  |
|           |       |

## Horizontal Illuminance (lux)

Zebra Crossing

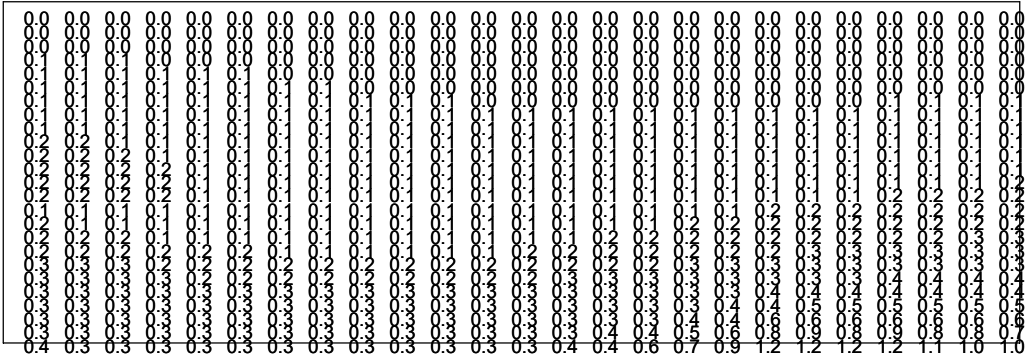


### Results

|           |       |
|-----------|-------|
| Eav       | 12.02 |
| Emin      | 9.50  |
| Emax      | 15.79 |
| Emin/Emax | 0.60  |
| Emin/Eav  | 0.79  |
|           |       |

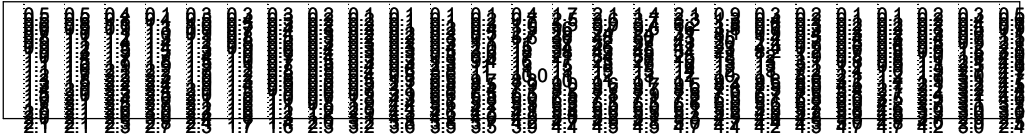
**Illuminance (lux)**

Intrusive Light House Facade



**Illuminance (lux)**

Intrusive Light House Facade



**Results**

|           |       |
|-----------|-------|
| Eav       | 4.88  |
| Emin      | 0.08  |
| Emax      | 57.03 |
| Emin/Emax | 0.00  |
| Emin/Eav  | 0.02  |
|           |       |

**Illuminance (lux)**

Intrusive Light House Facade

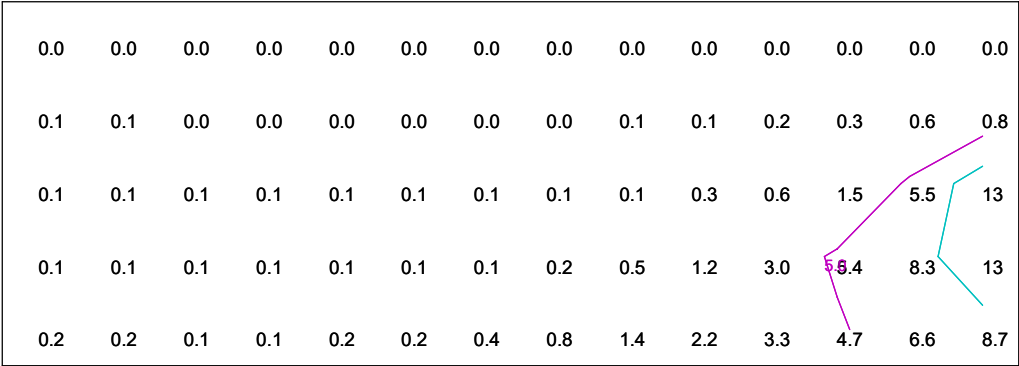
|     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 0.3 | 0.4 | 0.6 | 0.9 | 1.4 | 1.3 | 1.2 | 0.8 | 0.6 | 0.4 | 0.2 |
| 0.6 | 0.9 | 1.3 | 2.0 | 2.6 | 2.8 | 2.4 | 1.7 | 1.2 | 0.7 | 0.5 |
| 1.2 | 1.3 | 2.0 | 2.8 | 3.4 | 3.8 | 3.0 | 2.3 | 1.4 | 0.9 | 0.6 |
| 5.3 | 2.9 | 2.4 | 2.8 | 2.8 | 3.0 | 2.6 | 2.2 | 1.9 | 1.5 | 1.2 |

**Results**

|           |      |
|-----------|------|
| Eav       | 1.40 |
| Emin      | 0.06 |
| Emax      | 5.32 |
| Emin/Emax | 0.01 |
| Emin/Eav  | 0.04 |
|           |      |

**Illuminance (lux)**

Intrusive Light House Facade



**Results**

|           |       |
|-----------|-------|
| Eav       | 1.22  |
| Emin      | 0.02  |
| Emax      | 12.93 |
| Emin/Emax | 0.00  |
| Emin/Eav  | 0.02  |
|           |       |



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