

Lighting Calculations

Installation : Llysfaen R2

Project number : 78181

Customer :

Processed by : D Baxter

Date : 29.07.2024

All calculations unless stated have been based upon an open plan area without any obstructions above the working plane. With regards to CIBSE/ BSEN12464-1:2011 we have shown illuminance levels and ratios for your ultimate approval. UGR and luminance values are available for your approval if necessary. It may be necessary in some instances to check UGR values even if the luminance values are below the compliant threshold.

Emergency lighting has been designed in accordance with BS5266-1:2016 but is an indicative layout only - additional lighting may be required. All emergency lighting is to be checked and confirmed with a local building/fire control officer and ultimately approved by the owner of the building. Any emergency lighting calculations that have been completed have been based on 0.5 lux for open areas and 1 lux for escape routes (where details of escape routes have been given).

Please be aware of L2 requirements and check that conformity has been met where required. In addition, ensuring that fire tents are used where needed to conform to current building regulations is vital; please contact our sales office for a quotation.

All luminaires used are subject to approval/certification of client/end user.

Common design parameters (shown below) have been used in order to carry out all calculations.

If any part of this scheme or luminaire choice within this scheme is deemed not suitable for the application, please contact us for re-calculations to be carried out prior to an order being placed.

All calculations have been based upon rated lumen outputs and may vary with ambient on site temperatures.

Please ensure that this lighting scheme complies with all requirements, and if further details/calculations are required please contact us via the below details.

Final quantities are to be confirmed prior to an order/installation and we will not be held responsible for any errors or omissions.

Nominal Values Used:

Maintenance Factor - 0.8

Reflectance Values (Office Type Interior): 70\50\20

Reflectance Values (Warehouse Type Interior): 50\30\20

The following values are based on precise calculations performed on calibrated lamps and luminaires, and their configurations, whereby gradual, unavoidable deviations can occur in practice. All guarantee claims are excluded for the specified data.

This exclusion of liability applies irrespective of the legal grounds for both damages and consequential damages suffered by users and third parties.

Object : Lighting Calculations
Installation : Llysfaen R2
Project number : 78181
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1 Exterior

1.1 Description, Exterior

1.1.1 Luminaire data/Room elements

Product data:

Type No.\Make

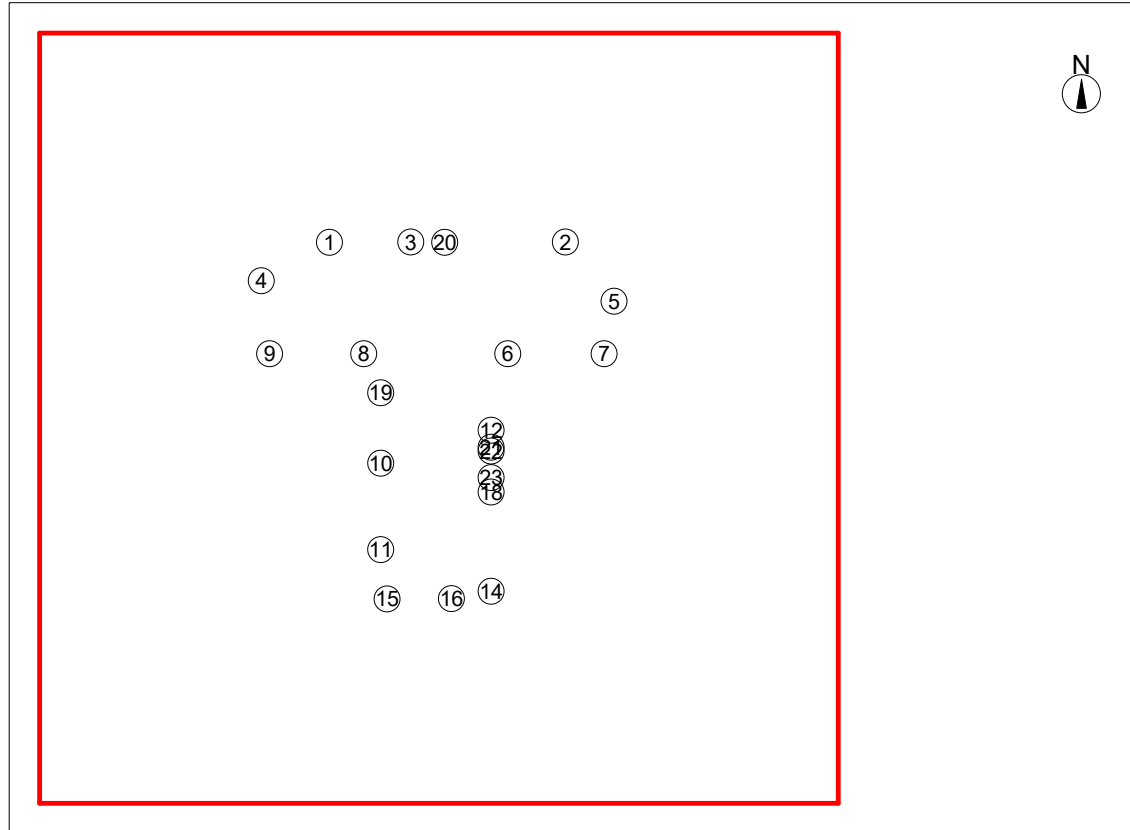
		Tamlite Lighting
1	21 x	Order No. : ICWL90T2WWGMS
		Luminaire name : CITY WL
		Equipment : 1 x 7 W / 900 lm

1 Exterior

1.1 Description, Exterior

1.1.1 Luminaire data/Room elements

Floor with luminaire and sensor positions:



No.	Centre point			Rotation angle			Target coordinates		
	X [m]	Y [m]	Z [m]	Z [°]	C0 [°]	C90 [°]	Xa [m]	Ya [m]	Za [m]
Tamlite Lighting CITY WL ICWL90T2WWGMS									
1	20.26	39.96	3.70	90.00	0.00	0.00	20.26	41.23	0.00
4	14.47	36.68	3.70	180.00	0.00	0.00	13.20	36.68	0.00
10	24.45	21.41	1.85	180.00	0.00	0.00	23.81	21.41	0.00
19	24.45	27.30	3.70	180.00	0.00	0.00	23.81	27.30	1.85
12	33.85	24.17	3.70	0.00	0.00	0.00	34.47	24.17	1.90
21	33.85	22.76	1.52	0.00	0.00	0.00	34.38	22.76	0.00
18	33.85	19.01	3.70	0.00	0.00	0.00	34.47	19.01	1.90
14	33.85	10.72	1.85	0.00	0.00	0.00	34.49	10.72	0.00
11	24.45	14.19	1.85	180.00	0.00	0.00	23.81	14.19	0.00
5	44.14	34.98	3.70	0.00	0.00	0.00	45.41	34.97	0.00
6	35.17	30.48	3.70	270.00	0.00	0.00	35.17	29.84	1.85
8	23.12	30.49	3.70	270.00	0.00	0.00	23.12	29.85	1.85
9	15.25	30.48	3.70	270.00	0.00	0.00	15.25	29.84	1.85
7	43.21	30.48	3.70	270.00	0.00	0.00	43.21	29.84	1.85
15	25.08	9.98	1.85	270.00	0.00	0.00	25.08	9.35	0.00
16	30.45	10.03	1.85	270.00	0.00	0.00	30.45	9.39	0.00
3	27.06	39.98	3.70	90.00	0.00	0.00	27.06	41.26	0.00
20	29.89	39.96	3.70	90.00	0.00	0.00	29.89	41.23	0.00
2	39.97	39.99	3.70	90.00	0.00	0.00	39.97	41.26	0.00
22	33.85	22.43	3.00	0.00	0.00	0.00	34.23	22.43	1.90
23	33.85	20.21	3.00	0.00	0.00	0.00	34.23	20.21	1.90

1 Exterior

1.1 Description, Exterior

1.1.1 Luminaire data/Room elements

Measuring surface

							Rotation angle	
No.	xm[m]	ym[m]	zm[m]	Length	Width	z axis	L axis	Q axis
Ref. plane 1.1								
	-4.00	-7.00	0.00	66.78	64.39	0.00	0.00	0.00
M 1	24.13	30.10	1.90	33.91	14.66	271.15	0.00	0.00
M 2	34.18	26.61	-0.00	13.42	18.62	0.00	0.00	0.00
Light Spill North								
M 3	34.22	27.03	1.90	66.74	29.09	359.90	0.00	0.00
Light Spill South								
M 4	-4.22	26.66	0.00	67.06	35.85	359.83	0.00	0.00
Bat Box East								
M 5	43.94	34.39	6.25	0.00	1.00	0.00	0.00	90.00
Bat Box West								
M 6	14.53	34.58	5.00	0.00	1.00	0.00	0.00	-90.00
Bat Box South								
M 7	28.81	9.87	4.75	1.00	0.00	0.00	90.00	-0.00

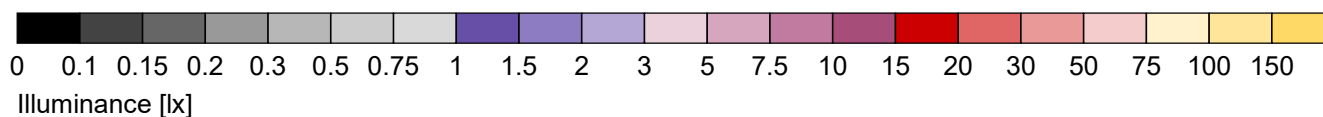
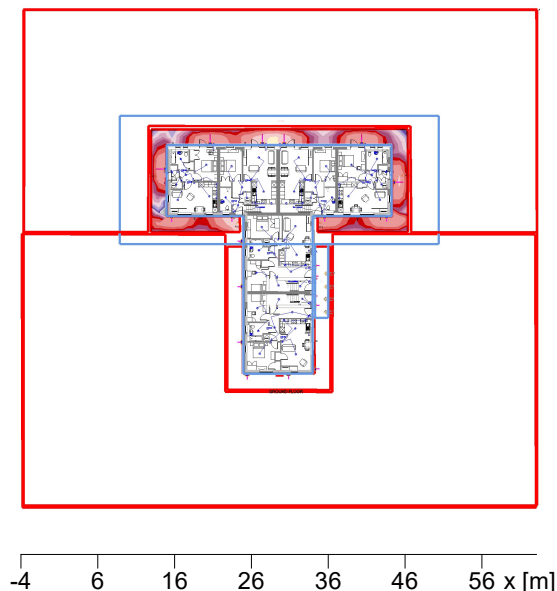
Others

No.	xm[m]	ym[m]	zm[m]	Length	Width	z axis	Rotation angle		rho[%]
							L axis	Q axis	
A 1	14.61	39.82	0.00	29.26	29.73	0.00	0.00	0.00	50
A 1	8.52	26.94	0.00	41.47	16.67	0.00	0.00	0.00	50
A 2	33.90	17.36	1.85	1.72	9.57	0.00	0.00	0.00	50
A 3	33.90	17.36	4.26	1.72	9.57	0.00	0.00	0.00	50
A 2	14.61	39.82	-0.00	29.26	29.71	0.00	0.00	0.00	50

1 Exterior

1.2 Summary, Exterior

1.2.1 Result overview, Measuring area 1



General

Calculation algorithm used
 Height of evaluation surface
 Maintenance factor

Average indirect fraction
 1.90 m
 0.80

Total luminous flux
 Total power
 Total power per area (4300.13 m²)

18900 lm
 147 W
 0.03 W/m²

Illuminance

Average illuminance	$\bar{E}_m$	23.9 lx
Minimum illuminance	E_{min}	2.2 lx
Maximum illuminance	E_{max}	80.7 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:10.8 (0.09)
Diversity U_d	E_{min}/E_{max}	1:36.6 (0.03)

Type No. Make

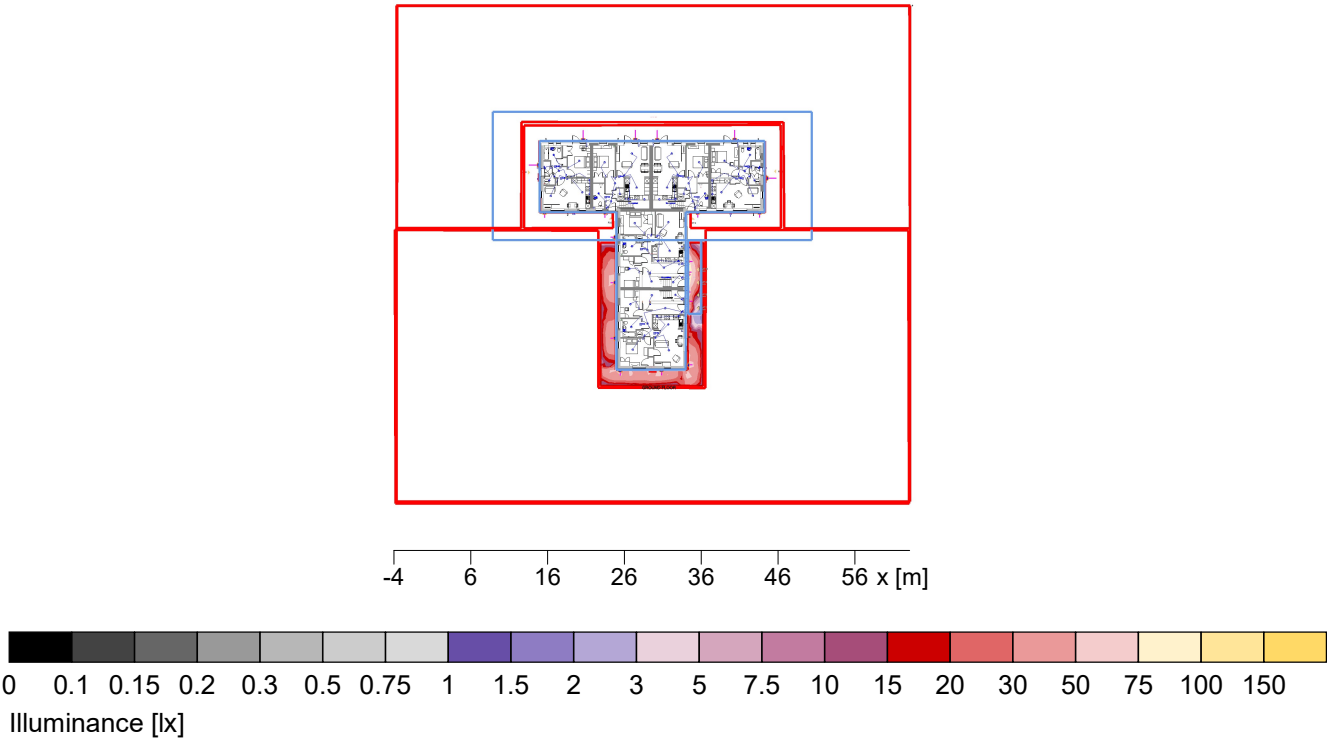
1 21 x **Tamlite Lighting**
 Order No. : !CWL90T2WWGMS
 Luminaire name : CITY WL
 Equipment : 1 x 7 W / 900 lm





1.2 Summary, Exterior

1.2.2 Result overview, Measuring area 2



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	-0.00 m
Maintenance factor	0.80
Total luminous flux	18900 lm
Total power	147 W
Total power per area (4300.13 m²)	0.03 W/m²

Illuminance

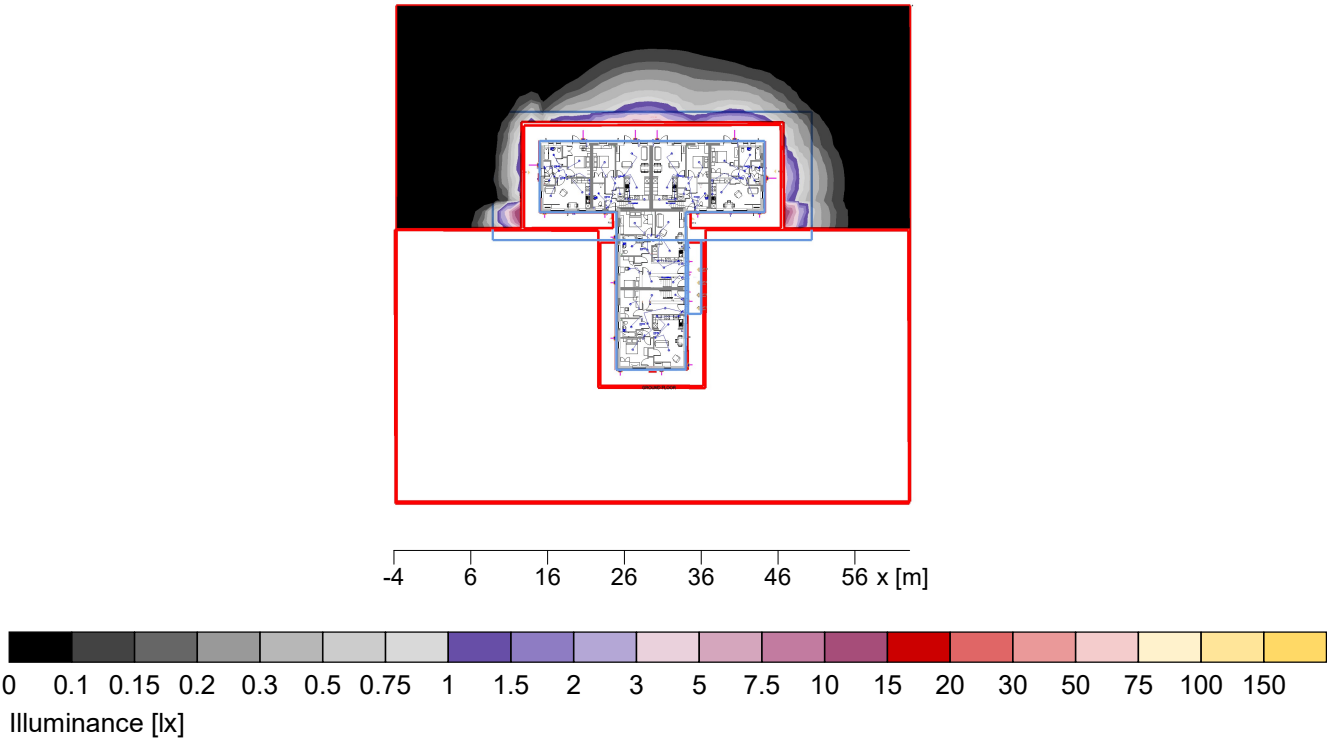
Average illuminance	$\bar{E}_m$	29 lx
Minimum illuminance	E_{min}	2.1 lx
Maximum illuminance	E_{max}	75 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:14 (0.07)
Diversity U_d	E_{min}/E_{max}	1:36.2 (0.03)

Type No. Make

1	21 x	Tamlite Lighting
	Order No.	: !CWL90T2WWGMS
	Luminaire name	: CITY WL
	Equipment	: 1 x 7 W / 900 lm

1.2 Summary, Exterior

1.2.3 Result overview, Light Spill North



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	1.90 m
Maintenance factor	0.80
Total luminous flux	18900 lm
Total power	147 W
Total power per area (4300.13 m²)	0.03 W/m²

Illuminance

Average illuminance	$\bar{E}_m$	0.2 lx
Minimum illuminance	E_{min}	0 lx
Maximum illuminance	E_{max}	14.1 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:89.4 (0.01)
Diversity U_d	E_{min}/E_{max}	1:5640 (0)

Type No. Make

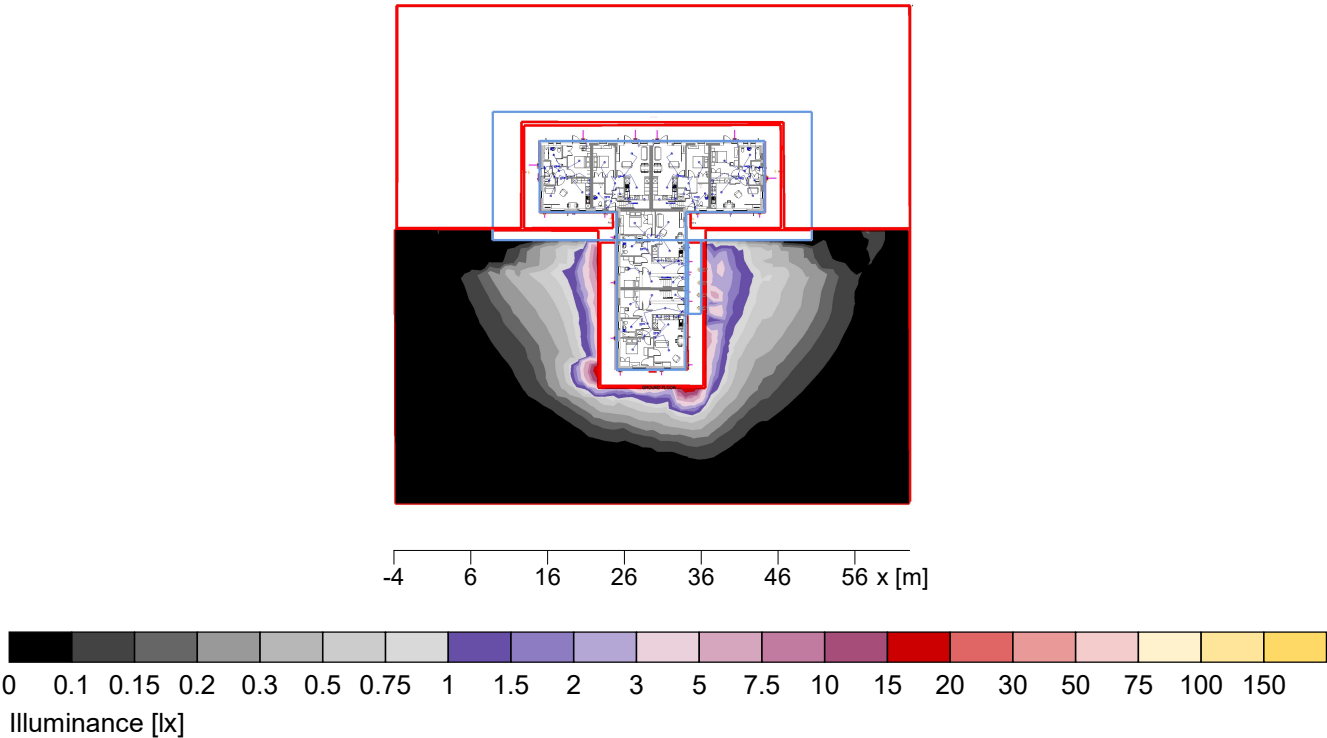
1	21 x	Tamlite Lighting
		Order No. : !CWL90T2WWGMS
		Luminaire name : CITY WL
		Equipment : 1 x 7 W / 900 lm





1.2 Summary, Exterior

1.2.4 Result overview, Light Spill South



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.00 m
Maintenance factor	0.80
Total luminous flux	18900 lm
Total power	147 W
Total power per area (4300.13 m²)	0.03 W/m²

Illuminance

Average illuminance	$\bar{E}_m$	0.29 lx
Minimum illuminance	E_{min}	0.01 lx
Maximum illuminance	E_{max}	7.4 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:30.1 (0.03)
Diversity U_d	E_{min}/E_{max}	1:780 (0)

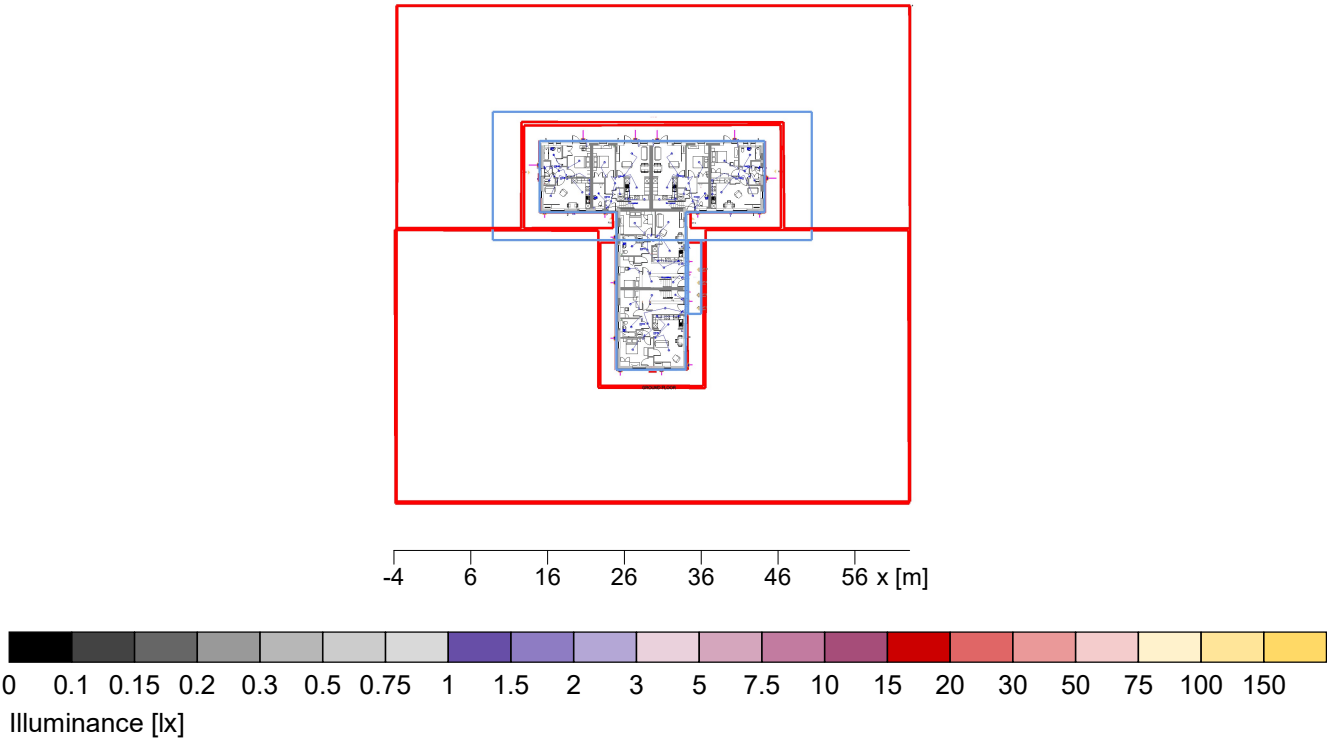
Type No. Make

1	21 x	Tamlite Lighting
	Order No.	: !CWL90T2WWGMS
	Luminaire name	: CITY WL
	Equipment	: 1 x 7 W / 900 lm



1.2 Summary, Exterior

1.2.5 Result overview, Bat Box East



General

Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Total luminous flux	18900 lm
Total power	147 W
Total power per area (4300.13 m²)	0.03 W/m²

Illuminance

Average illuminance	$\bar{E}_m$	0.76 lx
Minimum illuminance	E_{min}	0.61 lx
Maximum illuminance	E_{max}	0.93 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:1.24 (0.8)
Diversity U_d	E_{min}/E_{max}	1:1.52 (0.66)

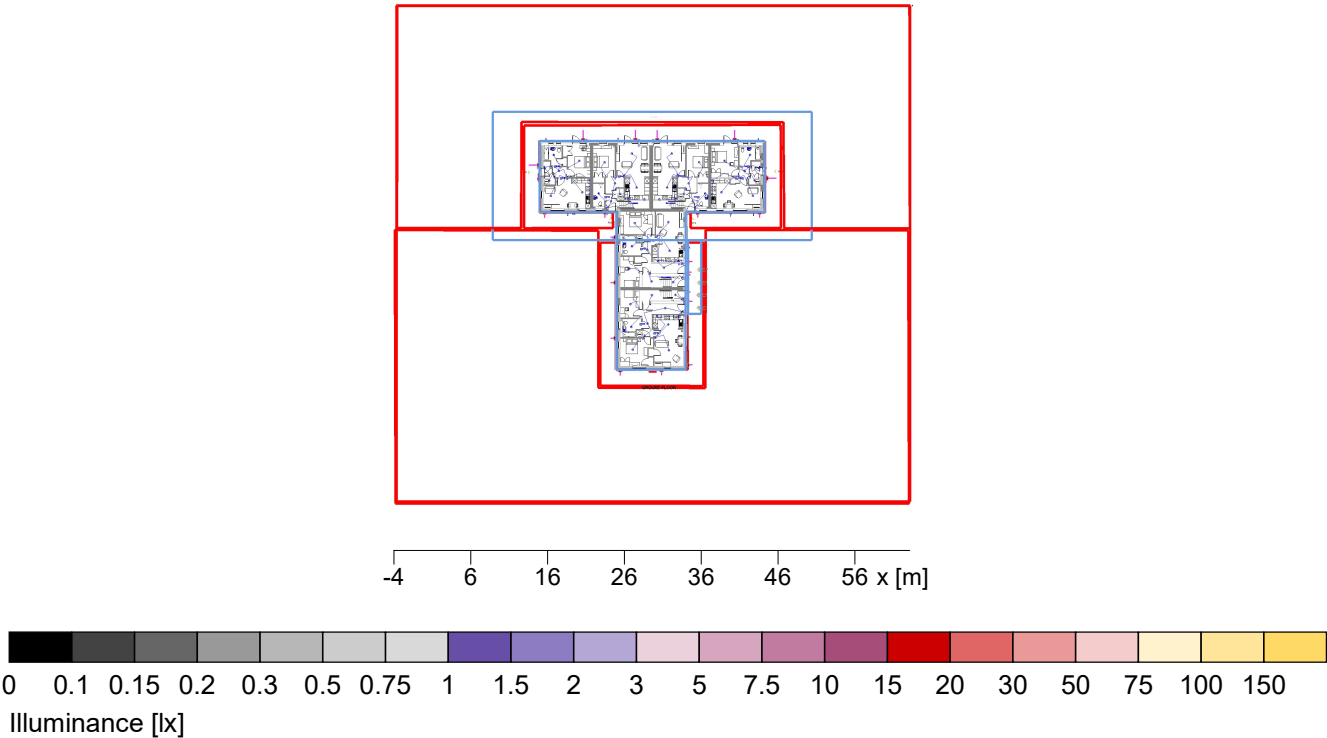
Type No.Make

1	21 x	Tamlite Lighting
	Order No.	: !CWL90T2WWGMS
	Luminaire name	: CITY WL
	Equipment	: 1 x 7 W / 900 lm



1.2 Summary, Exterior

1.2.6 Result overview, Bat Box West



General

Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Total luminous flux	18900 lm
Total power	147 W
Total power per area (4300.13 m²)	0.03 W/m²

Illuminance

Average illuminance	$\bar{E}_m$	0.66 lx
Minimum illuminance	E_{min}	0.53 lx
Maximum illuminance	E_{max}	0.82 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:1.24 (0.81)
Diversity U_d	E_{min}/E_{max}	1:1.53 (0.65)

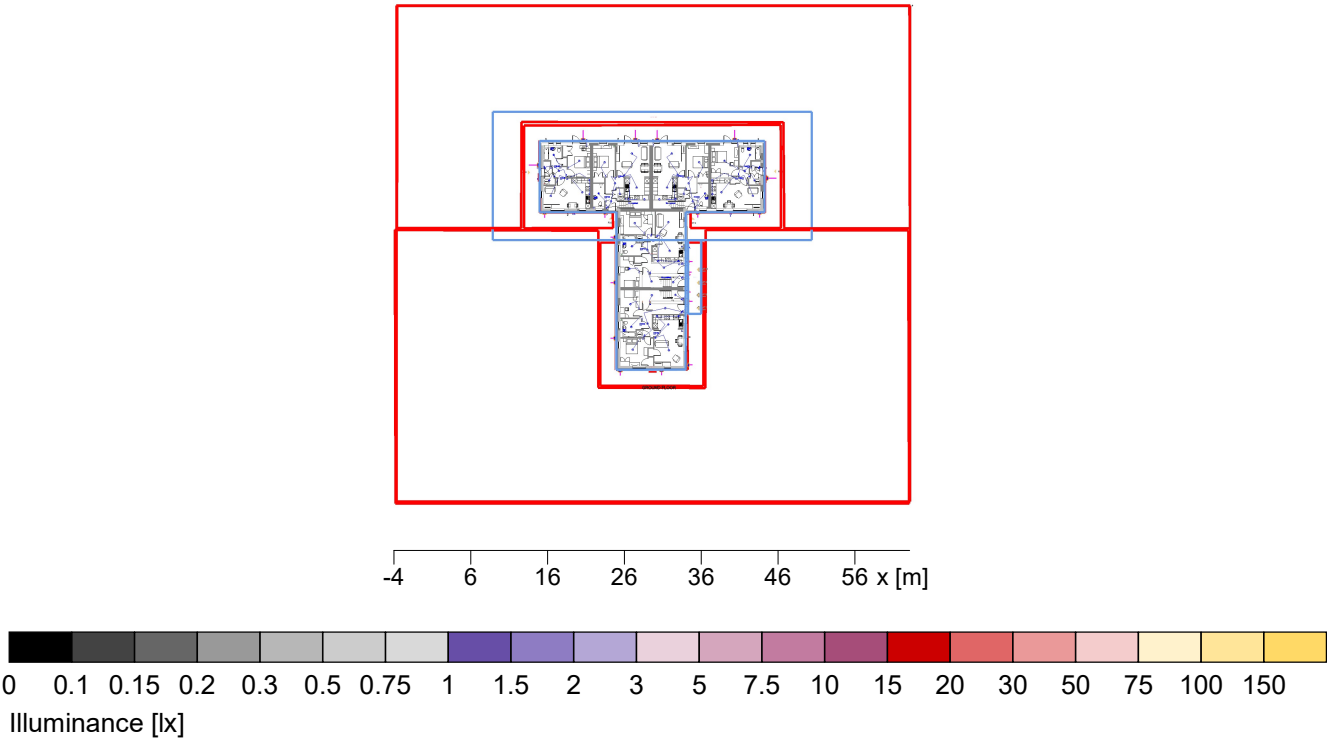
Type No.Make

1	21 x	Tamlite Lighting
	Order No.	: !CWL90T2WWGMS
	Luminaire name	: CITY WL
	Equipment	: 1 x 7 W / 900 lm



1.2 Summary, Exterior

1.2.7 Result overview, Bat Box South



General

Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Total luminous flux	18900 lm
Total power	147 W
Total power per area (4300.13 m²)	0.03 W/m²

Illuminance

Average illuminance	$\bar{E}_m$	0.06 lx
Minimum illuminance	E_{min}	0.05 lx
Maximum illuminance	E_{max}	0.06 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:1.13 (0.89)
Diversity U_d	E_{min}/E_{max}	1:1.24 (0.81)

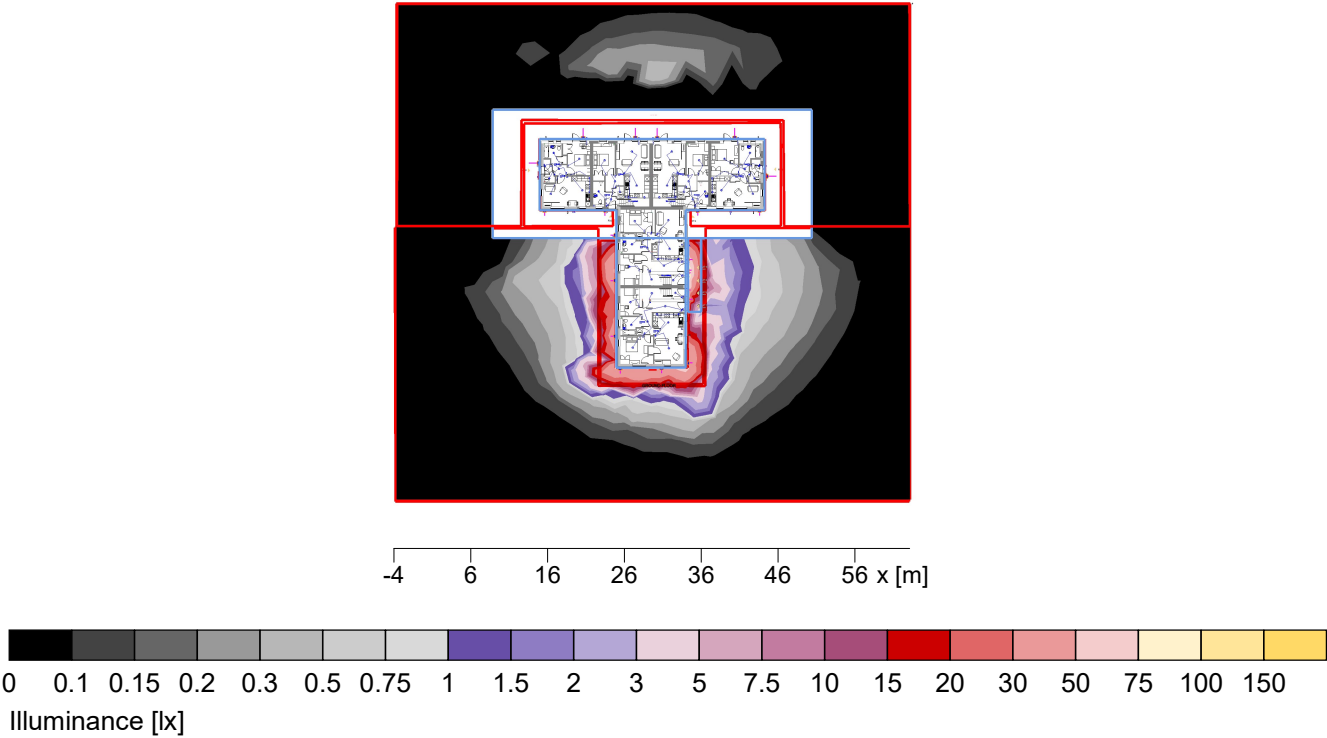
Type No. Make

1	21 x	Tamlite Lighting
	Order No.	: !CWL90T2WWGMS
	Luminaire name	: CITY WL
	Equipment	: 1 x 7 W / 900 lm



1.2 Summary, Exterior

1.2.8 Result overview, Evaluation area 1



General

Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Total luminous flux	18900.00 lm
Total power	147.0 W
Total power per area (4300.13 m²)	0.03 W/m² (2.03 W/m²/100lx)

Evaluation area 1

Reference plane 1.1

$\bar{E}_m$	Horizontal
E_{min}	1.69 lx
$E_{min}/\bar{E}_m (U_o)$	0 lx
$E_{min}/E_{max} (U_d)$	---
Position	---
	0.00 m

Type No.\Make

Tamlite Lighting

1 21 x



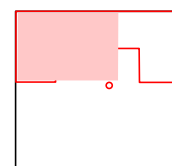
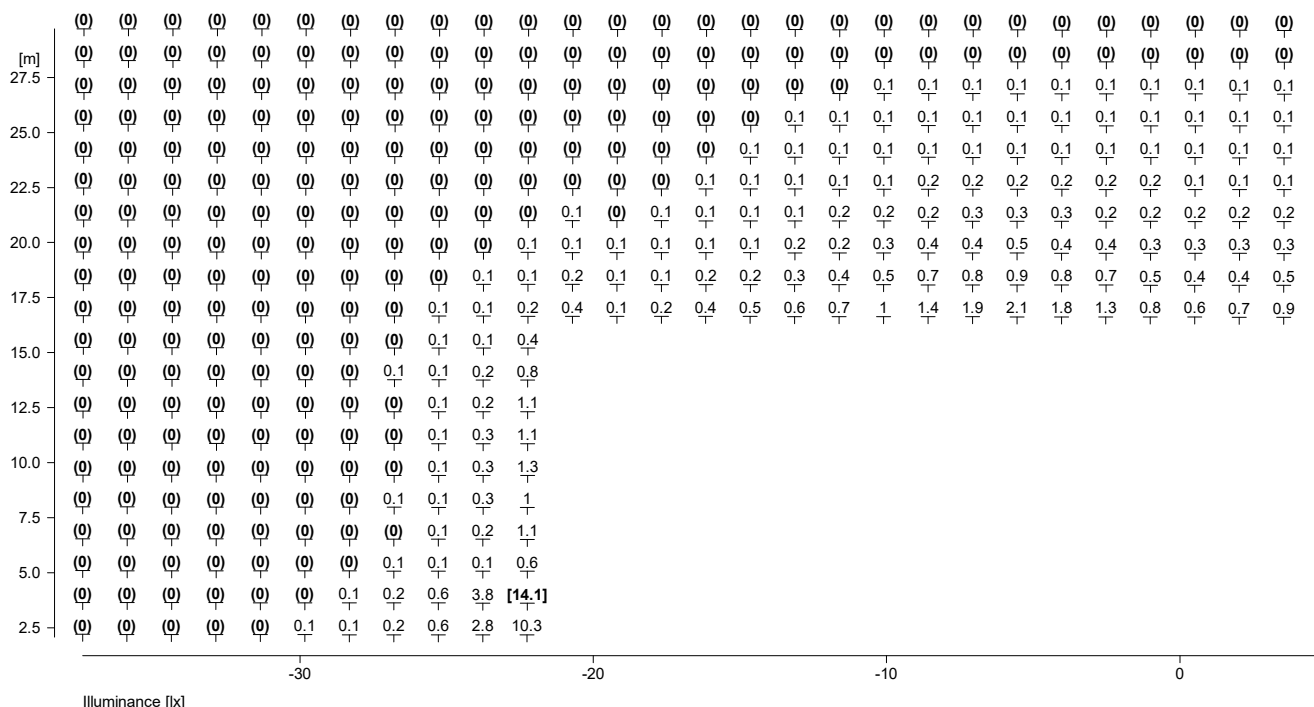
Order No. : !CWL90T2WWGMS
Luminaire name : CITY WL
Equipment : 1 x 7 W / 900 lm



1 Exterior

1.3 Calculation results, Exterior

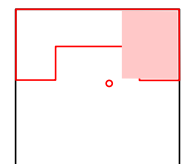
1.3.1 Table, Light Spill North (E)



Part1

Height reference plane	: 1.90 m
Average illuminance	$\bar{E}_m$: 0.2 lx
Minimum illuminance	E_{min} : 0 lx
Maximum illuminance	E_{max} : 14.1 lx
Uniformity U_o	$E_{min}/\bar{E}_m$: 1 : 89.45 (0.01)
Diversity U_d	E_{min}/E_{max} : 1 : 5637.43 (0.00)

1.3.1 Table, Light Spill North (E)



1.3 Calculation results, Exterior

1.3.2 Table, Light Spill South (E)



Part1

Height reference plane	: 0.00 m
Average illuminance	$\bar{E}_m$: 0.29 lx
Minimum illuminance	E_{min} : 0.01 lx
Maximum illuminance	E_{max} : 7.4 lx
Uniformity U_o	$E_{min}/\bar{E}_m$: 1 : 30.10 (0.03)
Diversity U_d	E_{min}/E_{max} : 1 : 780.44 (0.00)

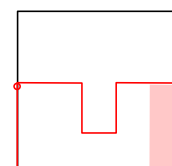


1.3 Calculation results, Exterior

1.3.2 Table, Light Spill South (E)

0.07	0.05	0.06	0.06	0.13	0.11	0.08	0.07	
0.16	0.12	0.09	0.07	0.07	0.11	0.1	0.08	0.07
0.2	0.13	0.11	0.09	0.07	0.1	0.09	0.07	0.06
0.29	0.23	0.16	0.13	0.1	0.09	0.08	0.07	0.06
0.27	0.21	0.16	0.12	0.1	0.09	0.08	0.06	0.06
0.24	0.19	0.15	0.12	0.1	0.09	0.07	0.06	0.05
0.23	0.18	0.14	0.12	0.1	0.08	0.07	0.06	0.05
0.2	0.16	0.13	0.11	0.09	0.07	0.06	0.05	0.05
0.18	0.14	0.12	0.1	0.08	0.07	0.06	0.05	0.04
0.15	0.13	0.11	0.09	0.07	0.06	0.05	0.05	0.04
0.13	0.11	0.09	0.08	0.07	0.06	0.05	0.04	0.04
0.11	0.1	0.08	0.07	0.06	0.05	0.05	0.04	0.04
0.1	0.08	0.07	0.06	0.05	0.05	0.04	0.04	0.03
0.08	0.07	0.06	0.05	0.05	0.04	0.04	0.03	0.03
0.07	0.06	0.05	0.05	0.04	0.04	0.03	0.03	0.03
0.06	0.05	0.05	0.04	0.04	0.03	0.03	0.03	0.02
0.05	0.05	0.04	0.04	0.03	0.03	0.03	0.02	0.02
0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.02
0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02
0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02
0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02(0.01)
0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02(0.01)	0.01

60 [m]

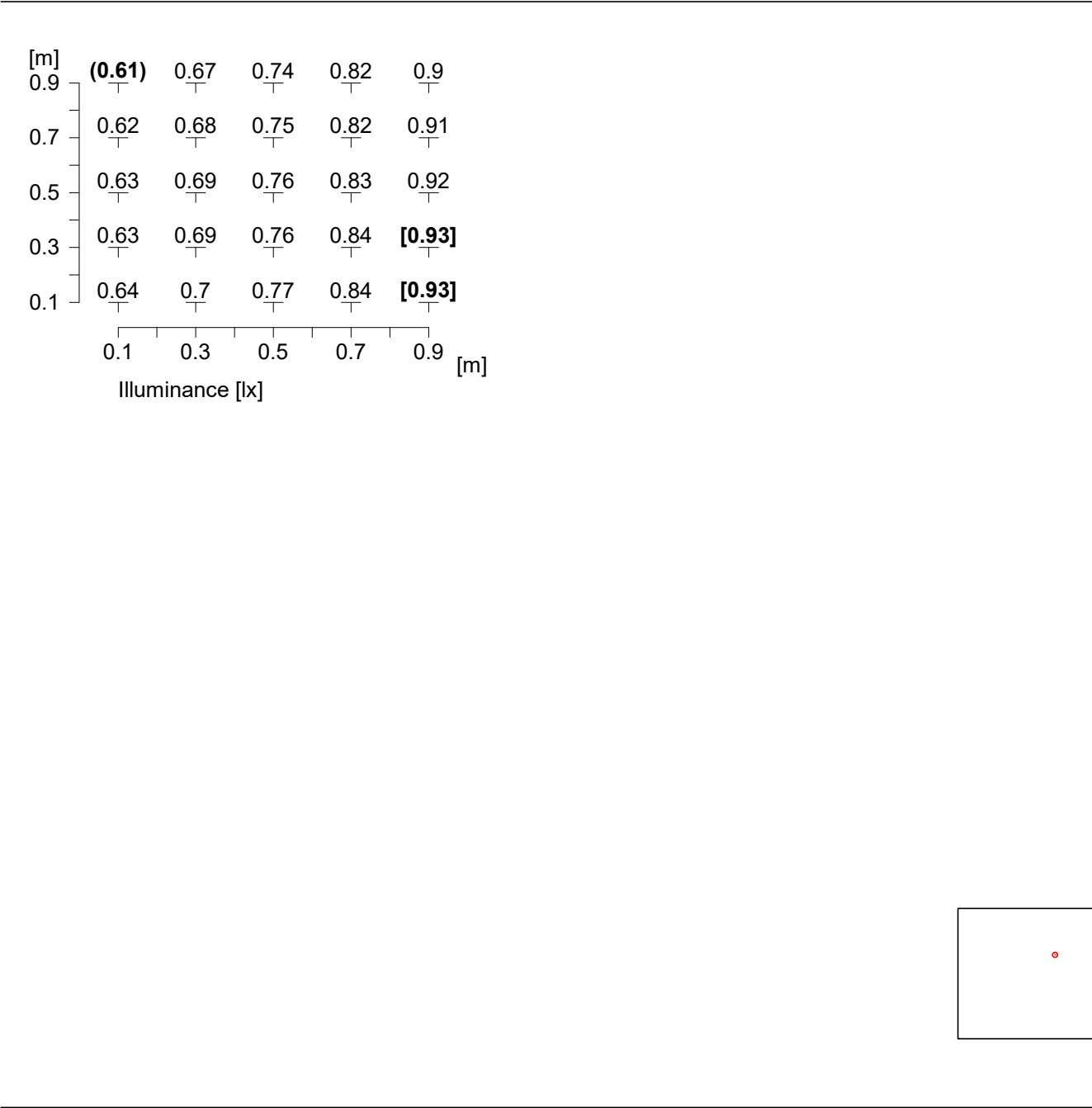


Part2



1.3 Calculation results, Exterior

1.3.3 Table, Bat Box East (E)

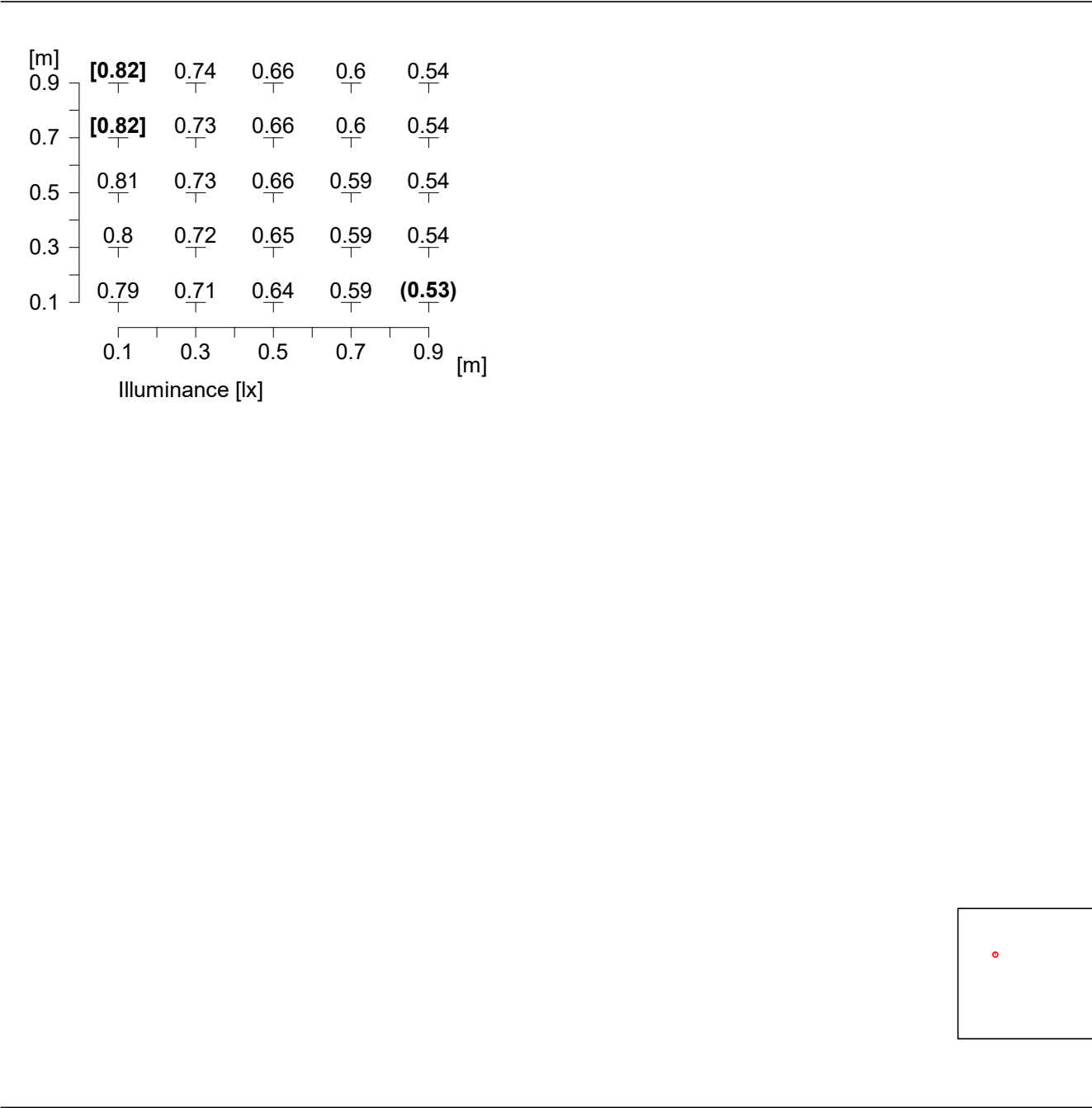


Average illuminance	$\bar{E}_m$	: 0.76 lx
Minimum illuminance	E_{min}	: 0.61 lx
Maximum illuminance	E_{max}	: 0.93 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 1.24 (0.80)
Diversity U_d	E_{min}/E_{max}	: 1 : 1.52 (0.66)



1.3 Calculation results, Exterior

1.3.4 Table, Bat Box West (E)

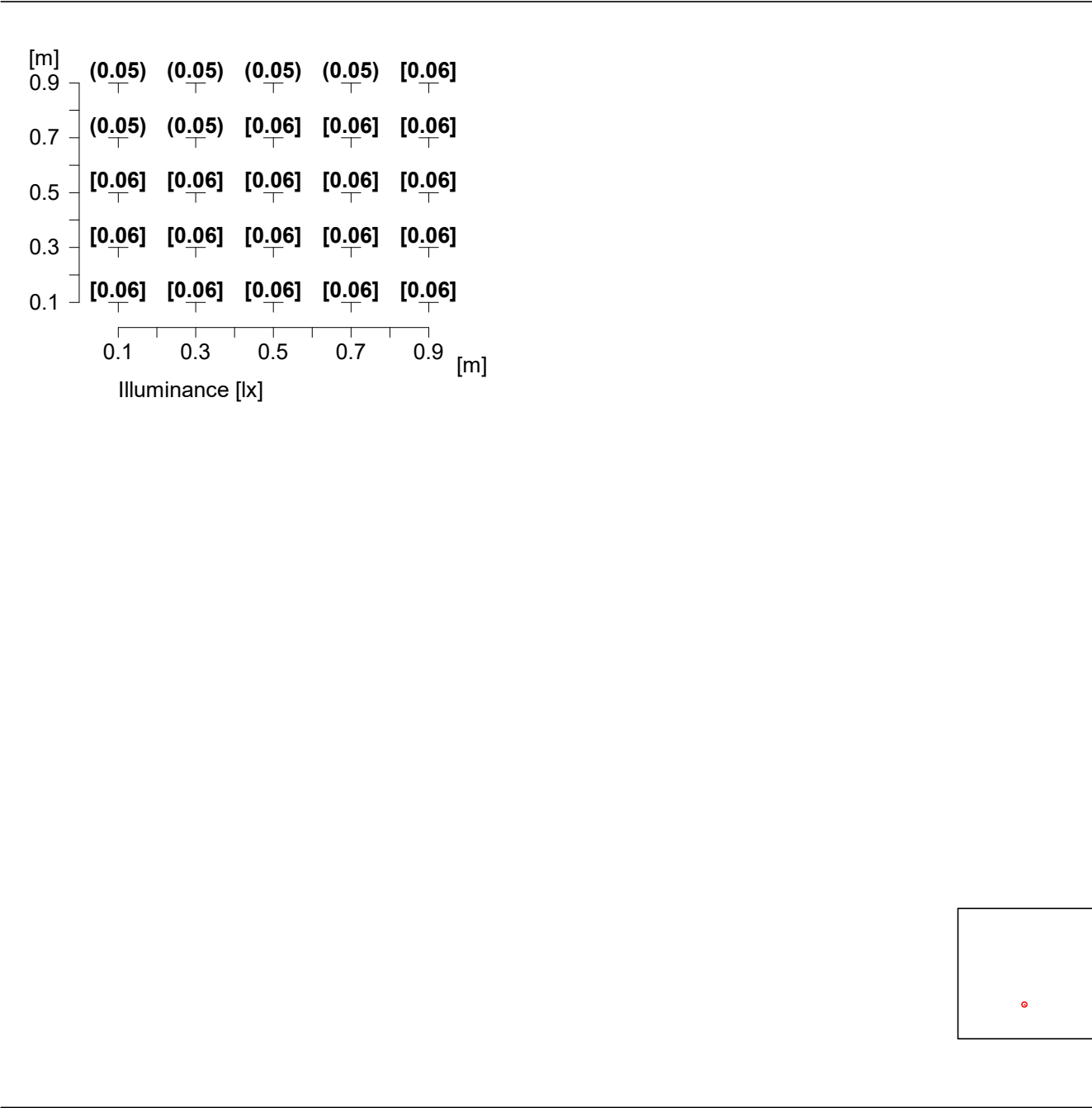


Average illuminance	$\bar{E}_m$	: 0.66 lx
Minimum illuminance	E_{min}	: 0.53 lx
Maximum illuminance	E_{max}	: 0.82 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 1.24 (0.81)
Diversity U_d	E_{min}/E_{max}	: 1 : 1.53 (0.65)



1.3 Calculation results, Exterior

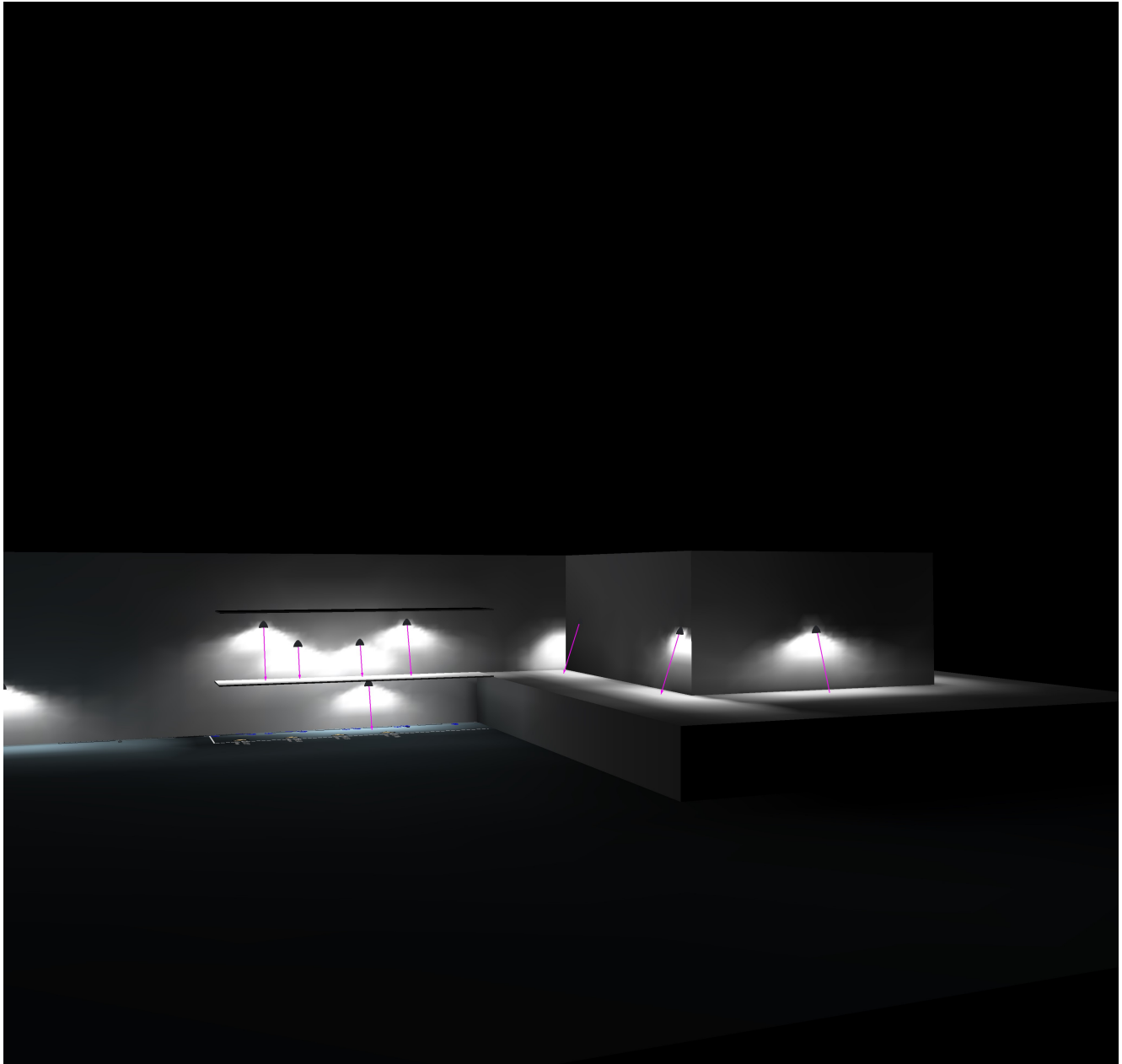
1.3.5 Table, Bat Box South (E)



Average illuminance	$\bar{E}_m$	: 0.06 lx
Minimum illuminance	E_{min}	: 0.05 lx
Maximum illuminance	E_{max}	: 0.06 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 1.13 (0.89)
Diversity U_d	E_{min}/E_{max}	: 1 : 1.24 (0.81)

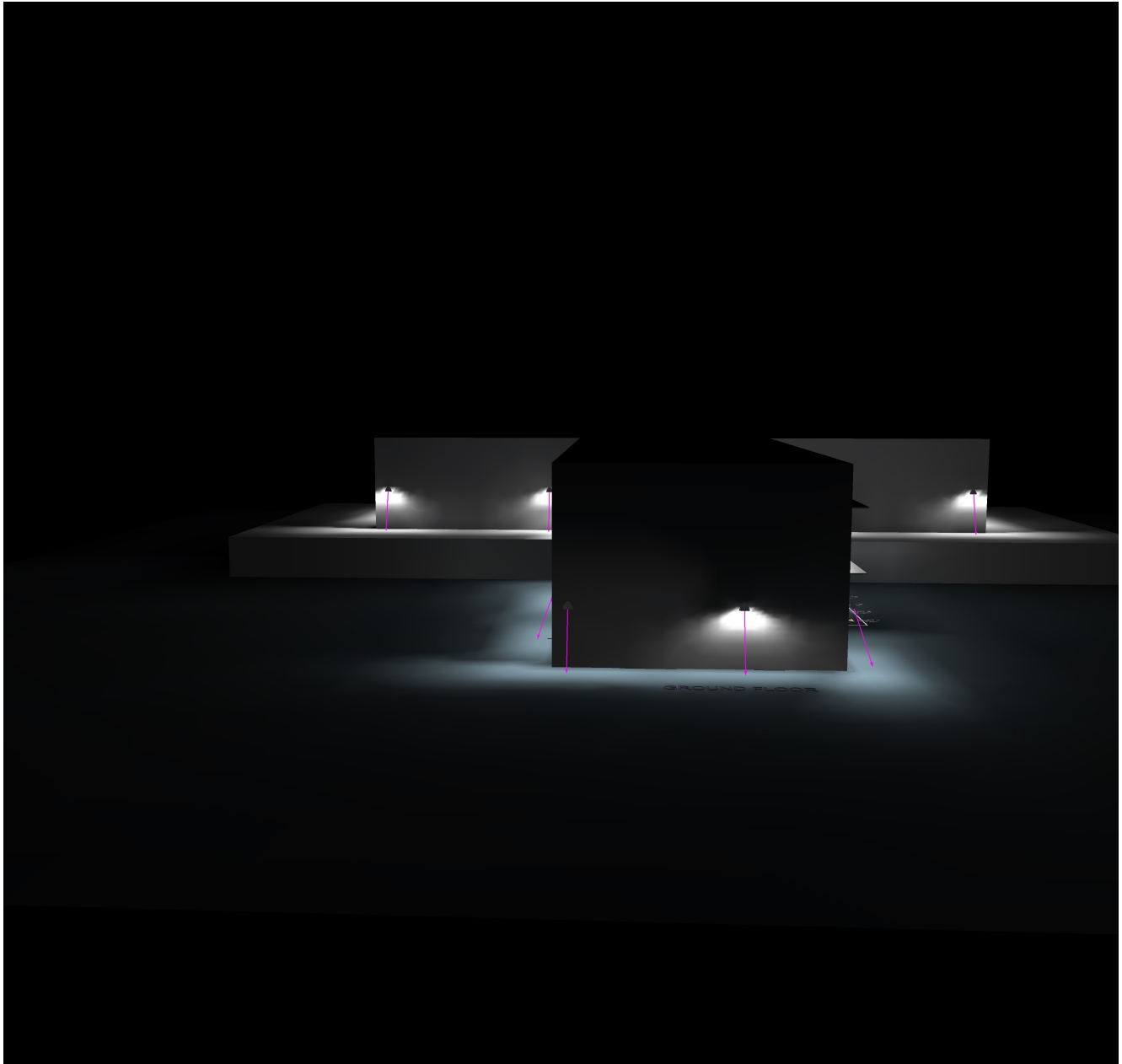
1.3 Calculation results, Exterior

1.3.6 3D luminance, View 1



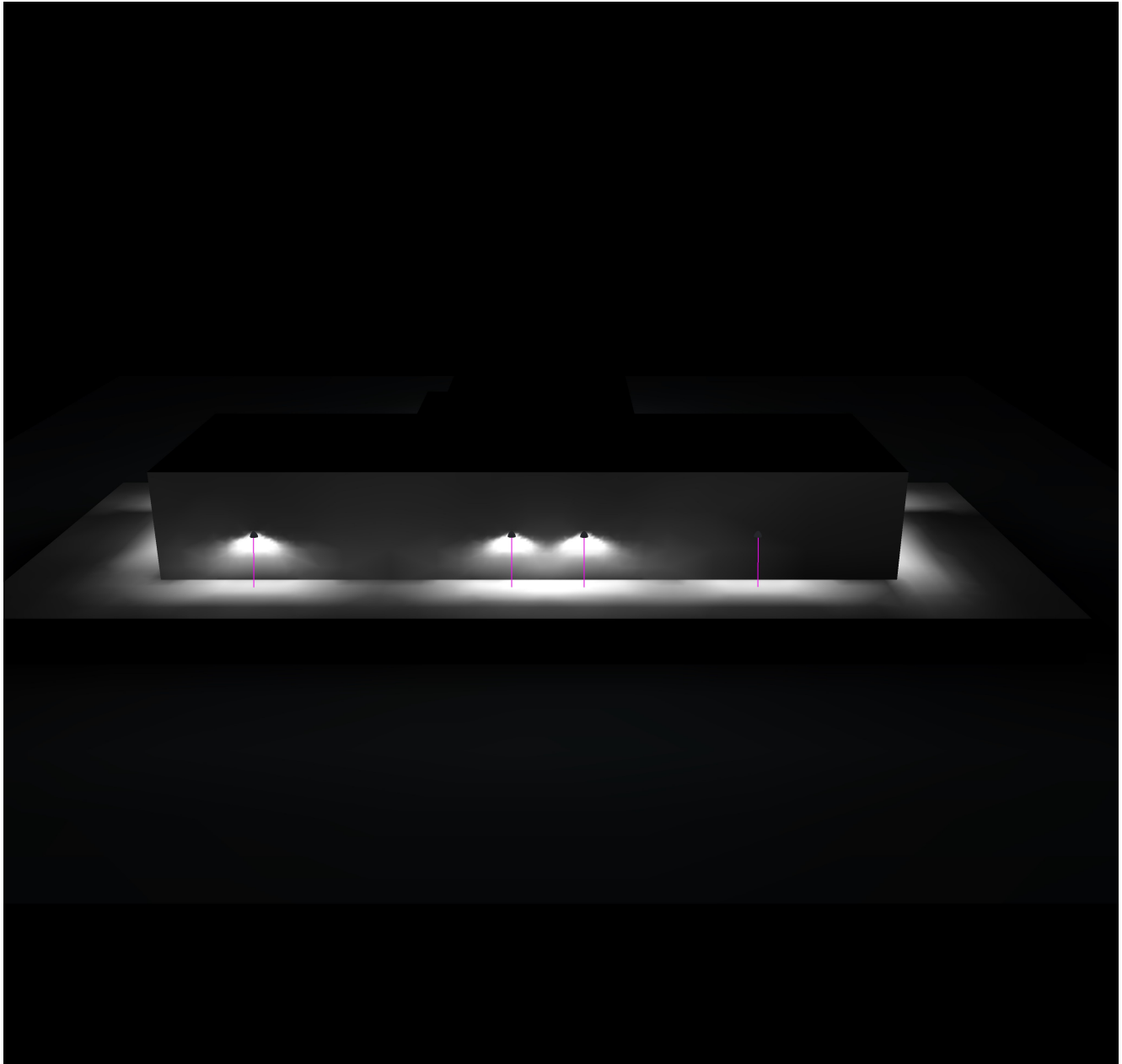
1.3 Calculation results, Exterior

1.3.7 3D luminance, View 2



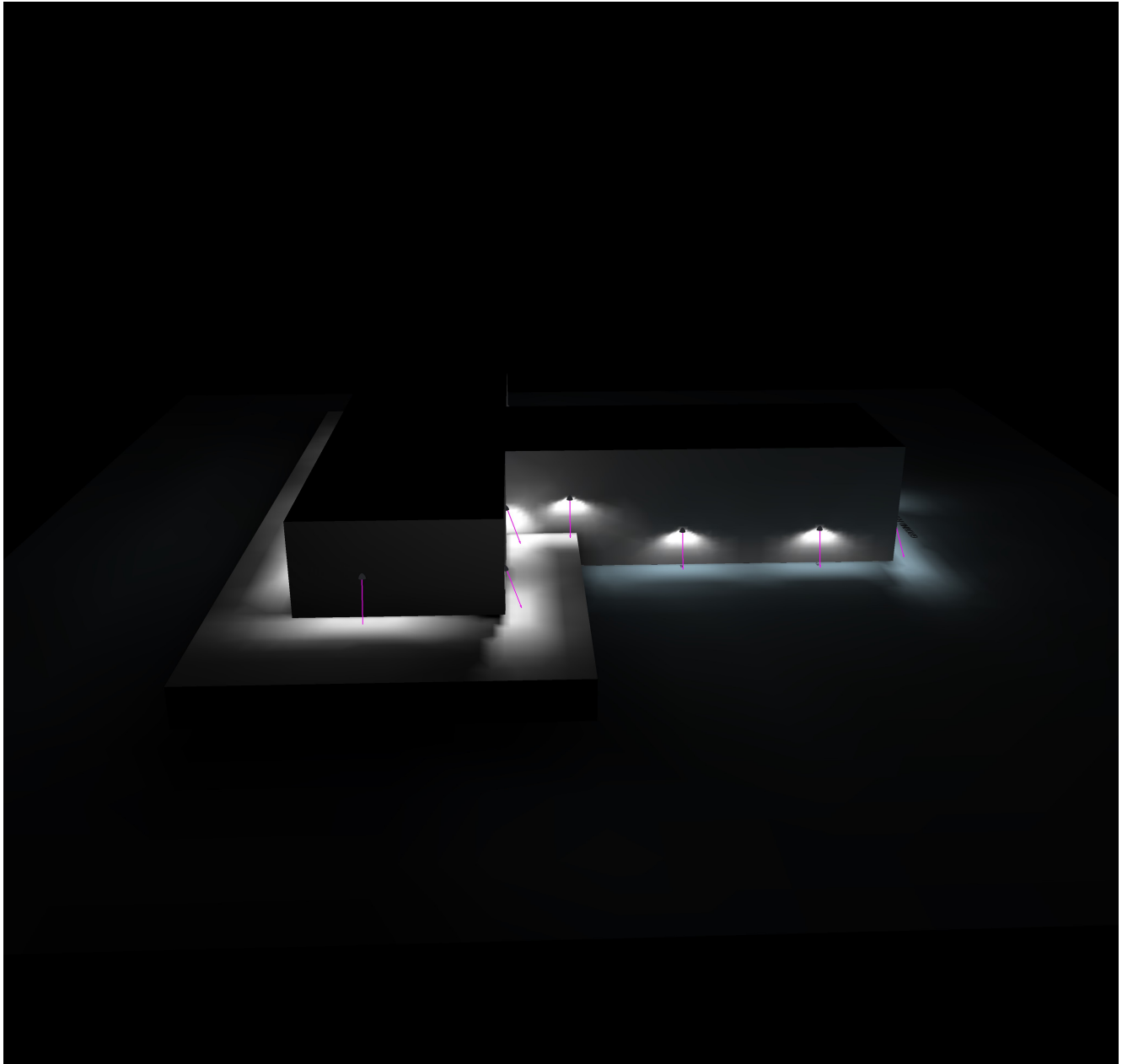
1.3 Calculation results, Exterior

1.3.8 3D luminance, View 3



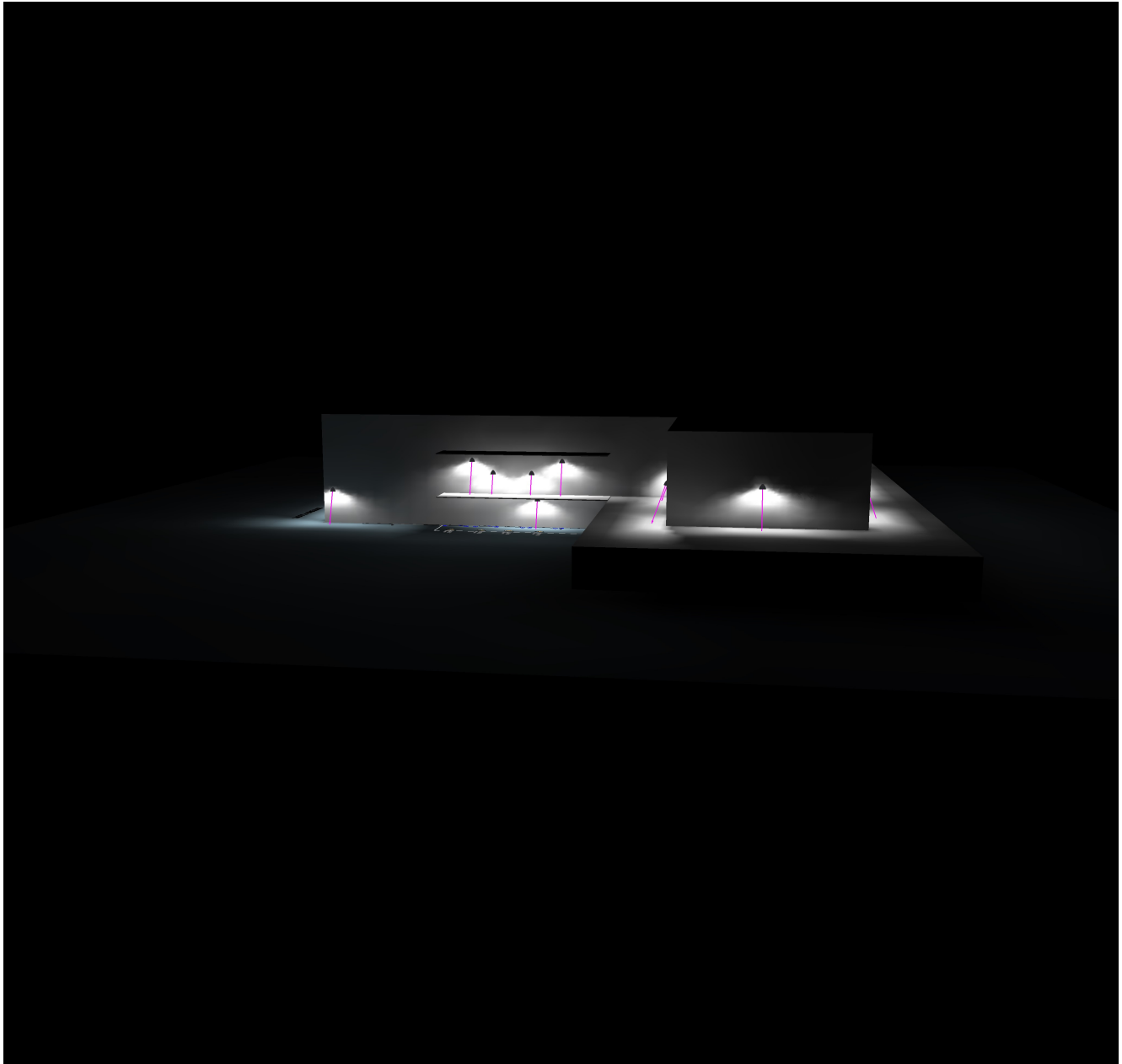
1.3 Calculation results, Exterior

1.3.9 3D luminance, View 4



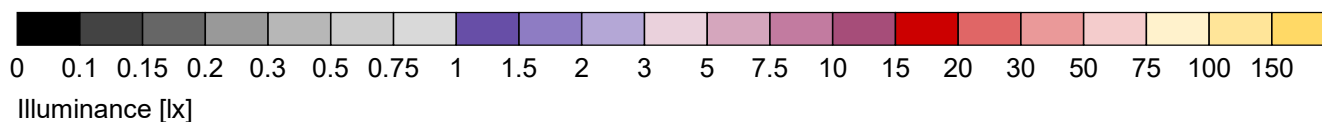
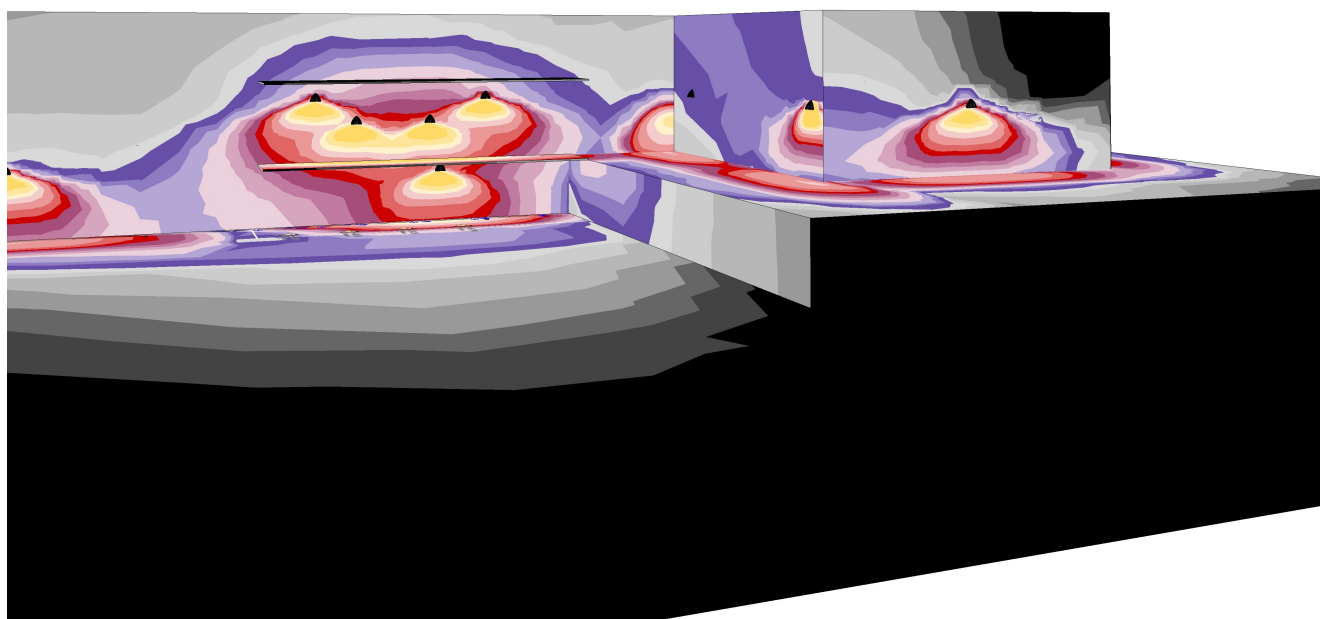
1.3 Calculation results, Exterior

1.3.10 3D luminance, View 5



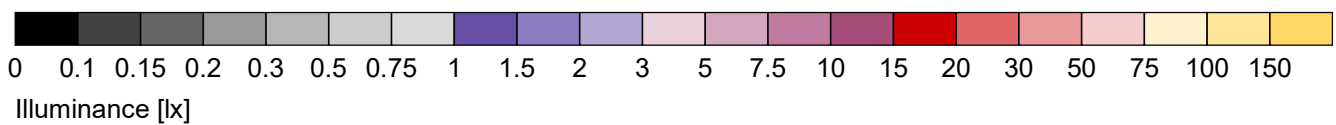
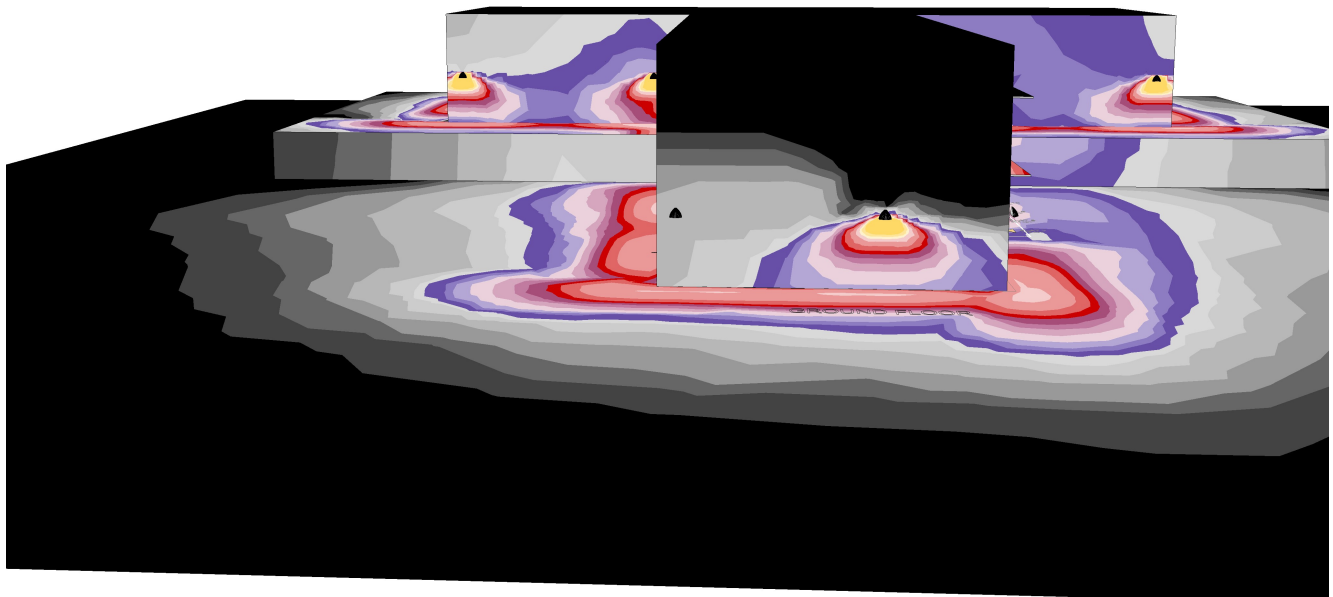
1.3 Calculation results, Exterior

1.3.11 3D pseudo colours, View 1 (E)



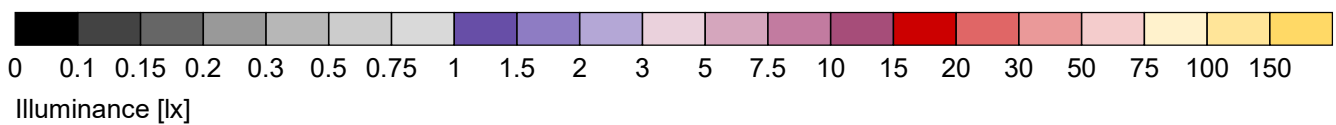
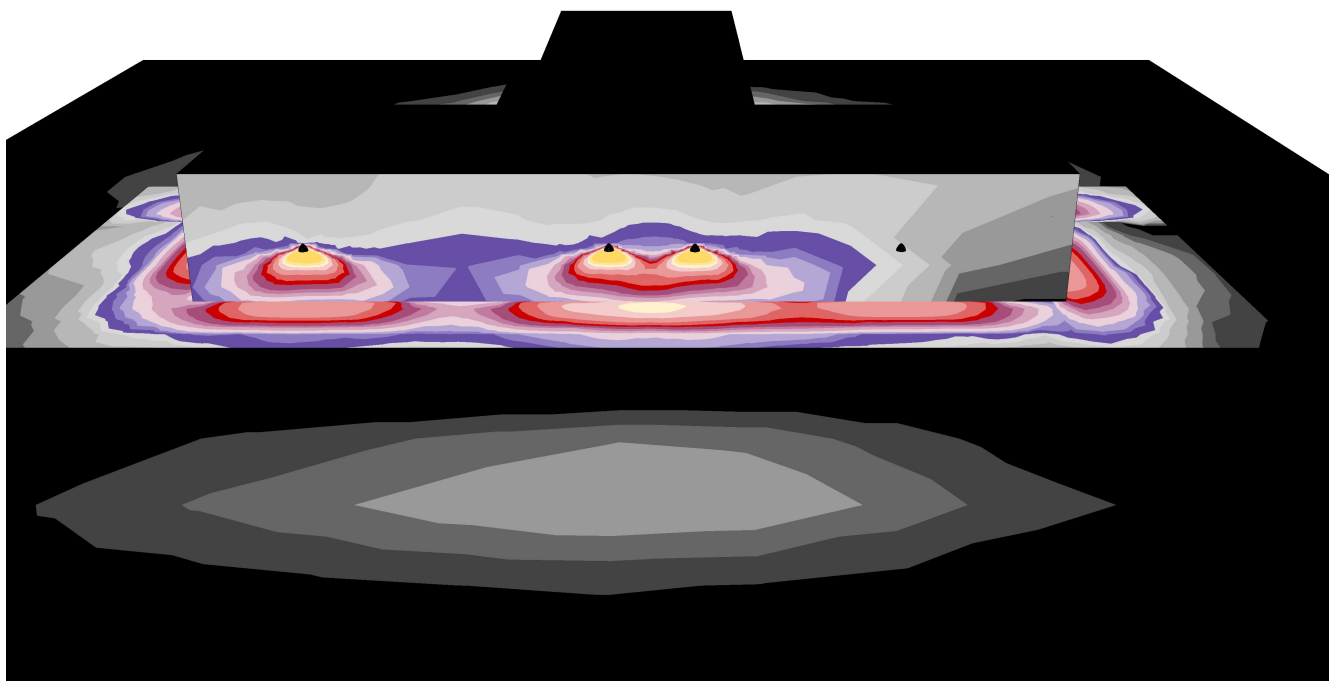
1.3 Calculation results, Exterior

1.3.12 3D pseudo colours, View 2 (E)



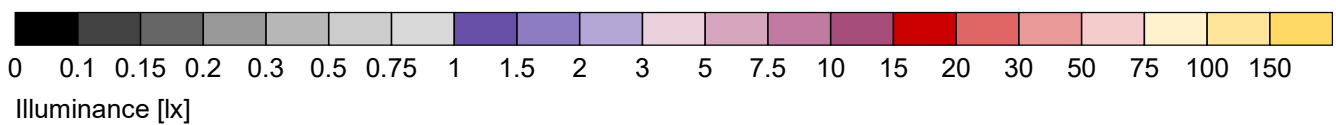
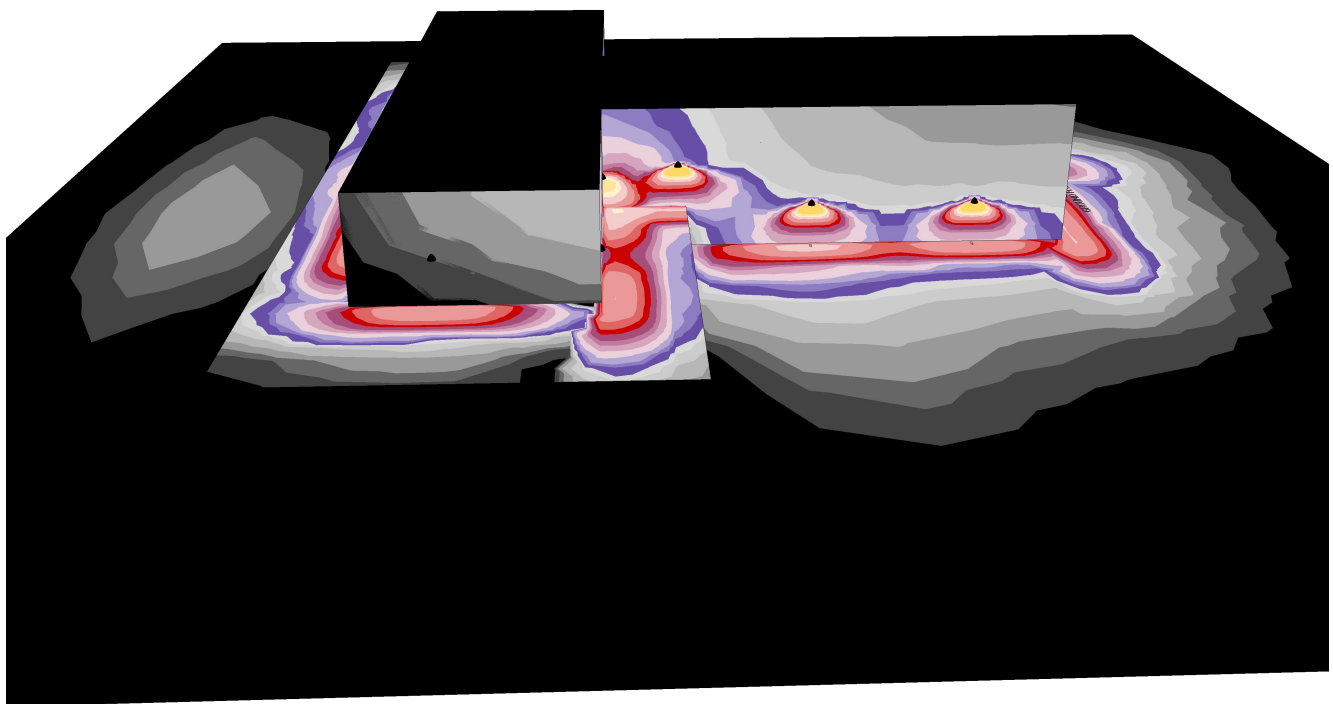
1.3 Calculation results, Exterior

1.3.13 3D pseudo colours, View 3 (E)



1.3 Calculation results, Exterior

1.3.14 3D pseudo colours, View 4 (E)



1.3 Calculation results, Exterior

1.3.15 3D pseudo colours, View 5 (E)

