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TECHNICAL SUBMITTAL – No8
LDL Lighting External Lighting Calculations
Document Ref: FS0911-ABE-XX-XX-T-E-0008

Project:	Rochdale SEND School			Status
A&B Contract No:		Date:	14.11.2024	S3
Engineers:	Jordan Thompson		Rev.P01	



ROCHDALE SEN

Installation : EXTERIOR

Project number :
Customer : A & B ENGINEERING
Processed by : N ROBERTS
Date : 06.11.2024

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.

Luminaire data

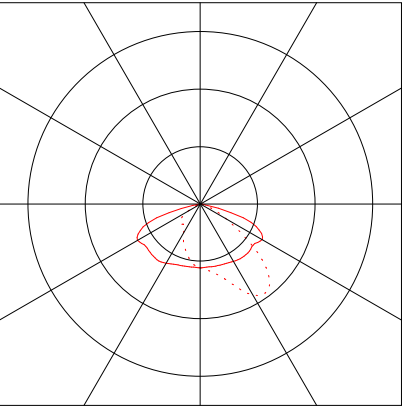
1.1 LDL, STREET Medium L1optic 55... (ST/M/L1/5500/74)

1.1.1 Data sheet

Manufacturer: LDL

ST/M/L1/5500/74STREET Medium L1optic 5534lm 56w 740 550mA

Luminaire data		Equipped with	
Absolute Photometry		Quantity	: 1
Luminaire efficacy	: 99.35 lm/W	Designation	: LED Backlight
Classification	: A30 ↓100.0% ↑0.0%	Colour	: 4000
CIE Flux Codes	: 37 74 98 100 100	Colour reproduction	: 72
UGR 4H 8H	: 35.6 / 21.4		
Power	: 55.7 W		
Luminous flux	: 5534 lm		
Dimensions	: 500 mm x 250 mm x 100 mm		



Luminaire data

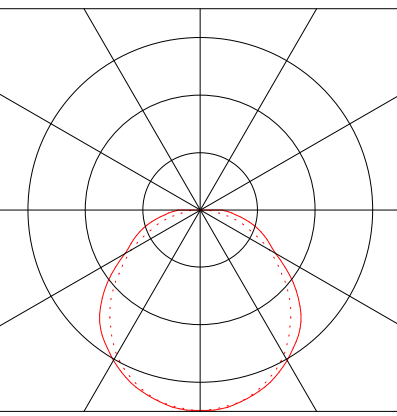
1.2 LDL, WPZ 1575mm 5359lm 36w 840 3... (WPZ/5/5360/4)

1.2.1 Data sheet

Manufacturer: LDL

WPZ/5/5360/4 WPZ 1575mm 5359lm 36w 840 300mA

Luminaire data		Equipped with	
Absolute Photometry		Quantity	: 1
Luminaire efficacy	: 153.66 lm/W	Designation	: LED Backlight
Classification	: A40 ↓99.6% ↑0.4%	Colour	: 4000
CIE Flux Codes	: 46 76 93 100 104	Colour reproduction	: 80
UGR 4H 8H	: 24.4 / 23.9		
Power	: 36.24 W		
Luminous flux	: 5568.8 lm		
Dimensions	: 1575 mm x 101 mm x 84 mm		



Luminaire data

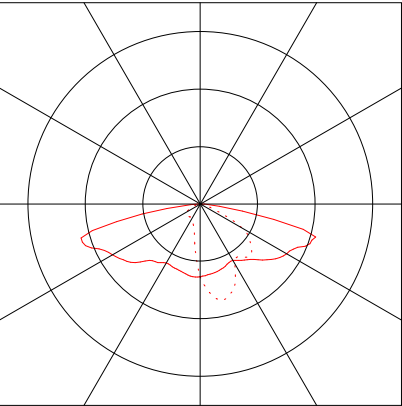
1.3 LDL, LUNA L6optic 1205lm 14w ... (LUNA/L6/1200/74)

1.3.1 Data sheet

Manufacturer: LDL

LUNA/L6/1200/74LUNA L6optic 1205lm 14w 740 250mA

Luminaire data		Equipped with	
Absolute Photometry		Quantity	: 1
Luminaire efficacy	: 88.72 lm/W	Designation	: LED Backlight
Classification	: A20 ↓100.0% ↑0.0%	Colour	: 4000
CIE Flux Codes	: 31 64 93 100 100	Colour reproduction	: 70
UGR 4H 8H	: 37.5 / 19.4		
Power	: 13.8 W		
Luminous flux	: 1224.4 lm		
Dimensions	: 220 mm x 220 mm x 230 mm		



Luminaire data

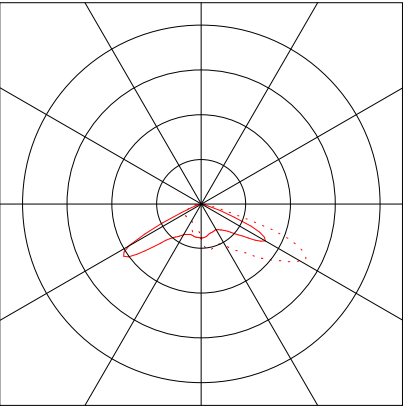
1.4 LDL, CORA Floodlight L2optic 32... (COR/L2/3200/4)

1.4.1 Data sheet

Manufacturer: LDL

COR/L2/3200/4CORA Floodlight L2optic 3226lm 38w 840 500mA

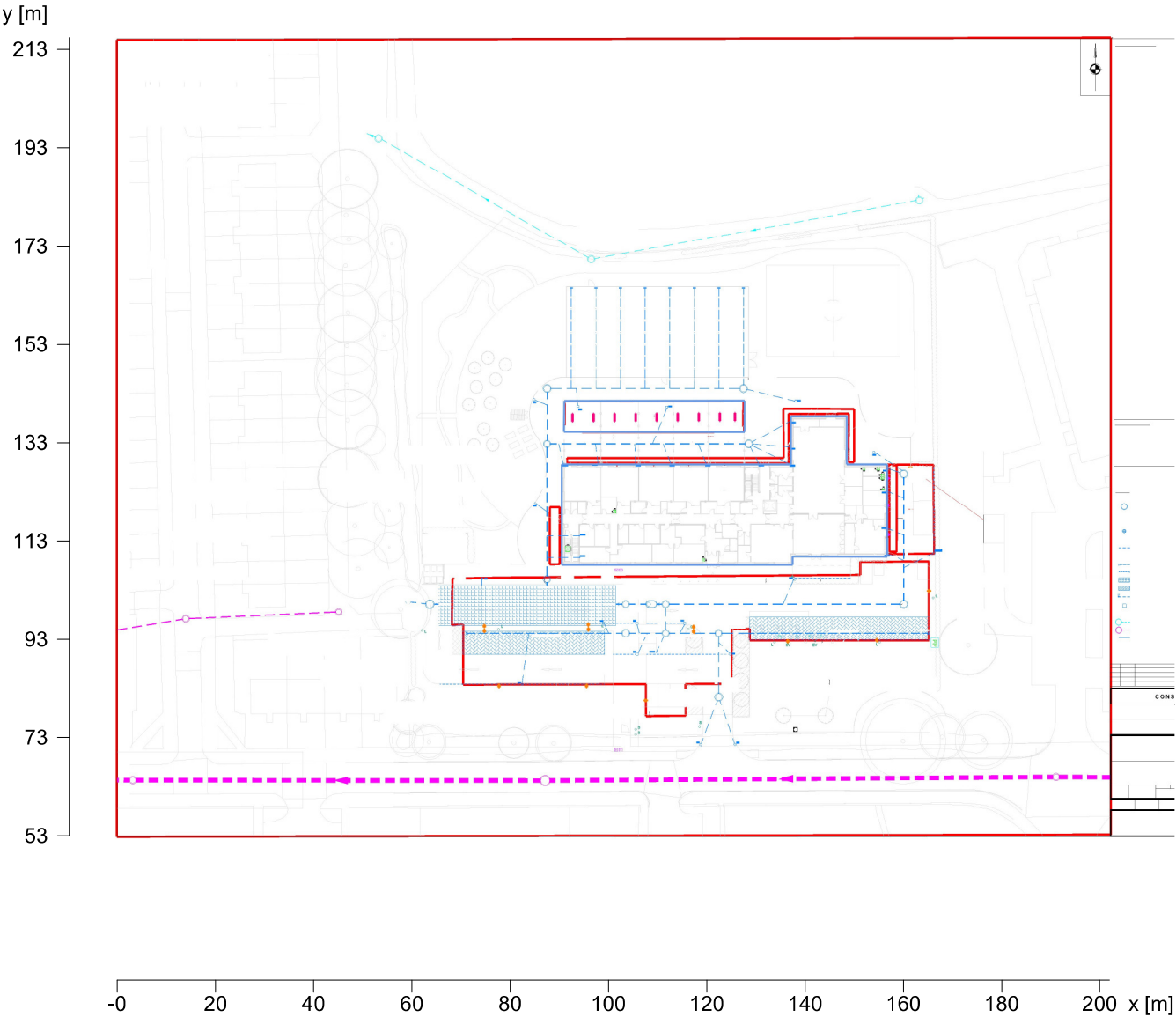
Luminaire data		Equipped with	
Absolute Photometry		Quantity	: 1
Luminaire efficacy	: 84.81 lm/W	Designation	: LED Backlight
Classification	: A20 ↓100.0% ↑0.0%	Colour	: 4000
CIE Flux Codes	: 25 63 98 100 101	Colour reproduction	: 80
UGR 4H 8H	: 33.3 / 24.7		
Power	: 38.04 W		
Luminous flux	: 3226 lm		
Dimensions	: 295 mm x 190 mm x 60 mm		



2 Exterior 1

2.1 Description, Exterior 1

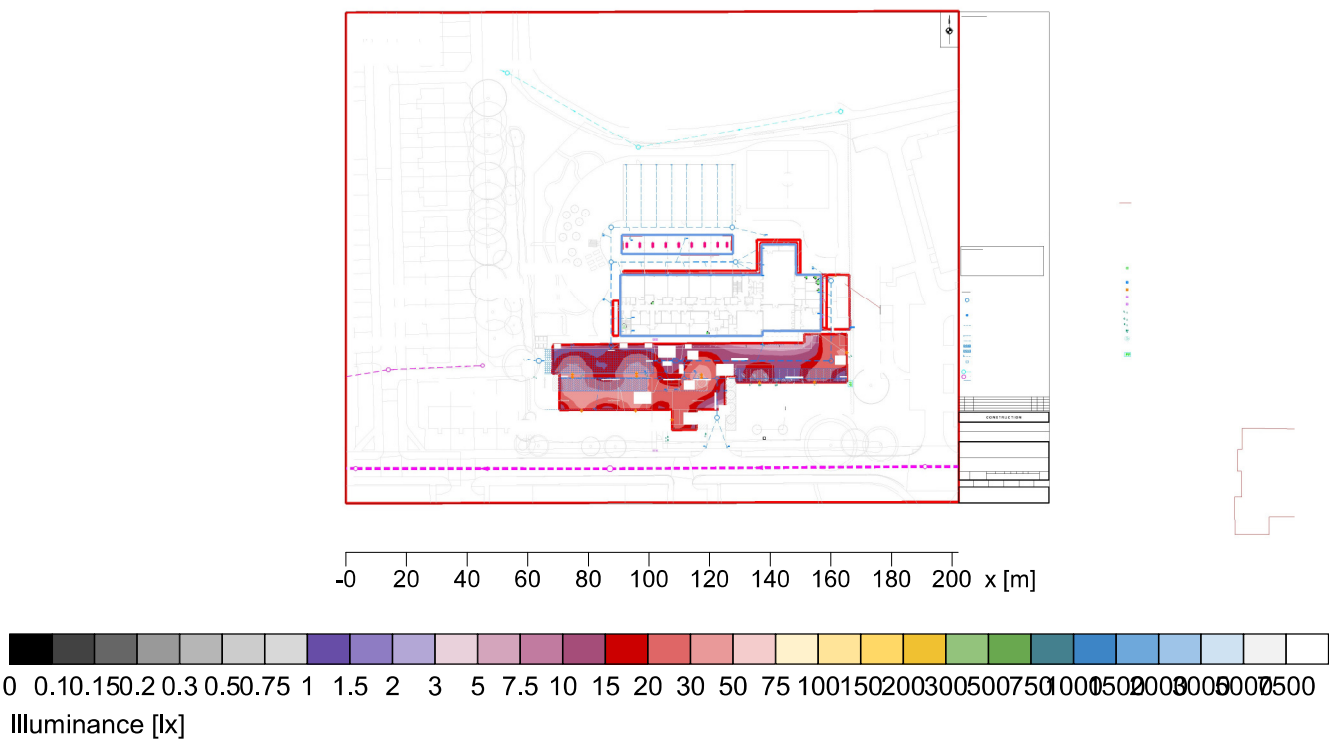
2.1.1 Floor plan



2 Exterior 1

2.2 Summary, Exterior 1

2.2.1 Result overview, Measuring area 1



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.00 m
Maintenance factor	0.80
Total luminous flux	144802 lm
Total power	1343.3 W
Total power per area (32717.89 m²)	0.04 W/m²

Illuminance

Average illuminance	Em	20.4 lx
Minimum illuminance	Emin	5 lx
Maximum illuminance	Emax	49 lx
Uniformity Uo	Emin/Em	1:4.08 (0.25)
Diversity Ud	Emin/Emax	1:9.81 (0.1)

Type No.Make

LDL		
1	12 x	Order No. : ST/M/L1/5500/74
		Luminaire name : STREET Medium L1optic 5534lm 56w 740 550mA
		Equipment : 1 x LED Backlight 55.7 W / 5534 lm
2	9 x	Order No. : WPZ/5/5360/4
		Luminaire name : WPZ 1575mm 5359lm 36w 840 300mA
		Equipment : 1 x LED Backlight 36.24 W / 5359 lm



Project : ROCHDALE SEN

Installation : EXTERIOR

Project number :

Date : 06.11.2024



2 Exterior 1

2.2 Summary, Exterior 1

2.2.1 Result overview, Measuring area 1

- 3

17 x



Order No. : LUNA/L6/1200/74

Luminaire name : LUNA L6optic 1205lm 14w 740 250mA

Equipment : 1 x LED Backlight 13.8 W / 1205 lm
- 4

3 x



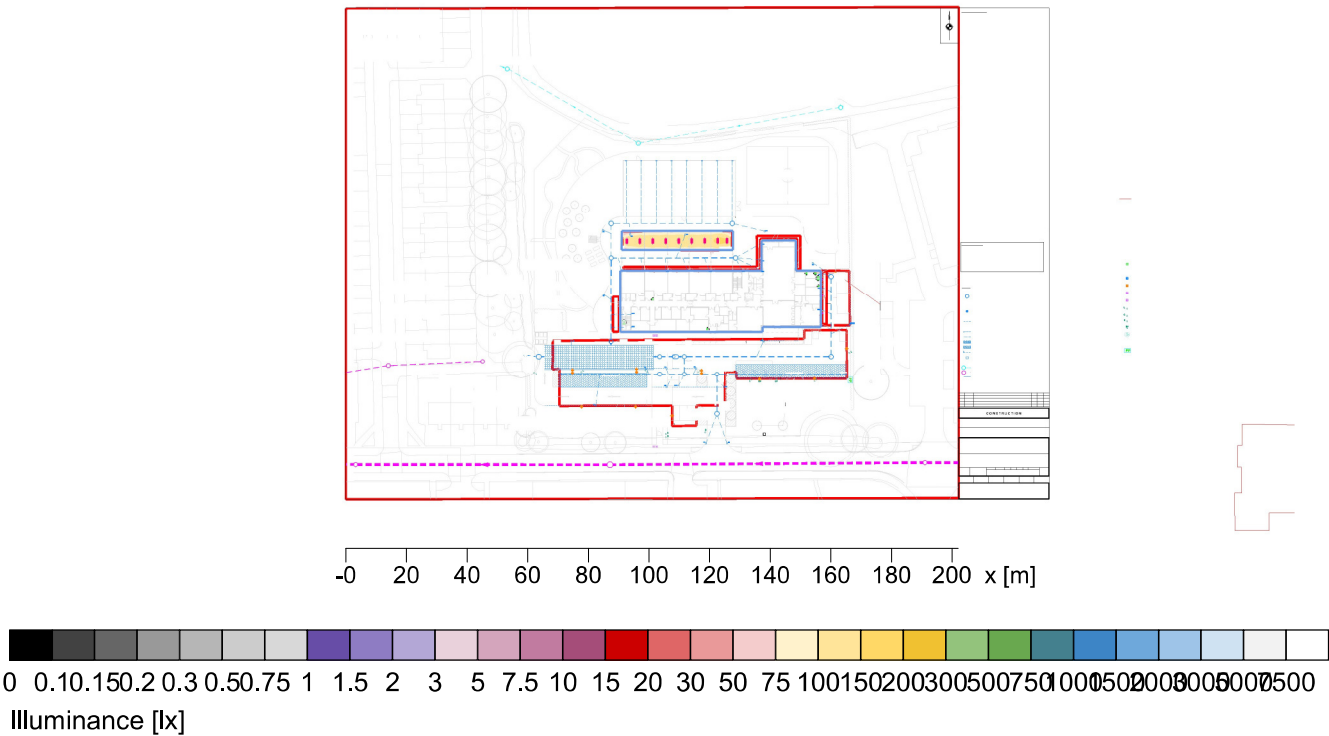
Order No. : COR/L2/3200/4

Luminaire name : CORA Floodlight L2optic 3226lm 38w 840 500mA

Equipment : 1 x LED Backlight 38.04 W / 3226 lm

2.2 Summary, Exterior 1

2.2.2 Result overview, UNDER CANOPY



General	
Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.00 m
Maintenance factor	0.80
Total luminous flux	
144802 lm	
Total power	
1343.3 W	
Total power per area (32717.89 m²)	
0.04 W/m²	

Illuminance		
Average illuminance	Em	109 lx
Minimum illuminance	Emin	46 lx
Maximum illuminance	Emax	170 lx
Uniformity Uo	Emin/Em	1:2.39 (0.42)
Diversity Ud	Emin/Emax	1:3.71 (0.27)

Type No.Make

LDL		
112 x 	Order No.	: ST/M/L1/5500/74
	Luminaire name	: STREET Medium L1optic 5534lm 56w 740 550mA
	Equipment	: 1 x LED Backlight 55.7 W / 5534 lm
29 x 	Order No.	: WPZ/5/5360/4
	Luminaire name	: WPZ 1575mm 5359lm 36w 840 300mA
	Equipment	: 1 x LED Backlight 36.24 W / 5359 lm



Project : ROCHDALE SEN
Installation : EXTERIOR
Project number :
Date : 06.11.2024



2.2 Summary, Exterior 1

2.2.2 Result overview, UNDER CANOPY

- 3

17 x



Order No. : LUNA/L6/1200/74
Luminaire name : LUNA L6optic 1205lm 14w 740 250mA
Equipment : 1 x LED Backlight 13.8 W / 1205 lm
- 4

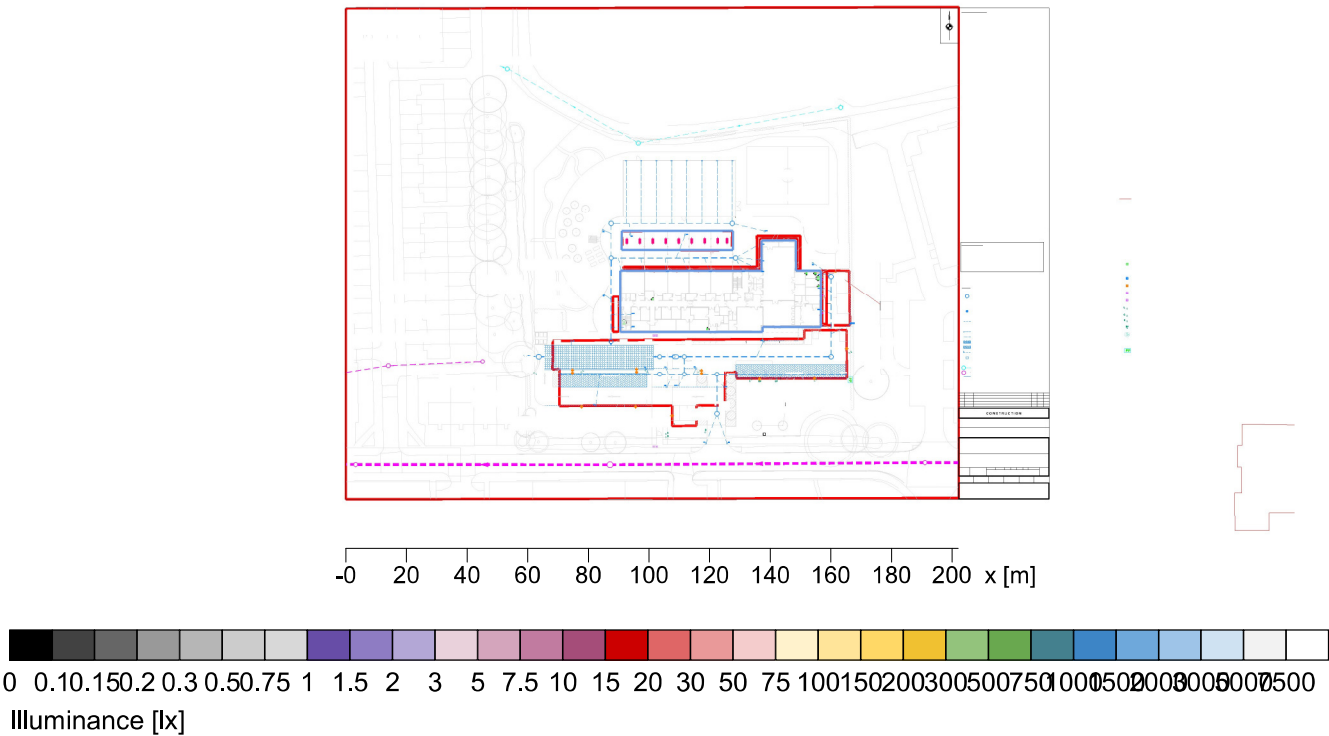
3 x



Order No. : COR/L2/3200/4
Luminaire name : CORA Floodlight L2optic 3226lm 38w 840 500mA
Equipment : 1 x LED Backlight 38.04 W / 3226 lm

2.2 Summary, Exterior 1

2.2.3 Result overview, REAR PERIMETER



General	
Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Total luminous flux	144802 lm
Total power	1343.3 W
Total power per area (32717.89 m²)	0.04 W/m²

Illuminance	
Average illuminance	Em 36 lx
Minimum illuminance	Emin 21.5 lx
Maximum illuminance	Emax 52.3 lx
Uniformity Uo	Emin/Em 1:1.67 (0.6)
Diversity Ud	Emin/Emax 1:2.43 (0.41)

Type No. Make

LDL	
1 12 x	Order No. : ST/M/L1/5500/74
	Luminaire name : STREET Medium L1optic 5534lm 56w 740 550mA
	Equipment : 1 x LED Backlight 55.7 W / 5534 lm
2 9 x	Order No. : WPZ/5/5360/4
	Luminaire name : WPZ 1575mm 5359lm 36w 840 300mA
	Equipment : 1 x LED Backlight 36.24 W / 5359 lm
3 17 x	Order No. : LUNA/L6/1200/74
	Luminaire name : LUNA L6optic 1205lm 14w 740 250mA
	Equipment : 1 x LED Backlight 13.8 W / 1205 lm

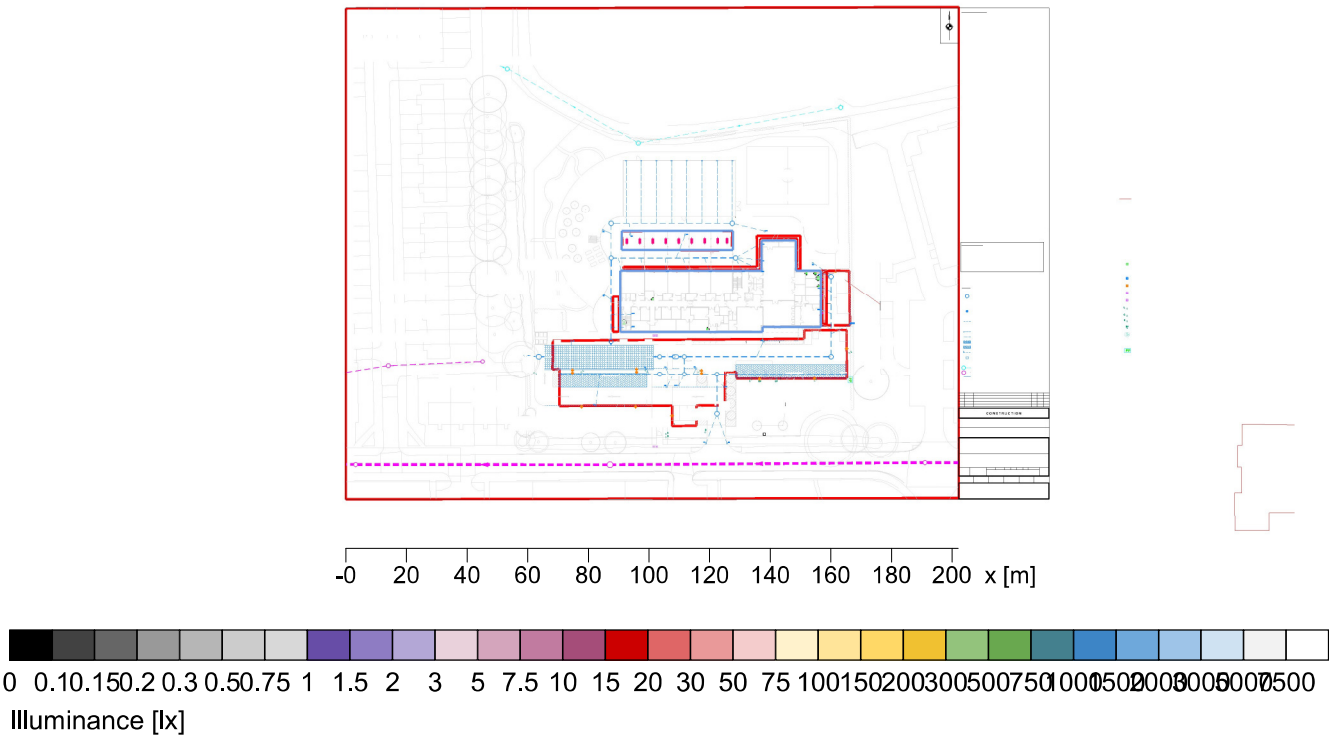
2.2 **Summary, Exterior 1**

2.2.3 **Result overview, REAR PERIMETER**

4	3 x	Order No.	: COR/L2/3200/4
		Luminaire name	: CORA Floodlight L2optic 3226lm 38w 840 500mA
		Equipment	: 1 x LED Backlight 38.04 W / 3226 lm

2.2 Summary, Exterior 1

2.2.4 Result overview, RIGHT PERIMETER



General	
Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.00 m
Maintenance factor	0.80
Total luminous flux	
144802 lm	
Total power	
1343.3 W	
Total power per area (32717.89 m²)	
0.04 W/m²	

Illuminance		
Average illuminance	Em	59.4 lx
Minimum illuminance	Emin	36.9 lx
Maximum illuminance	Emax	77.8 lx
Uniformity Uo	Emin/Em	1:1.61 (0.62)
Diversity Ud	Emin/Emax	1:2.11 (0.47)

Type No.Make

1		12 x		LDL	
		Order No.		: ST/M/L1/5500/74	
		Luminaire name		: STREET Medium L1optic 5534lm 56w 740 550mA	
		Equipment		: 1 x LED Backlight 55.7 W / 5534 lm	
2		9 x		Order No.	
				: WPZ/5/5360/4	
		Luminaire name		: WPZ 1575mm 5359lm 36w 840 300mA	
		Equipment		: 1 x LED Backlight 36.24 W / 5359 lm	



Project : ROCHDALE SEN
Installation : EXTERIOR
Project number :
Date : 06.11.2024



2.2 Summary, Exterior 1

2.2.4 Result overview, RIGHT PERIMETER

- 3

17 x



Order No. : LUNA/L6/1200/74
Luminaire name : LUNA L6optic 1205lm 14w 740 250mA
Equipment : 1 x LED Backlight 13.8 W / 1205 lm
- 4

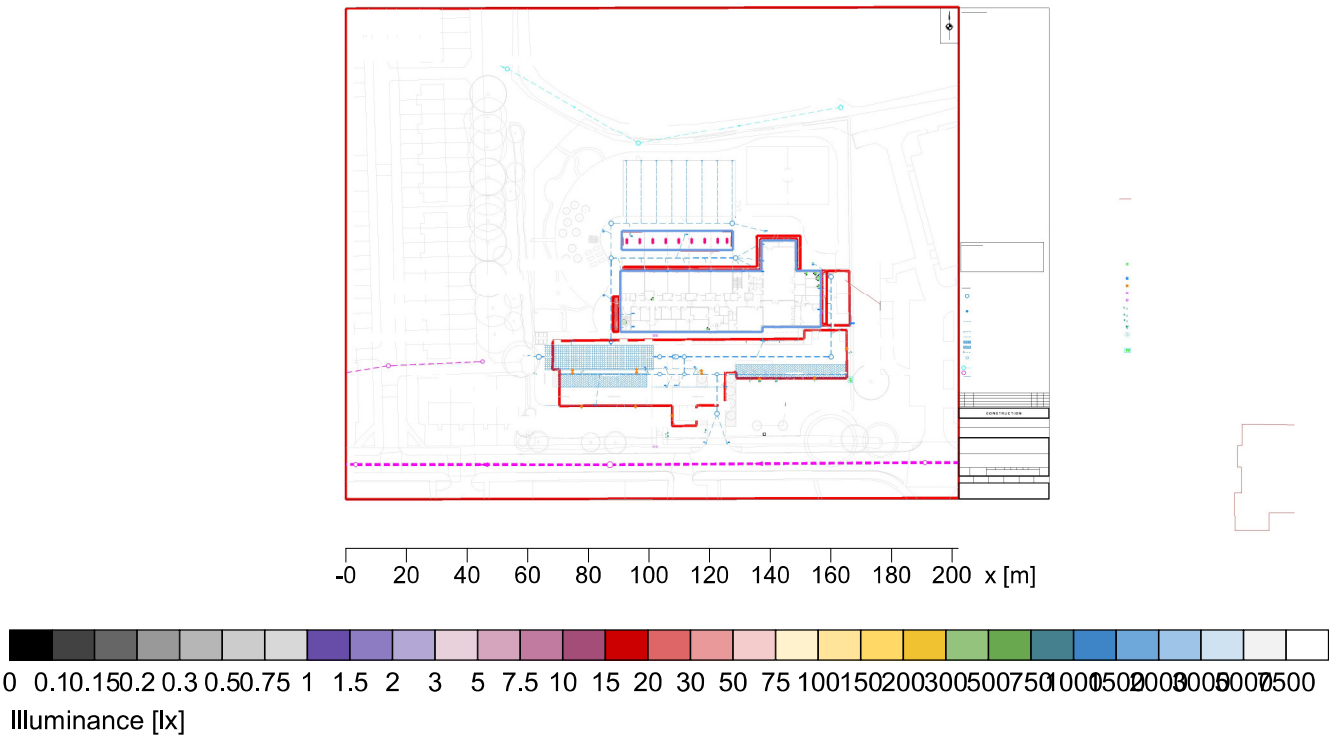
3 x



Order No. : COR/L2/3200/4
Luminaire name : CORA Floodlight L2optic 3226lm 38w 840 500mA
Equipment : 1 x LED Backlight 38.04 W / 3226 lm

2.2 Summary, Exterior 1

2.2.5 Result overview, LEFT ENTRANCE



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.00 m
Maintenance factor	0.80
Total luminous flux	144802 lm
Total power	1343.3 W
Total power per area (32717.89 m²)	0.04 W/m²

Illuminance

Average illuminance	Em	24.3 lx
Minimum illuminance	Emin	15.7 lx
Maximum illuminance	Emax	40.8 lx
Uniformity Uo	Emin/Em	1:1.55 (0.64)
Diversity Ud	Emin/Emax	1:2.61 (0.38)

Type No.Make

LDL		
1	12 x	Order No. : ST/M/L1/5500/74
		Luminaire name : STREET Medium L1optic 5534lm 56w 740 550mA
		Equipment : 1 x LED Backlight 55.7 W / 5534 lm
2	9 x	Order No. : WPZ/5/5360/4
		Luminaire name : WPZ 1575mm 5359lm 36w 840 300mA
		Equipment : 1 x LED Backlight 36.24 W / 5359 lm



Project : ROCHDALE SEN
Installation : EXTERIOR
Project number :
Date : 06.11.2024



2.2 Summary, Exterior 1

2.2.5 Result overview, LEFT ENTRANCE

- 3

17 x



Order No. : LUNA/L6/1200/74
Luminaire name : LUNA L6optic 1205lm 14w 740 250mA
Equipment : 1 x LED Backlight 13.8 W / 1205 lm
- 4

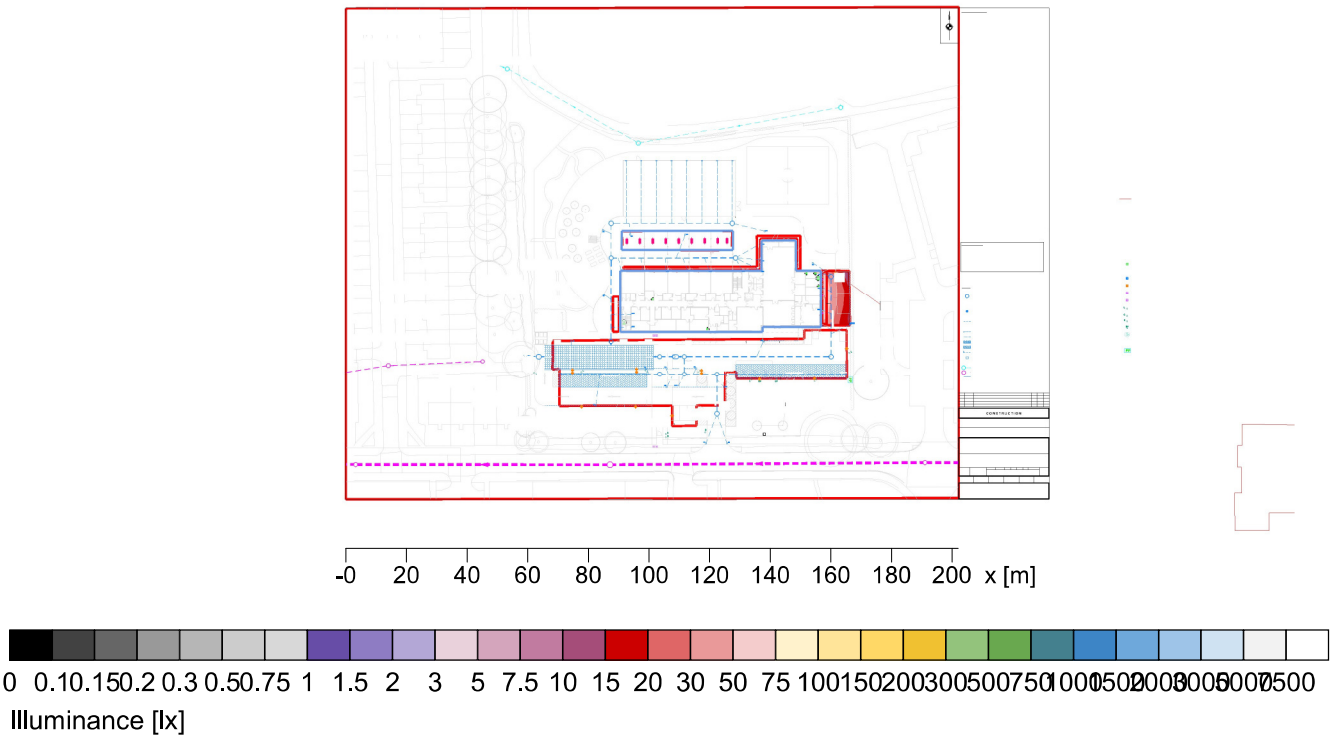
3 x



Order No. : COR/L2/3200/4
Luminaire name : CORA Floodlight L2optic 3226lm 38w 840 500mA
Equipment : 1 x LED Backlight 38.04 W / 3226 lm

2.2 Summary, Exterior 1

2.2.6 Result overview, RIGHT HAND LAND



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.00 m
Maintenance factor	0.80
Total luminous flux	144802 lm
Total power	1343.3 W
Total power per area (32717.89 m²)	0.04 W/m²

Illuminance

Average illuminance	Em	34 lx
Minimum illuminance	Emin	11.9 lx
Maximum illuminance	Emax	77.8 lx
Uniformity Uo	Emin/Em	1:2.85 (0.35)
Diversity Ud	Emin/Emax	1:6.51 (0.15)

Type No.Make

LDL		
1	12 x	Order No. : ST/M/L1/5500/74
		Luminaire name : STREET Medium L1optic 5534lm 56w 740 550mA
		Equipment : 1 x LED Backlight 55.7 W / 5534 lm
2	9 x	Order No. : WPZ/5/5360/4
		Luminaire name : WPZ 1575mm 5359lm 36w 840 300mA
		Equipment : 1 x LED Backlight 36.24 W / 5359 lm



Project : ROCHDALE SEN
Installation : EXTERIOR
Project number :
Date : 06.11.2024



2.2 Summary, Exterior 1

2.2.6 Result overview, RIGHT HAND LAND

- 3

17 x



Order No. : LUNA/L6/1200/74
Luminaire name : LUNA L6optic 1205lm 14w 740 250mA
Equipment : 1 x LED Backlight 13.8 W / 1205 lm
- 4

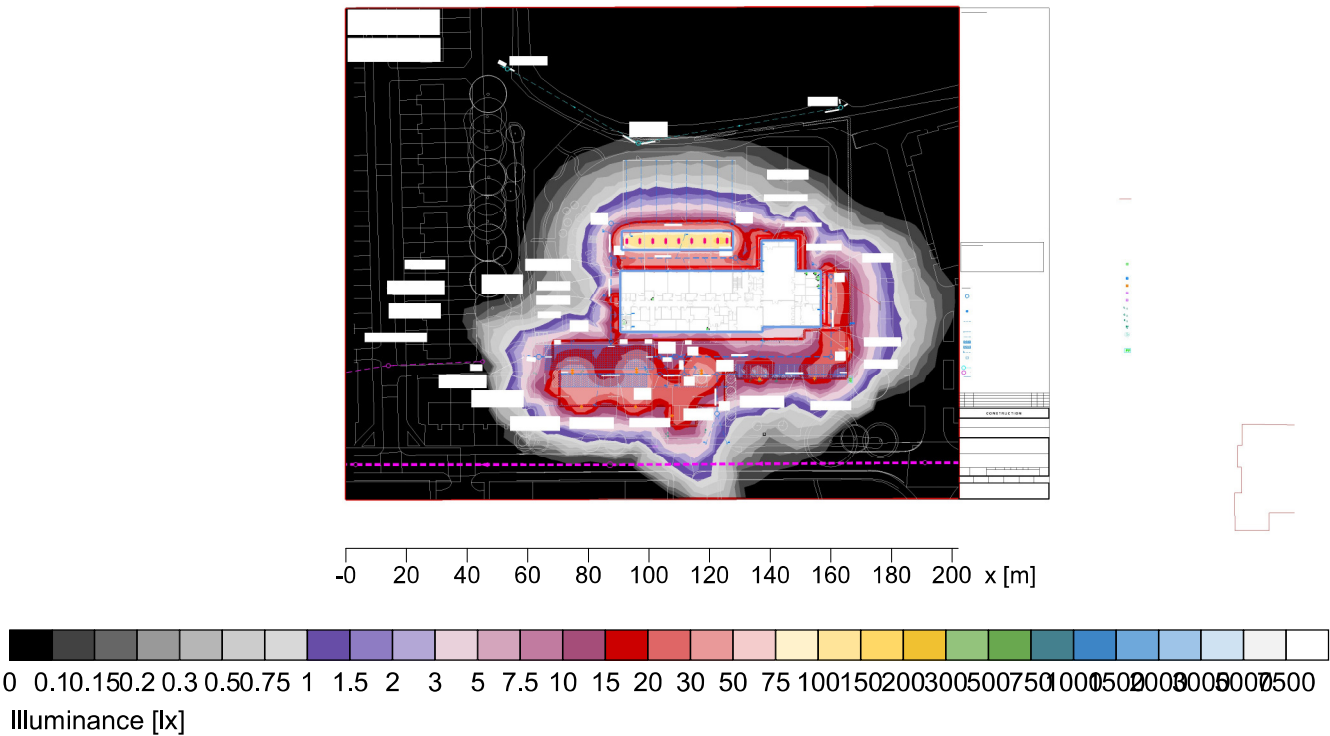
3 x



Order No. : COR/L2/3200/4
Luminaire name : CORA Floodlight L2optic 3226lm 38w 840 500mA
Equipment : 1 x LED Backlight 38.04 W / 3226 lm

2.2 Summary, Exterior 1

2.2.7 Result overview, Evaluation area 1



General	
Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Total luminous flux	144802.00 lm
Total power	1343.3 W
Total power per area (32717.89 m²)	0.04 W/m² (0.95 W/m²/100lx)

Evaluation area 1	Reference plane 1.1
	Horizontal
Em	4.34 lx
Emin	0 lx
Emin/Em (Uo)	0.00
Emin/Emax (Ud)	0.00
Position	0.00 m

Type No.Make

LDL	
1 12 x	Order No. : ST/M/L1/5500/74
	Luminaire name : STREET Medium L1optic 5534lm 56w 740 550mA
	Equipment : 1 x LED Backlight 55.7 W / 5534 lm
2 9 x	Order No. : WPZ/5/5360/4
	Luminaire name : WPZ 1575mm 5359lm 36w 840 300mA
	Equipment : 1 x LED Backlight 36.24 W / 5359 lm



Project : ROCHDALE SEN
Installation : EXTERIOR
Project number :
Date : 06.11.2024



2.2 Summary, Exterior 1

2.2.7 Result overview, Evaluation area 1

- 3

17 x



Order No. : LUNA/L6/1200/74
Luminaire name : LUNA L6optic 1205lm 14w 740 250mA
Equipment : 1 x LED Backlight 13.8 W / 1205 lm
- 4

3 x

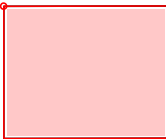
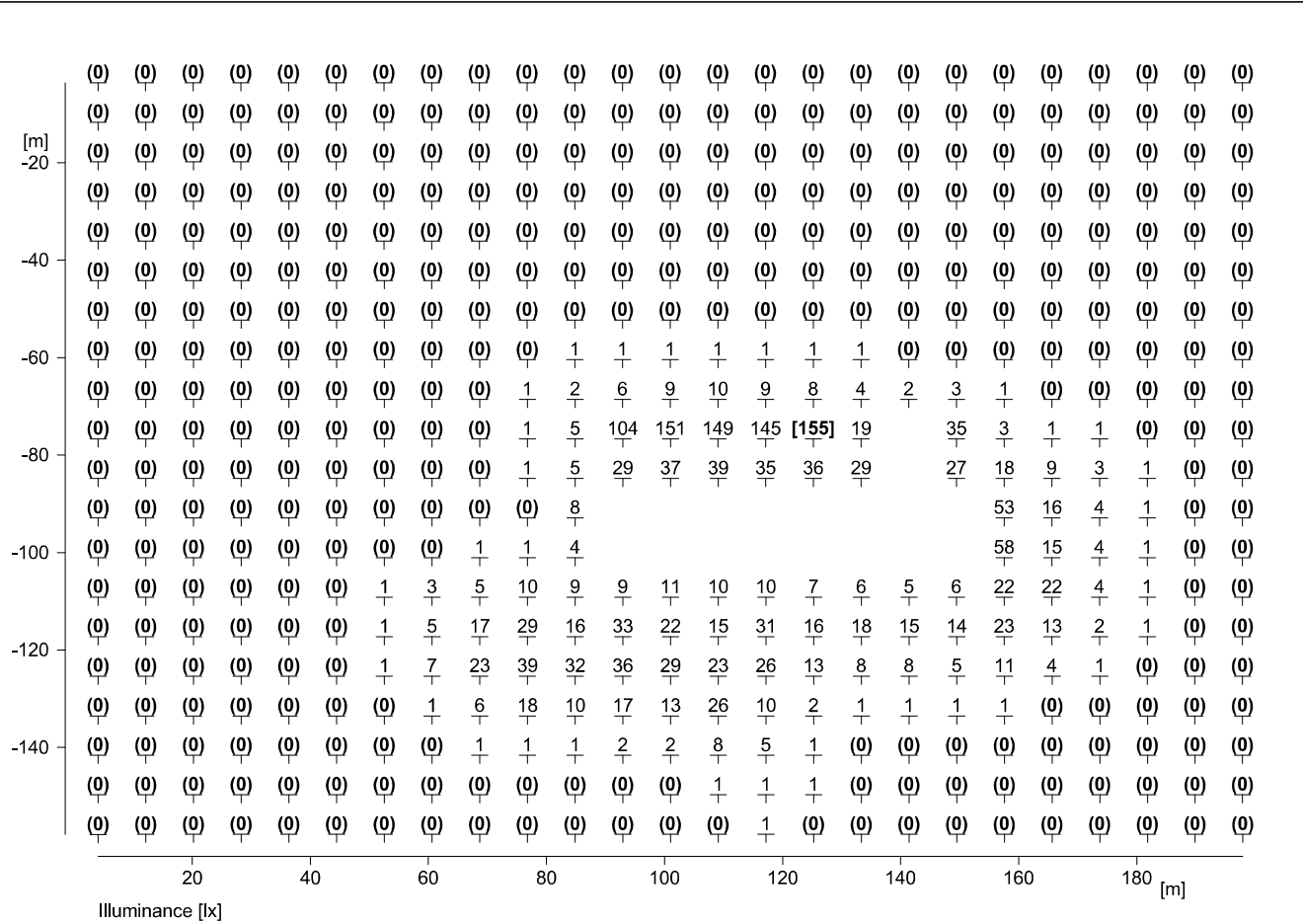


Order No. : COR/L2/3200/4
Luminaire name : CORA Floodlight L2optic 3226lm 38w 840 500mA
Equipment : 1 x LED Backlight 38.04 W / 3226 lm

2 Exterior 1

2.3 Calculation results, Exterior 1

2.3.1 Table, Reference plane 1.1 (E)



Height reference plane : 0.00 m

Average illuminance Em : 4 lx

Minimum illuminance Emin : 0 lx

Maximum illuminance Emax : 155 lx

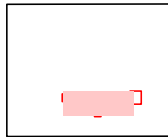
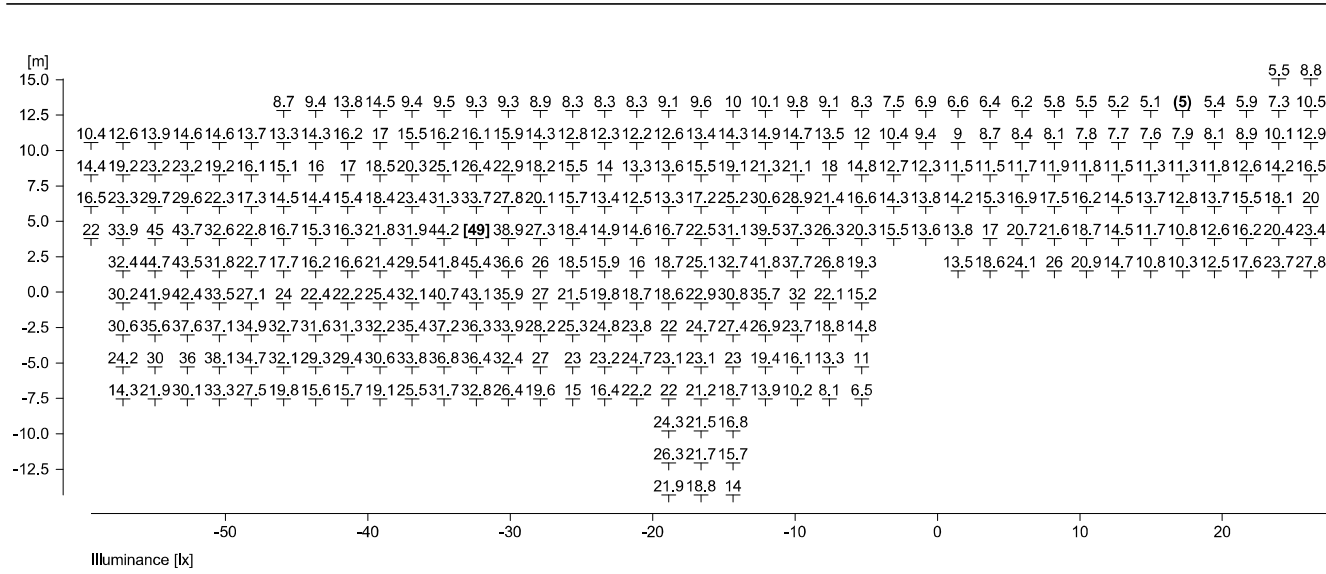
Uniformity Uo Emin/Em : 1 : 3264.05 (0.00)

Diversity Ud Emin/Emax : 1 : 116221.14 (0.00)



2.3 Calculation results, Exterior 1

2.3.2 Table, Measuring area 1 (E)



Part1

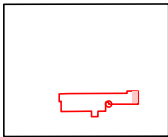
Height reference plane	: 0.00 m
Average illuminance	Em : 20.4 lx
Minimum illuminance	Emin : 5 lx
Maximum illuminance	Emax : 49 lx
Uniformity Uo	Emin/Em : 1 : 4.08 (0.25)
Diversity Ud	Emin/Emax : 1 : 9.81 (0.10)

2.3 Calculation results, Exterior 1

2.3.2 Table, Measuring area 1 (E)

22	28,223,321,1
20,327,227,427,3	
19,927,5	30 32,6
21	26,328,429,8
22,424,223,322,2	
23,721,916,9	14
25,420,713,5	9,9

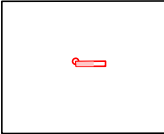
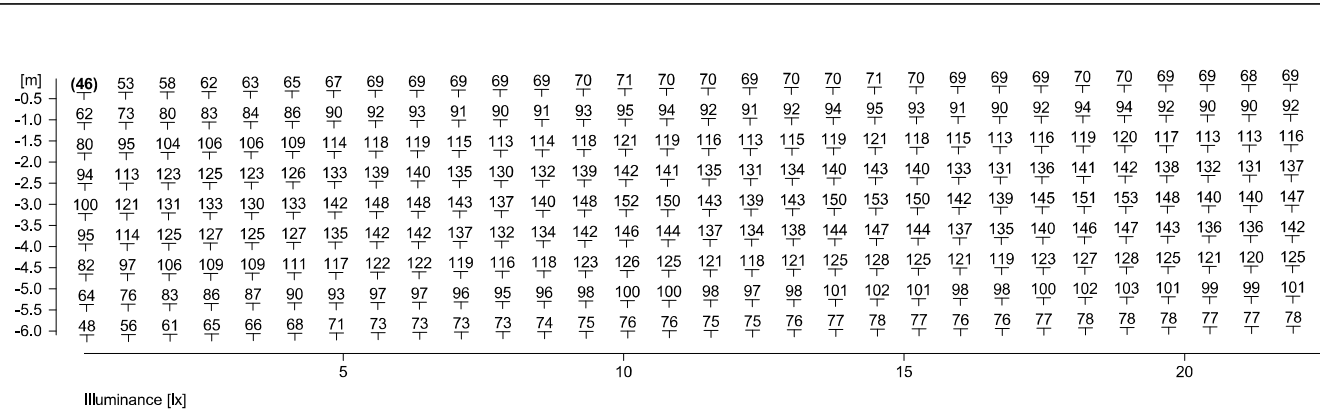
30 [m]



Part2

2.3 Calculation results, Exterior 1

2.3.3 Table, UNDER CANOPY (E)



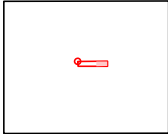
Part1

Height reference plane	: 0.00 m
Average illuminance	Em : 109 lx
Minimum illuminance	Emin : 46 lx
Maximum illuminance	Emax : 170 lx
Uniformity Uo	Emin/Em : 1 : 2.39 (0.42)
Diversity Ud	Emin/Emax : 1 : 3.71 (0.27)

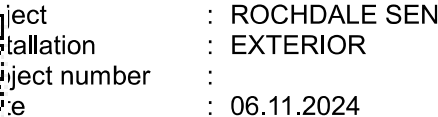
2.3 Calculation results, Exterior 1

2.3.3 Table, UNDER CANOPY (E)

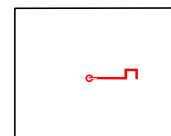
70	69	69	68	68	69	69	69	69	69	70	72	73	73	72	68	63	56	47
93	93	91	90	90	92	93	93	91	91	93	97	99	100	98	94	87	77	63
119	119	115	112	113	116	119	118	115	114	118	124	129	130	128	123	114	100	81
141	141	136	131	132	138	142	141	136	133	138	148	155	156	154	149	139	121	96
152	152	146	140	141	149	153	152	146	142	148	160	168	170	167	162	151	132	104
147	147	141	136	137	144	149	147	142	139	145	155	163	165	162	158	147	128	101
129	128	124	121	122	127	130	129	125	124	128	136	142	144	142	137	128	111	89
103	103	101	99	100	102	105	104	102	102	105	110	114	115	113	109	101	88	72
79	79	78	77	78	79	80	80	79	80	81	84	86	86	85	81	75	67	56
25			30							35 [m]								



Part2



2.3.4 Table, REAR PERIMETER (E)



Part1

Average illuminance
Minimum illuminance
Maximum illuminance
Uniformity U_0
Diversity U_d

Em : 36 lx
Emin : 21.5 lx
Emax : 52.3 lx
Emin/Em : 1 : 1.67 (0.60)
Emin/Emax : 1 : 2.43 (0.41)



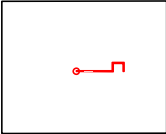
Project : ROCHDALE SEN
Installation : EXTERIOR
Project number :
Date : 06.11.2024



2.3 Calculation results, Exterior 1

2.3.4 Table, REAR PERIMETER (E)

43.3	43.1	41.7	39.7	37.7	36.4	35.6	35	34.5	34.1	33.7	33.6	34	34.5	35	35.5	36.1	37	38.7	40.9	43.1	44.7	44.8	43.4	41.6	39.6	38	37.1	36.6	36.2
49.1	48.4	45.8	42.7	39.6	37.3	35.7	34.7	33.9	33.2	32.8	32.6	32.8	33.5	34.5	35.6	36.8	38.5	41.1	44.5	48	50.4	50.2	47.9	44.7	41.7	39.2	37.5	36.3	35.6
51	50.3	47.3	43.6	39.6	36.5	34.4	32.7	32.1	31.6	31.2	31	31.1	31.5	32.6	33.9	35.8	37.8	40.7	45.4	49.4	52.1	51.9	49.3	45.4	41.6	38.4	36.2	34.7	33.4
10														15															20

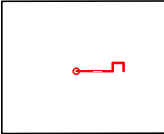


Part2

2.3 Calculation results, Exterior 1

2.3.4 Table, REAR PERIMETER (E)

35.8	35.5	35.5	35.8	36.3	36.4	36.9	37.6	38.9	40.8	43	45	45.4	44.4	42.3	40.2	38.2	36.9	36.1	35.7	35.2	34.8	34.7	34.8	35.3	35.7	36.2	36.9	38
35	34.6	34.6	34.9	35.4	36	37.1	38.6	40.9	44	47.4	50.1	50.8	49.1	45.9	42.4	39.3	37.3	35.9	35.2	34.4	33.7	33.4	33.6	34.1	34.8	35.6	36.9	38.9
33.1	33	33	33.3	33.4	33.8	35.8	37.7	40.6	44.3	47.9	51	51.9	50.2	46.7	42.2	38.1	35.7	34.4	33.2	32.4	31.5	31.4	31.7	32.2	32.6	33.5	34.9	37.3
25															30													



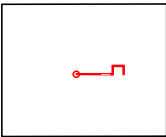
Part3



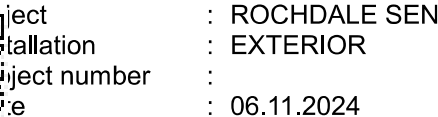
2.3 Calculation results, Exterior 1

2.3.4 Table, REAR PERIMETER (E)

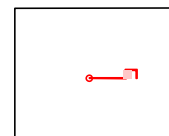
39.6	41.9	44.3	46.1	45.8	44.2	41.9	39.4	37.4	36	35.1	34.6	34.1	33.7	33.5	33.5	33.6	33.7	34.3	35.7	37.8	40.3	41.9	41.6	39.7	37	34.4	32.4	31	30
41.6	45.1	48.7	51	50.7	48.3	45	41.2	38	35.8	34.4	33.8	33.2	32.7	32.4	32.4	33	33.8	35.1	37.4	40.8	44.2	46.5	46.3	43.9	40.2	36.2	33.1	31	29.6
40.7	44.8	48.3	50.5	50.3	48.2	44.5	40.2	36.4	33	32.3	31.5	30.9	30.5	30.1	29.9	30.6	31.8	33.2	35.7	38.6	42.4	44.5	44.2	42.2	38.4	34.4	31.1	28.8	27.7
35															40														



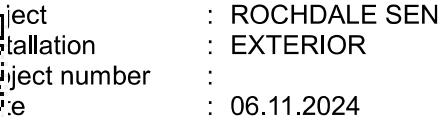
Part4



2.3.4 Table, REAR PERIMETER (E)

[illegible]

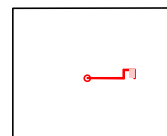
Part5



2.3.4 Table, REAR PERIMETER (E)

[illegible]

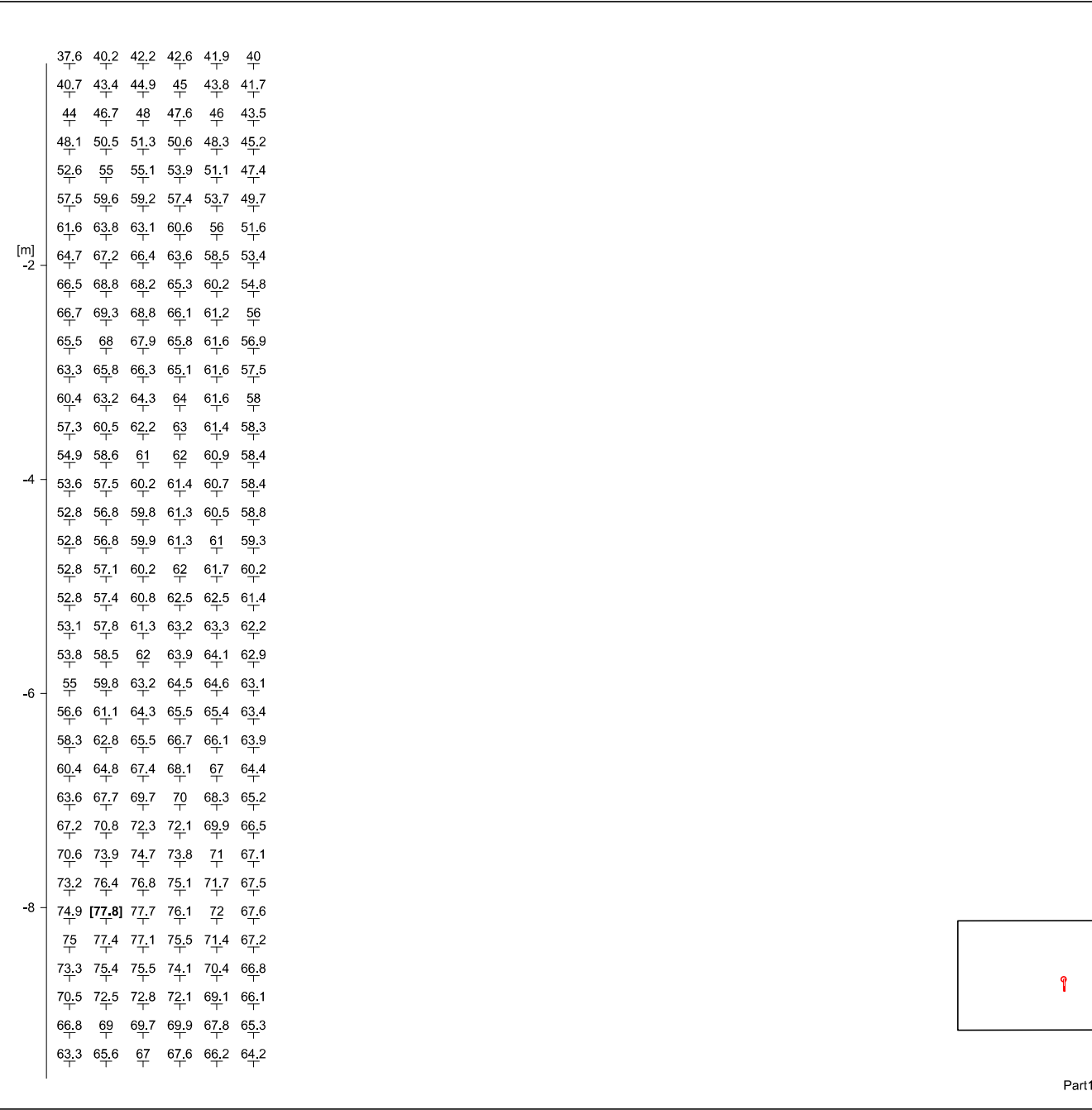
55 [m]



Part6

2.3 Calculation results, Exterior 1

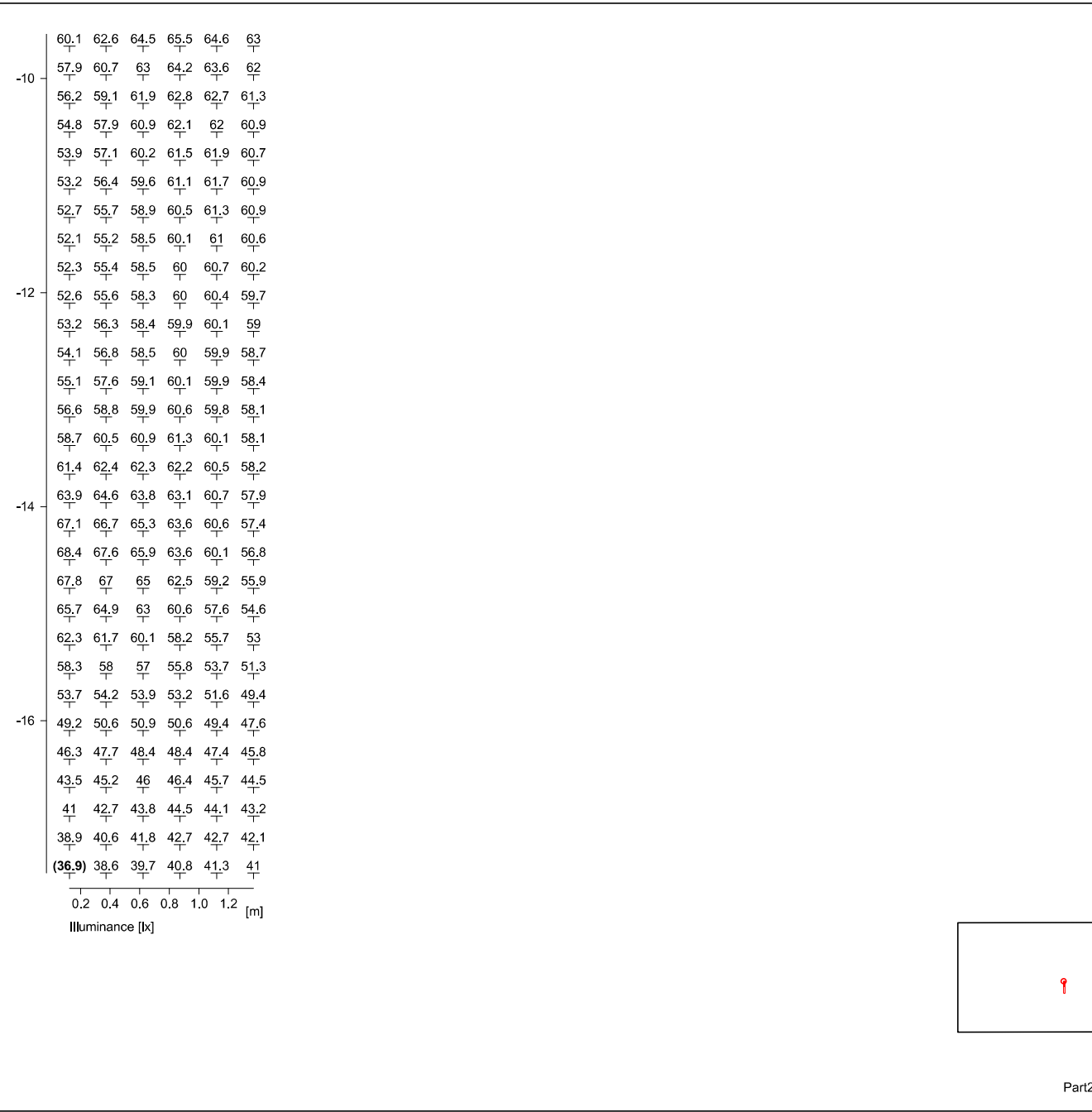
2.3.5 Table, RIGHT PERIMETER (E)



Height reference plane		: 0.00 m
Average illuminance	Em	: 59.4 lx
Minimum illuminance	Emin	: 36.9 lx
Maximum illuminance	Emax	: 77.8 lx
Uniformity Uo	Emin/Em	: 1 : 1.61 (0.62)
Diversity Ud	Emin/Emax	: 1 : 2.11 (0.47)

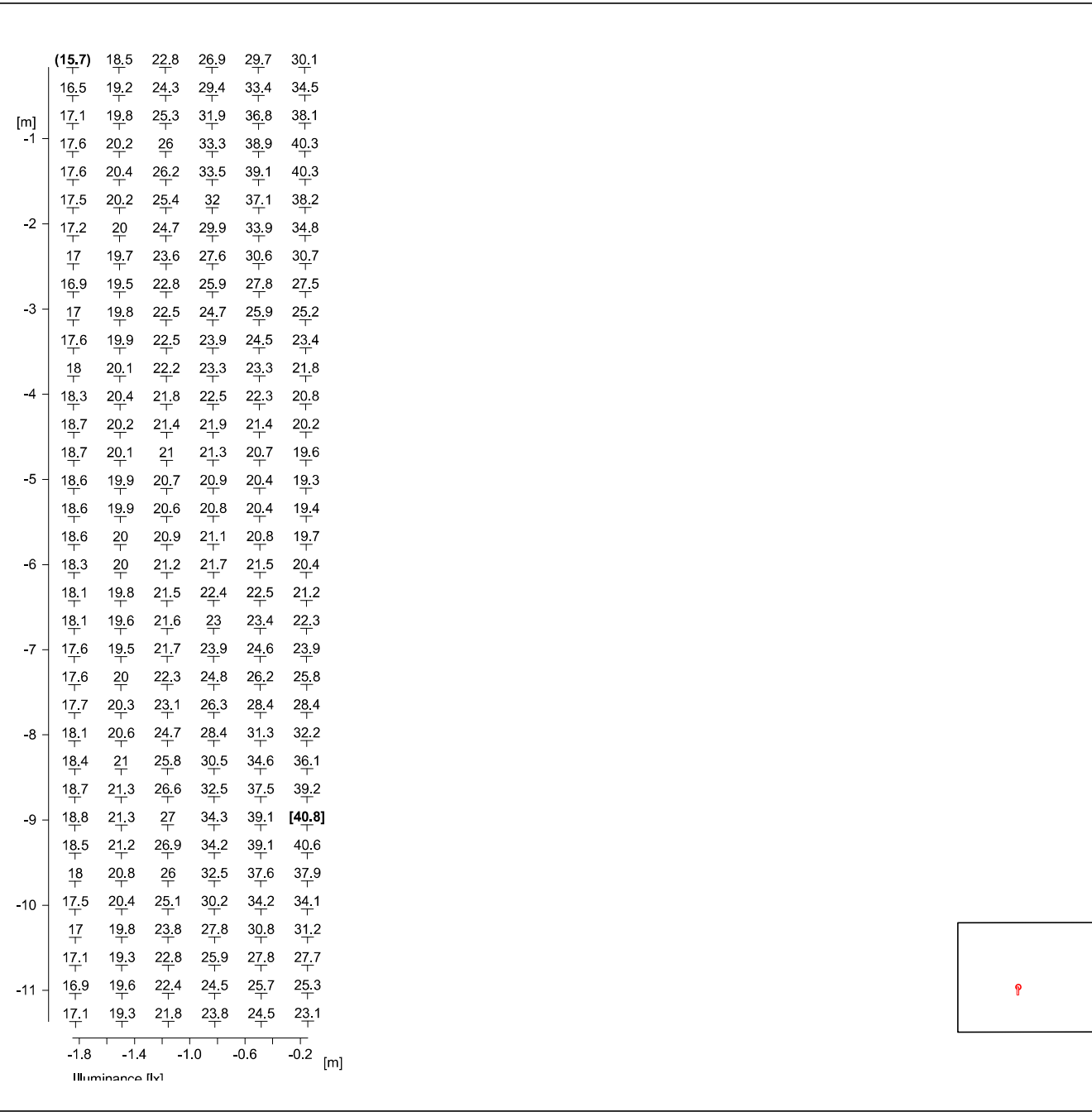
2.3 Calculation results, Exterior 1

2.3.5 Table, RIGHT PERIMETER (E)



2.3 Calculation results, Exterior 1

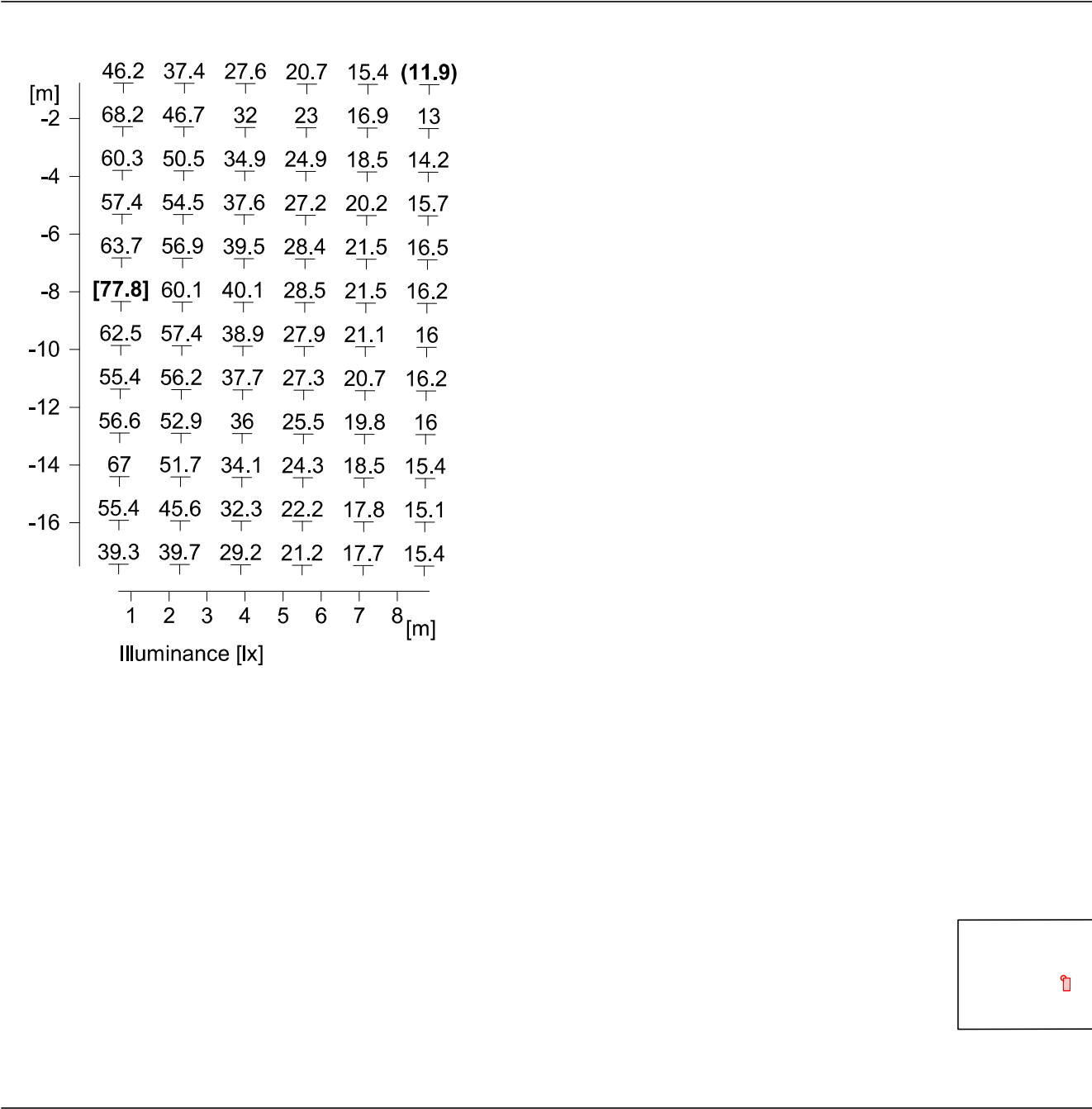
2.3.6 Table, LEFT ENTRANCE (E)



Height reference plane	: 0.00 m
Average illuminance	Em : 24.3 lx
Minimum illuminance	Emin : 15.7 lx
Maximum illuminance	Emax : 40.8 lx
Uniformity Uo	Emin/Em : 1 : 1.55 (0.64)
Diversity Ud	Emin/Emax : 1 : 2.61 (0.38)

2.3 Calculation results, Exterior 1

2.3.7 Table, RIGHT HAND LAND (E)



Height reference plane		: 0.00 m
Average illuminance	Em	: 34 lx
Minimum illuminance	Emin	: 11.9 lx
Maximum illuminance	Emax	: 77.8 lx
Uniformity Uo	Emin/Em	: 1 : 2.85 (0.35)
Diversity Ud	Emin/Emax	: 1 : 6.51 (0.15)