



ELECTRICAL SERVICES LTD

Specialist Contractors

PUBLIC LIGHTING – FLOODLIGHTING – SPORTS LIGHTING – DUCT PROVING

UNIT 11 BELLEVUE INDUSTRIAL ESTATE, FINGLAS DUBLIN 11. PH: 01 8110875 graham@sabrelighting.ie

Cabinteely Greenway Lighting Design Process and Considerations

Project Brief:

Brief: Provide a Public Lighting layout along the proposed section of the greenway meeting Dun Laoghaire Rathdown County Councils' Public lighting specification whilst minimising negative ecological impact to the areas immediately adjacent.

Public lighting is required so it provides a safer environment and aids and encourages use of the greenway.

Design methodology:

The whole section of the greenway was designated as being ecologically sensitive. Some areas along the route that were considered especially ecologically sensitive to light spill; these areas were highlighted to us. This is to enable us to give additional consideration to these areas throughout the design process. A compromise between all interested parties was reached; this was a warm white colour temperature selected, the addition of louvres and switching off selected section for part of the night (switch off to proposed to be between 22:00 – 06:00).

The lighting class was selected as per the methodology of EN13201-1:2014 and in conjunction with Dun Laoghaire Rathdown County Councils' Public lighting specification.

EN13201-2:2015 Category P4 was selected for the cycle/footpath sections, EN13201-2:2015 Category P3 for roadway sections, EN13201-2:2015 Category C4 for the junction areas.

Bollards and illuminated handrails were not considered as they are unacceptable to Dun Laoghaire Rathdown County Council Public Lighting department.

2200K LEDs were selected as these are the warmest colour temperature LEDs available at time of design that are considered to be white light. Cooler LEDs were considered, however it was determined the increased energy efficiency benefit did not outweigh the potential additional negative ecological impact. It is accepted that warmer colour temperature LEDs have less negative ecological impact due to lower amounts of light in the blue spectrum emitted by them.

All proposed luminaires were selected on their optical and energy performance as well as their robustness.

To achieve the required lux levels on the greenway the lighting configuration was carefully designed to achieve recommended illuminance levels whilst minimising light spill. This was achieved by a combination of optimised column height, luminaire Wattage, optical setting and column location. All luminaires proposed have high performance optics designed to get the light onto the target area thus minimising spill light. The Upward Light Ratio (ULR) is 0%. The colour temperature of the LEDs is 2200K or 2700K. Additional front, rear, front & rear louvres are fitted as required to further minimise the amount spill light. The lighting calculation takes into account the effect of any louvres/shields proposed.

The layout was reviewed and adjustments made as required until a satisfactory solution was achieved for all interested parties.

Section between CH 740 & CH1700 was advised as being most critical to wildlife. Due consideration was given to an Intelligent Lighting control system with motion detection and pre programmed dimming of the luminaires to reduce light levels during time of low usage, however it was decided (by others) that part night switch off for this section was the preferred option.

Part night switch off for luminaires in section chainages of CH 740 & CH1700 to be controlled via an astral time clock, hours of operation can be programmed as required. The astral clock will automatically adjust according to seasons of year so to avoid luminaires being energised when not required. Profile proposed is switch on at dusk, off at 22:00, on at 06:00 off at dawn.

Non part night switch off luminaires to be controlled via an individual photocell, this will enable each luminaire to automatically switch on at 35 lux and switch off at 18 lux each night. Additionally these luminaires are to be pre programmed to dim to 75% during hours 00:00 – 06:00 each night.

Lighting Layout:

Proposed Luminaire:

- Foot/Cycle section – Urbis Axia 2.1 fitted with 2200K colour temperature LEDs. Front, rear or front & rear louvres available as retrofittable option. Impact resistance rating of 10 (IK10) and Ingress Protection rating of 66 (IP66).
- Road section (Cornelscourt) – C U Phosco P863 fitted with 2700K colour temperature LEDs & rear shields, mounted.
- All luminaires have a design life of 25 years (100,000h LED & driver burn life).

Lighting levels and light Spill:

The target design lighting categories were achieved for all sections. Column positions, luminaire mounting height and full technical details of the luminaires is detailed on the lighting layouts and lighting calculation report.

The extents of light spill are also demonstrated on our lighting layout, 0.25, 0.5, 1.0, 3.0 & 5.0 lux lines are detailed. There are separate layouts detailing lux contour lines for part night switch off.

Figure 1 below details the calculated light spill for a sample section of the proposed foot/cycle way.

Figure 2 details the louvres that in conjunction with specified optics enable the control of light minimising light spill. The 40 degree front off generated by the louvres limits the any light directly forward from the luminaire by 1.15 times the luminaire mounting height, for a 6m column this is approximately 6.9m and 5.75m for a 5m column.

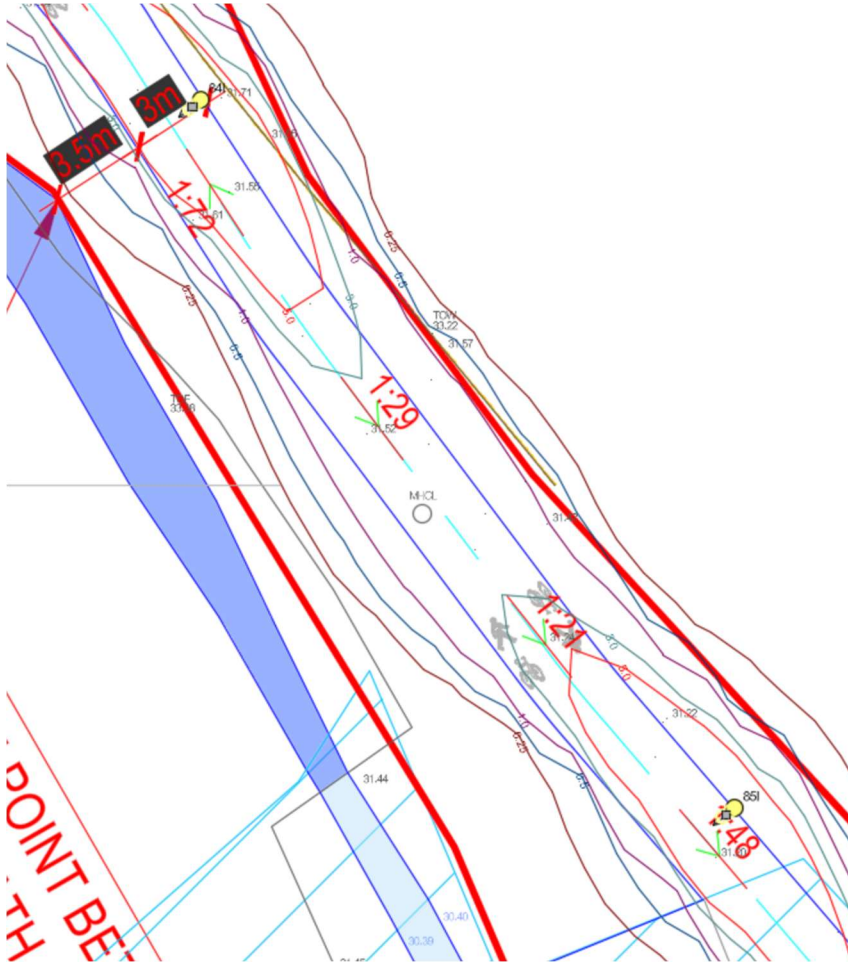


Figure 1: Calculated horizontal light spill demonstrated, 0.25, 0.5, 1.0, 3.0 & 5.0 lux lines detailed.

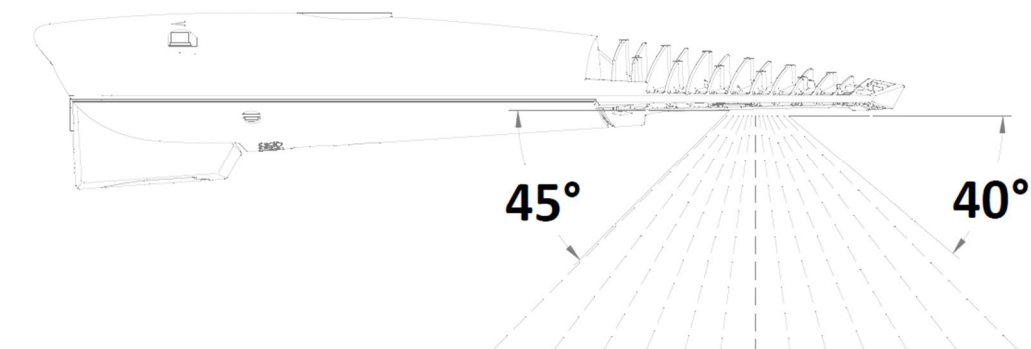


Figure 2: Details of the louvres and cut off angles.

DATE: 6 June 2025
DESIGNER: Alex Naper
PROJECT No: SES 16324 Rev E
PROJECT NAME: Cabinteely Greenway - DBFL



All Luminaires at 100%
Cycle/Footpath section designed in accordance with EN13201-2:2015 Category P4.
Road section designed in accordance with EN13201-2:2015 Category P2.

Road section leading up to crossing point designed in accordance with EN13201-2:2015 Category P3.
Junction & Roundabout designed in accordance with EN13201-2:2015 Category C4.

MF derived from: 0.92 x 0.95 (LMF (Low pollution environment & 72 month cleaning cycle) x LLMF) LLMF value @ 100,000 hours & 25 degrees C Ta.

Rev B: Additional areas added.
Rev C: Updated site layout.
Rev D: Updated site layout.
Rev E: Updated as per comments.

Outdoor Lighting Report

PREPARED BY: Sabre Electrical Services Ltd.
Unit 11,
Bellview Industrial Estate,
Tolka Valley Road,
Dublin 11
D11 VN59
Phone Number: 01 8110875
Contact: Graham Sheehan
eMail: graham@sabrelighting.ie

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	722289.40	725730.96	160.00	67.32	1.50	1.50
2	Grid 2	722216.06	725509.12	84.00	243.00	1.50	1.50
3	Grid 3	722295.39	725483.47	302.00	141.00	1.50	1.50
4	Grid 4	722563.12	725344.38	165.00	141.00	1.50	1.50
5	Grid 5	722695.97	725264.72	69.00	84.00	1.50	1.50
6	Grid 6	722733.92	725191.82	343.75	239.71	1.49	1.50
7	Grid 7	723008.49	724977.89	374.35	239.71	1.50	1.50
8	Grid 8	723332.17	724829.26	344.00	81.00	1.50	1.50
9	Grid 9	723418.30	724628.95	99.00	81.00	1.50	1.50
10	Grid 10	722303.99	725748.47	160.00	67.32	1.50	1.50
11	Grid 11	723471.76	724514.32	99.00	81.00	1.50	1.50
12	Grid 12	723248.36	724901.38	99.00	81.00	1.50	1.50
13	Grid 13	722717.05	725271.59	57.00	53.89	1.50	1.50

Luminaires

Luminaire A Data

Supplier	
Type	AXIA 2.1 5167 Integrated lenses Rear louvers 24 OSLO SQUARE
Lamp(s)	24 OSLO SQUARE GIANT@300mA WW 722 230V 00-36-646
LampFlux(klm)/Colour	3.40 WW 2200K/70
File Name	AXIA 2.1 5167 24 OSLO SQUARE GIANT 300mA WW 722 22.4W 434362 Integrated ...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	905.2, 130.9, 2.0
No. in Project	19

Luminaire B Data

Supplier	
Type	AXIA 2.1 5178 Integrated lenses 8 OSLO SQUARE GIANT@400mA W
Lamp(s)	8 OSLO SQUARE GIANT@400mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	1.47 WW 2200K/70
File Name	AXIA 2.1 5178 8 OSLO SQUARE GIANT 400mA WW 722 11.6W 464242 Integrated I...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	725.5, 206.2, 0.8
No. in Project	18



Luminaire C Data

Supplier	
Type	AXIA 2.1 5167 Integrated lenses 24 OSLO SQUARE GIANT@300mA
Lamp(s)	24 OSLO SQUARE GIANT@300mA WW 722 230V 00-36-646
LampFlux(klm)/Colour	3.40 WW 2200K/70
File Name	AXIA 2.1 5167 24 OSLO SQUARE GIANT 300mA WW 722 22.4W 434362 Integrated ...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	1028.1, 179.4, 2.6
No. in Project	9

Luminaire D Data

Supplier	C U Phosco
Type	P863-128-H6-4x4-BB-727-SA-0425-79W
Lamp(s)	727SA
Lamp Flux (klm)	8.20
File Name	P863-128-H6-4x4-BB-727-SA-425-79W.ies
Maintenance Factor	0.91
Imax70,80,90(cd/klm)	355.5, 60.0, 0.0
No. in Project	11

Luminaires

Luminaire E Data

Supplier	
Type	AXIA 2.1 5167 Integrated lenses Rear louvers 24 OSLON SQUARE
Lamp(s)	24 OSLON SQUARE GIANT@300mA WW 722 230V 00-36-646
LampFlux(klm)/Colour	3.40 WW 2200K/70
File Name	AXIA 2.1 5167 24 OSLON SQUARE GIANT 300mA WW 722 22.4W 434342 Integrated ...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	905.2, 130.9, 2.0
No. in Project	4

Luminaire F Data

Supplier	
Type	AXIA 2.1 5165 Integrated lenses Rear louvers 8 OSLON SQUARE G
Lamp(s)	8 OSLON SQUARE GIANT@500mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	1.79 WW 2200K/70
File Name	AXIA 2.1 5165 8 OSLON SQUARE GIANT 500mA WW 722 14.2W 434262 Integrated I...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	1250.5, 121.8, 2.3
No. in Project	30

Luminaire G Data

Supplier	
Type	AXIA 2.1 5166 Integrated lenses Rear louvers 8 OSLON SQUARE G
Lamp(s)	8 OSLON SQUARE GIANT@500mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	1.79 WW 2200K/70
File Name	AXIA 2.1 5166 8 OSLON SQUARE GIANT 500mA WW 722 14.2W 434302 Integrated I...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	854.2, 129.6, 2.0
No. in Project	9

Luminaire H Data

Supplier	
Type	AXIA 2.1 5166 Integrated lenses Rear louvers 16 OSLON SQUARE
Lamp(s)	16 OSLON SQUARE GIANT@300mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	2.27 WW 2200K/70
File Name	AXIA 2.1 5166 16 OSLON SQUARE GIANT 300mA WW 722 15.9W 434302 Integrated ...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	854.2, 129.6, 2.0
No. in Project	5

Luminaire I Data

Supplier	
Type	AXIA 2.1 5165 Integrated lenses Front-Rear louvers 8 OSLON SQ
Lamp(s)	8 OSLON SQUARE GIANT@500mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	1.79 WW 2200K/70
File Name	AXIA 2.1 5165 8 OSLON SQUARE GIANT 500mA WW 722 14.2W 434272 Integrated I...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	846.0, 82.7, 1.7
No. in Project	3

Luminaire J Data

Supplier	
Type	AXIA 2.1 5165 Integrated lenses Rear louvers 8 OSLON SQUARE G
Lamp(s)	8 OSLON SQUARE GIANT@500mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	1.79 WW 2200K/70
File Name	AXIA 2.1 5165 8 OSLON SQUARE GIANT 500mA WW 722 14.2W 434262 Integrated I...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	1250.5, 121.8, 2.3
No. in Project	13

Luminaire L Data

Supplier	
Type	AXIA 2.1 5165 Integrated lenses Rear louvers 24 OSLON SQUARE
Lamp(s)	24 OSLON SQUARE GIANT@500mA WW 722 230V 00-36-646
LampFlux(klm)/Colour	5.38 WW 2200K/70
File Name	AXIA 2.1 5165 24 OSLON SQUARE GIANT 500mA WW 722 37.2W 434262 Integrated ...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	1250.5, 121.8, 2.3
No. in Project	2

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	722425.82	725526.43	6.00	85.00	0.00	0.00	0.40			
2	A	722396.55	725523.53	6.00	108.00	0.00	0.00	0.40			
3	A	722454.10	725517.56	6.00	69.00	0.00	0.00	0.40			
4	B	722396.59	725523.41	6.00	284.00	0.00	0.00	0.50			
5	B	722355.56	725522.58	6.00	92.00	0.00	0.00	0.40			
6	B	722341.84	725541.09	6.00	208.00	0.00	0.00	0.40			
7	C	722379.24	725543.81	6.00	12.00	0.00	0.00	0.40			
8	B	722425.86	725526.43	6.00	266.00	0.00	0.00	0.40			
9	C	722441.67	725544.78	6.00	339.00	0.00	0.00	0.40			
10	A	722480.82	725503.57	6.00	70.00	0.00	0.00	0.40			
11	B	722454.06	725517.60	6.00	243.00	0.00	0.00	0.40			
12	B	722480.86	725503.41	6.00	241.00	0.00	0.00	0.40			
13	B	722505.23	725485.87	6.00	232.00	0.00	0.00	0.40			
14	A	722505.33	725486.03	6.00	51.00	0.00	0.00	0.40			
15	A	722528.41	725466.35	6.00	57.00	0.00	0.00	0.40			
16	A	722550.33	725448.18	6.00	57.00	0.00	0.00	0.40			
17	A	722571.61	725427.96	6.00	50.00	0.00	0.00	0.40			
18	A	722594.55	725407.58	6.00	57.00	0.00	0.00	0.40			
19	B	722594.44	725407.65	6.00	240.00	0.00	0.00	0.40			
20	B	722571.51	725427.93	6.00	232.00	0.00	0.00	0.40			
21	B	722550.43	725448.14	6.00	234.00	0.00	0.00	0.40			
22	B	722528.35	725466.21	6.00	240.00	0.00	0.00	0.40			
23	C	722370.56	725518.62	6.00	317.00	0.00	0.00	0.40			
24	C	722355.63	725492.50	6.00	338.00	0.00	0.00	0.40			
25	C	722346.79	725470.81	6.00	340.00	0.00	0.00	0.40			
26	C	722507.93	725516.30	6.00	317.00	0.00	0.00	0.40			
27	C	722564.44	725462.99	6.00	318.00	0.00	0.00	0.40			
28	A	722374.32	725474.06	6.00	260.00	0.00	0.00	0.40			
29	D	722364.01	725684.96	8.00	150.00	0.00	0.00	0.50			
30	D	722354.89	725657.81	8.00	160.00	0.00	0.00	0.50			
31	D	722346.63	725622.97	8.00	164.00	0.00	0.00	0.50			
32	D	722338.60	725589.50	8.00	166.00	0.00	0.00	0.50			
33	D	722326.94	725551.87	8.00	150.00	0.00	0.00	0.50			
34	A	722623.00	725386.81	6.00	57.00	0.00	0.00	0.40			
35	A	722652.52	725367.51	6.00	55.00	0.00	0.00	0.40			
36	A	722683.85	725351.17	6.00	64.00	0.00	0.00	0.40			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
37	A	722713.81	725334.35	6.00	54.00	0.00	0.00	0.40			
38	B	722713.78	725334.22	6.00	227.00	0.00	0.00	0.40			
39	C	722719.51	725357.68	6.00	308.00	0.00	0.00	0.40			
40	A	722728.66	725316.48	6.00	33.00	0.00	0.00	0.40			
41	B	722728.54	725316.39	6.00	205.00	0.00	0.00	0.40			
42	B	722622.90	725386.64	6.00	236.00	0.00	0.00	0.40			
43	B	722652.52	725367.47	6.00	236.00	0.00	0.00	0.40			
44	B	722683.67	725351.12	6.00	244.00	0.00	0.00	0.40			
45	C	722627.46	725410.22	6.00	320.00	0.00	0.00	0.40			
46	G	723502.11	724488.30	5.00	293.00	0.00	0.00	0.40			
47	E	722755.55	725291.81	6.00	237.00	0.00	0.00	0.40			
48	E	722780.44	725291.51	6.00	265.00	0.00	0.00	0.40			
49	E	722733.45	725266.01	6.00	333.00	0.00	0.00	0.40			
50	A	722739.18	725294.67	6.00	23.00	0.00	0.00	0.40			
51	E	722753.57	725276.58	6.00	114.00	0.00	0.00	0.40			
52	F	722773.00	725266.66	5.00	63.00	0.00	0.00	0.40			
53	F	722805.79	725267.67	5.00	280.00	0.00	0.00	0.40			
54	F	722839.05	725271.92	5.00	278.00	0.00	0.00	0.40			
55	F	722873.74	725275.25	5.00	279.00	0.00	0.00	0.40			
56	F	722873.71	725275.25	5.00	102.00	0.00	0.00	0.40			
57	F	722898.55	725286.01	5.00	307.00	0.00	0.00	0.40			
58	F	722917.26	725304.76	5.00	316.00	0.00	0.00	0.40			
59	F	722939.62	725312.85	5.00	274.00	0.00	0.00	0.40			
60	F	722965.61	725303.82	5.00	237.00	0.00	0.00	0.40			
61	F	722991.53	725282.91	5.00	235.00	0.00	0.00	0.40			
62	F	723011.87	725261.53	5.00	224.00	0.00	0.00	0.40			
63	F	723036.16	725236.21	5.00	232.00	0.00	0.00	0.40			
64	F	723062.67	725222.01	5.00	236.00	0.00	0.00	0.40			
65	F	723091.06	725196.71	5.00	220.00	0.00	0.00	0.40			
66	F	723106.32	725168.43	5.00	207.00	0.00	0.00	0.40			
67	F	723124.34	725141.60	5.00	221.00	0.00	0.00	0.40			
68	F	723146.30	725124.67	5.00	242.00	0.00	0.00	0.40			
69	F	723189.70	725088.92	5.00	228.00	0.00	0.00	0.40			
70	F	723168.59	725106.63	5.00	232.00	0.00	0.00	0.40			
71	F	723200.48	725072.82	5.00	210.00	0.00	0.00	0.40			
72	F	723211.26	725047.66	5.00	218.00	0.00	0.00	0.40			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
73	F	723216.44	725020.78	5.00	165.00	0.00	0.00	0.40			
74	F	723203.25	725001.71	5.00	135.00	0.00	0.00	0.40			
75	G	723182.97	724990.89	5.00	334.00	0.00	0.00	0.40			
76	F	723197.97	724969.44	5.00	217.00	0.00	0.00	0.40			
77	F	723218.43	724948.76	5.00	228.00	0.00	0.00	0.40			
78	G	723260.87	724917.60	5.00	231.00	0.00	0.00	0.40			
79	F	723242.03	724932.32	5.00	235.00	0.00	0.00	0.40			
80	F	723284.96	724892.32	5.00	224.00	0.00	0.00	0.40			
81	F	723304.16	724872.92	5.00	240.00	0.00	0.00	0.40			
82	F	723333.00	724856.26	5.00	235.00	0.00	0.00	0.40			
83	I	723360.31	724836.94	5.00	221.00	0.00	0.00	0.40			
84	I	723380.96	724810.30	5.00	218.00	0.00	0.00	0.40			
85	I	723400.39	724784.53	5.00	218.00	0.00	0.00	0.40			
86	J	723415.75	724757.45	5.00	197.00	0.00	0.00	0.40			
87	J	723419.83	724725.52	5.00	18.00	0.00	0.00	0.40			
88	J	723440.06	724701.94	5.00	223.00	0.00	0.00	0.40			
89	J	723459.39	724674.11	5.00	192.00	0.00	0.00	0.40			
90	J	723456.30	724650.18	5.00	15.00	0.00	0.00	0.40			
91	J	723472.41	724632.60	5.00	209.00	0.00	0.00	0.40			
92	J	723489.32	724599.76	5.00	202.00	0.00	0.00	0.40			
Relocated 93	D	722384.26	725706.93	8.00	61.00	0.00	0.00	0.40			
94	D	722415.70	725704.97	8.00	232.00	5.00	0.00	1.50			
95	D	722353.39	725730.48	8.00	39.00	0.00	0.00	0.40			
96	D	722328.84	725757.85	9.00	30.00	5.00	0.00	1.50			
97	D	722442.43	725663.54	8.00	56.00	0.00	0.00	0.40			
98	A	722312.75	725588.07	6.00	94.00	0.00	0.00	0.40			
99	D	722361.03	725713.05	8.00	328.00	0.00	0.00	0.40			
100	A	722327.29	725679.99	6.00	80.00	0.00	0.00	0.40			
101	J	723501.50	724578.55	5.00	203.00	0.00	0.00	0.40			
102	J	723508.19	724552.13	5.00	200.00	0.00	0.00	0.40			
103	J	723519.25	724525.83	5.00	198.00	0.00	0.00	0.40			
104	J	723511.90	724497.89	5.00	347.00	0.00	0.00	0.40			
105	G	723493.92	724470.97	5.00	31.00	0.00	0.00	0.40			
106	G	723508.64	724439.38	5.00	24.00	0.00	0.00	0.40			
107	J	723518.80	724473.76	5.00	24.00	0.00	0.00	0.40			
108	J	723530.79	724447.01	5.00	20.00	0.00	0.00	0.40			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
109	H	723502.61	724587.07	6.00	118.00	0.00	0.00	0.40			
110	H	723476.05	724572.48	6.00	119.00	0.00	0.00	0.40			
111	H	723469.85	724558.37	6.00	156.00	0.00	0.00	0.40			
112	H	723467.49	724584.23	6.00	253.00	0.00	0.00	0.40			
113	A	723329.56	724870.84	6.00	59.00	0.00	0.00	0.40			
114	L	723311.87	724872.43	6.00	331.00	5.00	0.00	0.90			
115	H	723330.74	724906.93	6.00	330.00	0.00	0.00	1.00			
116	L	723292.25	724837.55	6.00	336.00	5.00	0.00	0.90			
117	B	722754.65	725263.09	6.00	150.00	0.00	0.00	0.40			
118	B	722733.21	725284.24	5.00	330.00	0.00	0.00	0.40			
119	G	723514.25	724461.50	5.00	192.00	0.00	0.00	0.40			
120	F	722899.41	725303.87	5.00	230.00	0.00	0.00	0.40			
121	G	722854.00	725316.34	5.00	126.00	0.00	0.00	0.40			
122	G	722886.22	725329.52	5.00	101.00	0.00	0.00	0.40			
123	G	722876.44	725324.37	5.00	227.00	0.00	0.00	0.40			

Horizontal Illuminance (lux)

Grid 1

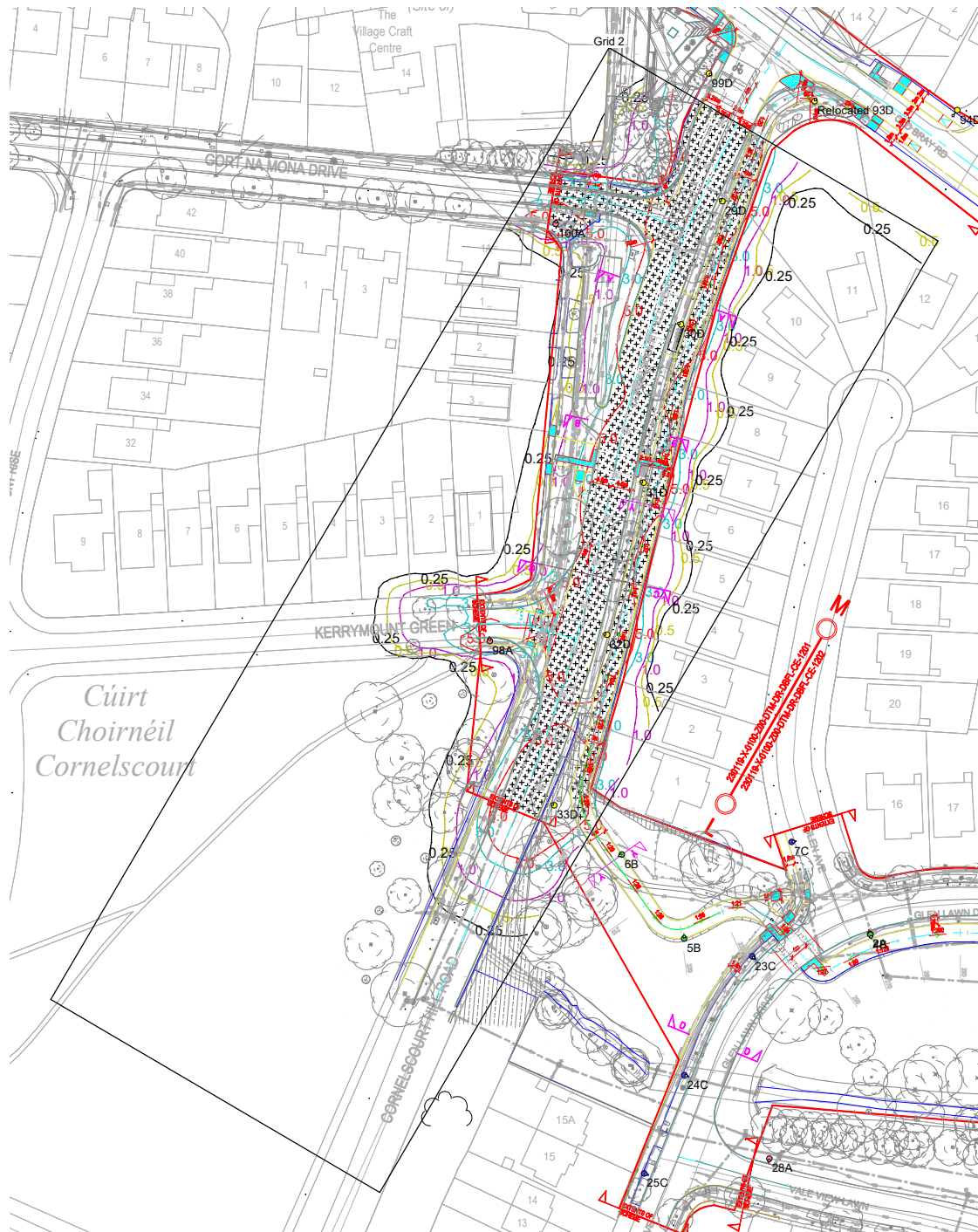


Results

Eav	13.21
Emin	5.32
E _{max}	29.55
E _{min} /E _{max}	0.18
E _{min} /E _{av}	0.40

Horizontal Illuminance (lux)

Grid 2

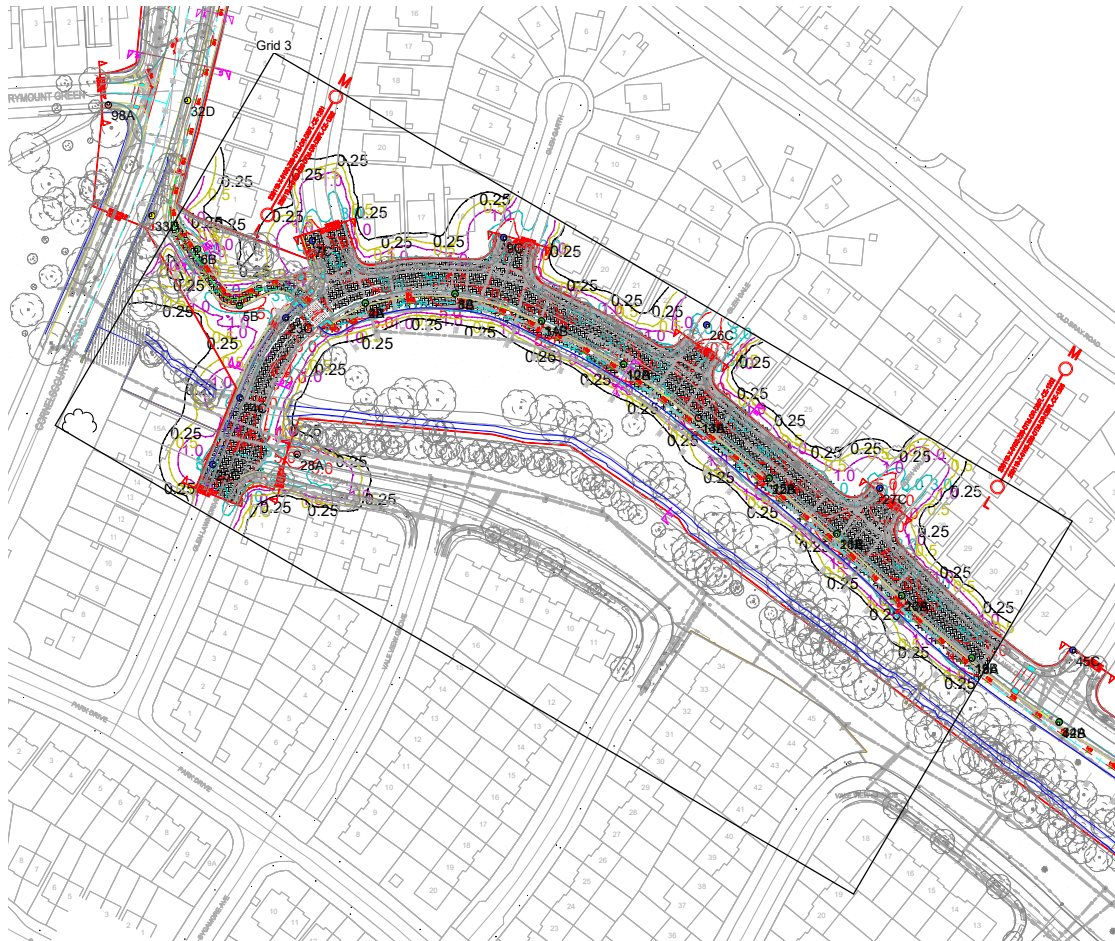


Results

Eav	10.01
Emin	2.29
Emax	27.74
Emin/Emax	0.08
Emin/Eav	0.23

Horizontal Illuminance (lux)

Grid 3

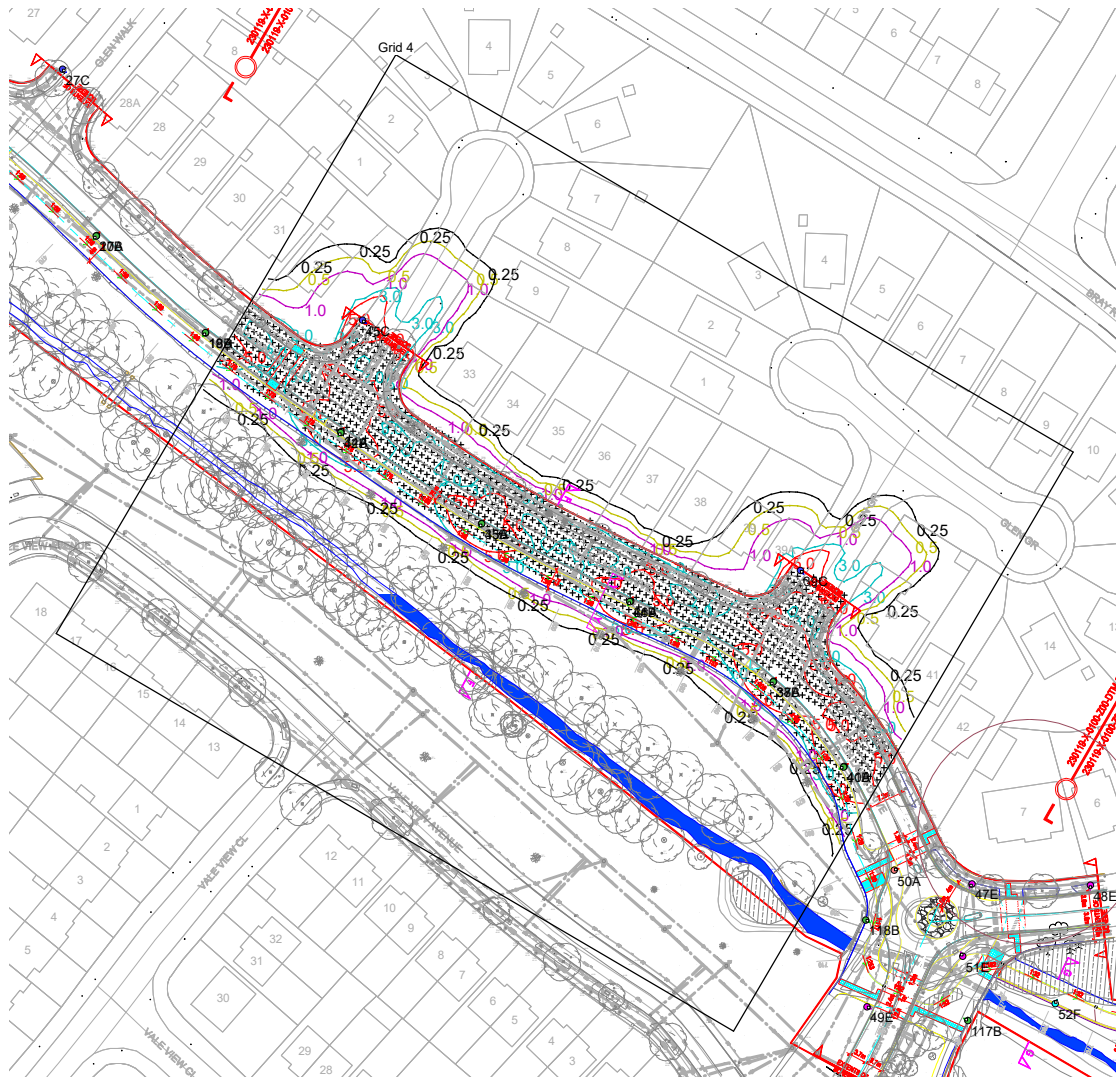


Results

Eav	5.58
Emin	1.09
Emax	20.49
Emin/Emax	0.05
Emin/Eav	0.19

Horizontal Illuminance (lux)

Grid 4

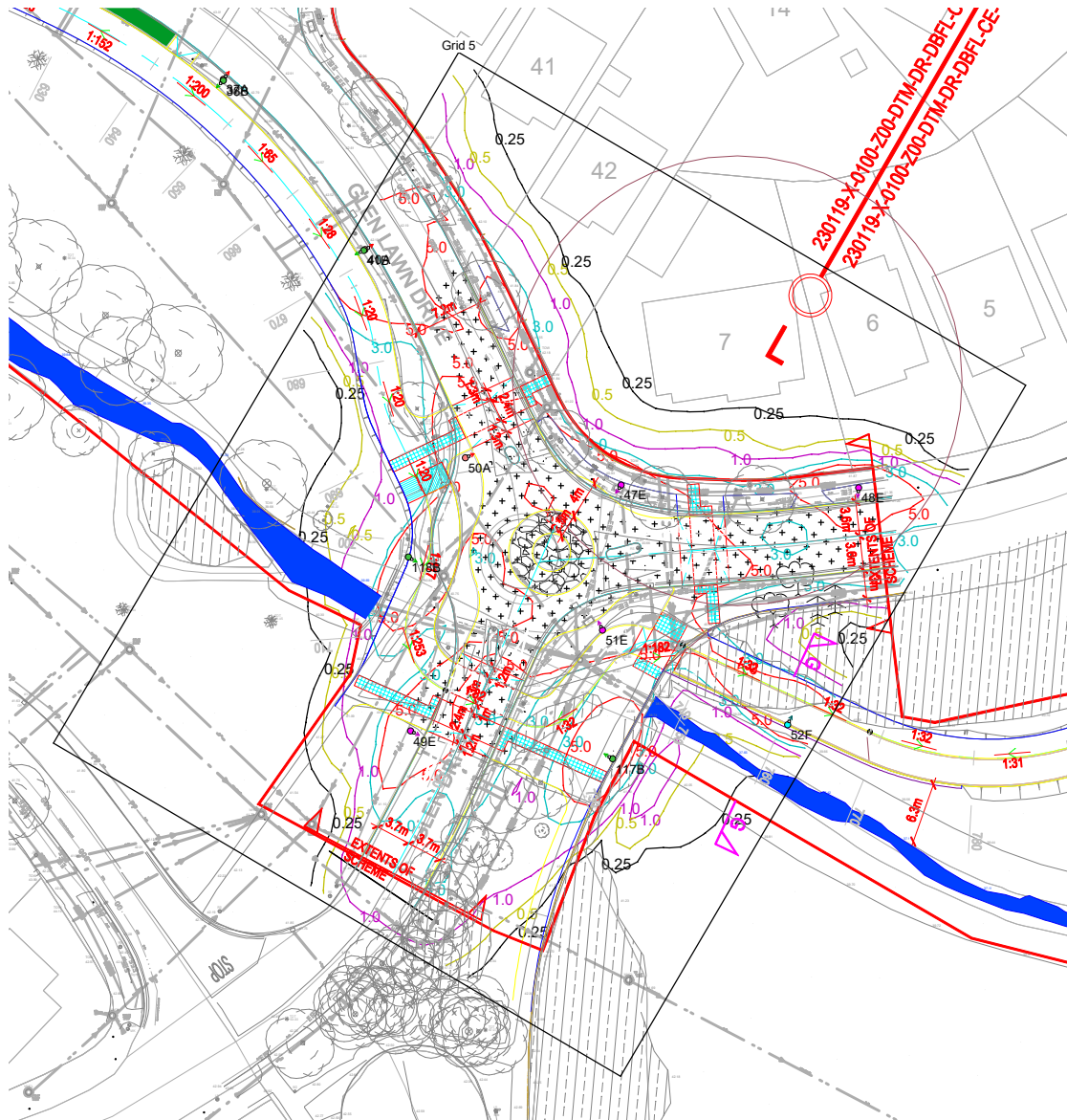


Results

Eav	5.11
Emin	1.16
Emax	20.60
Emin/Emax	0.06
Emin/Eav	0.23

Horizontal Illuminance (lux)

Grid 5

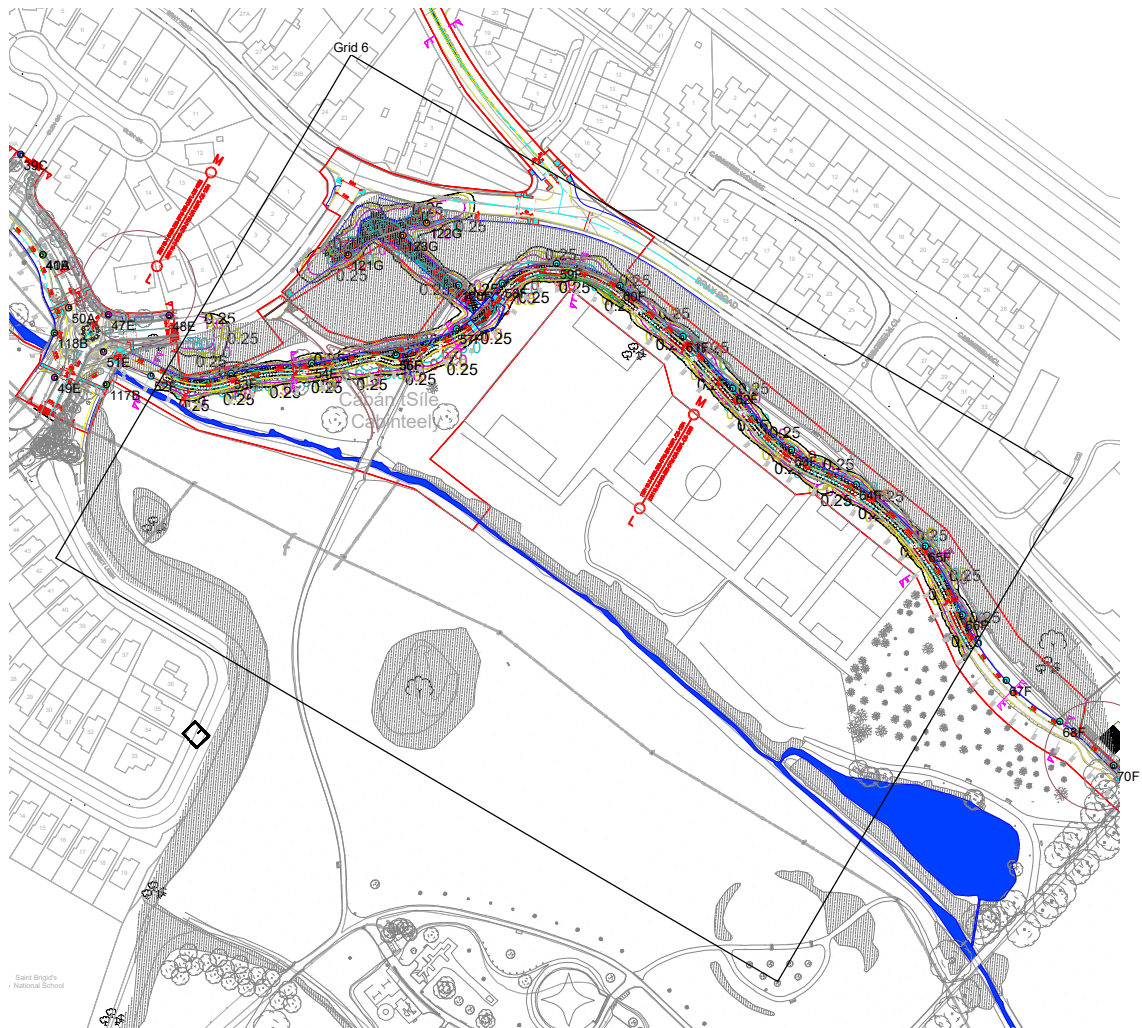


Results

Eav	6.12
Emin	2.47
Emax	11.83
Emin/Emax	0.21
Emin/Eav	0.40

Horizontal Illuminance (lux)

Grid 6

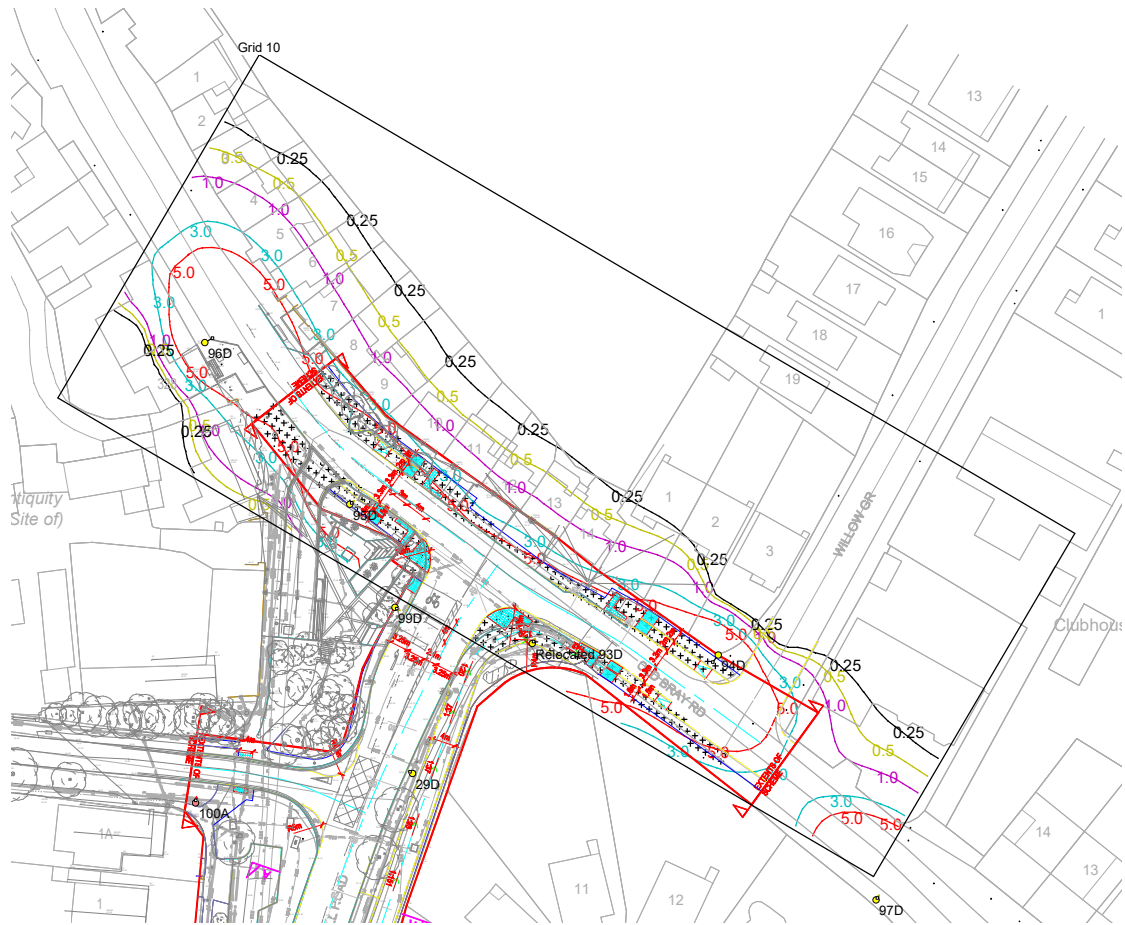


Results

Eav	5.61
Emin	1.12
Emax	26.28
Emin/Emax	0.04
Emin/Eav	0.20

Horizontal Illuminance (lux)

Grid 10



Results

Eav	11.02
Emin	3.11
Emax	28.12
Emin/Emax	0.11
Emin/Eav	0.28

Horizontal Illuminance (lux)

Grid 11

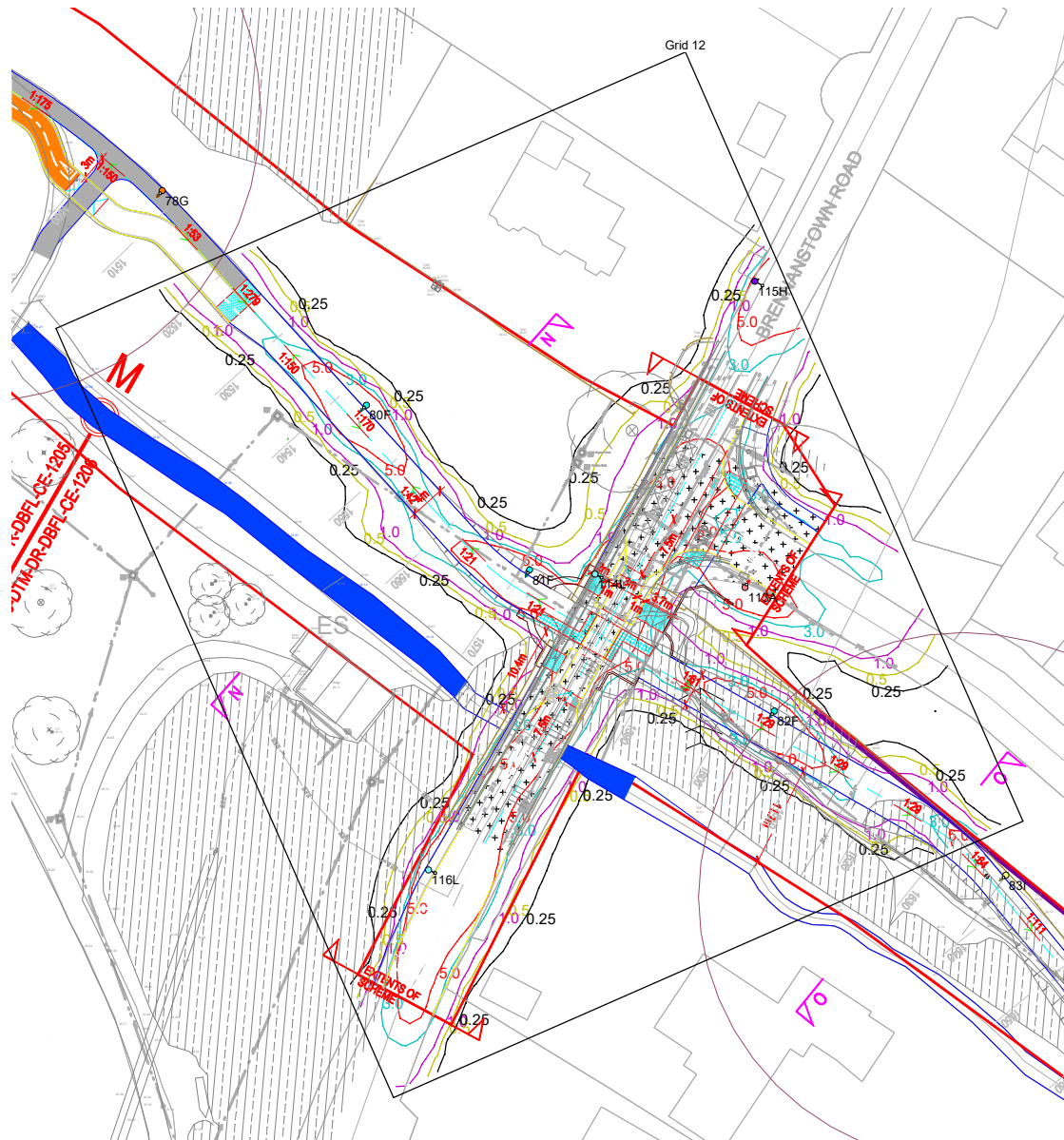


Results

Eav	6.65
Emin	1.60
Emax	16.23
Emin/Emax	0.10
Emin/Eav	0.24

Horizontal Illuminance (lux)

Grid 12

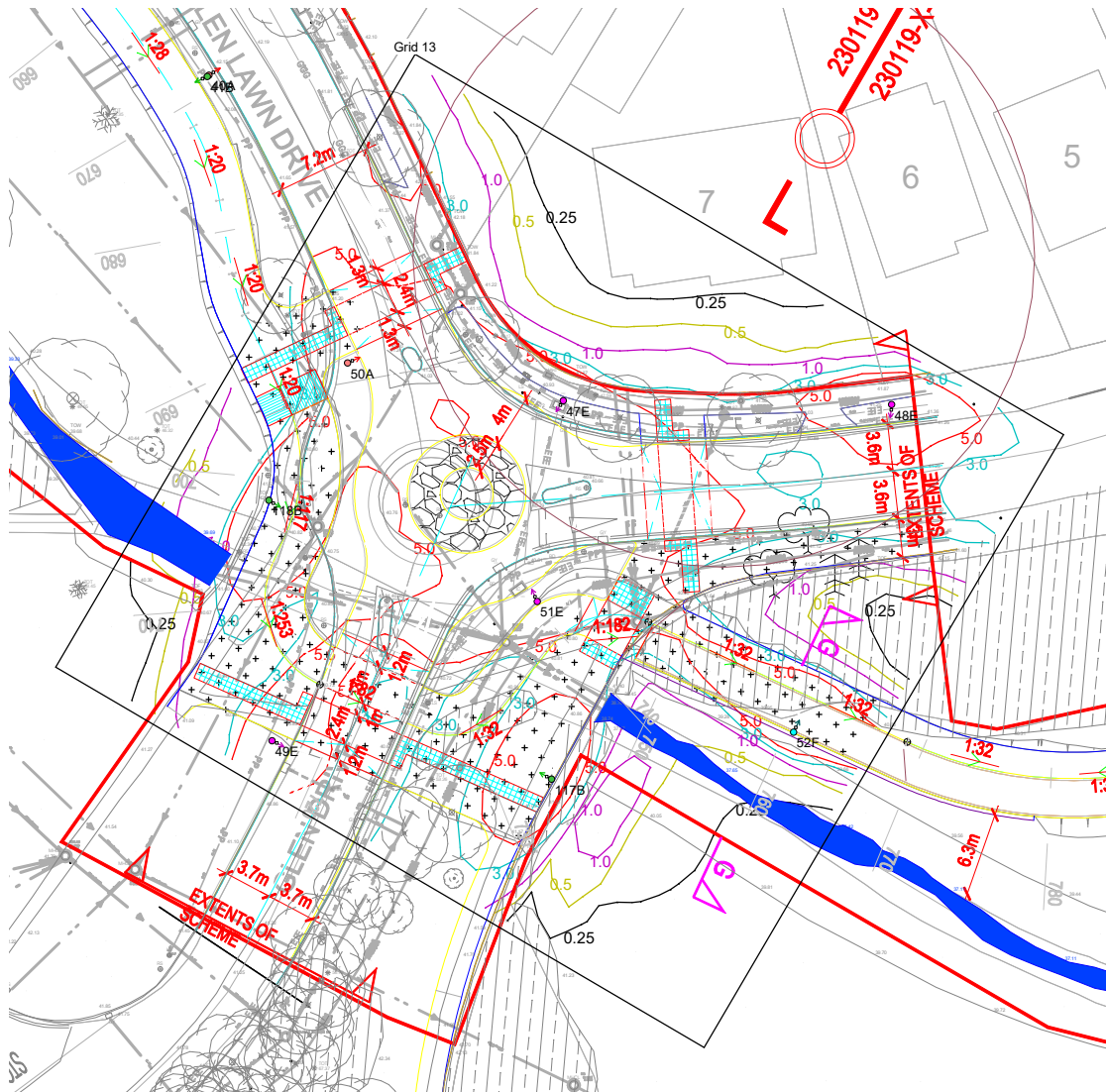


Results

Eav	8.55
Emin	1.80
Emax	31.44
Emin/Emax	0.06
Emin/Eav	0.21

Horizontal Illuminance (lux)

Grid 13



Results

Eav	5.37
Emin	1.24
E _{max}	16.68
E _{min} /E _{max}	0.07
E _{min} /E _{av}	0.23

DATE: 4 September 2025
DESIGNER: Alex Naper
PROJECT No: SES 16324 Rev F
PROJECT NAME: Cabinteely Greenway - DBFL



Dimmed section results.

Chainage 740 – 1680 to be part night switched off.

Cycle/Footpath section designed in accordance with EN13201-2:2015 Category P4.

Road section designed in accordance with EN13201-2:2015 Category P2.

Road section leading up to crossing point designed in accordance with EN13201-2:2015 Category P3.

Junction & Roundabout designed in accordance with EN13201-2:2015 Category C4.

MF derived from: 0.92×0.95 (LMF (Low pollution environment & 72 month cleaning cycle) $\times$ LLMF) LLMF value @ 100,000 hours & 25 degrees C Ta.

Rev B: Additional areas added.

Rev C: Updated site layout.

Outdoor Lighting Report

PREPARED BY: Sabre Electrical Services Ltd.
Unit 11,
Bellview Industrial Estate,
Tolka Valley Road,
Dublin 11
D11 VN59
Phone Number: 01 8110875
Contact: Graham Sheehan
eMail: graham@sabrelighting.ie

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	722289.40	725730.96	160.00	67.32	1.50	1.50
2	Grid 2	722216.06	725509.12	84.00	243.00	1.50	1.50
3	Grid 3	722295.39	725483.47	302.00	141.00	1.50	1.50
4	Grid 4	722563.12	725344.38	165.00	141.00	1.50	1.50
5	Grid 5	722695.97	725264.72	69.00	84.00	1.50	1.50
6	Grid 6	722733.92	725191.82	343.75	239.71	1.49	1.50
7	Grid 7	723008.49	724977.89	374.35	239.71	1.50	1.50
8	Grid 8	723332.17	724829.26	344.00	81.00	1.50	1.50
9	Grid 9	723418.30	724628.95	99.00	81.00	1.50	1.50
10	Grid 10	722303.99	725748.47	160.00	67.32	1.50	1.50
11	Grid 11	723471.76	724514.32	99.00	81.00	1.50	1.50
12	Grid 12	723248.36	724901.38	99.00	81.00	1.50	1.50
13	Grid 13	722717.05	725271.59	57.00	53.89	1.50	1.50

Luminaires

Luminaire A Data

Supplier	
Type	AXIA 2.1 5167 Integrated lenses Rear louvers 24 OSLO SQUARE
Lamp(s)	24 OSLO SQUARE GIANT@300mA WW 722 230V 00-36-646
LampFlux(klm)/Colour	3.40 WW 2200K/70
File Name	AXIA 2.1 5167 24 OSLO SQUARE GIANT 300mA WW 722 22.4W 434362 Integrated ...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	905.2, 130.9, 2.0
No. in Project	19

Luminaire B Data

Supplier	
Type	AXIA 2.1 5178 Integrated lenses 8 OSLO SQUARE GIANT@400mA W
Lamp(s)	8 OSLO SQUARE GIANT@400mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	1.47 WW 2200K/70
File Name	AXIA 2.1 5178 8 OSLO SQUARE GIANT 400mA WW 722 11.6W 464242 Integrated I...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	725.5, 206.2, 0.8
No. in Project	18



Luminaire C Data

Supplier	
Type	AXIA 2.1 5167 Integrated lenses 24 OSLO SQUARE GIANT@300mA
Lamp(s)	24 OSLO SQUARE GIANT@300mA WW 722 230V 00-36-646
LampFlux(klm)/Colour	3.40 WW 2200K/70
File Name	AXIA 2.1 5167 24 OSLO SQUARE GIANT 300mA WW 722 22.4W 434362 Integrated ...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	1028.1, 179.4, 2.6
No. in Project	9

Luminaire D Data

Supplier	C U Phosco
Type	P863-128-H6-4x4-BB-727-SA-0425-79W
Lamp(s)	727SA
Lamp Flux (klm)	8.20
File Name	P863-128-H6-4x4-BB-727-SA-425-79W.ies
Maintenance Factor	0.91
Imax70,80,90(cd/klm)	355.5, 60.0, 0.0
No. in Project	11

Luminaires

Luminaire E Data

Supplier	
Type	AXIA 2.1 5167 Integrated lenses Rear louvers 24 OSLON SQUARE
Lamp(s)	24 OSLON SQUARE GIANT@300mA WW 722 230V 00-36-646
LampFlux(klm)/Colour	3.40 WW 2200K/70
File Name	AXIA 2.1 5167 24 OSLON SQUARE GIANT 300mA WW 722 22.4W 434342 Integrated ...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	905.2, 130.9, 2.0
No. in Project	4

Luminaire F Data

Supplier	
Type	AXIA 2.1 5165 Integrated lenses Rear louvers 8 OSLON SQUARE G
Lamp(s)	8 OSLON SQUARE GIANT@500mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	1.79 WW 2200K/70
File Name	AXIA 2.1 5165 8 OSLON SQUARE GIANT 500mA WW 722 14.2W 434262 Integrated I...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	1250.5, 121.8, 2.3
No. in Project	30

Luminaire G Data

Supplier	
Type	AXIA 2.1 5166 Integrated lenses Rear louvers 8 OSLON SQUARE G
Lamp(s)	8 OSLON SQUARE GIANT@500mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	1.79 WW 2200K/70
File Name	AXIA 2.1 5166 8 OSLON SQUARE GIANT 500mA WW 722 14.2W 434302 Integrated I...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	854.2, 129.6, 2.0
No. in Project	9

Luminaire H Data

Supplier	
Type	AXIA 2.1 5166 Integrated lenses Rear louvers 16 OSLON SQUARE
Lamp(s)	16 OSLON SQUARE GIANT@300mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	2.27 WW 2200K/70
File Name	AXIA 2.1 5166 16 OSLON SQUARE GIANT 300mA WW 722 15.9W 434302 Integrated ...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	854.2, 129.6, 2.0
No. in Project	5

Luminaire I Data

Supplier	
Type	AXIA 2.1 5165 Integrated lenses Front-Rear louvers 8 OSLON SQ
Lamp(s)	8 OSLON SQUARE GIANT@500mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	1.79 WW 2200K/70
File Name	AXIA 2.1 5165 8 OSLON SQUARE GIANT 500mA WW 722 14.2W 434272 Integrated I...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	846.0, 82.7, 1.7
No. in Project	3

Luminaire J Data

Supplier	
Type	AXIA 2.1 5165 Integrated lenses Rear louvers 8 OSLON SQUARE G
Lamp(s)	8 OSLON SQUARE GIANT@500mA WW 722 230V 00-36-648
LampFlux(klm)/Colour	1.79 WW 2200K/70
File Name	AXIA 2.1 5165 8 OSLON SQUARE GIANT 500mA WW 722 14.2W 434262 Integrated I...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	1250.5, 121.8, 2.3
No. in Project	13

Luminaire L Data

Supplier	
Type	AXIA 2.1 5165 Integrated lenses Rear louvers 24 OSLON SQUARE
Lamp(s)	24 OSLON SQUARE GIANT@500mA WW 722 230V 00-36-646
LampFlux(klm)/Colour	5.38 WW 2200K/70
File Name	AXIA 2.1 5165 24 OSLON SQUARE GIANT 500mA WW 722 37.2W 434262 Integrated ...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	1250.5, 121.8, 2.3
No. in Project	2

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Dimmed to	Target X	Target Y	Target Z
1	A	722425.82	725526.43	6.00	85.00	0.00	0.00	0.40	100%			
2	A	722396.55	725523.53	6.00	108.00	0.00	0.00	0.40	100%			
3	A	722454.10	725517.56	6.00	69.00	0.00	0.00	0.40	100%			
4	B	722396.59	725523.41	6.00	284.00	0.00	0.00	0.50	100%			
5	B	722355.56	725522.58	6.00	92.00	0.00	0.00	0.40	100%			
6	B	722341.84	725541.09	6.00	208.00	0.00	0.00	0.40	100%			
7	C	722379.24	725543.81	6.00	12.00	0.00	0.00	0.40	100%			
8	B	722425.86	725526.43	6.00	266.00	0.00	0.00	0.40	100%			
9	C	722441.67	725544.78	6.00	339.00	0.00	0.00	0.40	100%			
10	A	722480.82	725503.57	6.00	70.00	0.00	0.00	0.40	100%			
11	B	722454.06	725517.60	6.00	243.00	0.00	0.00	0.40	100%			
12	B	722480.86	725503.41	6.00	241.00	0.00	0.00	0.40	100%			
13	B	722505.23	725485.87	6.00	232.00	0.00	0.00	0.40	100%			
14	A	722505.33	725486.03	6.00	51.00	0.00	0.00	0.40	100%			
15	A	722528.41	725466.35	6.00	57.00	0.00	0.00	0.40	100%			
16	A	722550.33	725448.18	6.00	57.00	0.00	0.00	0.40	100%			
17	A	722571.61	725427.96	6.00	50.00	0.00	0.00	0.40	100%			
18	A	722594.55	725407.58	6.00	57.00	0.00	0.00	0.40	100%			
19	B	722594.44	725407.65	6.00	240.00	0.00	0.00	0.40	100%			
20	B	722571.51	725427.93	6.00	232.00	0.00	0.00	0.40	100%			
21	B	722550.43	725448.14	6.00	234.00	0.00	0.00	0.40	100%			
22	B	722528.35	725466.21	6.00	240.00	0.00	0.00	0.40	100%			
23	C	722370.56	725518.64	6.00	317.00	0.00	0.00	0.40	100%			
24	C	722355.63	725492.50	6.00	338.00	0.00	0.00	0.40	100%			
25	C	722346.79	725470.81	6.00	340.00	0.00	0.00	0.40	100%			
26	C	722507.93	725516.30	6.00	317.00	0.00	0.00	0.40	100%			
27	C	722564.44	725462.99	6.00	318.00	0.00	0.00	0.40	100%			
28	A	722374.32	725474.06	6.00	260.00	0.00	0.00	0.40	100%			
29	D	722364.01	725684.96	8.00	150.00	0.00	0.00	0.50	100%			
30	D	722354.89	725657.81	8.00	160.00	0.00	0.00	0.50	100%			
31	D	722346.63	725622.97	8.00	164.00	0.00	0.00	0.50	100%			
32	D	722338.60	725589.50	8.00	166.00	0.00	0.00	0.50	100%			
33	D	722326.94	725551.87	8.00	150.00	0.00	0.00	0.50	100%			
34	A	722623.00	725386.81	6.00	57.00	0.00	0.00	0.40	100%			
35	A	722652.52	725367.51	6.00	55.00	0.00	0.00	0.40	100%			
36	A	722683.85	725351.17	6.00	64.00	0.00	0.00	0.40	100%			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Dimmed to	Target X	Target Y	Target Z
37	A	722713.81	725334.35	6.00	54.00	0.00	0.00	0.40	100%			
38	B	722713.78	725334.22	6.00	227.00	0.00	0.00	0.40	100%			
39	C	722719.51	725357.68	6.00	308.00	0.00	0.00	0.40	100%			
40	A	722728.66	725316.48	6.00	33.00	0.00	0.00	0.40	100%			
41	B	722728.54	725316.39	6.00	205.00	0.00	0.00	0.40	100%			
42	B	722622.90	725386.64	6.00	236.00	0.00	0.00	0.40	100%			
43	B	722652.52	725367.47	6.00	236.00	0.00	0.00	0.40	100%			
44	B	722683.67	725351.12	6.00	244.00	0.00	0.00	0.40	100%			
45	C	722627.46	725410.22	6.00	320.00	0.00	0.00	0.40	100%			
46	G	723502.11	724488.30	5.00	293.00	0.00	0.00	0.40	100%			
47	E	722755.55	725291.81	6.00	237.00	0.00	0.00	0.40	100%			
48	E	722780.44	725291.51	6.00	265.00	0.00	0.00	0.40	100%			
49	E	722733.45	725266.01	6.00	333.00	0.00	0.00	0.40	100%			
50	A	722739.18	725294.67	6.00	23.00	0.00	0.00	0.40	100%			
51	E	722753.57	725276.58	6.00	114.00	0.00	0.00	0.40	100%			
52	F	722773.00	725266.66	5.00	63.00	0.00	0.00	0.40	0%			
53	F	722805.79	725267.67	5.00	280.00	0.00	0.00	0.40	0%			
54	F	722839.05	725271.92	5.00	278.00	0.00	0.00	0.40	0%			
55	F	722873.74	725275.25	5.00	279.00	0.00	0.00	0.40	0%			
56	F	722873.71	725275.25	5.00	102.00	0.00	0.00	0.40	0%			
57	F	722898.55	725286.01	5.00	307.00	0.00	0.00	0.40	0%			
58	F	722917.26	725304.76	5.00	316.00	0.00	0.00	0.40	0%			
59	F	722939.62	725312.85	5.00	274.00	0.00	0.00	0.40	0%			
60	F	722965.61	725303.82	5.00	237.00	0.00	0.00	0.40	0%			
61	F	722991.53	725282.91	5.00	235.00	0.00	0.00	0.40	0%			
62	F	723011.87	725261.53	5.00	224.00	0.00	0.00	0.40	0%			
63	F	723036.16	725236.21	5.00	232.00	0.00	0.00	0.40	0%			
64	F	723062.67	725222.01	5.00	236.00	0.00	0.00	0.40	0%			
65	F	723091.06	725196.71	5.00	220.00	0.00	0.00	0.40	0%			
66	F	723106.32	725168.43	5.00	207.00	0.00	0.00	0.40	0%			
67	F	723124.34	725141.60	5.00	221.00	0.00	0.00	0.40	0%			
68	F	723146.30	725124.67	5.00	242.00	0.00	0.00	0.40	0%			
69	F	723189.70	725088.92	5.00	228.00	0.00	0.00	0.40	0%			
70	F	723168.59	725106.63	5.00	232.00	0.00	0.00	0.40	0%			
71	F	723200.48	725072.82	5.00	210.00	0.00	0.00	0.40	0%			
72	F	723211.26	725047.66	5.00	218.00	0.00	0.00	0.40	0%			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Dimmed to	Target X	Target Y	Target Z
73	F	723216.44	725020.78	5.00	165.00	0.00	0.00	0.40	0%			
74	F	723203.25	725001.71	5.00	135.00	0.00	0.00	0.40	0%			
75	G	723182.97	724990.89	5.00	334.00	0.00	0.00	0.40	0%			
76	F	723197.97	724969.44	5.00	217.00	0.00	0.00	0.40	0%			
77	F	723218.43	724948.76	5.00	228.00	0.00	0.00	0.40	0%			
78	G	723260.87	724917.60	5.00	231.00	0.00	0.00	0.40	0%			
79	F	723242.03	724932.32	5.00	235.00	0.00	0.00	0.40	0%			
80	F	723284.96	724892.32	5.00	224.00	0.00	0.00	0.40	0%			
81	F	723304.16	724872.92	5.00	234.00	0.00	0.00	0.40	35%			
82	F	723333.06	724856.23	5.00	240.00	0.00	0.00	0.40	0%			
83	I	723360.26	724836.92	5.00	224.00	0.00	0.00	0.40	0%			
84	I	723380.96	724810.30	5.00	218.00	0.00	0.00	0.40	0%			
85	I	723400.39	724784.53	5.00	218.00	0.00	0.00	0.40	100%			
86	J	723415.75	724757.45	5.00	197.00	0.00	0.00	0.40	100%			
87	J	723419.83	724725.52	5.00	18.00	0.00	0.00	0.40	100%			
88	J	723440.06	724701.94	5.00	223.00	0.00	0.00	0.40	100%			
89	J	723459.39	724674.11	5.00	192.00	0.00	0.00	0.40	100%			
90	J	723456.30	724650.18	5.00	15.00	0.00	0.00	0.40	100%			
91	J	723472.41	724632.60	5.00	209.00	0.00	0.00	0.40	100%			
92	J	723489.32	724599.76	5.00	202.00	0.00	0.00	0.40	100%			
Relocated 93	D	722384.26	725706.93	8.00	61.00	0.00	0.00	0.40	100%			
94	D	722415.70	725704.97	8.00	232.00	5.00	0.00	1.50	100%			
95	D	722353.39	725730.48	8.00	39.00	0.00	0.00	0.40	100%			
96	D	722328.84	725757.85	9.00	30.00	5.00	0.00	1.50	100%			
97	D	722442.43	725663.54	8.00	56.00	0.00	0.00	0.40	100%			
98	A	722312.75	725588.07	6.00	94.00	0.00	0.00	0.40	100%			
99	D	722361.03	725713.05	8.00	328.00	0.00	0.00	0.40	100%			
100	A	722327.29	725679.99	6.00	80.00	0.00	0.00	0.40	100%			
101	J	723501.49	724578.49	5.00	203.00	0.00	0.00	0.40	100%			
102	J	723508.19	724552.13	5.00	200.00	0.00	0.00	0.40	100%			
103	J	723519.27	724525.86	5.00	198.00	0.00	0.00	0.40	100%			
104	J	723511.17	724497.68	5.00	347.00	0.00	0.00	0.40	100%			
105	G	723493.92	724470.97	5.00	31.00	0.00	0.00	0.40	100%			
106	G	723508.64	724439.38	5.00	24.00	0.00	0.00	0.40	100%			
107	J	723518.80	724473.76	5.00	24.00	0.00	0.00	0.40	100%			
108	J	723530.74	724447.05	5.00	20.00	0.00	0.00	0.40	100%			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Dimmed to	Target X	Target Y	Target Z
109	H	723502.61	724587.07	6.00	118.00	0.00	0.00	0.40	100%			
110	H	723476.05	724572.48	6.00	119.00	0.00	0.00	0.40	100%			
111	H	723469.85	724558.37	6.00	156.00	0.00	0.00	0.40	100%			
112	H	723467.49	724584.23	6.00	253.00	0.00	0.00	0.40	100%			
113	A	723329.56	724870.84	6.00	59.00	0.00	0.00	0.40	100%			
114	L	723311.87	724872.43	6.00	331.00	5.00	0.00	0.90	100%			
115	H	723330.74	724906.93	6.00	330.00	0.00	0.00	1.00	100%			
116	L	723292.25	724837.55	6.00	336.00	5.00	0.00	0.90	100%			
117	B	722754.66	725263.05	6.00	150.00	0.00	0.00	0.40	100%			
118	B	722733.21	725284.24	5.00	330.00	0.00	0.00	0.40	100%			
119	G	723514.25	724461.50	5.00	192.00	0.00	0.00	0.40	100%			
120	F	722899.41	725303.87	5.00	230.00	0.00	0.00	0.40	0%			
121	G	722854.00	725316.34	5.00	126.00	0.00	0.00	0.40	100%			
122	G	722886.22	725329.52	5.00	101.00	0.00	0.00	0.40	100%			
123	G	722876.44	725324.37	5.00	227.00	0.00	0.00	0.40	100%			

Horizontal Illuminance (lux)

Grid 1

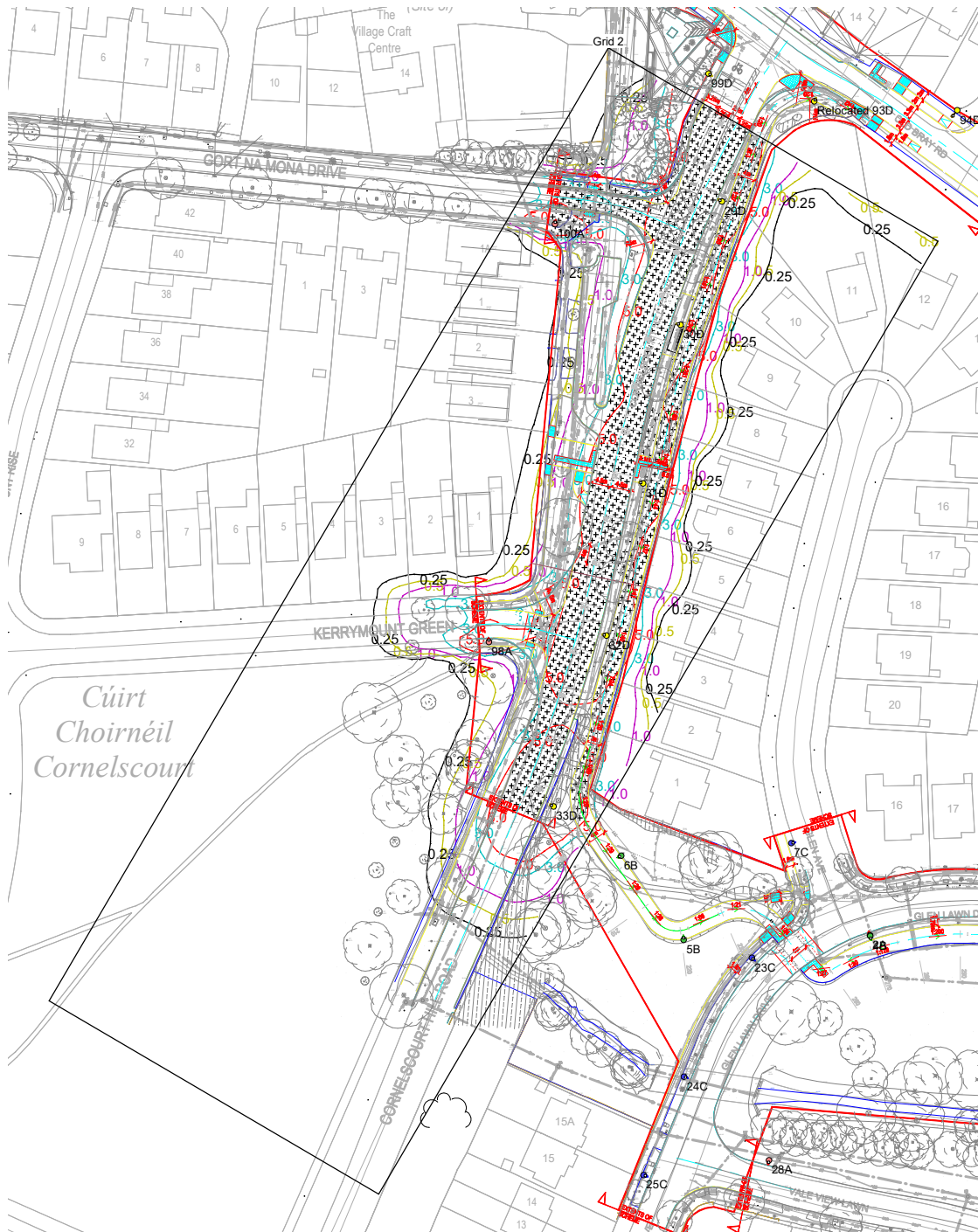


Results

Eav	13.21
Emin	5.32
E _{max}	29.55
E _{min} /E _{max}	0.18
E _{min} /E _{av}	0.40

Horizontal Illuminance (lux)

Grid 2

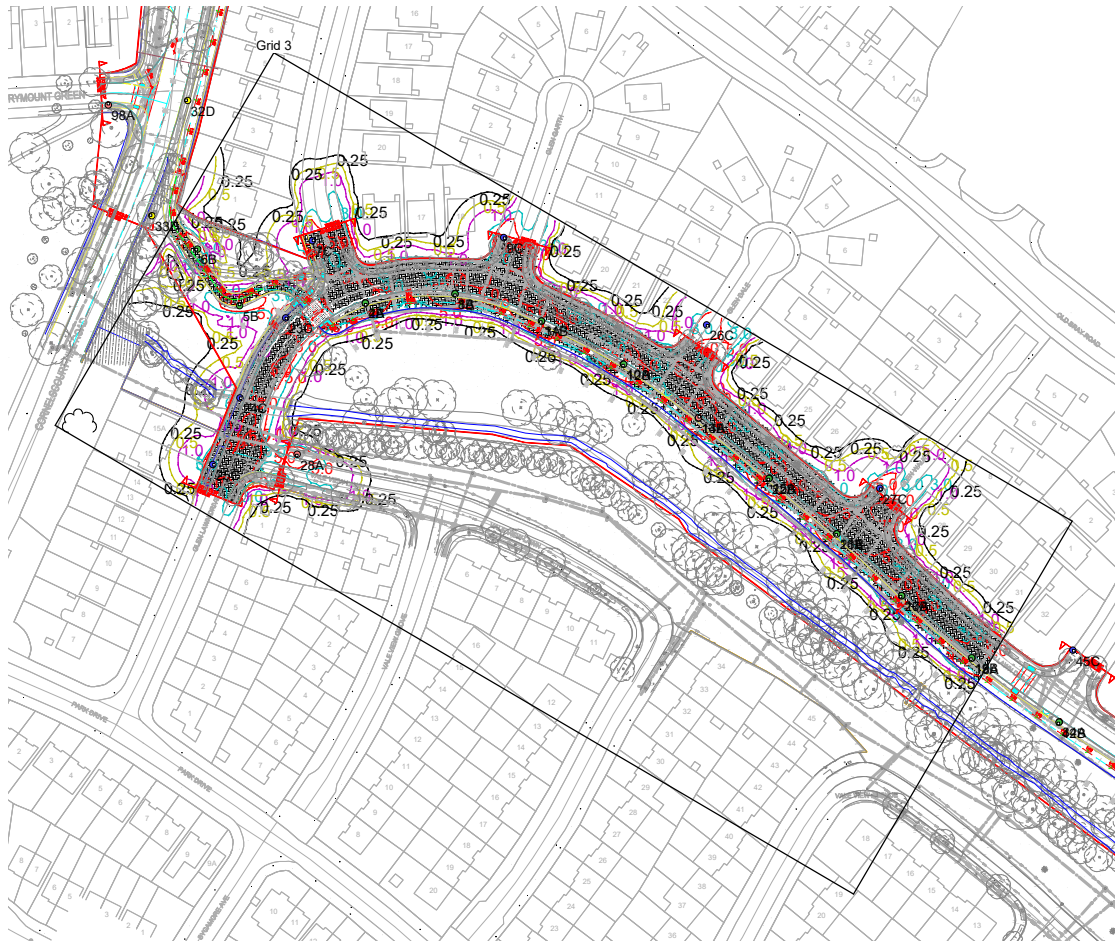


Results

Eav	10.01
Emin	2.29
Emax	27.74
Emin/Emax	0.08
Emin/Eav	0.23

Horizontal Illuminance (lux)

Grid 3

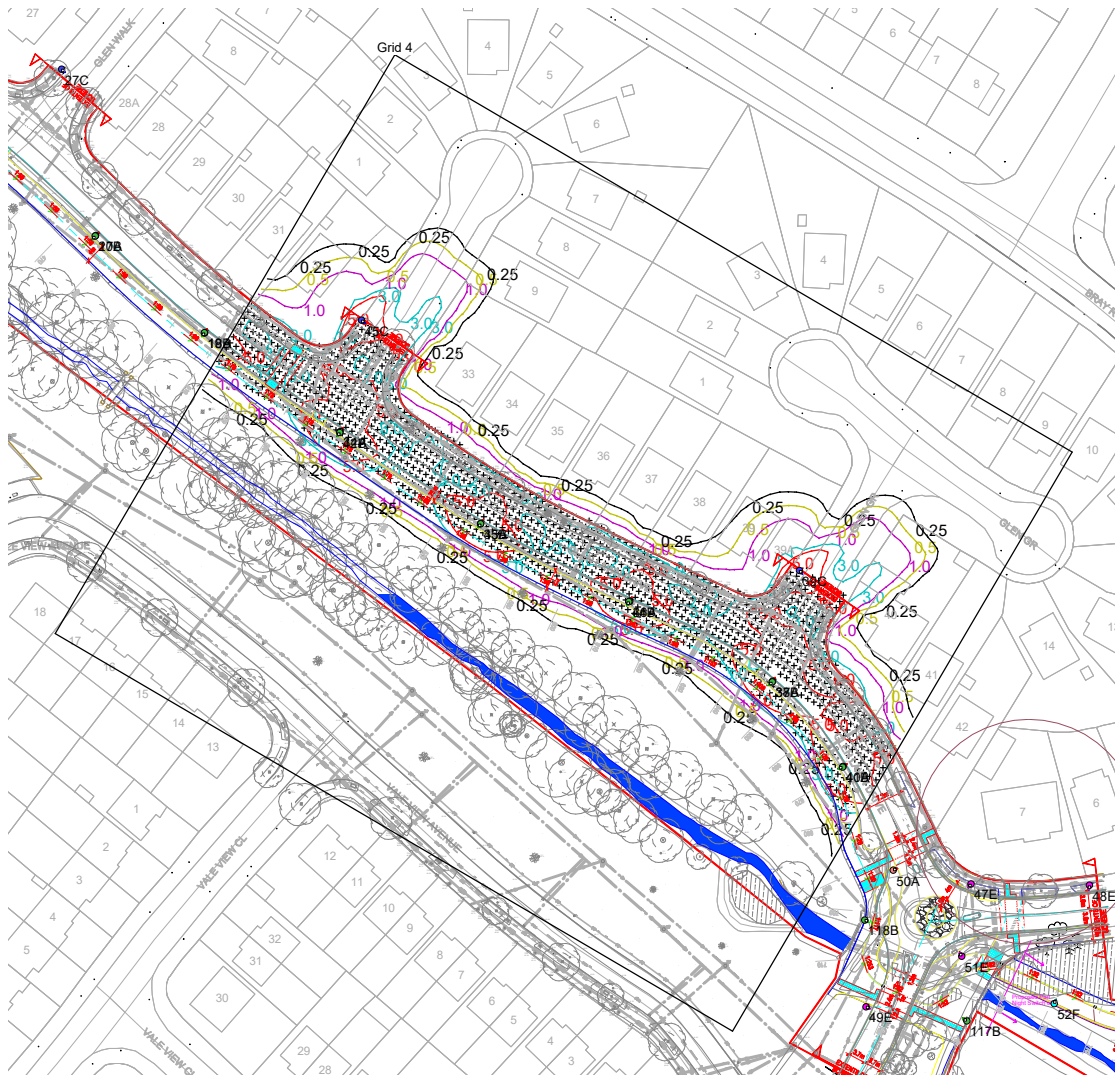


Results

Eav	5.58
Emin	1.09
Emax	20.49
Emin/Emax	0.05
Emin/Eav	0.20

Horizontal Illuminance (lux)

Grid 4

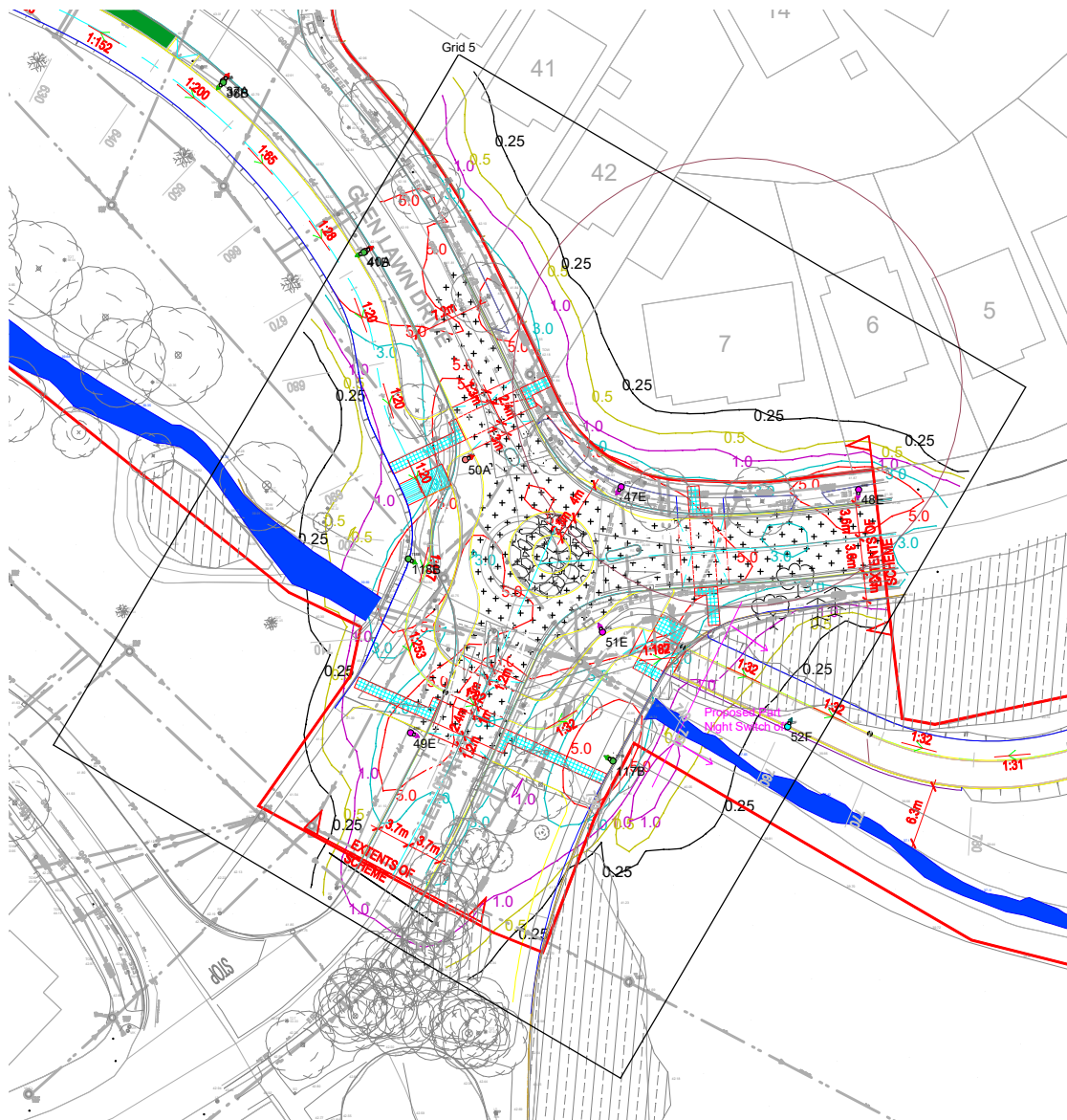


Results

Eav	5.11
Emin	1.16
Emax	20.60
Emin/Emax	0.06
Emin/Eav	0.23

Horizontal Illuminance (lux)

Grid 5



Results

Eav	6.11
Emin	2.47
Emax	11.80
Emin/Emax	0.21
Emin/Eav	0.40

Horizontal Illuminance (lux)

Grid 6

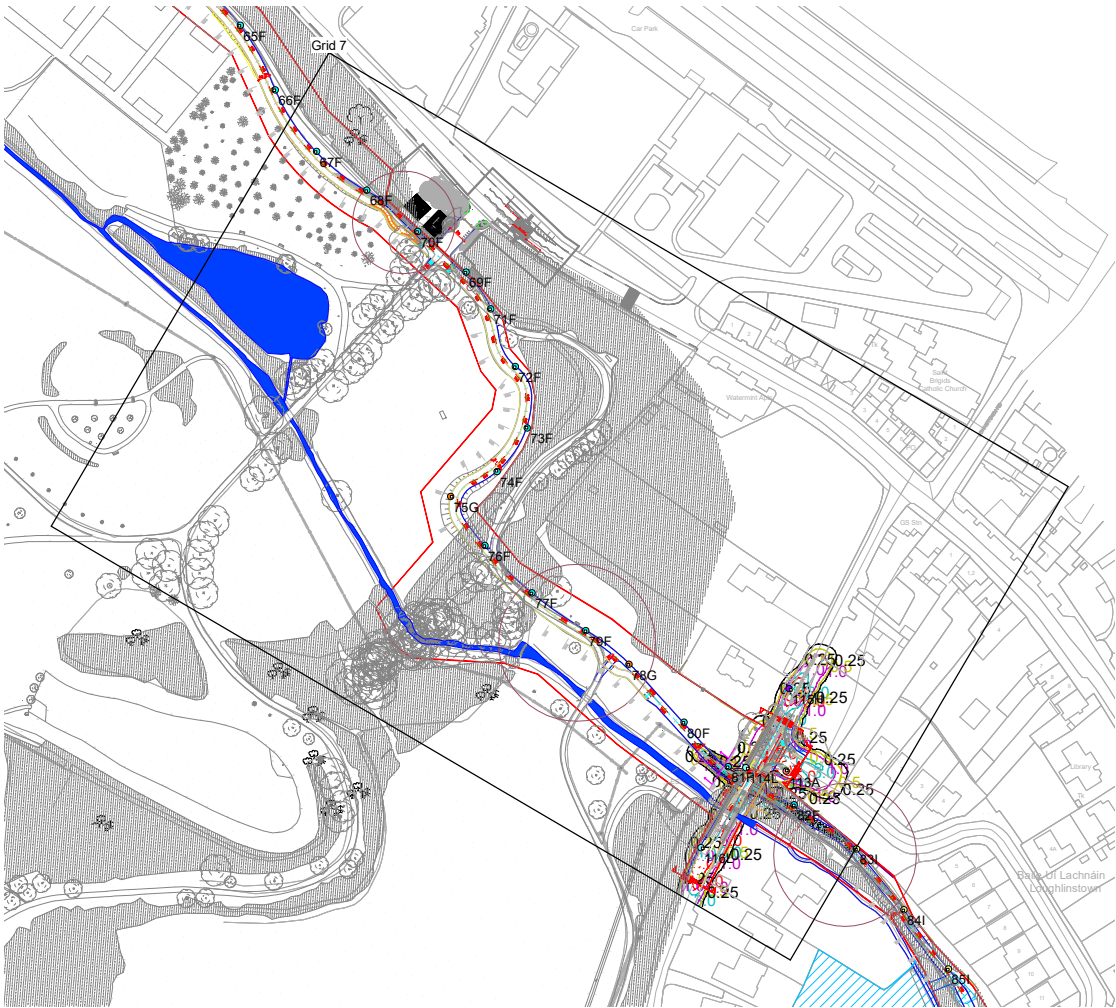


Results

Eav	5.05
Emin	1.13
Emax	12.41
Emin/Emax	0.09
Emin/Eav	0.22

Horizontal Illuminance (lux)

Grid 7

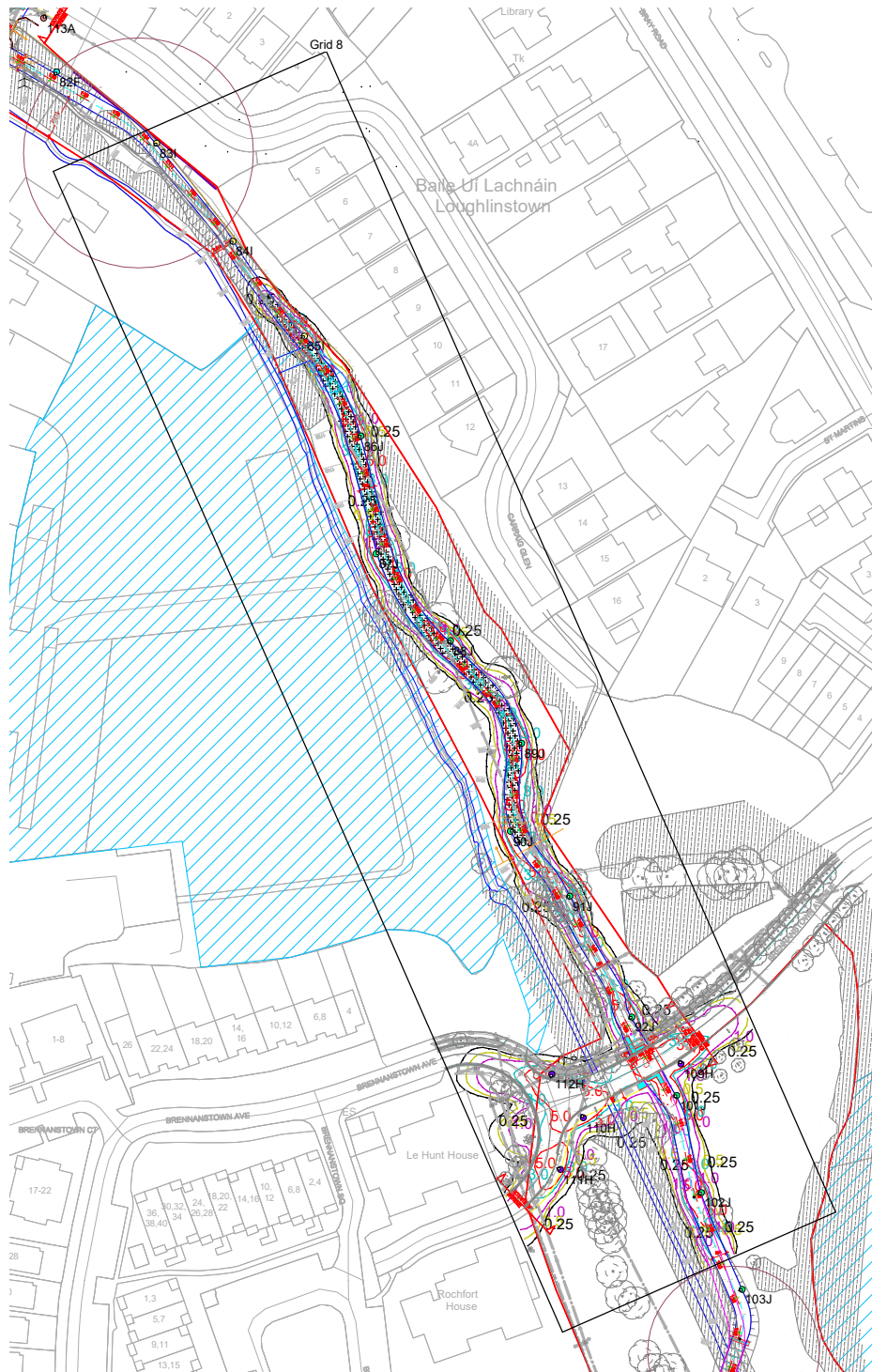


Results

Eav	0.76
Emin	0.00
Emax	5.61
Emin/Emax	0.00
Emin/Eav	0.00

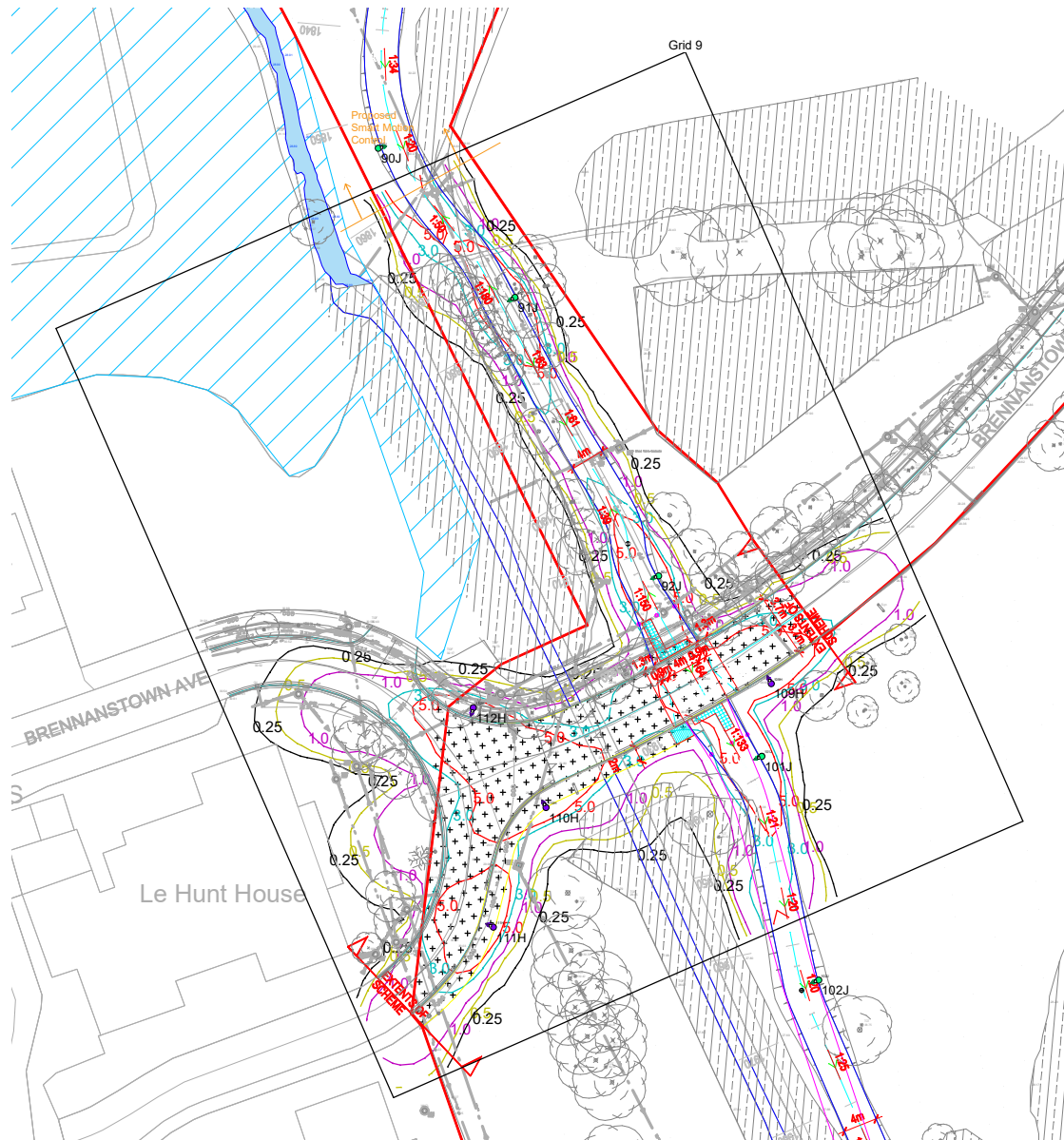
Horizontal Illuminance (lux)

Grid 8



Horizontal Illuminance (lux)

Grid 9

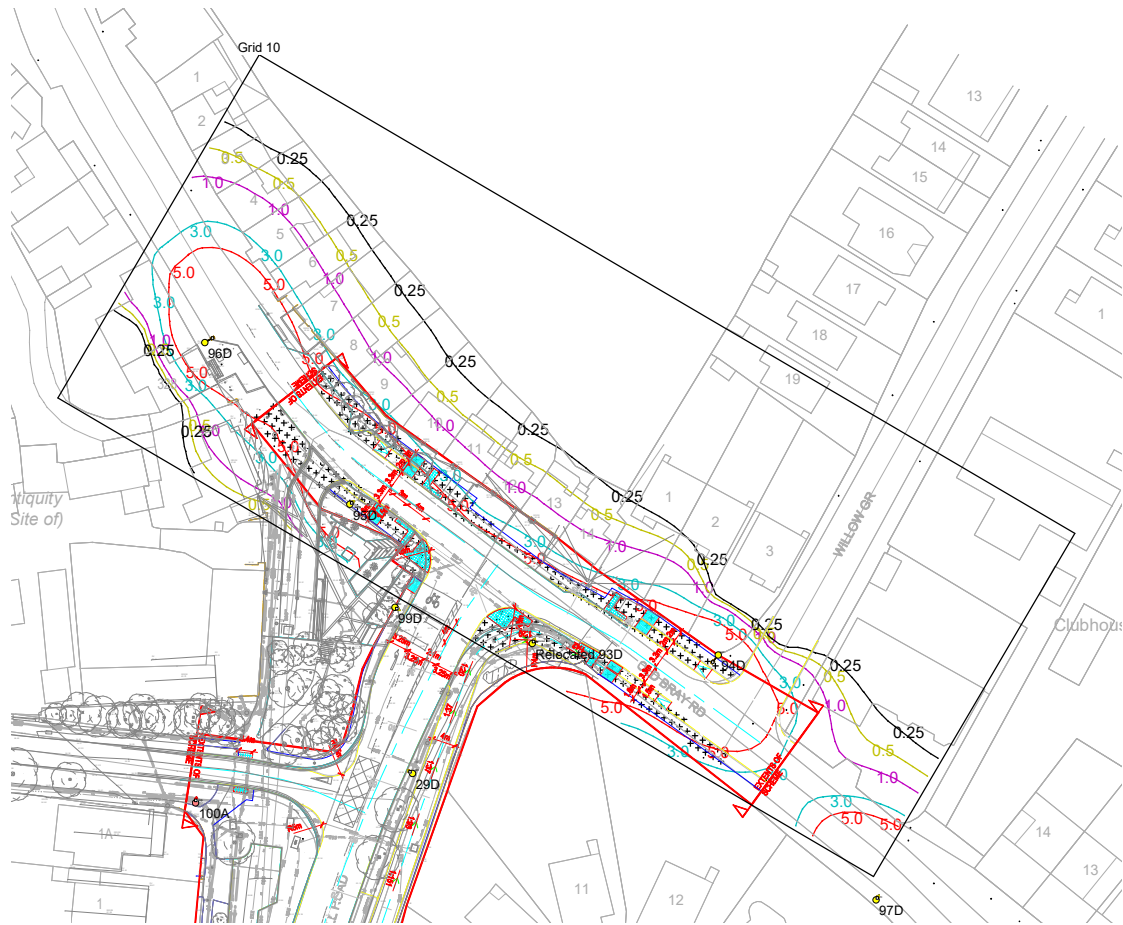


Results

Eav	5.92
Emin	1.50
Emax	13.48
Emin/Emax	0.11
Emin/Eav	0.25

Horizontal Illuminance (lux)

Grid 10



Results

Eav	11.02
Emin	3.11
Emax	28.12
Emin/Emax	0.11
Emin/Eav	0.28

Horizontal Illuminance (lux)

Grid 11

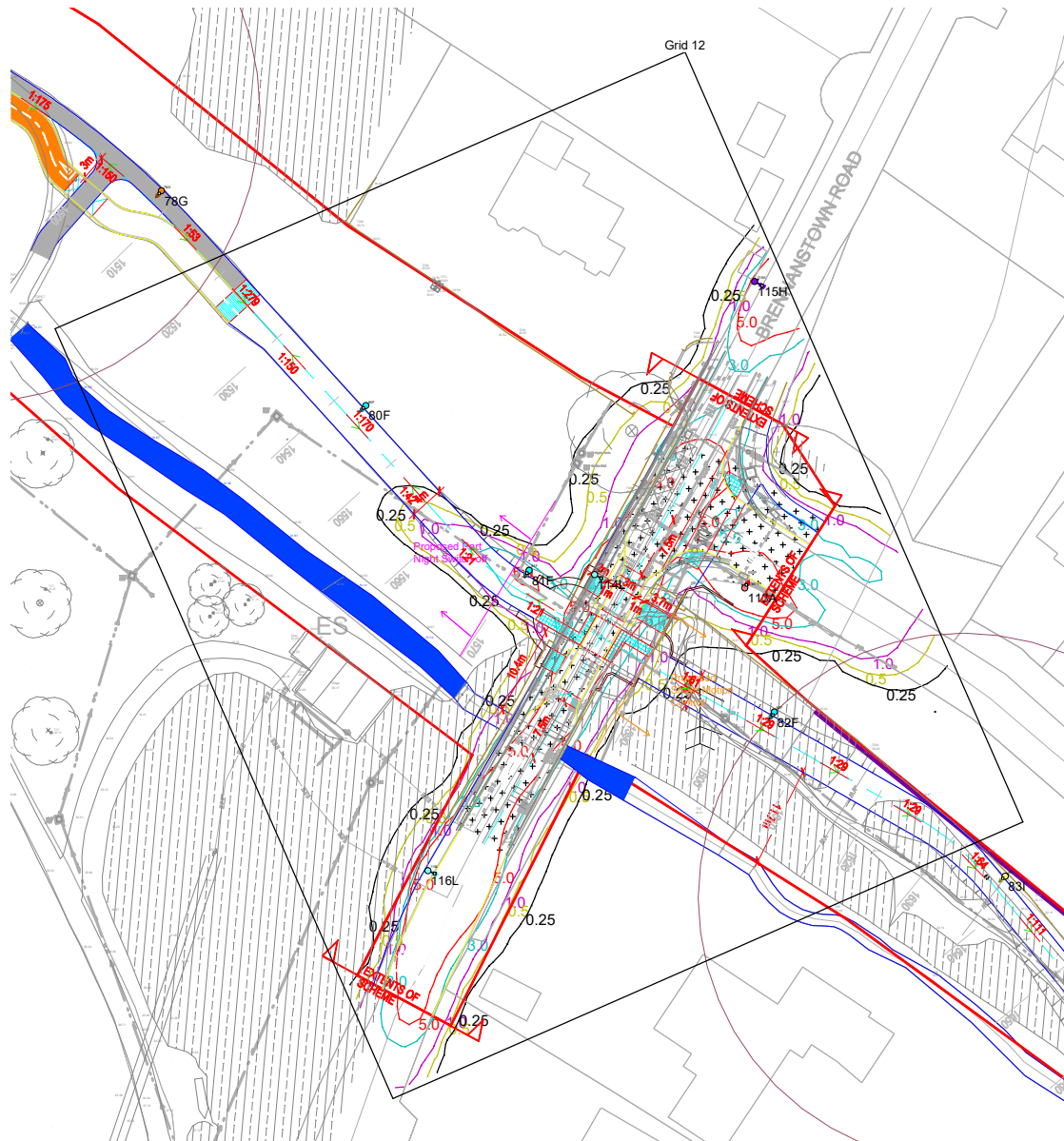


Results

Eav	6.52
Emin	1.57
Emax	15.99
Emin/Emax	0.10
Emin/Eav	0.24

Horizontal Illuminance (lux)

Grid 12

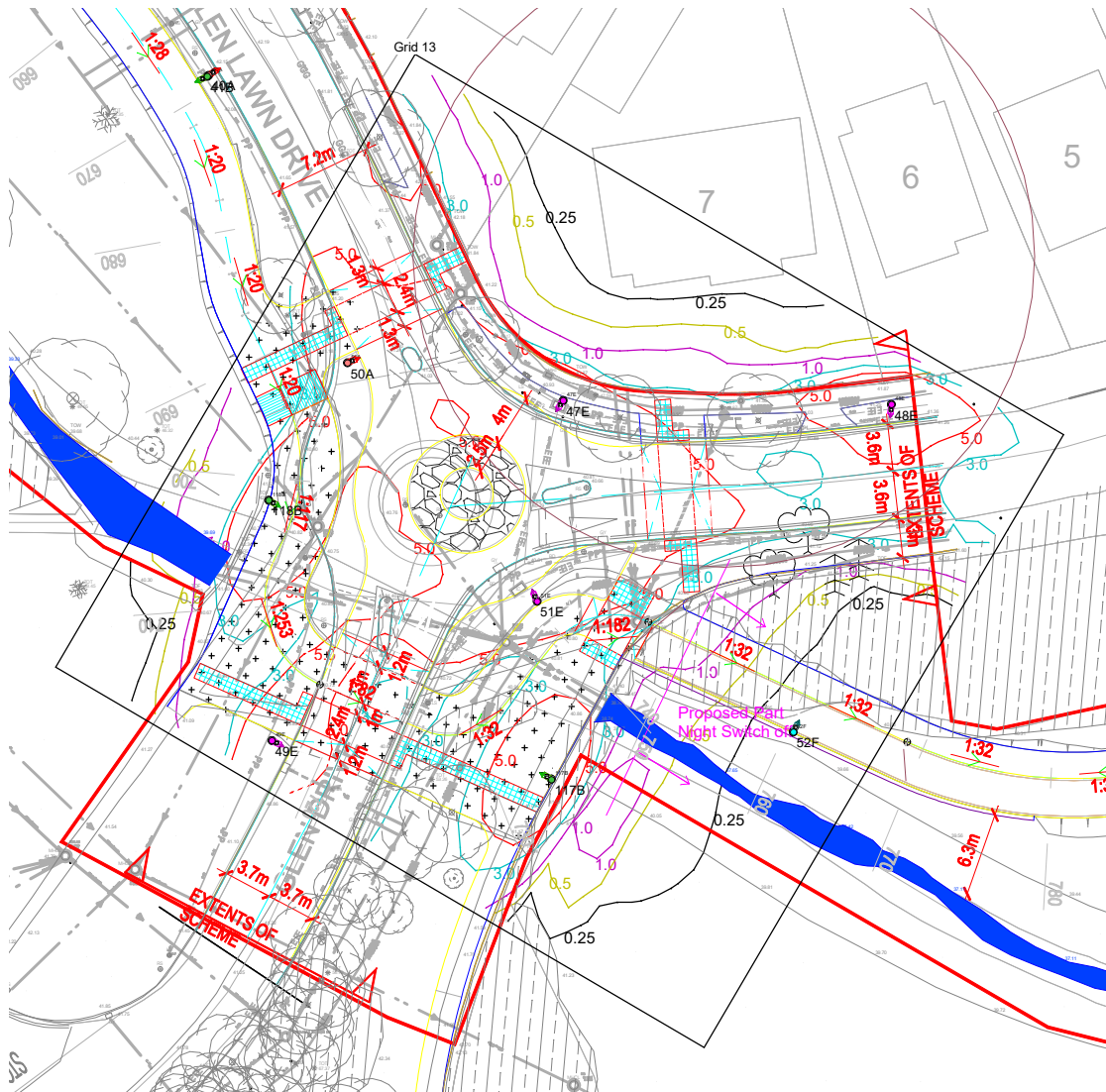


Results

Eav	8.36
Emin	1.80
Emax	31.37
Emin/Emax	0.06
Emin/Eav	0.22

Horizontal Illuminance (lux)

Grid 13



Results

Eav	5.18
Emin	1.22
E _{max}	16.68
Emin/E _{max}	0.07
Emin/Eav	0.24