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Lighting Assessment

Byway Alterations, Gibraltar Farm, Medway

100157

Document Control

Issue Date	Revision	Author
03/09/2020	A	Julian Joseph
23/12/2020	B	Julian Joseph

Table of Contents

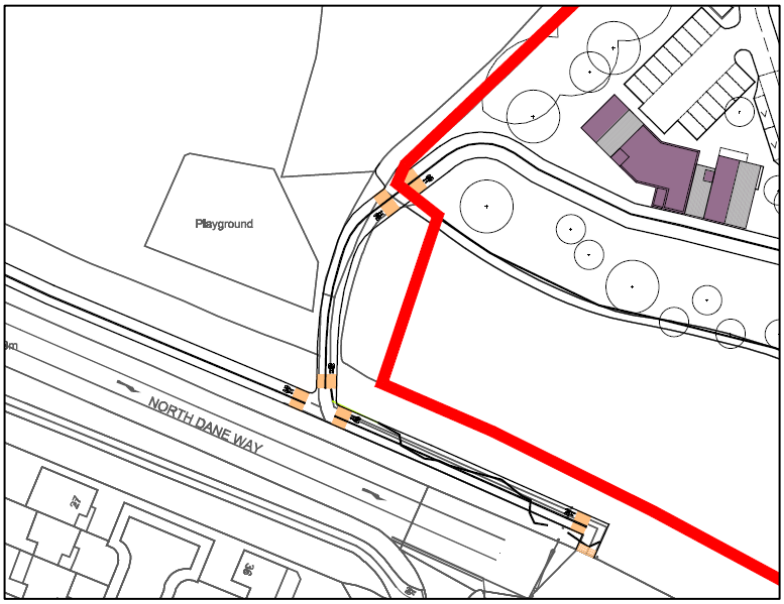
1. INTRODUCTION 4
2. SCOPE OF ASSESSMENT 4
3. LIGHTING REQUIREMENTS 5
4. CALCULATED RESULTS 6
5. CONCLUSION AND RECOMMENDATIONS 9
REFERENCES 10
APPENDIX A – DESIGN CLASS SELECTION 11
APPENDIX B – LIGHTING CALCULATIONS 12

1. Introduction

As part of the planning application for the Gibraltar Farm development, proposals for the alteration of an existing byway have been submitted. The proposal details the widening and resurfacing of the byway which will enhance the link from the development through to North Dane Way.

The Planning Authority have indicated that the byway should be lit to promote usage by pedestrians and cyclists during the hours of darkness.

Picture 1



Above image taken from Lee Evans Partnership drawing number 08418-A-L-(00)-0100

2. Scope of Assessment

This assessment has been produced to confirm:

- The horizontal illuminance on the byway surface
- The vertical illuminance or spill light along the adjacent ancient woodland tree line
- Recommendations for a compliant lighting installation

3. Lighting Requirements

Byway Lighting

Using BS EN 13201:2015 (Guidelines on the selection of lighting classes) the byway lighting is to be measured against the P6 design classification. The selection table can be found in Appendix A with the required P6 illuminance values listed in Table 1.

Table 1

Lighting Classification	Average Horizonal Illuminance (lux)	Minimum Horizontal Illuminance (lux)
P1	15.00	3.00
P2	10.00	2.00
P3	7.50	1.50
P4	5.00	1.00
P5	3.00	0.60
P6	2.00	0.40

Ecology Constraints

The Site Wide Ecological Mitigation Strategy (June 2019) document produced by EDP details ecology constraints to consider when producing a lighting strategy and design. These include the presence of bats and ancient woodland.

Many of the core design principles listed in the document such as the requirement for warm white colour temperatures and dimming, can be controlled at the either the outline or detailed design stage.

The requirement for lighting levels of less than 1 lux along the tree line will be considered in this assessment by using appropriate luminaire shielding and optical data within the calculations.

Existing Lighting - North Dane Way

The nearest lighting column to the byway access point is approximately 16m east along North Dane Way. This column has been used for contribution in the lighting assessment calculations. This contribution may be removed during detailed design to ensure the path is lit independently.

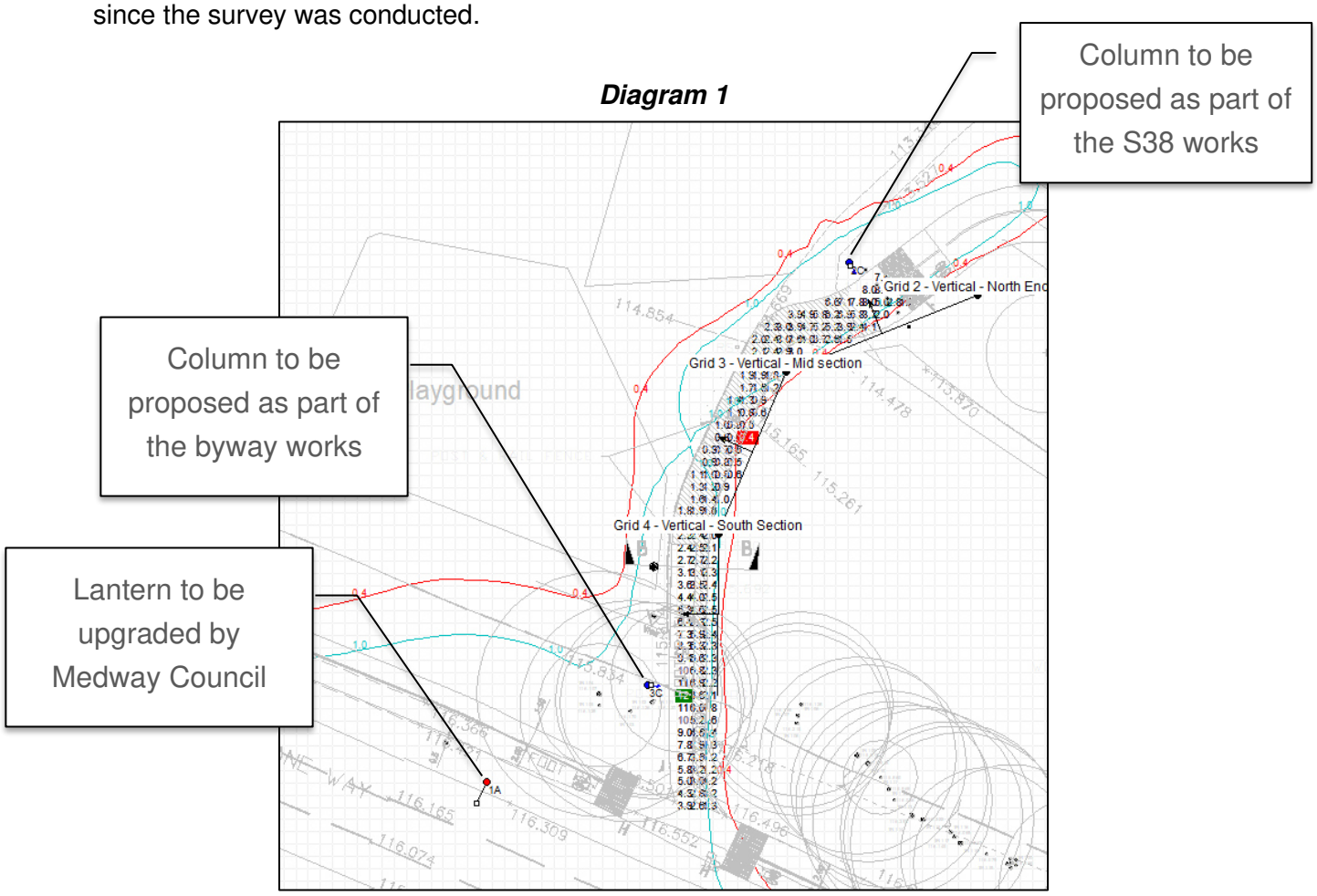
4. Calculated Results

Horizontal Illuminance

Diagram 1 taken from the calculation in Appendix B demonstrates that the P6 lighting class can be achieved using 6m columns at either end of the byway.

The red lux contour represents 0.4 lux and the blue line is equal to 1 lux at ground level. The trees depicted in the topographical plan between the column and byway have been removed since the survey was conducted.

Diagram 1



Vertical Illuminance

Diagrams 2, 3 & 4 show the vertical illuminance grids along the tree line of the woodland.

The diagrams along with the calculation in Appendix B prove that the vertical illuminance can be limited to 1 lux or lower.

Diagram 2

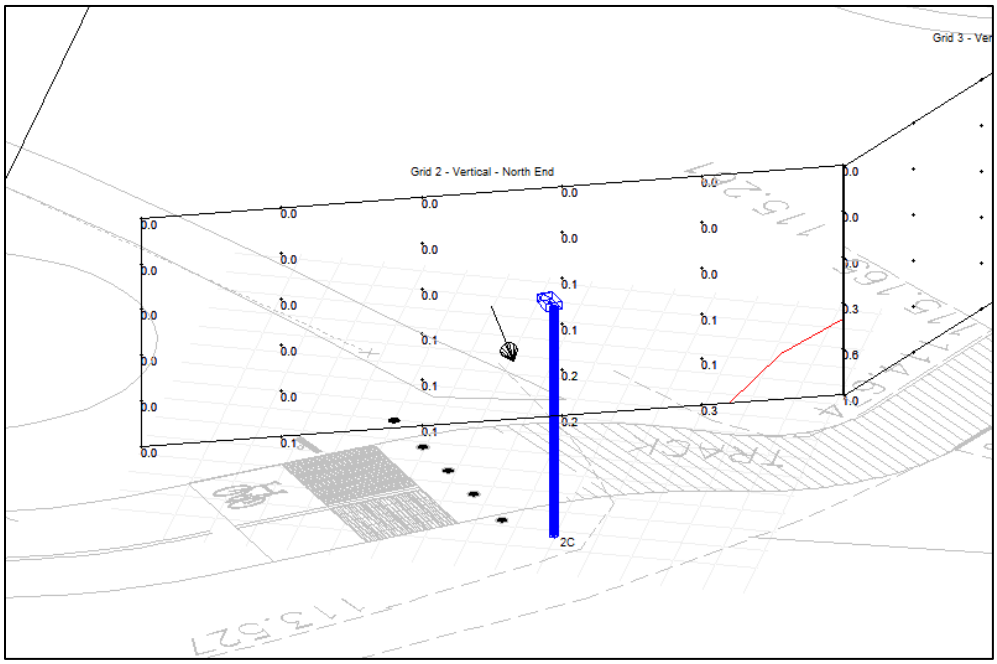


Diagram 3

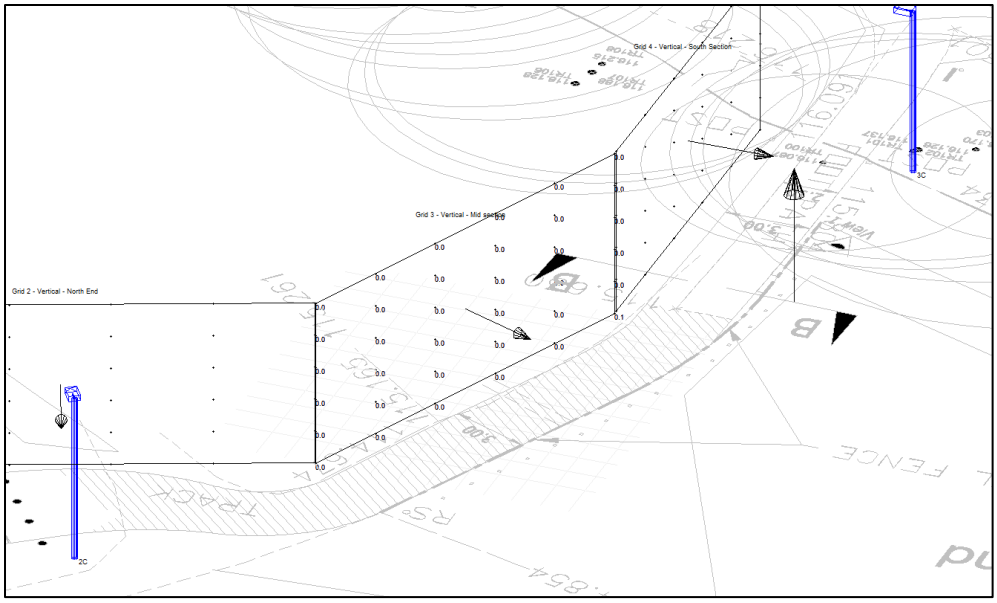
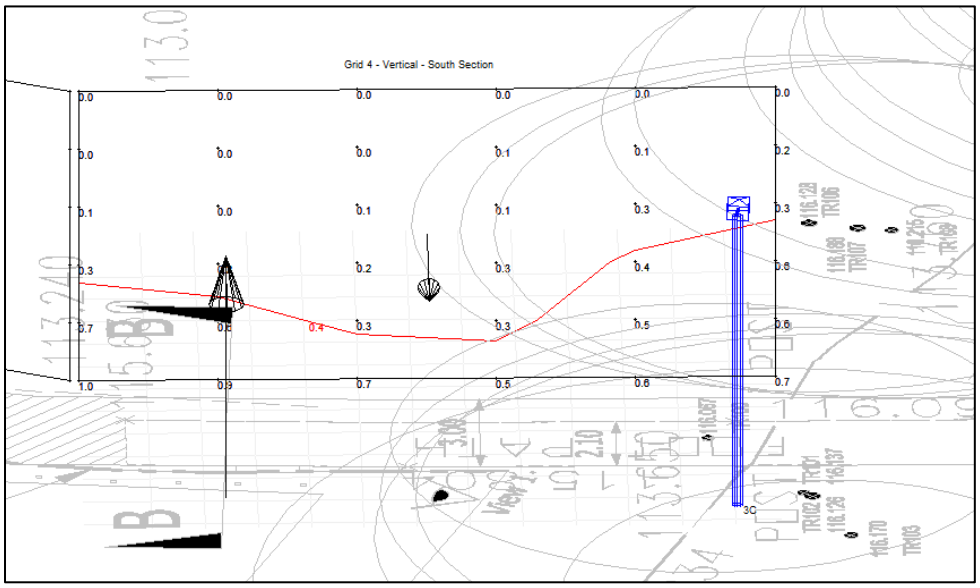


Diagram 4



5. Conclusion and Recommendations

The calculation in appendix B shows that the introduction of a new 6 metre column at either end of the byway can achieve the minimum horizontal illuminance required for a footpath. Using a lower mounting height would not achieve the required results.

The luminaires are to be fitted with shields to the front of the LEDs to limit the light emitted forward against the tree line of the woodland. With the luminaire and column correctly installed, the overspill should be kept to under 1 lux.

Due to land ownership and legal complexities of byways, any new lighting should be sited within the boundary of the highway. This would ensure future maintenance of the lighting unit by the Local Authority without having to enter legal agreements such as wayleaves for the access of services.

References

The following documents have been referred to during the preparation of this assessment:

- BS5489:2013-1 Code of practice for the design of road lighting
- EN 13201:2015 Guidelines on the selection of lighting classes
- Medway Council Highway Lighting Developers Guide December 2019

Appendix A – Design Class Selection

Design Parameters

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Project Number:	100157	**Revision:**	A
Project Name:	Byway, Gibraltar Farm - Assessment	**Date:**	02/09/2020

Selection of Lighting Class P6 - Byway

Travel Speed	Low	v ≥ 11 mph	1	1
	Very Low	< 11 mph	0	
Use Intensity	Busy		1	-1
	Normal		0	
	Quiet		-1	
Traffic Composition	Pedestrians, cyclists and motorized traffic		2	1
	Pedestrians and motorized traffic		1	
	Pedestrians and cyclists only		1	
	Pedestrians only		0	
	Cyclists only		0	
Parked Vehicles	Present		1	0
	Not Present		0	
Ambient Luminance	High		1	0
	Moderate		0	
	Low		-1	
			Total Score	**1**

P Class Illuminance Values

Score	P Class	SP Ratio	Eav	Emin	Eav (max)
6	P1	0.00	15.00	3.00	22.50
5	P2		10.00	2.00	15.00
4	P3		7.50	1.50	11.25
3	P4		5.00	1.00	7.50
2	P5		3.00	0.60	4.50
1	P6		2.00	0.40	3.00

Appendix B – Lighting Calculations

DATE: 23 December 2020

DESIGNER: Julian Joseph

PROJECT No: 100157 - Appendix B2 (REVISION B)

PROJECT NAME: Gibraltar Farm - Byway Lighting Assessment

This calculation has been composed to illustrate both the horizontal illuminance for the byway and the vertical illuminance against the ancient woodland treeline.

The byway is to be lit to P6:
Horizontal Illuminance - Eav: 2.00; Emin: 0.40

Vertical illuminance should not exceed 1.0 lux

Lanterns with both front and rear shields have been utilised.

Outdoor Lighting Report

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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 - Horizontal Illu...	577633.65	163034.08	65.00	75.00	1.00	1.00
2	Grid 2 - Vertical - Nort...	577692.53	163093.65	16.77	6.00	3.35	1.20
3	Grid 3 - Vertical - Mid ...	577676.90	163087.48	14.16	6.00	2.83	1.20
4	Grid 4 - Vertical - Sout...	577671.38	163074.27	13.13	6.00	2.63	1.20

Luminaires

Luminaire A Data

Supplier	Thorn
Type	ISARO PRO L - 48 x Neutral White 4000K LE D CRI70 350mA - MR O
Lamp(s)	LED_4000K
LampFlux(klm)/Colour	8.12 4000/70
File Name	IP48L35MR740G36_DC.LDT
Maintenance Factor	1.00
Imax70,80,90(cd/klm)	533.5, 92.6, 0.0
Lamp S/P Ratio	1.53
No. in Project	1

Luminaire C Data

Supplier	Joseph Lighting
Type	AXIA 2.1 5166 [[see details], PC, Black], [Integrated lenses]
Lamp(s)	8 NVSL219CT@690mA WW830 230V 00-25-501
LampFlux(klm)/Colour	0.94 WW 3000K/80
File Name	AXIA 2.1 5166 8 NVSL219CT 690mA WW830 19W 392552 [[see details], PC, Black], [Inte...
Maintenance Factor	1.00
Imax70,80,90(cd/klm)	1342.6, 171.5, 0.0
Lamp S/P Ratio	0.00
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	577652.58	163054.07	10.00	243.00	5.00	0.00	2.00	100%			
2	C	577682.02	163096.30	6.00	303.00	0.00	0.00	0.30	75%			
3	C	577665.66	163061.95	6.00	356.00	0.00	0.00	0.30	100%			

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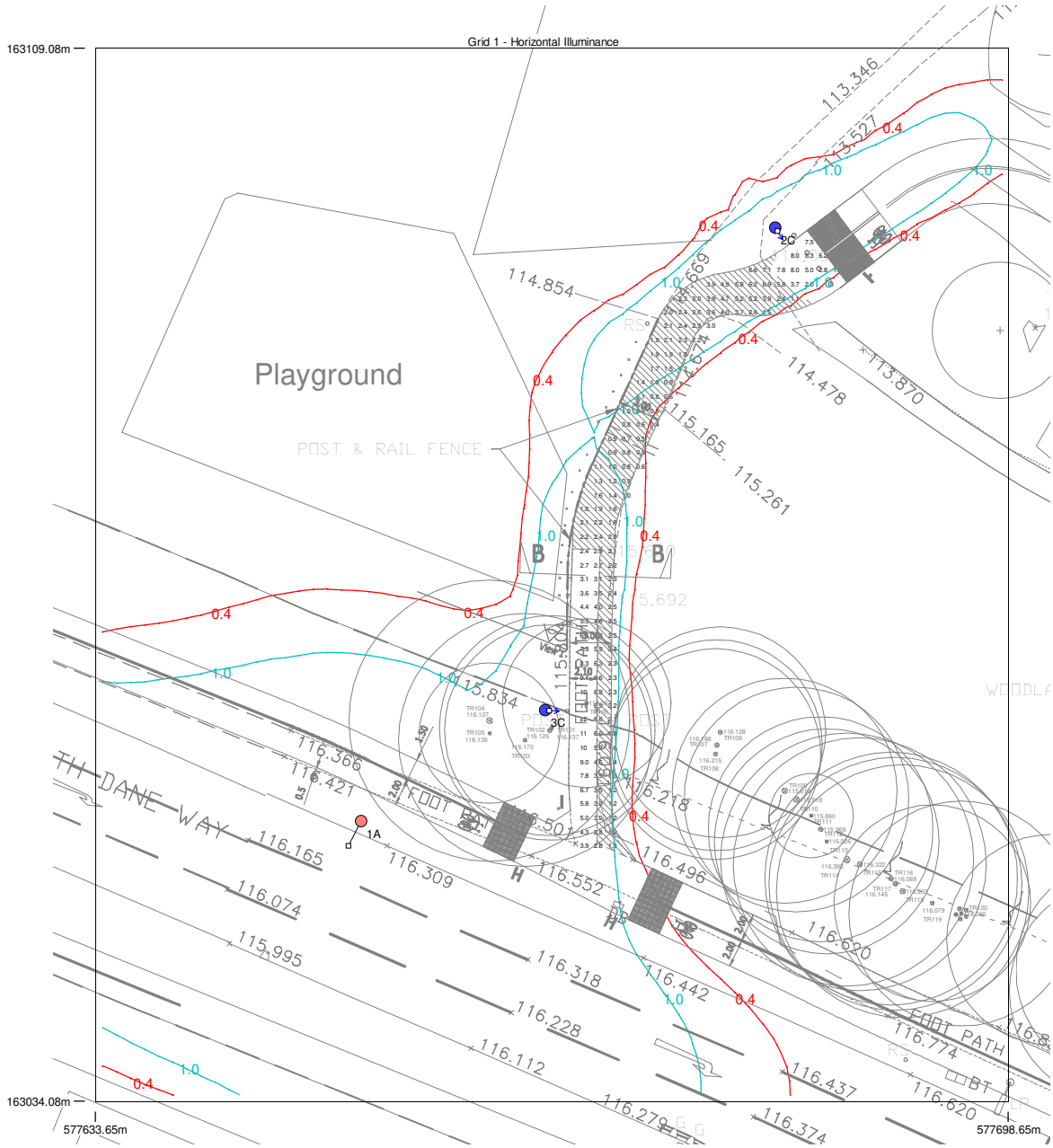
Horizontal Illuminance (lux)

Grid 1 - Horizontal Illuminance



Results

Eav	3.44
Emin	0.40
Emax	11.64
Emin/Emax	0.03
Emin/Eav	0.12

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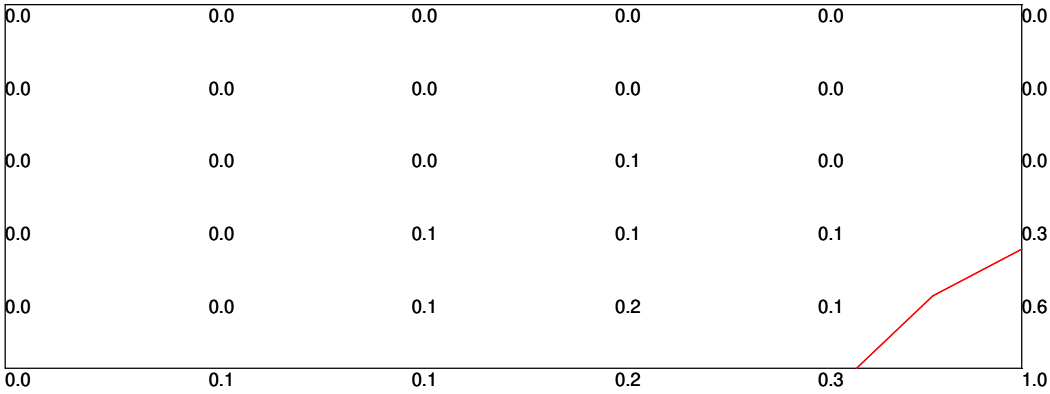
Illuminance (lux)

Grid 2 - Vertical - North End

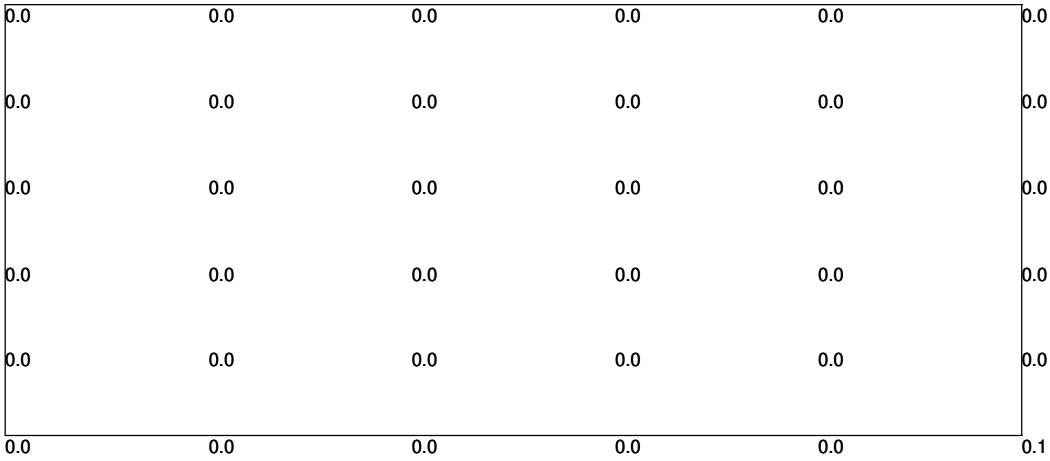


Results

Eav	0.10
Emin	0.00
Emax	0.99
Emin/Emax	0.00
Emin/Eav	0.00

Illuminance (lux)

Grid 3 - Vertical - Mid section



Results

Eav	0.01
Emin	0.00
Emax	0.06
Emin/Emax	0.00
Emin/Eav	0.00

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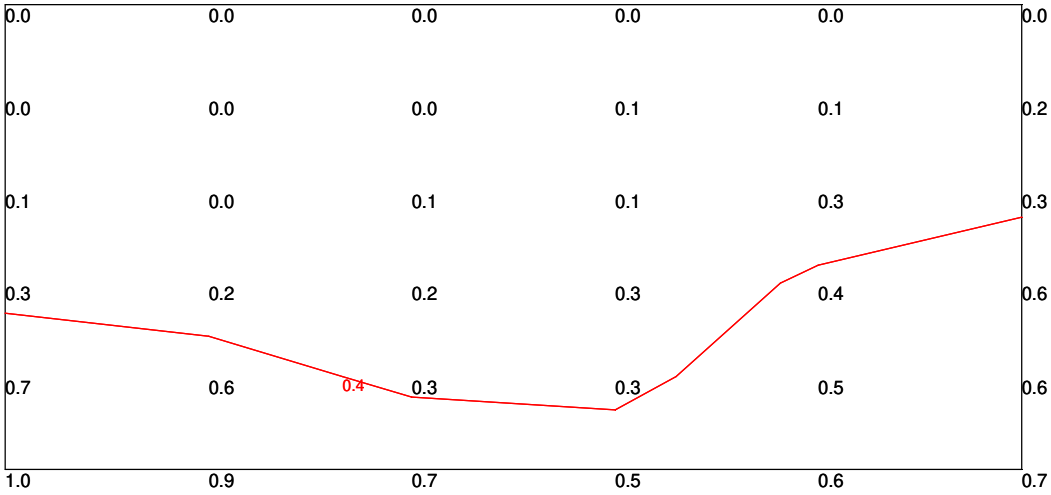
Illuminance (lux)

Grid 4 - Vertical - South Section



Results

Eav	0.29
Emin	0.00
Emax	0.97
Emin/Emax	0.00
Emin/Eav	0.00