Storrington Lawn Tennis Club

Outdoor LED Tennis Lighting Design

Project code:	6430b
Date:	17/09/2024
Client:	Storrington Lawn Tennis Club
Client Representative:	
Lighting Consultant:	
Project Consultant:	
Planning Consultant:	
Lighting Design Company:	Luminance Pro Lighting Systems Ltd
Lighting Design Representative:	Matthew Haskins
Lighting Design Software:	CalcuLux Area 7.7.0.1
Design Criteria:	To provide a lighting scheme suitable for Tennis Class II as defined in British Standard BS12193:2018, whilst minimising light spill and glare to neighbouring properties. P.A. = 300 Lux maintained
Columns:	30 No. Existing 6.0 metre nominal columns to be utilised
Luminaires:	36 No. (HiLux model: Match LED)
Notes:	This lighting design is solely based on the use of the equipment detailed. Any deviation from this equipment will produce differing results. The superior optics of the HiLux Match luminaire have been specifically selected to minimise the effects of nuisance overspill to adjacent dwellings. Due to the vast and varying topography of the site, only minimal screening has been modelled. With the extensive screening that exists onsite, actual readings are likely to be much lower then the calculated values.

The nominal values shown in this report are the result of precision calculations, based upon precisely positioned luminaires in a fixed relationship to each other and to the area under examination. In practice the values may vary due to tolerances on luminaires, luminaire positioning, reflection properties and electrical supply.

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HiLux

SAPCA
SPORTS AND PLAY CONSTRUCTION ASSOCIATION

APPROVED CONTRACTOR

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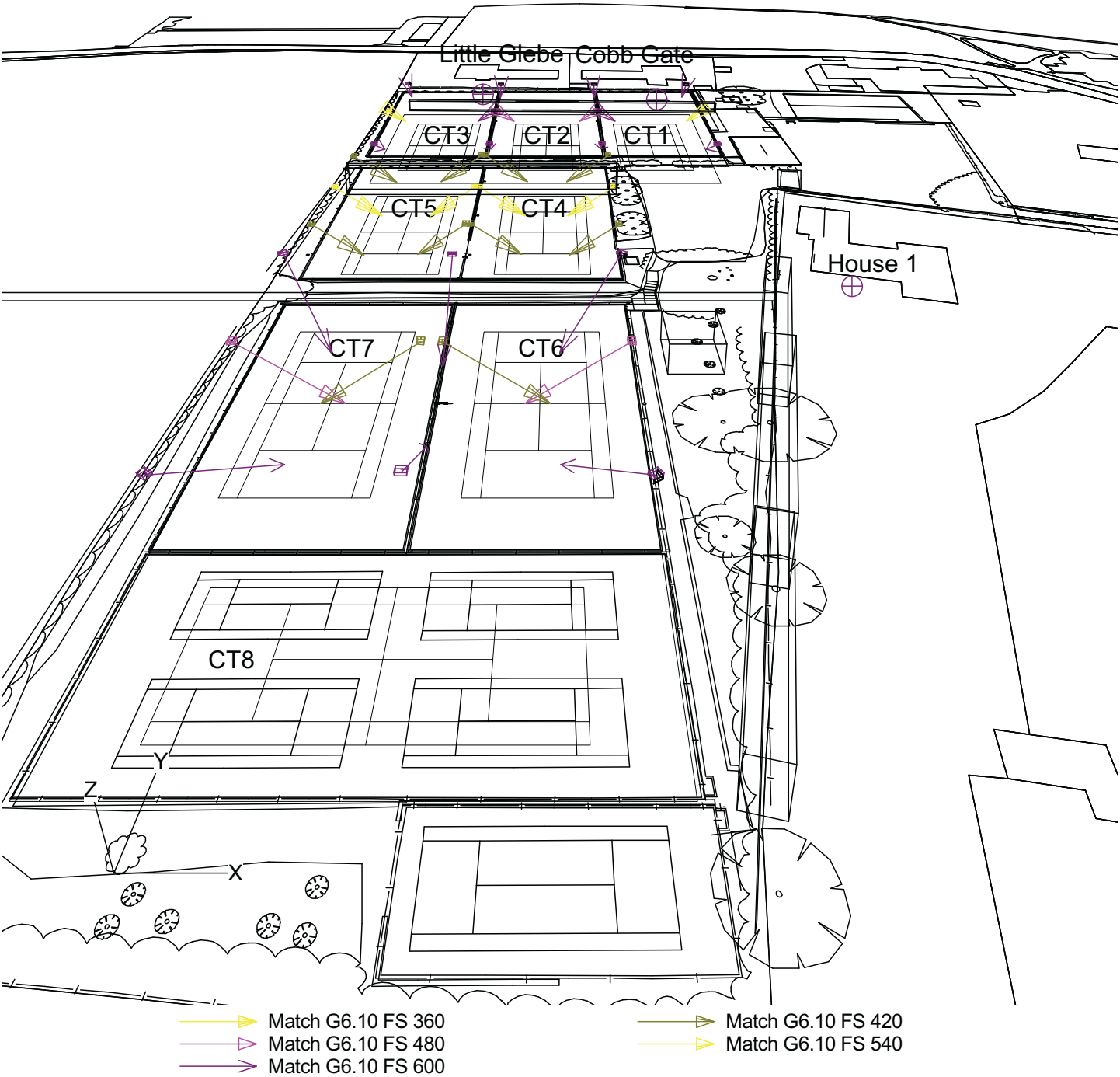
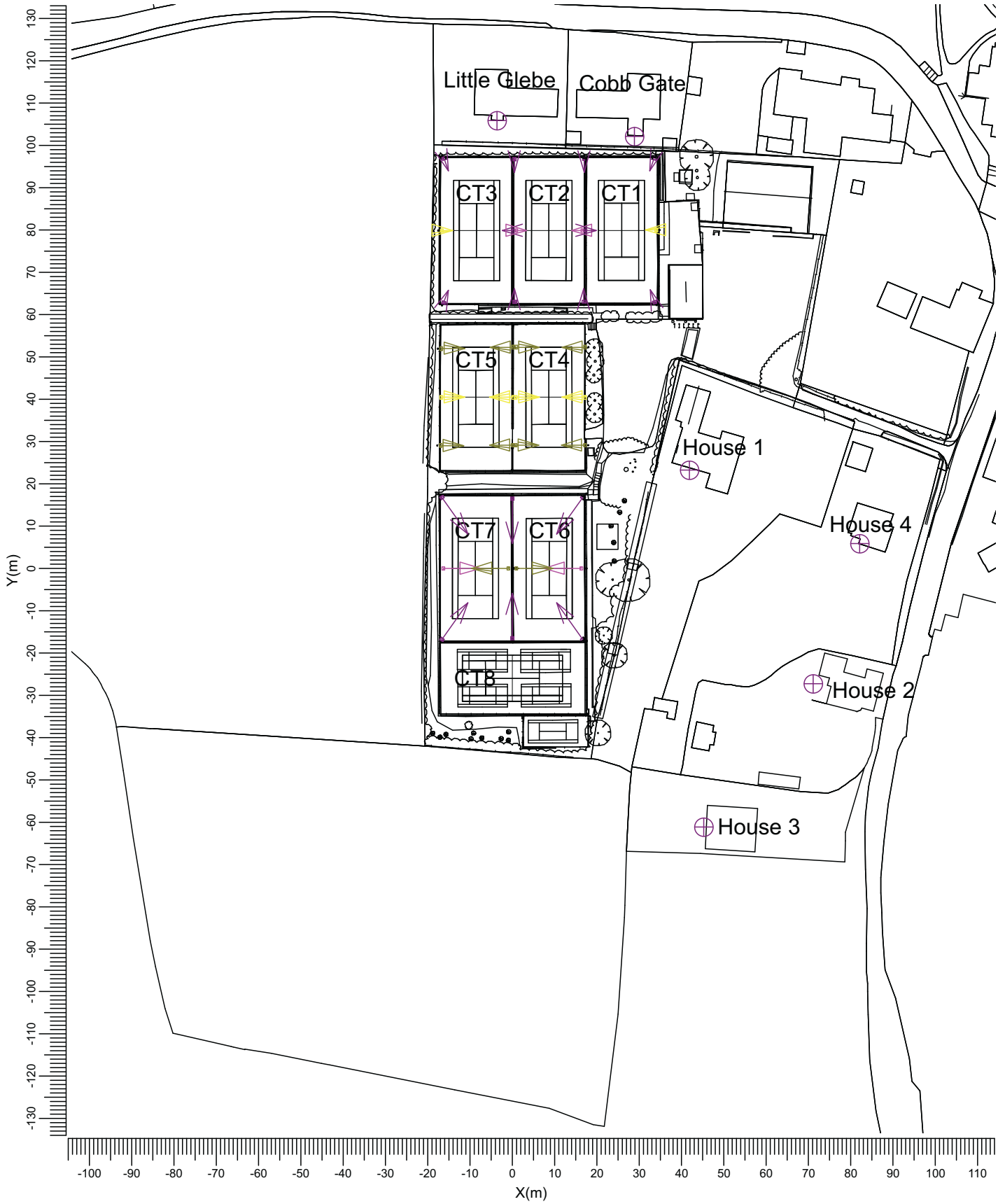
1. Project Description

1.1 3-D Project Overview



1.2 Top Project Overview



Scale
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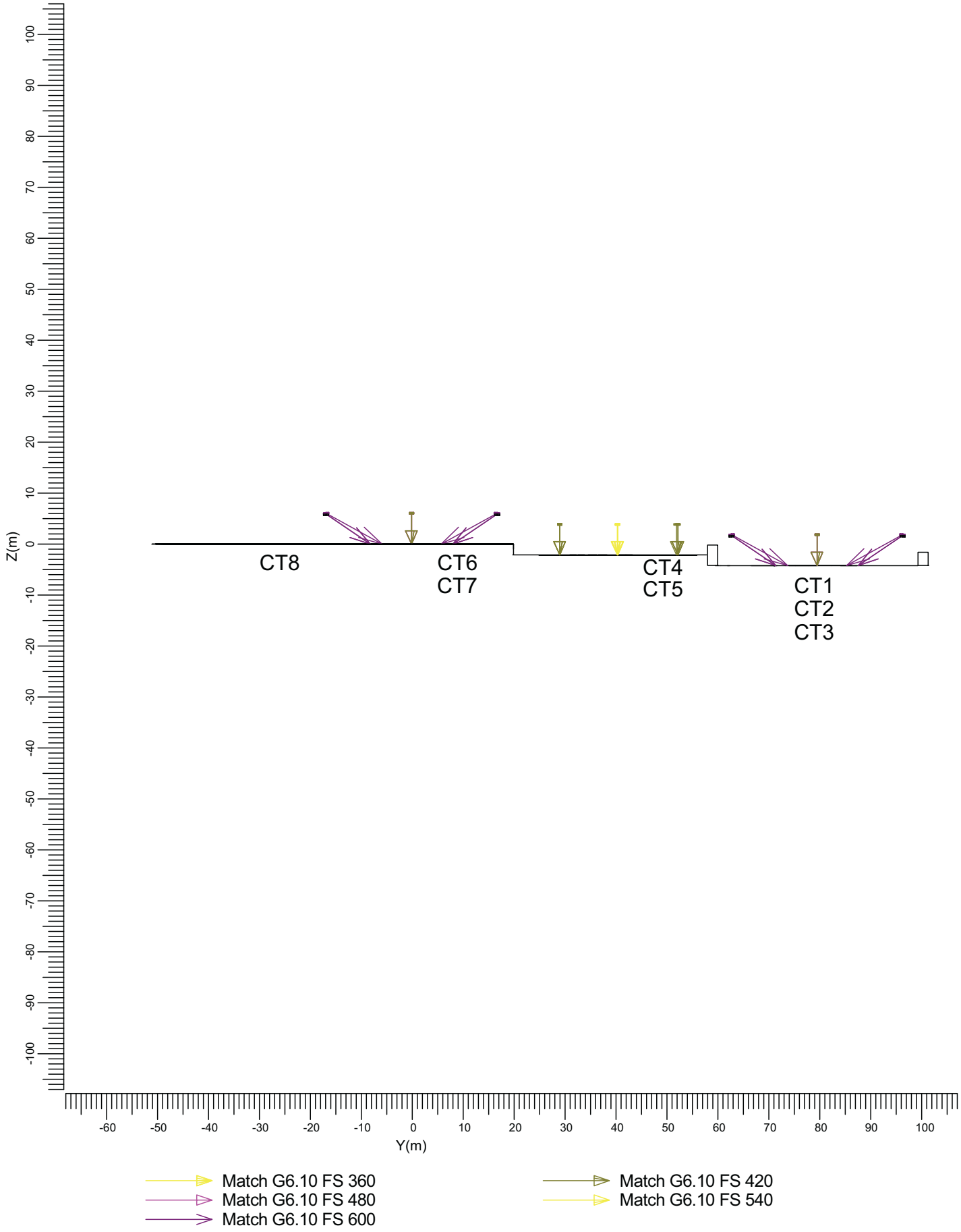
1.3 Right Project Overview



Scale
1:1000

2. Summary

2.1 General Information

The overall maintenance factor used for this project is 1.00.

2.2 Observer Information

Code	Observer	Position		
		X (m)	Y (m)	Z (m)
Aa	Observer 1	41.88	23.22	-0.92
Bb	Observer 2	45.22	-61.07	1.50
Cc	Observer 3	71.12	-27.28	-3.17
Dd	Observer 4	82.07	5.84	-3.17
Ee	Little Glebe	-3.57	105.82	-2.70
Ff	Cobb Gate	28.93	102.13	-2.70

2.3 Obstacle Information

Obstacle	Transparency (%)	Position		
		X (m)	Y (m)	Z (m)
Fence 01	95	39.56	49.62	-3.20
Shed	0	20.00	4.50	0.00
Poly Block	0	0.00	0.00	-1.00
Foliage 01	35	19.00	-35.00	-0.01
Rear Deflector 01	0	16.43	17.28	5.87
		16.43	-17.28	5.87
Side Deflector 01	0	17.10	16.81	5.87
		17.10	-16.81	5.87
Foliage 02	35	22.50	-20.00	-0.01
Foliage 03	35	27.00	0.00	-0.01
Hedge 01	0	-16.65	100.99	-4.20
Rear Deflector 02	0	0.07	97.05	1.67
Rear Deflector 03	0	16.61	97.07	1.67
Side Deflector 02	0	33.27	97.35	1.67
Rear Deflector 04	0	33.27	97.35	1.67
Hedge 02	0	-19.59	60.10	-4.20
Side Deflector 03	0	-15.88	97.34	1.67
Side Deflector 04	0	17.42	97.06	1.67

2.4 Project Luminaires

Code	Qty	Luminaire Type	Lamp Type	Power (W)	Flux (lm)
H	4	Match G6.10 FS 360	1 * LED 06+00	348.0	1 * 52830
L	10	Match G6.10 FS 420	1 * LED 07+00	406.0	1 * 61600
Q	4	Match G6.10 FS 480	1 * LED 08+00	464.0	1 * 70290
V	2	Match G6.10 FS 540	1 * LED 09+00	522.0	1 * 78620
a	16	Match G6.10 FS 600	1 * LED 10+00	580.0	1 * 86430

The total installed power: 17.63 (kWatt)

Number of Luminaires Per Switching Mode:

Switching Mode	Luminaire Code					Power (kWatt)
	H	L	Q	V	a	
Court 1	0	0	0	1	5	3.42
Court 2	0	0	2	0	4	3.25
Court 3	0	0	0	1	5	3.42
Courts 1-3	0	0	2	2	10	7.77
Court 4	2	4	0	0	0	2.32
Court 5	2	4	0	0	0	2.32
Courts 4&5	4	8	0	0	0	4.64

Switching Mode	Luminaire Code					Power (kWatt)
	H	L	Q	V	a	
Court 6	0	2	1	0	4	3.60
Court 7	0	2	1	0	4	3.60
Courts 6&7	0	2	2	0	6	5.22
Court 8	0	0	0	0	0	0.00
All Lights	4	10	4	2	16	17.63

Number of Luminaires Per Arrangement:

Arrangement	Luminaire Code					Power (kWatt)
	H	L	Q	V	a	
CT1 P1	0	0	0	0	1	0.58
CT1 P2	0	0	0	1	0	0.52
CT1 P3	0	0	0	0	1	0.58
CT1 P4	0	0	0	0	1	0.58
CT1,2 P1	0	0	0	0	1	0.58
CT1,2 P2	0	0	0	0	1	0.58
CT2 P1	0	0	1	0	0	0.46
CT2 P2	0	0	1	0	0	0.46
CT2,3 P1	0	0	0	0	1	0.58
CT2,3 P2	0	0	0	0	1	0.58
CT3 P1	0	0	0	0	1	0.58
CT3 P2	0	0	0	0	1	0.58
CT3 P3	0	0	0	1	0	0.52
CT3 P4	0	0	0	0	1	0.58
CT4 P1	0	1	0	0	0	0.41
CT4 P2	1	0	0	0	0	0.35
CT4 P3	0	1	0	0	0	0.41
CT4 P4	0	1	0	0	0	0.41
CT4 P5	1	0	0	0	0	0.35
CT4 P6	0	1	0	0	0	0.41
CT5 P1	0	1	0	0	0	0.41
CT5 P2	1	0	0	0	0	0.35
CT5 P3	0	1	0	0	0	0.41
CT5 P4	0	1	0	0	0	0.41
CT5 P5	1	0	0	0	0	0.35
CT5 P6	0	1	0	0	0	0.41
CT6 P1	0	0	0	0	1	0.58
CT6 P2	0	0	1	0	0	0.46
CT6 P3	0	0	0	0	1	0.58
CT6 P4	0	1	0	0	0	0.41
CT6,7 P1	0	0	0	0	1	0.58
CT6,7 P2	0	0	0	0	1	0.58
CT7 P1	0	1	0	0	0	0.41
CT7 P2	0	0	0	0	1	0.58
CT7 P3	0	0	1	0	0	0.46
CT7 P4	0	0	0	0	1	0.58

2.5 Calculation Results

Switching Modes:

Code	Switching Mode
1	Court 1
2	Court 2
3	Court 3
4	Courts 1-3
5	Court 4
6	Court 5
7	Courts 4&5
8	Court 6
9	Court 7
10	Courts 6&7
11	Court 8
12	All Lights

(II)luminance Calculations (with overall maintenance factor of 0.80):

Calculation	Switching Mode	Type	Unit	Ave	Max
PA1	1	Surface Illuminance	lux	361	
PA2	2	Surface Illuminance	lux	344	
PA3	3	Surface Illuminance	lux	364	
PA4	5	Surface Illuminance	lux	326	
PA5	6	Surface Illuminance	lux	321	
PA6	8	Surface Illuminance	lux	366	
PA7	9	Surface Illuminance	lux	366	

(II)luminance Calculations (with overall maintenance factor of 1.00):

Calculation	Switching Mode	Type	Unit	Ave	Max
House 1 Side A	12	Surface Illuminance	lux		0.65
House 1 Side B	12	Surface Illuminance	lux		0.09
House 1 Side C	12	Surface Illuminance	lux		0.19
House 1 Side D	12	Surface Illuminance	lux		0.05
House 2 Side A	12	Surface Illuminance	lux		0.03
House 2 Side B	12	Surface Illuminance	lux		0.00
House 3 Side A	12	Surface Illuminance	lux		0.02
House 3 Side B	12	Surface Illuminance	lux		0.02
House 4 Side A	12	Surface Illuminance	lux		0.06
House 4 Side B	12	Surface Illuminance	lux		0.01
Little Glebe	12	Surface Illuminance	lux		0.54
Cobb Gate A	12	Surface Illuminance	lux		0.52
Cobb Gate B	12	Surface Illuminance	lux		0.21
Cobb Gate C	12	Surface Illuminance	lux		0.58
Cobb Gate D	12	Surface Illuminance	lux		0.03
Cobb Gate E	12	Surface Illuminance	lux		0.41
Overspill - At Ct's 1-3	12	Surface Illuminance	lux		
Overspill - At Ct's 4&5	12	Surface Illuminance	lux		
Overspill - At Ct's 6&7	12	Surface Illuminance	lux		

Obtrusive Light Calculations (with overall maintenance factor of 1.00):

Switching Mode	Observer Code	Luminaire Code	Position			Aiming Angles			Maximum Intensity (cd)
			X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0	
12	Aa	a	-16.58	16.79	5.90	-55.00	61.00	0.00	80
12	Bb	a	33.54	96.92	1.70	-110.00	61.00	0.00	23
12	Cc	a	-16.58	16.79	5.90	-55.00	61.00	0.00	63
12	Dd	a	-16.58	-16.79	5.90	55.00	61.00	0.00	57
12	Ee	a	0.56	63.02	1.70	90.00	61.00	0.00	195
12	Ff	a	17.30	79.90	1.70	0.00	56.00	0.00	131

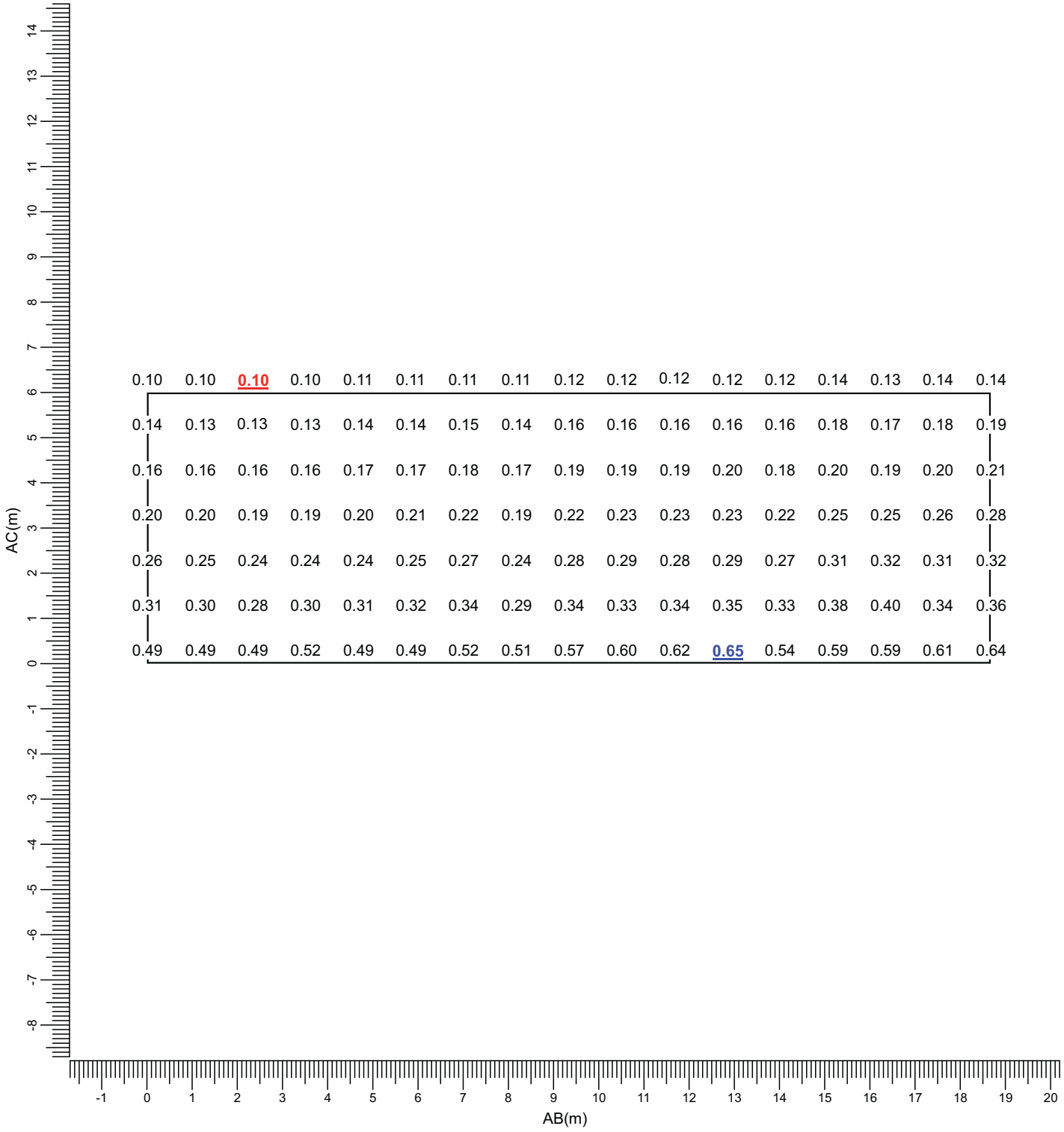
Switching Mode	ULR
1	0.00
2	0.00
3	0.00
4	0.00
5	0.00
6	0.00
7	0.00
8	0.00
9	0.00
10	0.00
11	0.00
12	0.00

3. Calculation Results

3.1 House 1 Side A: Graphical Table

All Lights

Grid : House 1 Side A
Calculation : Surface Illuminance (lux)



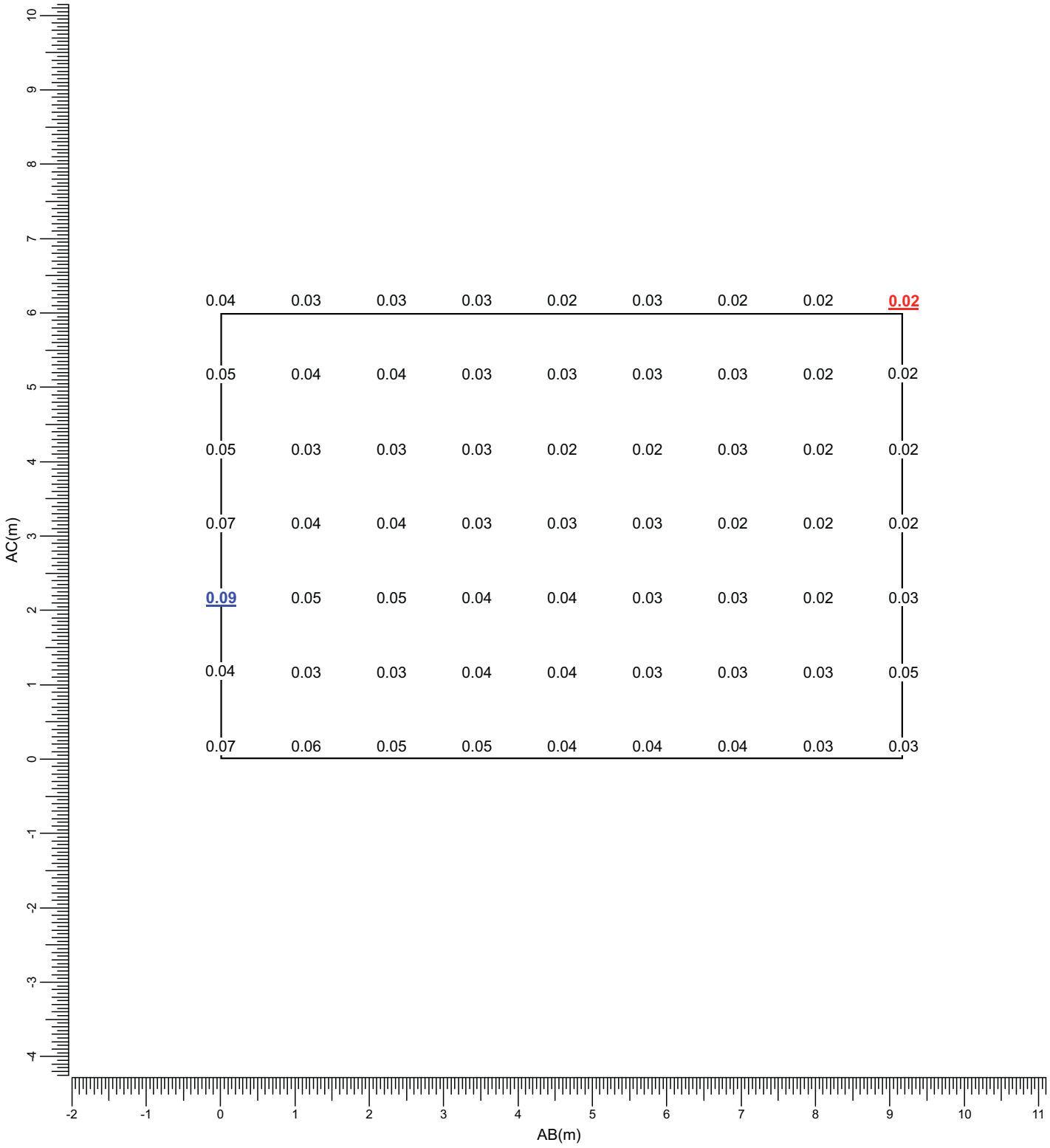
(40.94, 43.40, 2.80) C-----D (35.68, 25.49, 2.80)
(40.94, 43.40, -3.20) A-----B (35.68, 25.49, -3.20)

Maximum	Project maintenance factor	Scale
0.65	1.00	1:125

3.2 House 1 Side B: Graphical Table

All Lights

Grid : House 1 Side B
Calculation : Surface Illuminance (lux)



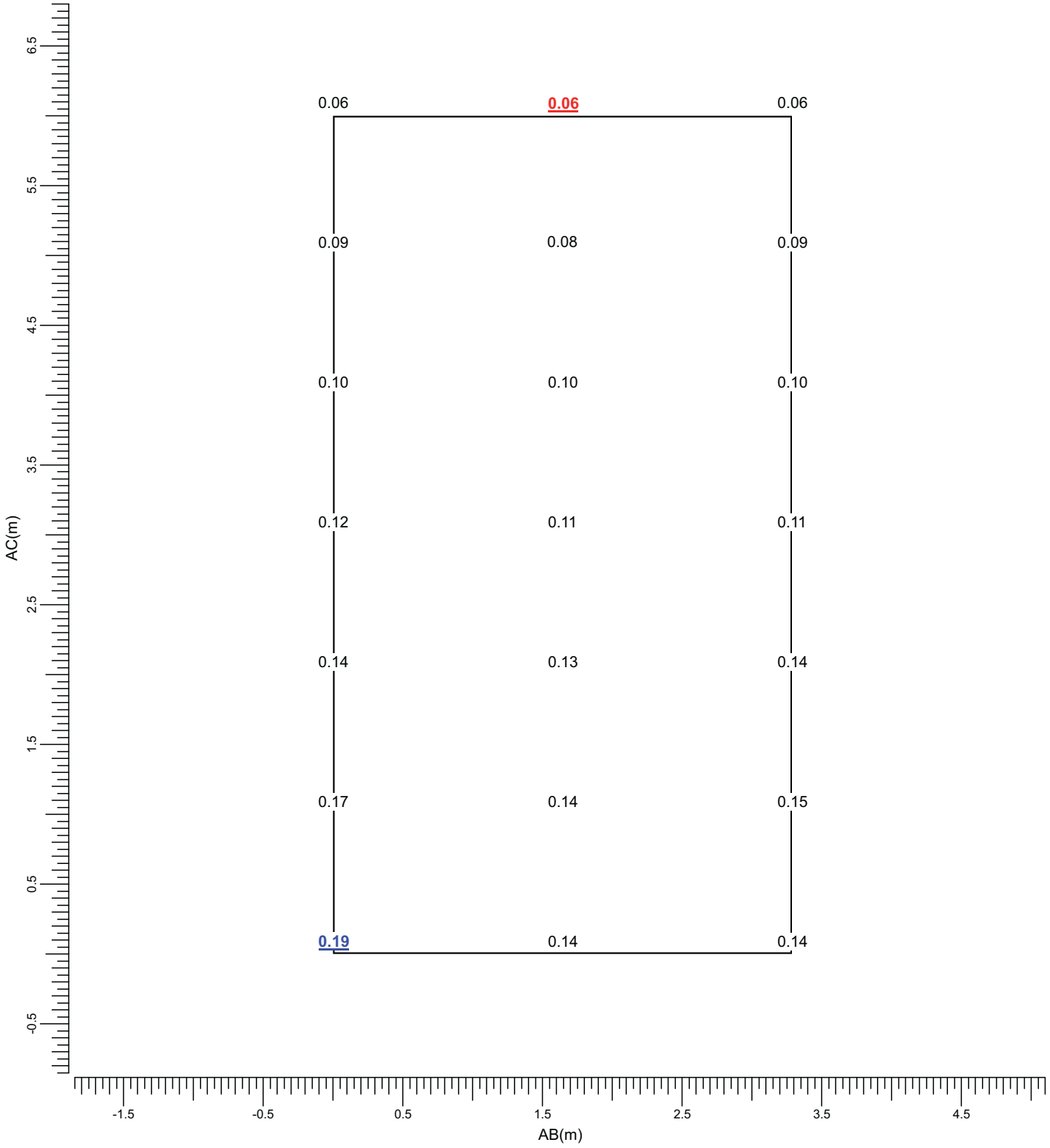
(37.78, 24.89, 2.80) C-----D (46.57, 22.26, 2.80)
| |
(37.78, 24.89, -3.20) A-----B (46.57, 22.26, -3.20)

Maximum	Project maintenance factor	Scale
0.09	1.00	1:75

3.3 House 1 Side C: Graphical Table

All Lights

Grid : House 1 Side C
Calculation : Surface Illuminance (lux)



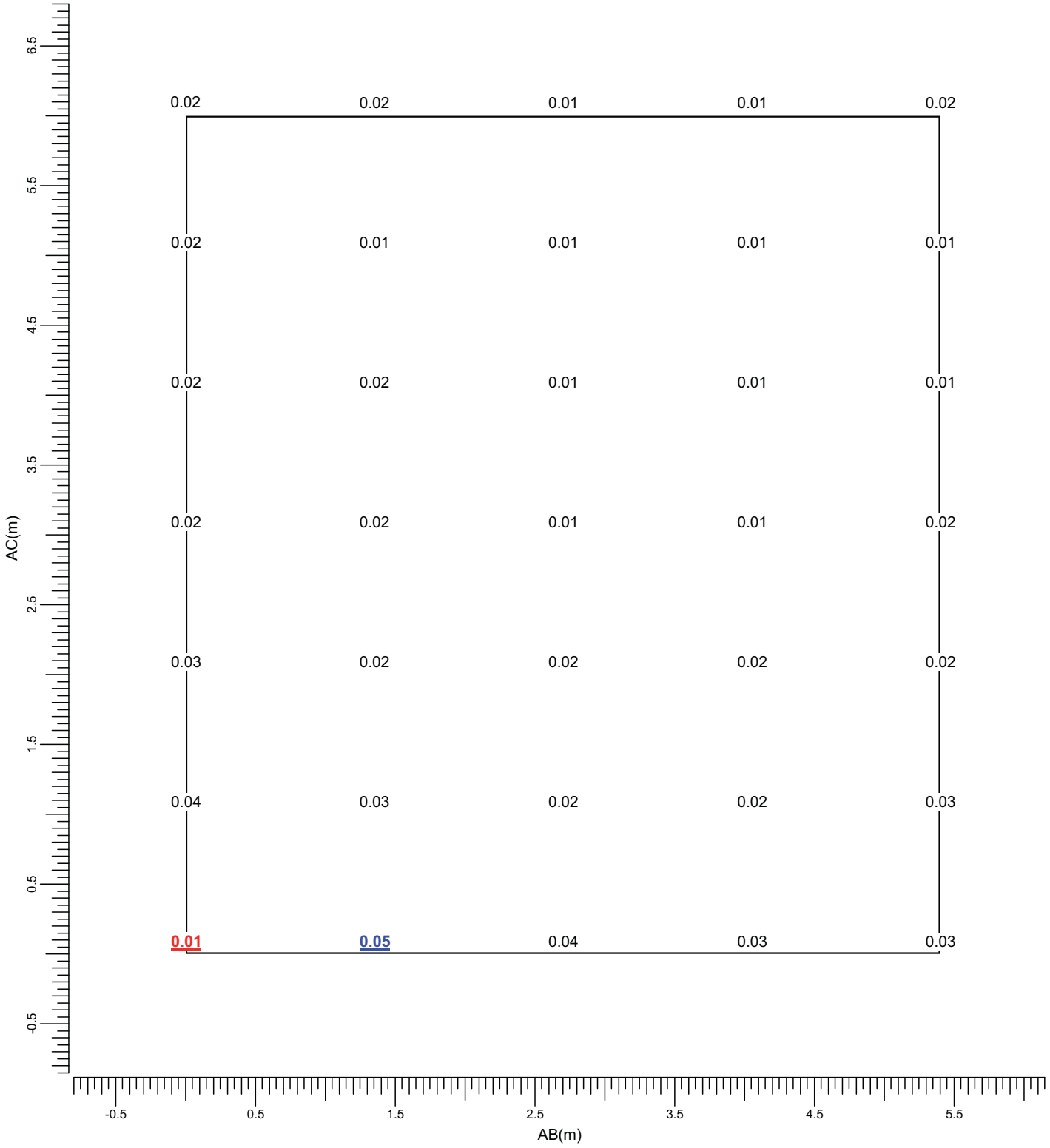
(46.57, 22.26, 2.80) C-----D (45.64, 19.11, 2.80)
(46.57, 22.26, -3.20) A-----B (45.64, 19.11, -3.20)

Maximum	Project maintenance factor	Scale
0.19	1.00	1:40

3.4 House 1 Side D: Graphical Table

All Lights

Grid : House 1 Side D
Calculation : Surface Illuminance (lux)



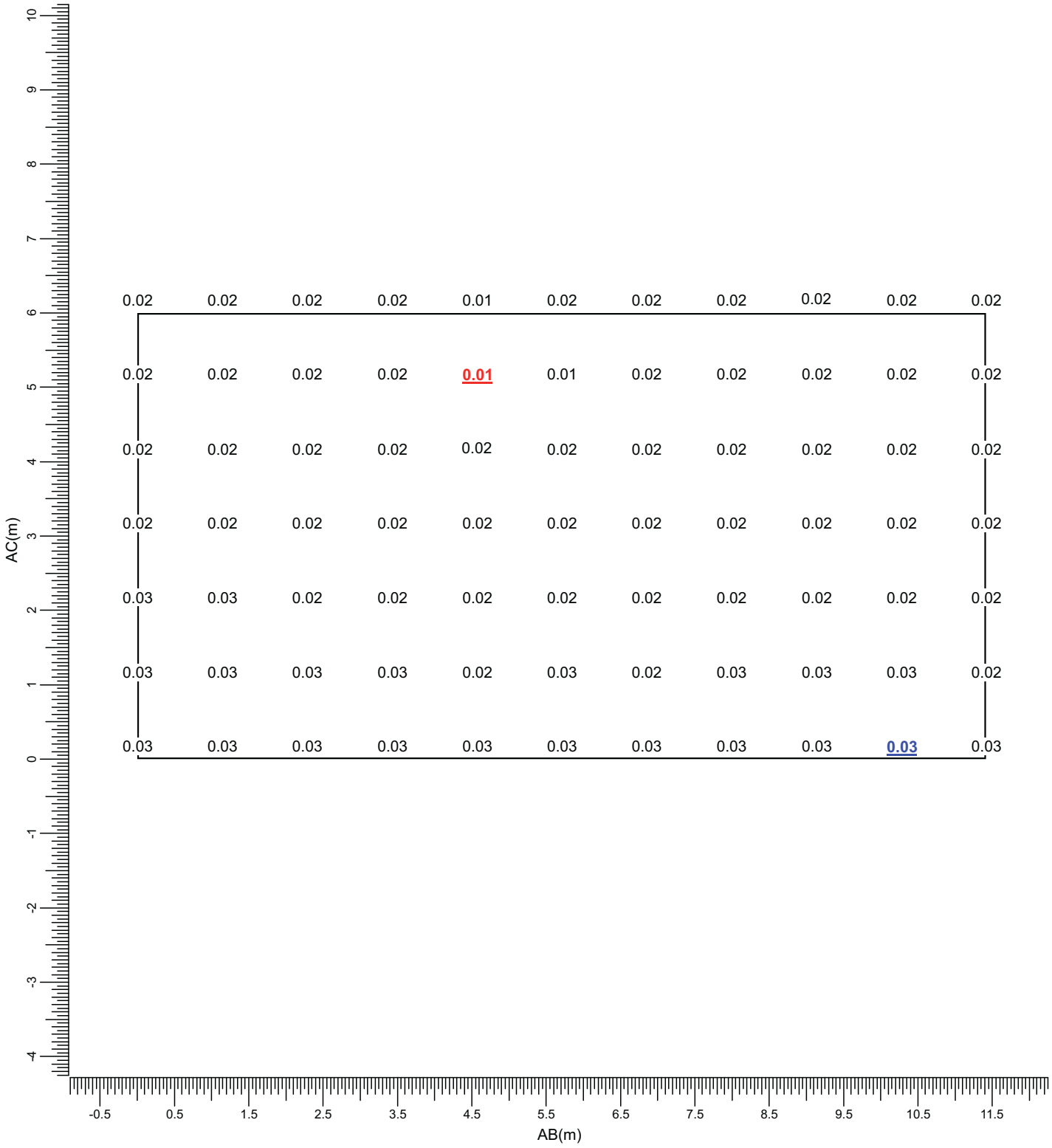
(45.61, 19.03, 2.80) C-----D (50.79, 17.50, 2.80)
| |
(45.61, 19.03, -3.20) A-----B (50.79, 17.50, -3.20)

Maximum	Project maintenance factor	Scale
0.05	1.00	1:40

3.5 House 2 Side A: Graphical Table

All Lights

Grid : House 2 Side A
Calculation : Surface Illuminance (lux)



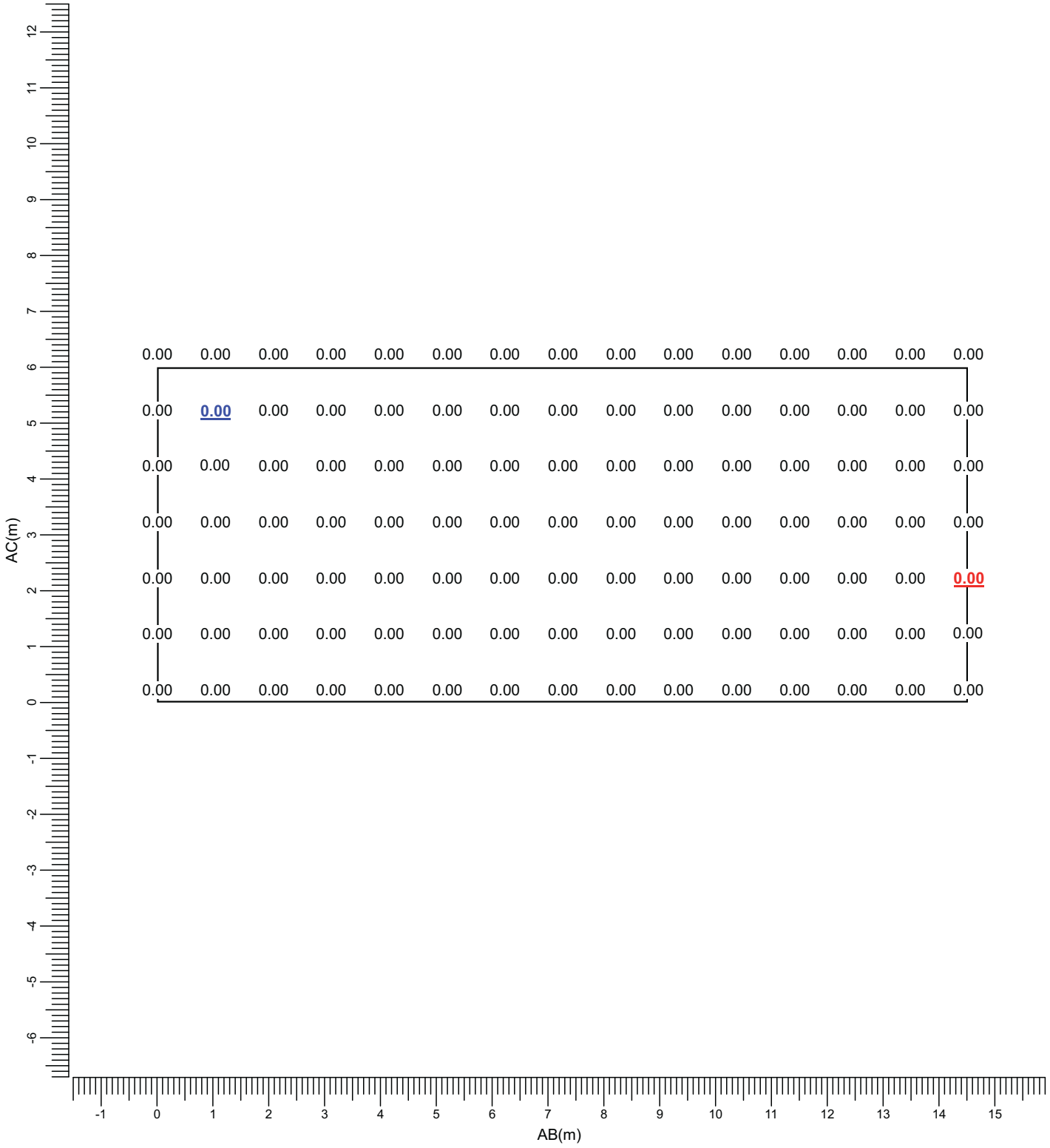
(73.73, -19.97, 2.80) C-----D (70.83, -31.01, 2.80)
(73.73, -19.97, -3.20) A-----B (70.83, -31.01, -3.20)

Maximum	Project maintenance factor	Scale
0.03	1.00	1:75

3.6 House 2 Side B: Graphical Table

All Lights

Grid : House 2 Side B
Calculation : Surface Illuminance (lux)



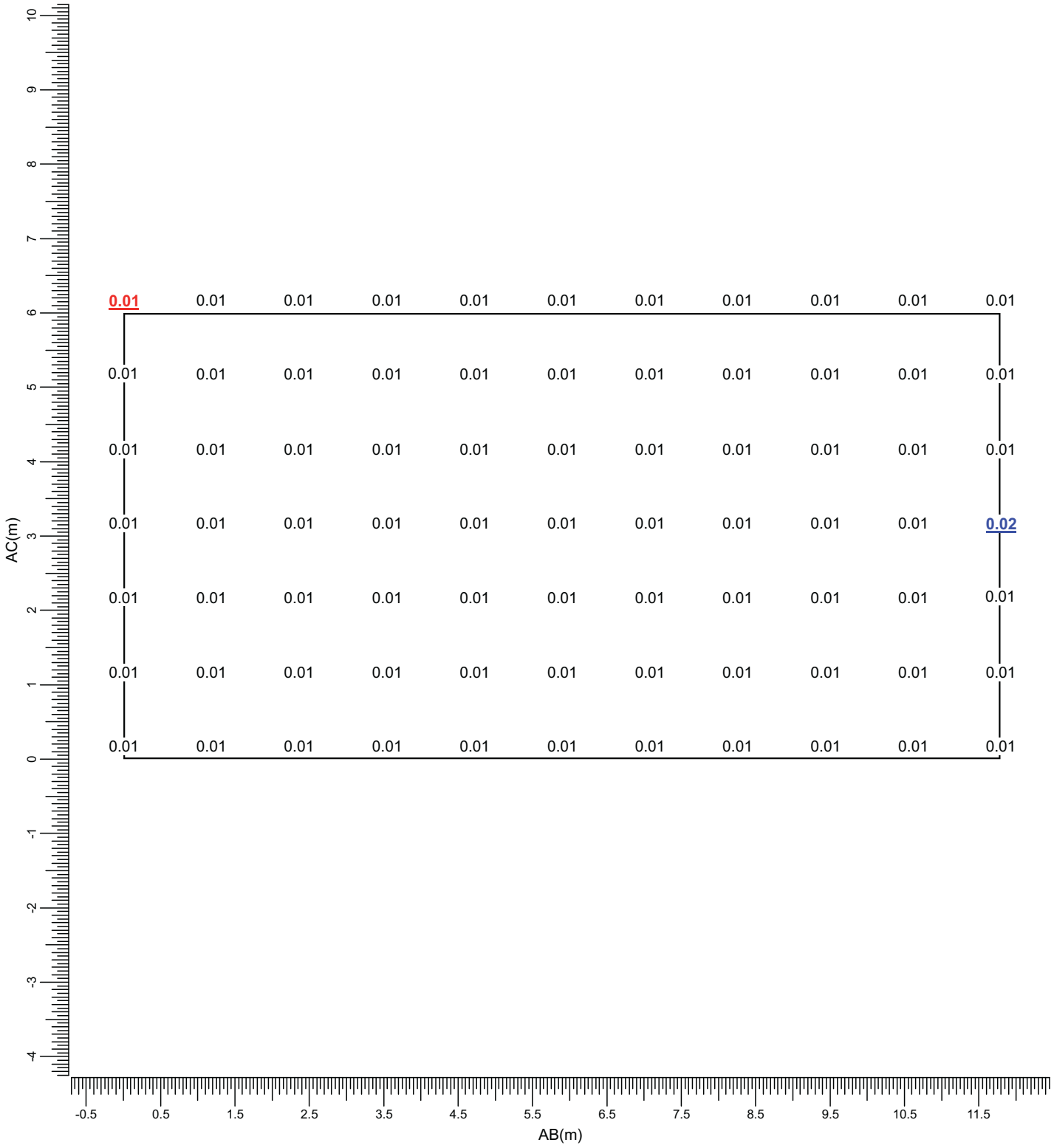
(70.91, -31.17, 2.80) C-----D (84.92, -34.96, 2.80)
| |
(70.91, -31.17, -3.20) A-----B (84.92, -34.96, -3.20)

Maximum	Project maintenance factor	Scale
0.00	1.00	1:100

3.7 House 3 Side A: Graphical Table

All Lights

Grid : House 3 Side A
Calculation : Surface Illuminance (lux)



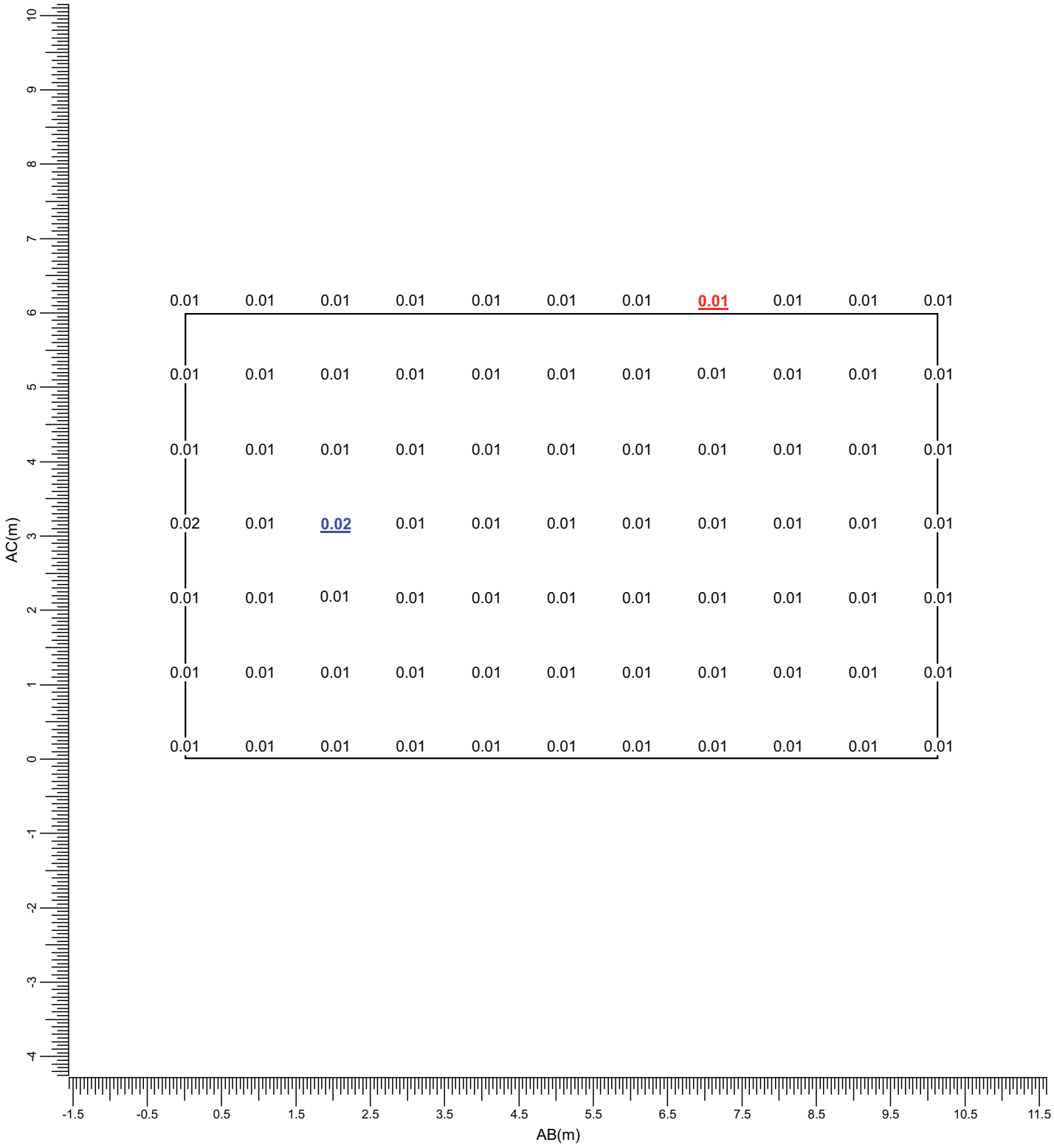
(57.96, -56.62, 6.00) C-----D (46.19, -55.91, 6.00)
| |
(57.96, -56.62, -0.00) A-----B (46.19, -55.91, -0.00)

Maximum	Project maintenance factor	Scale
0.02	1.00	1:75

3.8 House 3 Side B: Graphical Table

All Lights

Grid : House 3 Side B
Calculation : Surface Illuminance (lux)



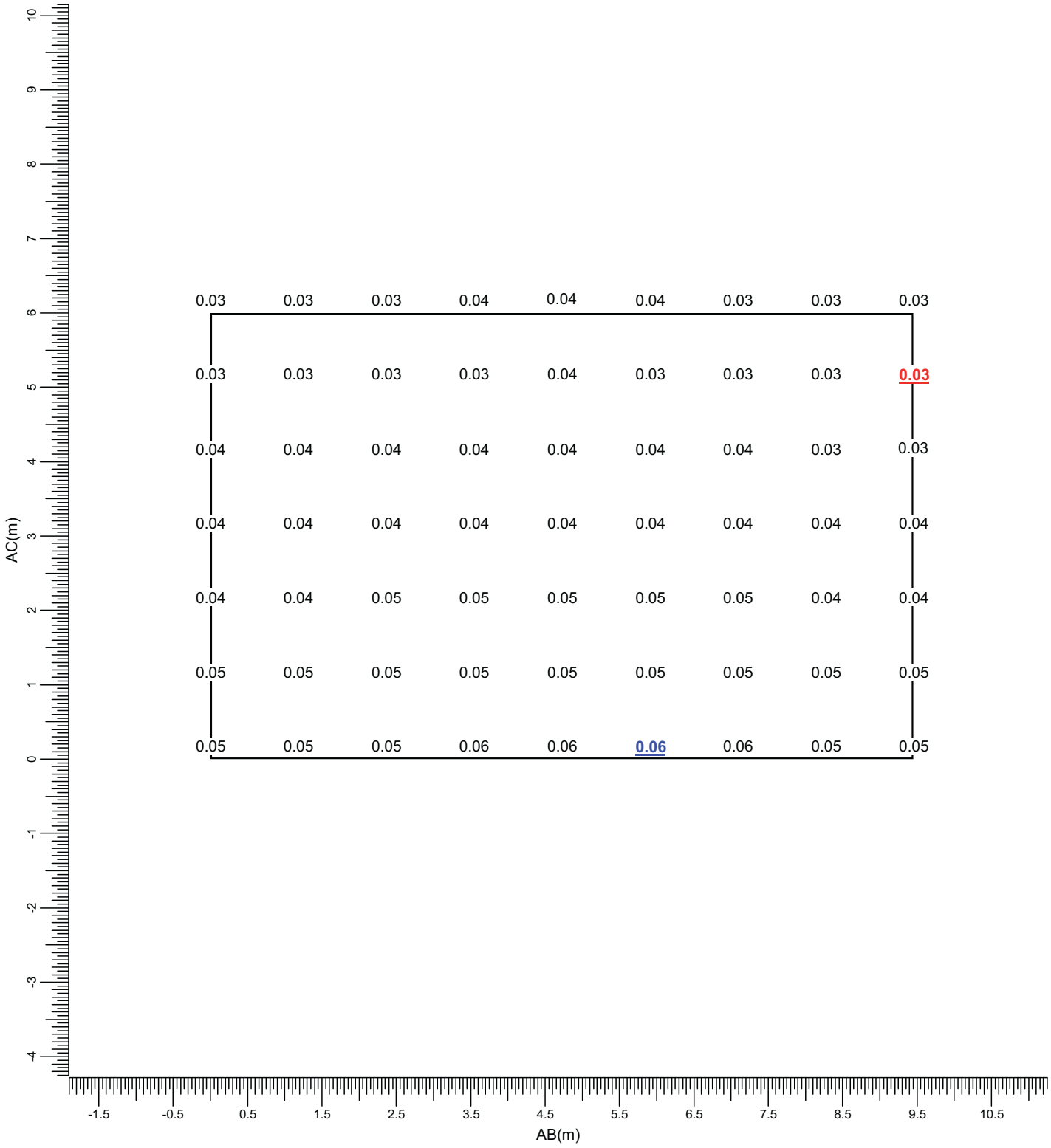
(45.98, -56.05, 6.00) C-----D (45.39, -66.18, 6.00)
| |
(45.98, -56.05, -0.00) A-----B (45.39, -66.18, -0.00)

Maximum	Project maintenance factor	Scale
0.02	1.00	1:75

3.9 House 4 Side A: Graphical Table

All Lights

Grid : House 4 Side A
Calculation : Surface Illuminance (lux)



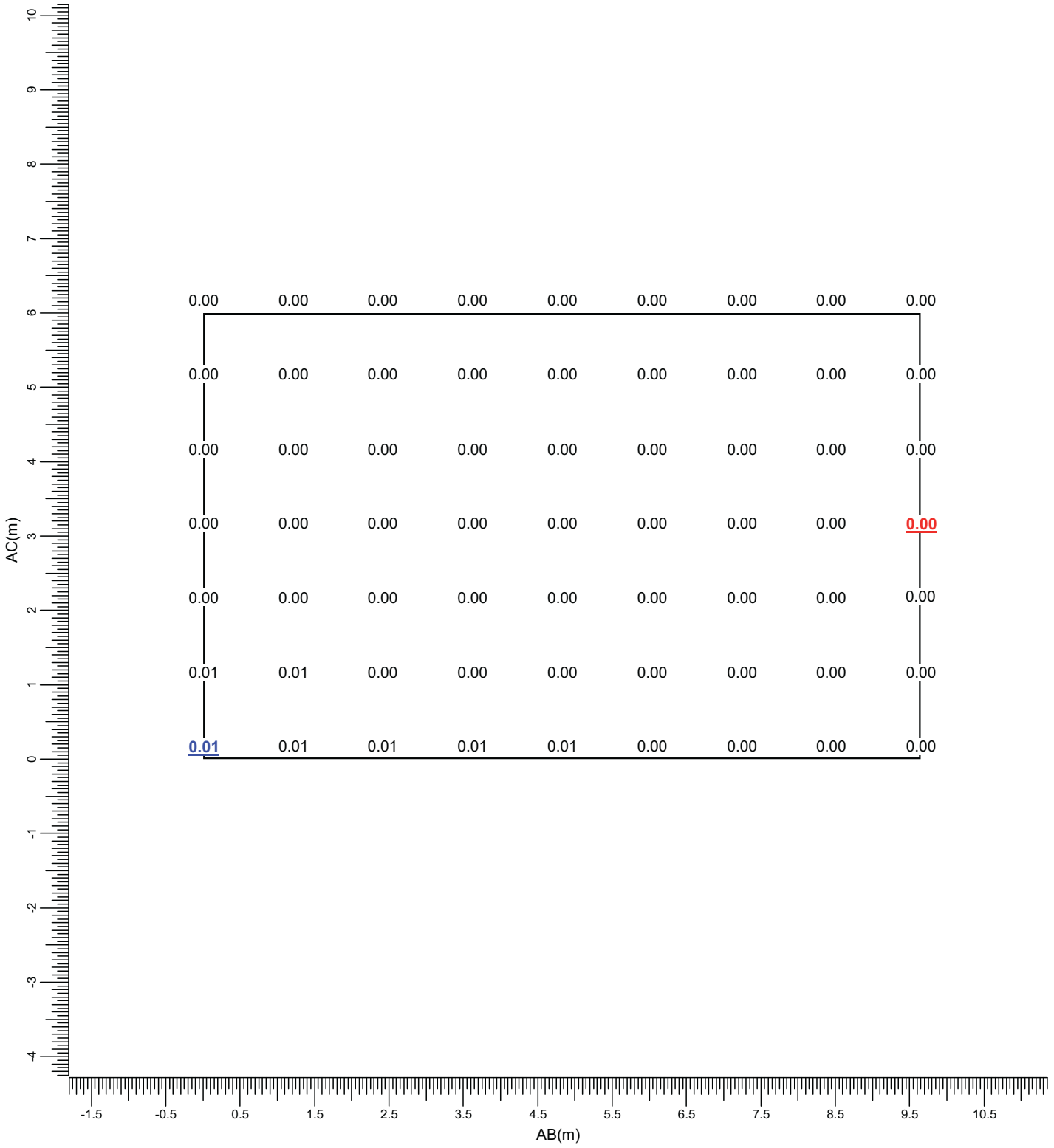
(81.48, 15.56, 2.80) C-----D (78.47, 6.60, 2.80)
| |
(81.48, 15.56, -3.20) A-----B (78.47, 6.60, -3.20)

Maximum	Project maintenance factor	Scale
0.06	1.00	1:75

3.10 House 4 Side B: Graphical Table

All Lights

Grid : House 4 Side B
Calculation : Surface Illuminance (lux)



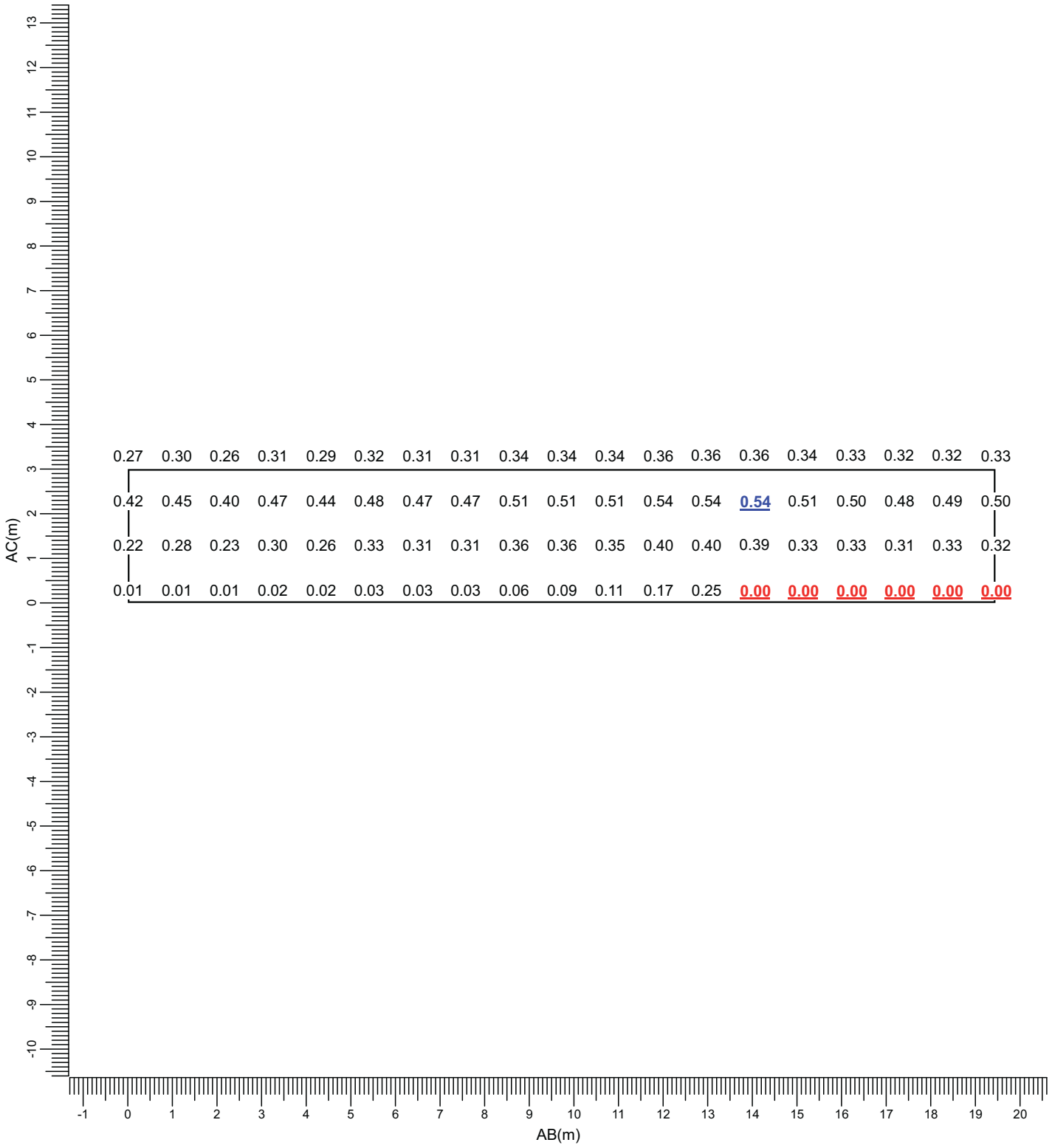
(78.82, 6.53, 2.80) C-----D (88.08, 3.82, 2.80)
| |
(78.82, 6.53, -3.20) A-----B (88.08, 3.82, -3.20)

Maximum	Project maintenance factor	Scale
0.01	1.00	1:75

3.11 Little Glebe: Graphical Table

All Lights

Grid : Little Glebe
Calculation : Surface Illuminance (lux)



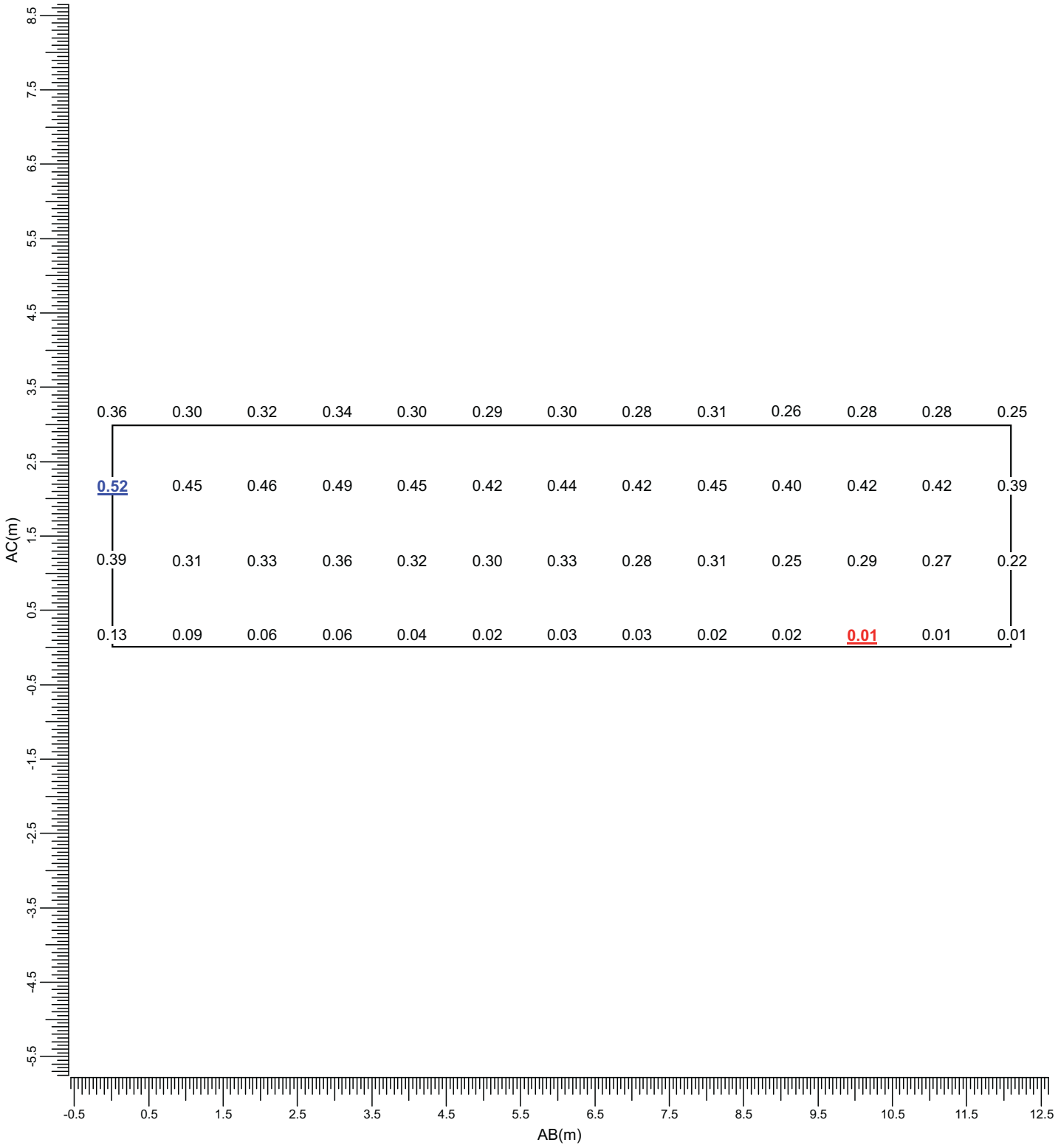
(-9.14, 105.95, -1.20) C-----D (10.30, 105.43, -1.20)
(-9.14, 105.95, -4.20) A-----B (10.30, 105.43, -4.20)

Maximum	Project maintenance factor	Scale
0.54	1.00	1:125

3.12 Cobb Gate A: Graphical Table

All Lights

Grid : Cobb Gate A
Calculation : Surface Illuminance (lux)



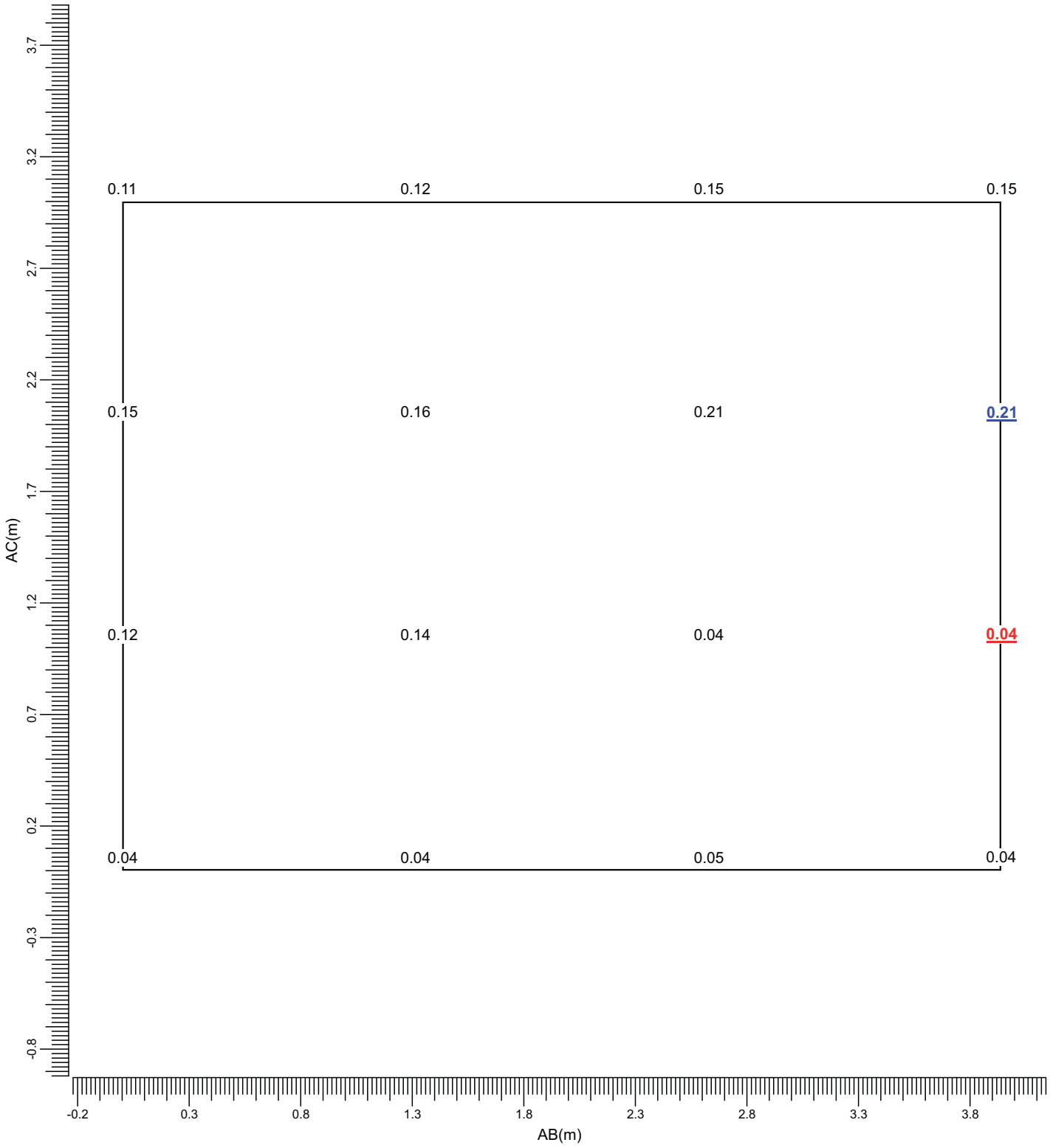
(15.12, 106.54, -1.20) C-----D (27.22, 106.25, -1.20)
| |
(15.12, 106.54, -4.20) A-----B (27.22, 106.25, -4.20)

Maximum	Project maintenance factor	Scale
0.52	1.00	1:75

3.13 Cobb Gate B: Graphical Table

All Lights

Grid : Cobb Gate B
Calculation : Surface Illuminance (lux)



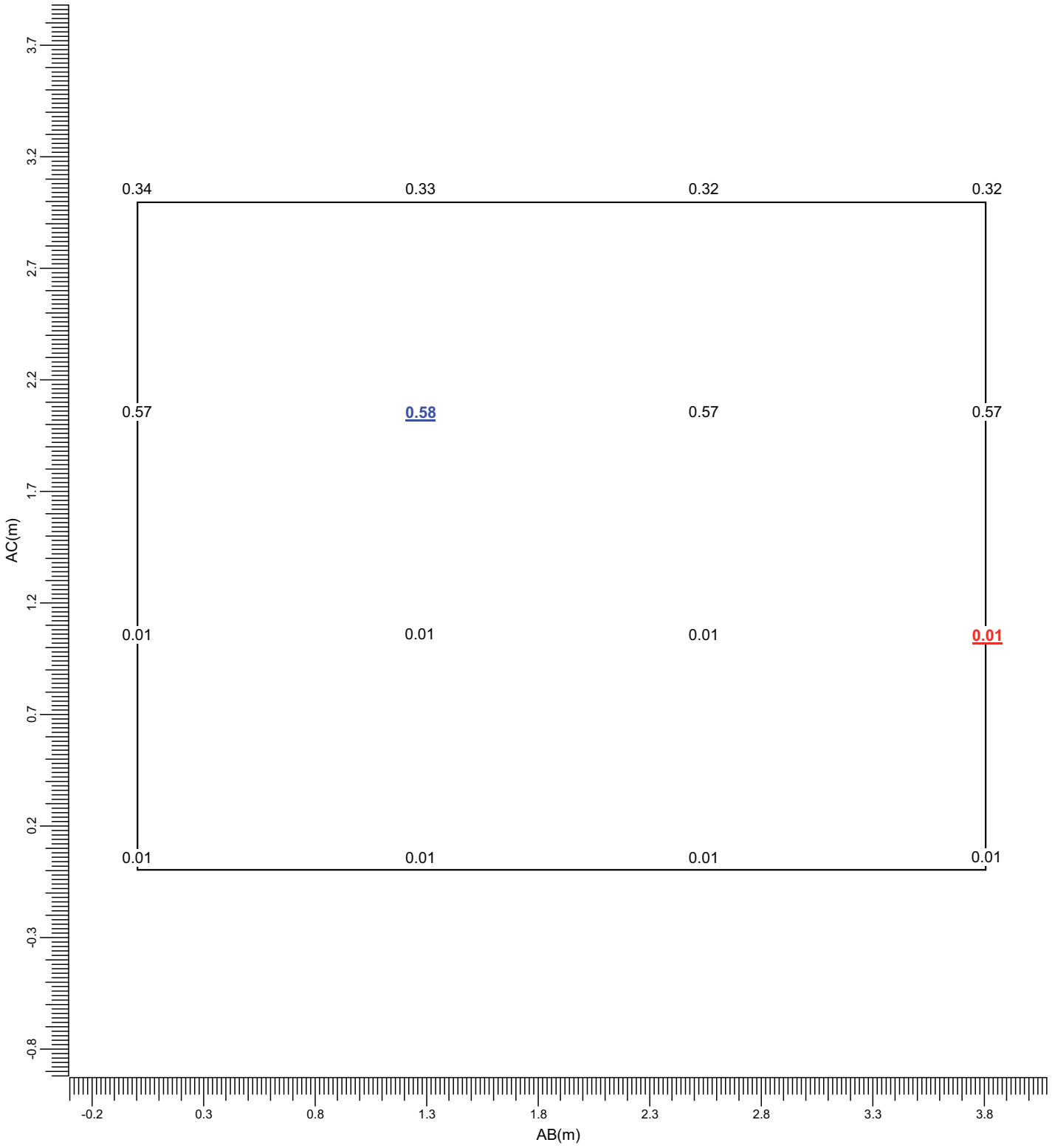
(27.22, 106.25, -1.20) C-----D (27.14, 102.31, -1.20)
| |
(27.22, 106.25, -4.20) A-----B (27.14, 102.31, -4.20)

Maximum	Project maintenance factor	Scale
0.21	1.00	1:25

3.14 Cobb Gate C: Graphical Table

All Lights

Grid : Cobb Gate C
Calculation : Surface Illuminance (lux)



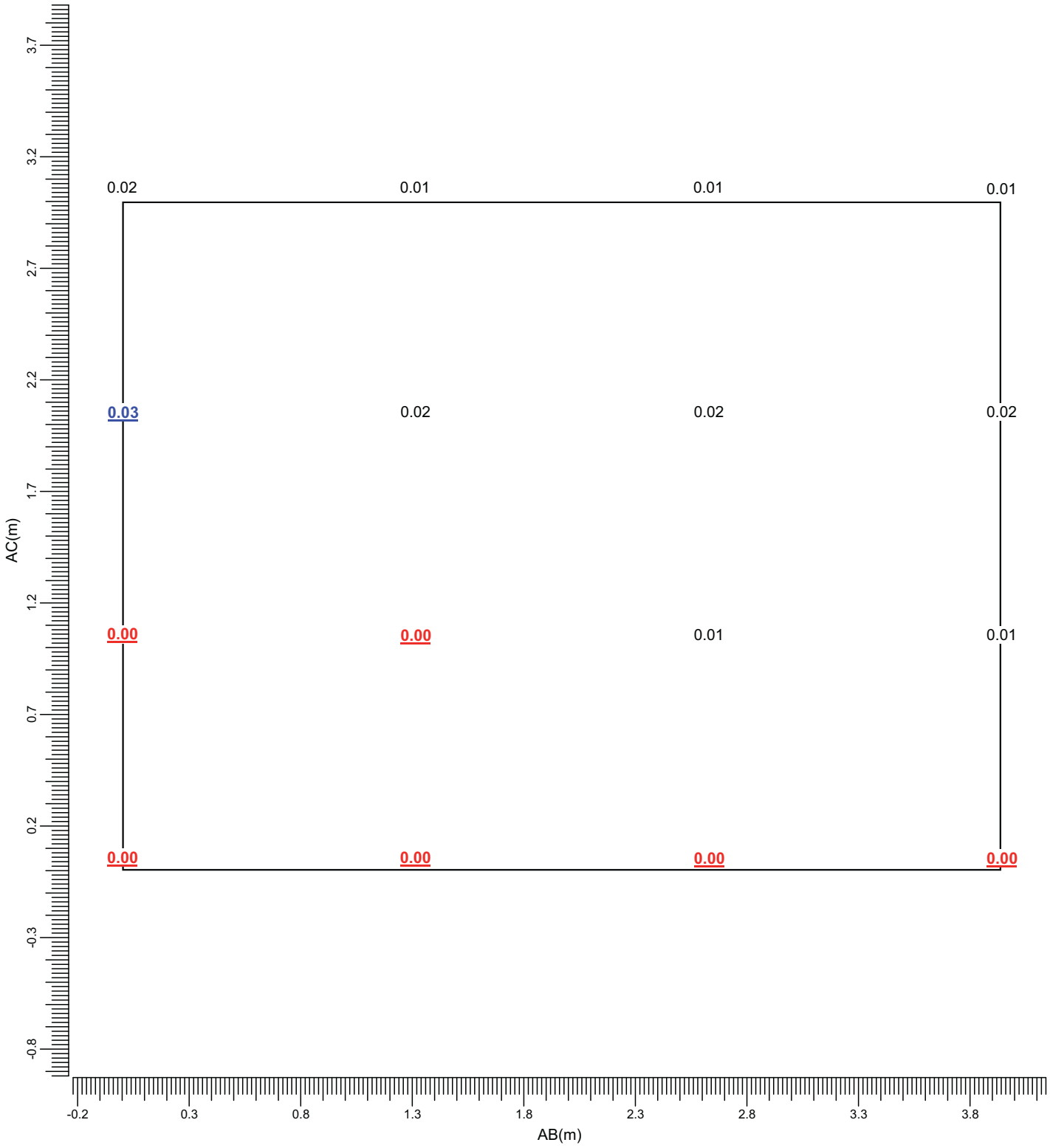
(27.14, 102.31, -1.20) C-----D (30.95, 102.21, -1.20)
| |
(27.14, 102.31, -4.20) A-----B (30.95, 102.21, -4.20)

Maximum	Project maintenance factor	Scale
0.58	1.00	1:25

3.15 Cobb Gate D: Graphical Table

All Lights

Grid : Cobb Gate D
Calculation : Surface Illuminance (lux)



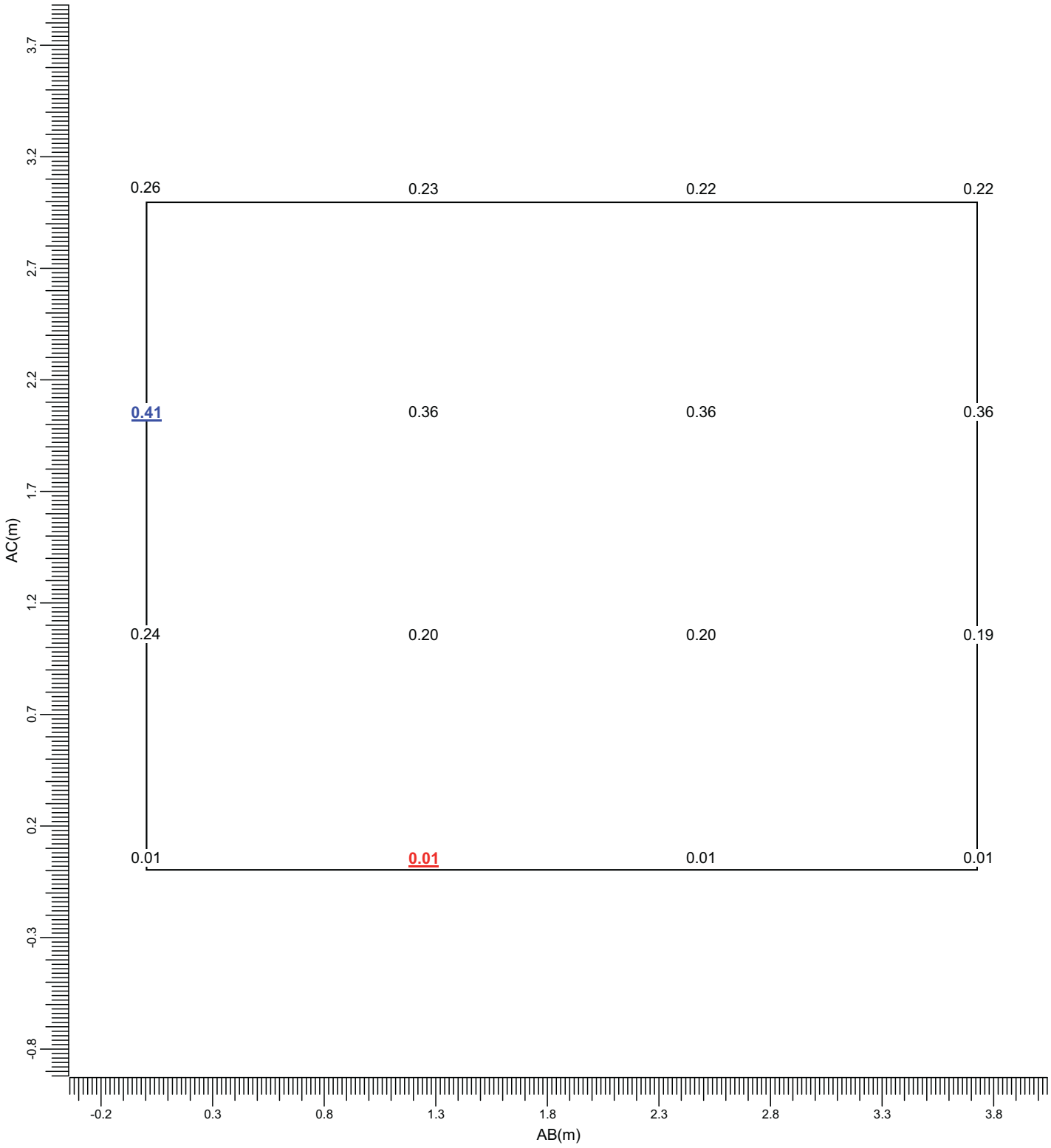
(30.95, 102.21, -1.20) C-----D (31.08, 106.15, -1.20)
| |
(30.95, 102.21, -4.20) A-----B (31.08, 106.15, -4.20)

Maximum	Project maintenance factor	Scale
0.03	1.00	1:25

3.16 Cobb Gate E: Graphical Table

All Lights

Grid : Cobb Gate E
Calculation : Surface Illuminance (lux)



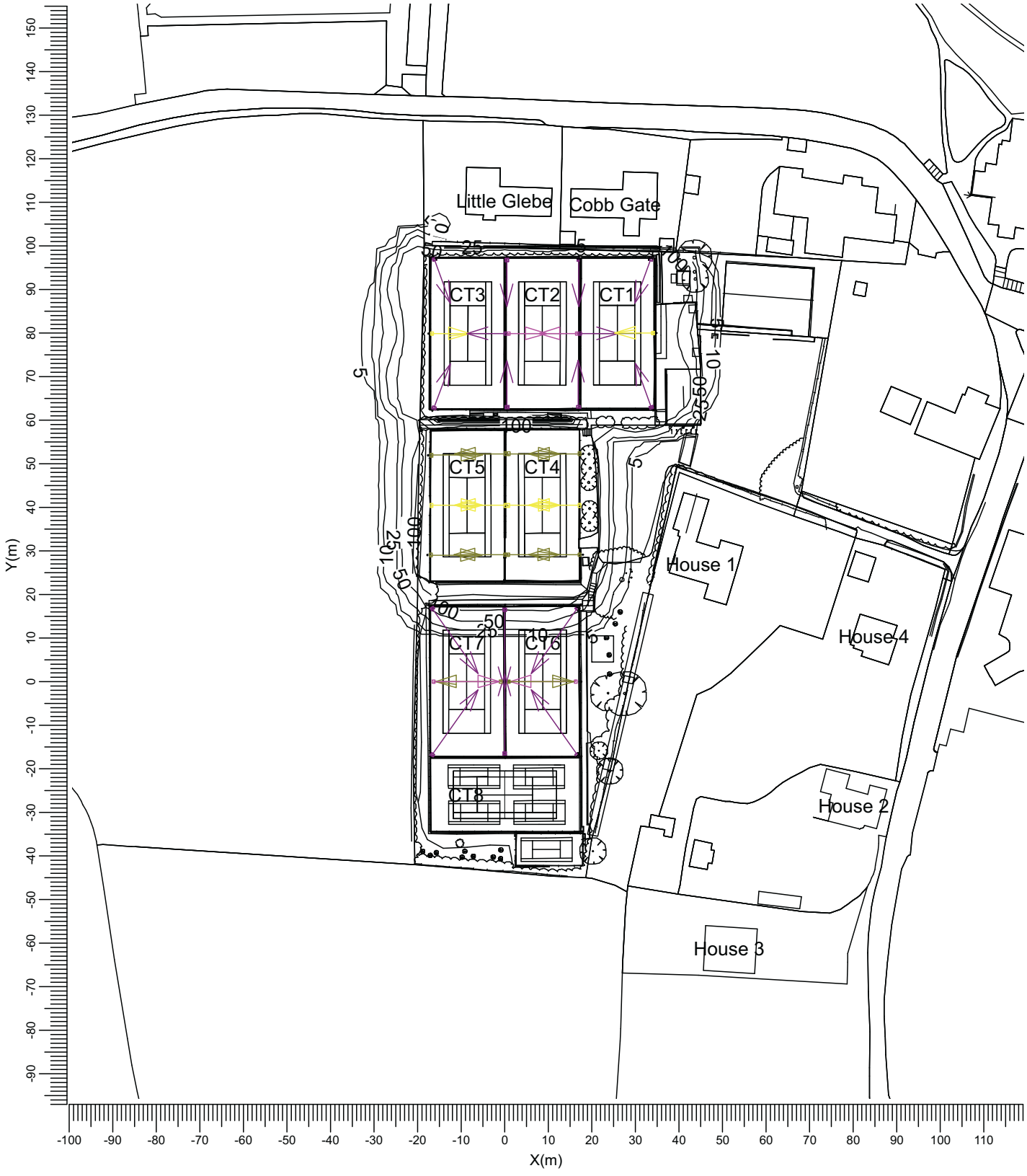
(31.08, 106.15, -1.20) C-----D (34.81, 106.05, -1.20)
(31.08, 106.15, -4.20) A-----B (34.81, 106.05, -4.20)

Maximum	Project maintenance factor	Scale
0.41	1.00	1:25

3.17 Overspill - At Ct's 1-3: Iso Contour

All Lights

Grid : Overspill - At Ct's 1-3 at Z = -4.20 m
Calculation : Surface Illuminance (lux)



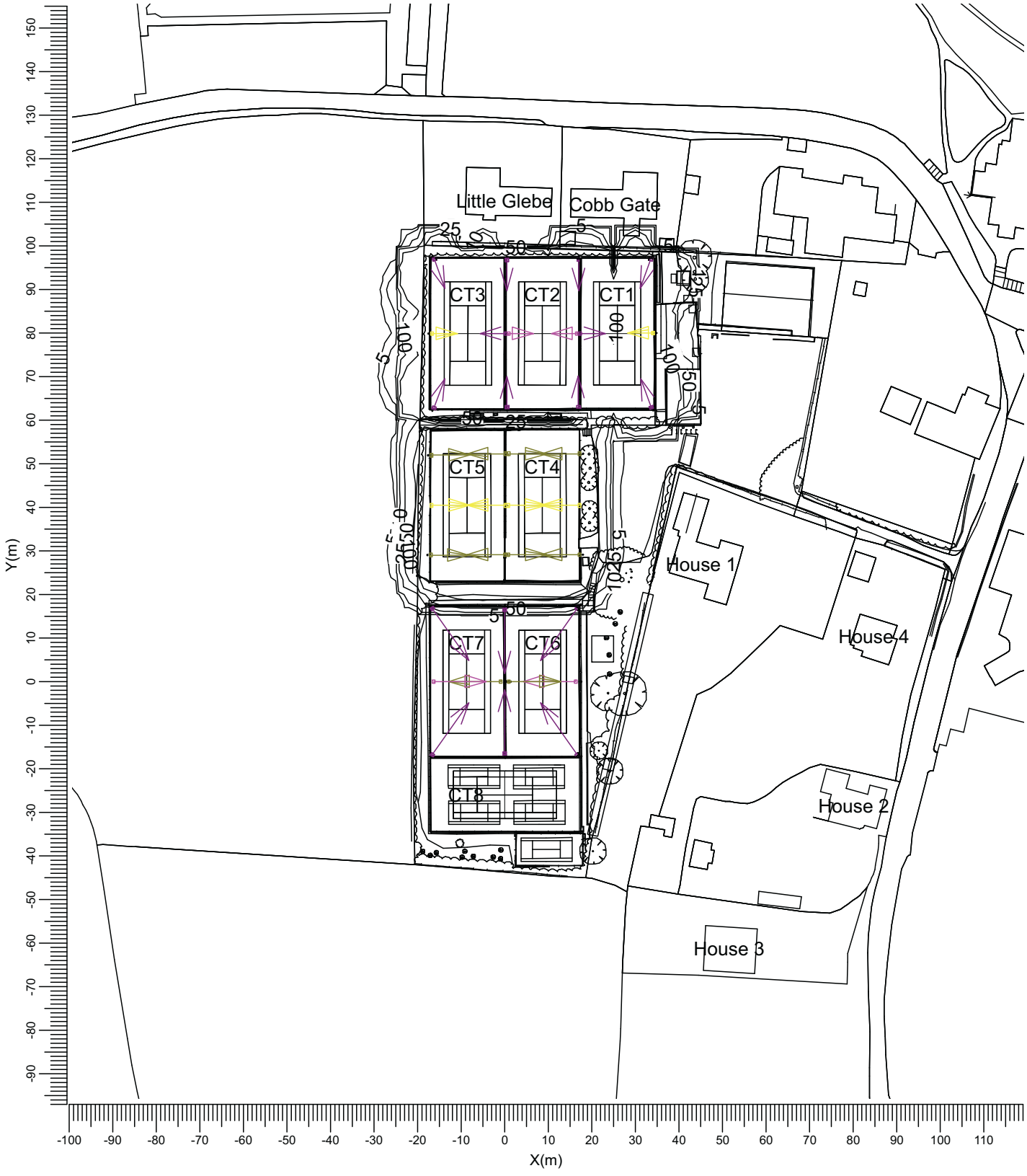
Project maintenance factor
1.00

Scale
1:1250

3.18 Overspill - At Ct's 4&5: Iso Contour

All Lights

Grid : Overspill - At Ct's 4&5 at Z = -2.20 m
Calculation : Surface Illuminance (lux)



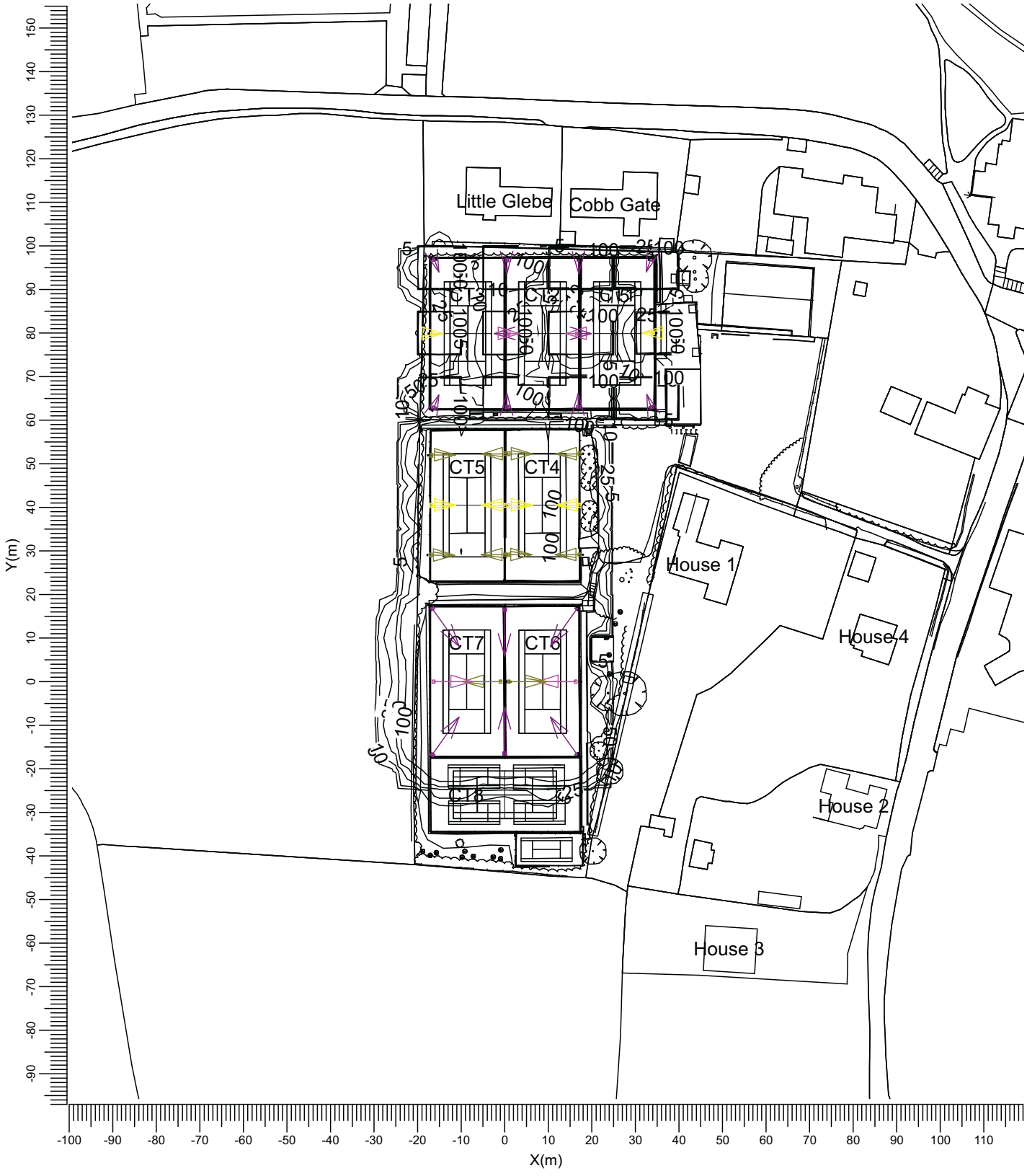
Project maintenance factor
1.00

Scale
1:1250

3.19 Overspill - At Ct's 6&7: Iso Contour

All Lights

Grid : Overspill - At Ct's 6&7 at Z = -0.00 m
Calculation : Surface Illuminance (lux)



Project maintenance factor
1.00

Scale
1:1250

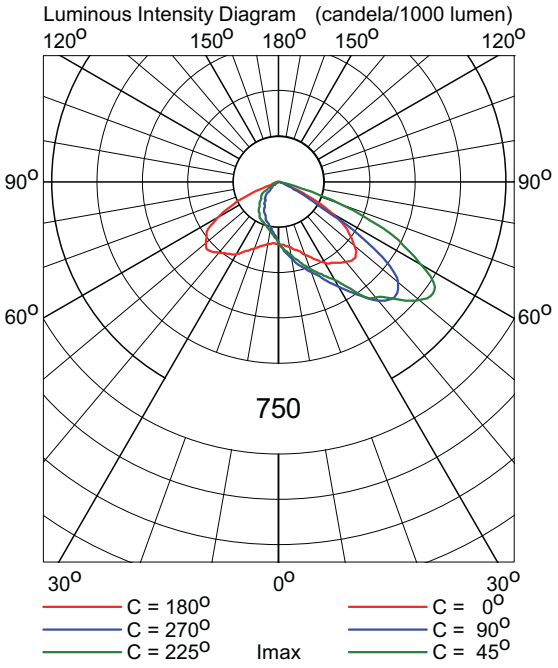
4. Luminaire Details

4.1 Project Luminaires

Match G6.10 FS 360

Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

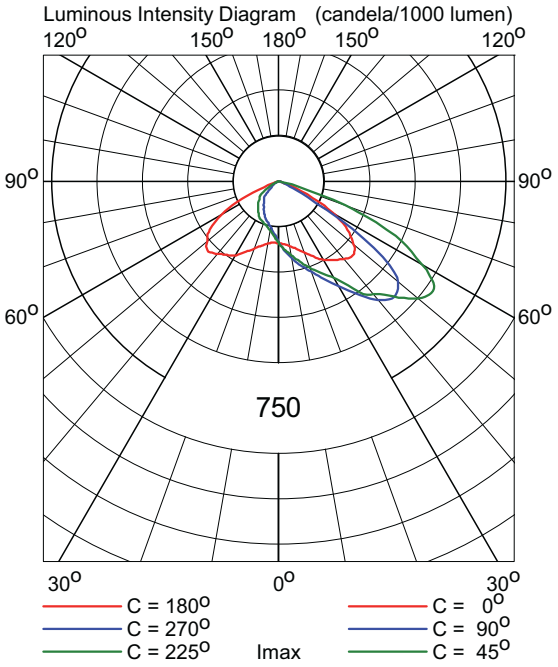
Lamp flux : 52830 lm
Luminaire wattage : 348.0 W
Measurement code : 321V1.5



Match G6.10 FS 420

Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

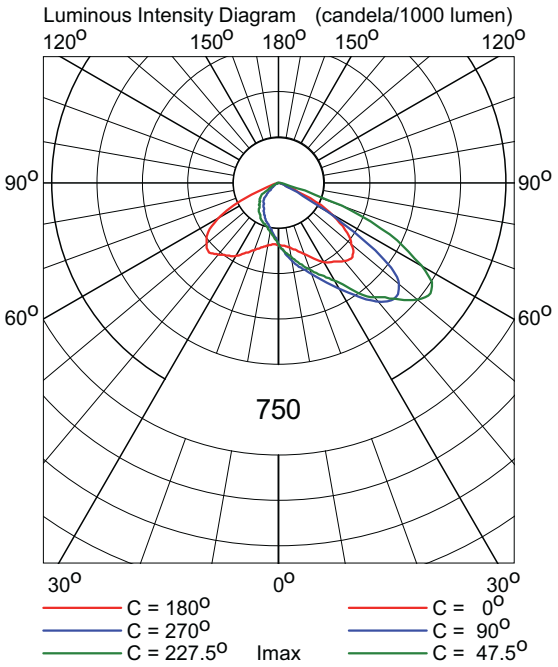
Lamp flux : 61600 lm
Luminaire wattage : 406.0 W
Measurement code : 321V1.5



Match G6.10 FS 480

Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

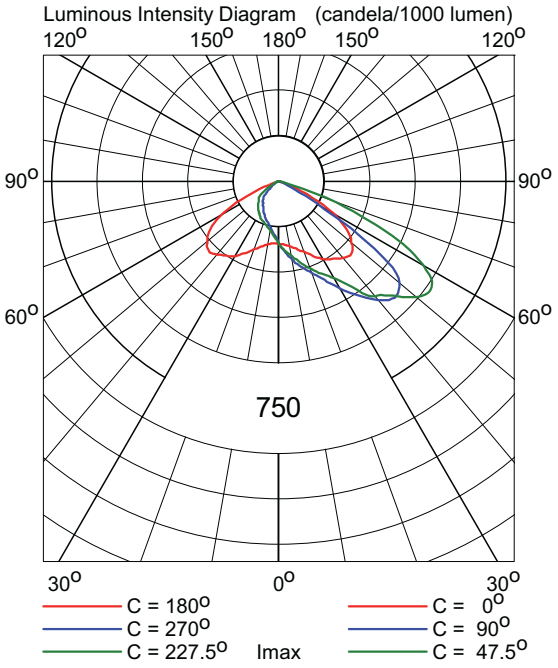
Lamp flux : 70290 lm
Luminaire wattage : 464.0 W
Measurement code : 321V1.5



Match G6.10 FS 540

Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

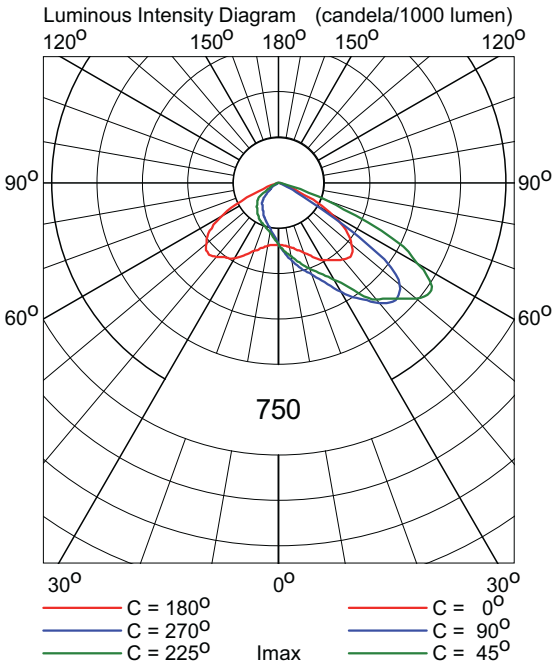
Lamp flux : 78620 lm
Luminaire wattage : 522.0 W
Measurement code : 321V1.5



Match G6.10 FS 600

Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

Lamp flux : 86430 lm
Luminaire wattage : 580.0 W
Measurement code : 321V1.5



Obstacle, Vertical Grid, Observer & Deflector Locations



Match G6.10 FS 360
Match G6.10 FS 480
Match G6.10 FS 600
Foliage 65% transparent 4m height
Foliage 65% transparent 4m height
Hedge 0% transparent 1.8m height
A Extended Rear Deflector
Aa Obtrusive light calculation

Match G6.10 FS 420
Match G6.10 FS 540
Vertical Grid
Foliage 65% transparent 6m height
Shed 0% transparent 3m height
Hedge 0% transparent 4m height
B Extended Side Deflector

Obtrusive Light - Compliance Report

Guidance notes for the reduction of obtrusive light
Environmental zone classification: E2-Rural
Pre-Curfew
Project code: 6430b
17/09/2024

Table 1:

Maximum values of vertical illuminance on properties (CIE 150 table 2)

Maximum Allowable Value: 5 Lux

Calculations Tested (16):

Calculation Label	Max. Illum. (Lux)	Max. Allowable (Lux)	Test Results
House 1 Side A	0.65	5	PASS
House 1 Side B	0.09	5	PASS
House 1 Side C	0.19	5	PASS
House 1 Side D	0.05	5	PASS
House 2 Side A	0.03	5	PASS
House 2 Side B	0.00	5	PASS
House 3 Side A	0.02	5	PASS
House 3 Side B	0.02	5	PASS
House 4 Side A	0.06	5	PASS
House 4 Side B	0.01	5	PASS
Little Glebe	0.54	5	PASS
Cobb Gate A	0.52	5	PASS
Cobb Gate B	0.21	5	PASS
Cobb Gate C	0.58	5	PASS
Cobb Gate D	0.03	5	PASS
Cobb Gate E	0.41	5	PASS

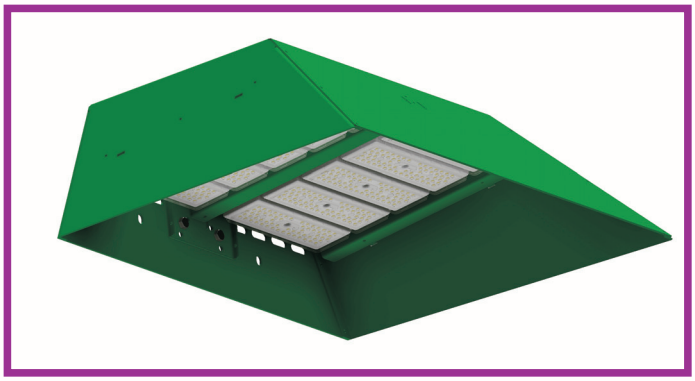
Table 2:

Luminous intensity (Cd) of bright luminaires (CIE 150 table 3 (amended))

Maximum Allowable Value calculated from CIE 150:2017 (varies by Projected Area Sq.m and distance factor)
For E2-Low district brightness, Projected Area and Distance Factors
Maximum Allowable Value: 0.13<Ap<=0.50 (10d)

Calculations Tested (6):

Calculation Label	Max. Measured (Cd)	Allowable (Cd) Based on (10d)	Test Results
Observer 1	80	588	PASS
Observer 2	23	1584	PASS
Observer 3	63	982	PASS
Observer 4	57	1012	PASS
Little Glebe	195	430	PASS
Cobb Gate	131	251	PASS



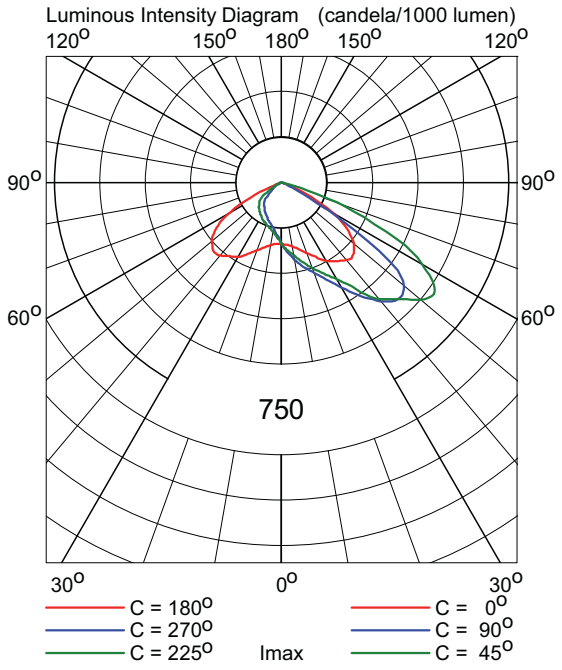
HiLux® Match® LED

The Match LED is a new generation of HiLux high performance luminaires designed for use in sports lighting.

Match LED

Box quantity	1
Net Weight	16.5 - 19.6kg
Body colour (standard)	RAL6005
Optic	Standard**
IP rating	IP68
Windage	0.28m²
Mounting method	4 x M10 factory fitted

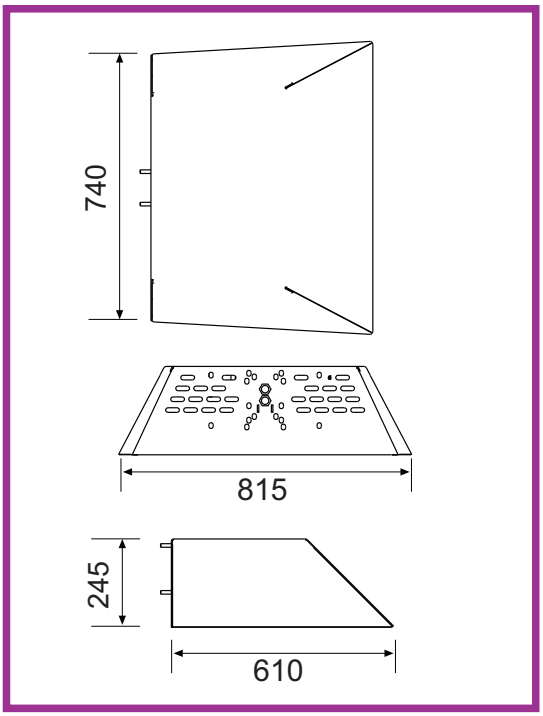
Lamp type	LED
Luminaire power	360W - 600W
Lamp colour	5000 K
Supply voltage	230v



- ✓ LED low energy lighting
- ✓ Exceptional light control
- ✓ Designed for outdoor sports lighting
- ✓ Lightweight aluminium body
- ✓ Stainless steel components
- ✓ Computer designed optics
- ✓ Heavy duty mounting
- ✓ IP68 ingress protection for main elements
- ✓ Powder coat finish (RAL 6005) Green
- ✓ 5 year limited warranty via direct install*
- ✓ 5 & 10 year onsite extended warranty available*

Product code:
MATCH-FS10/LED

Options
/C - Alternative colour finish



* Conditions apply
** Various optics available

luminance pro
lighting systems

Tel: +44 (0)1276 855 666 info@luminancepro.co.uk
Fax: +44 (0)1276 855 999 www.luminancepro.co.uk

Ref: MATCHFS10LED/GEN6/V2.2/Feb 2024

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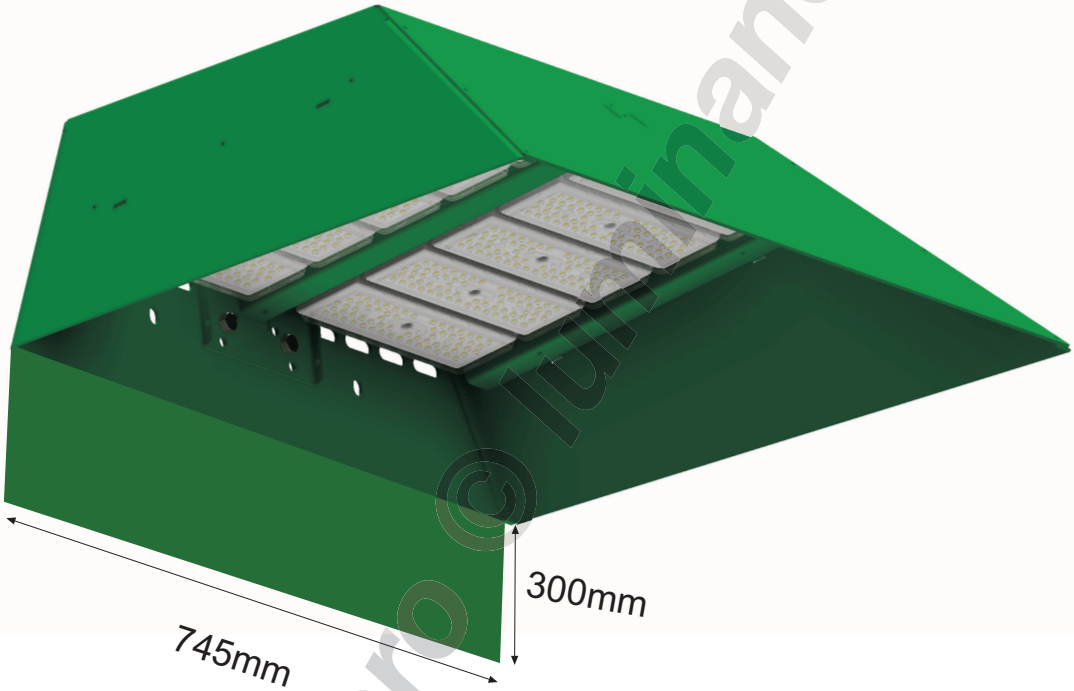
HiLux

Match FS LED Gen6
Rear Deflector

A



Part No: HLRD00

Rear
Deflector

*This indicative drawing is for information only.

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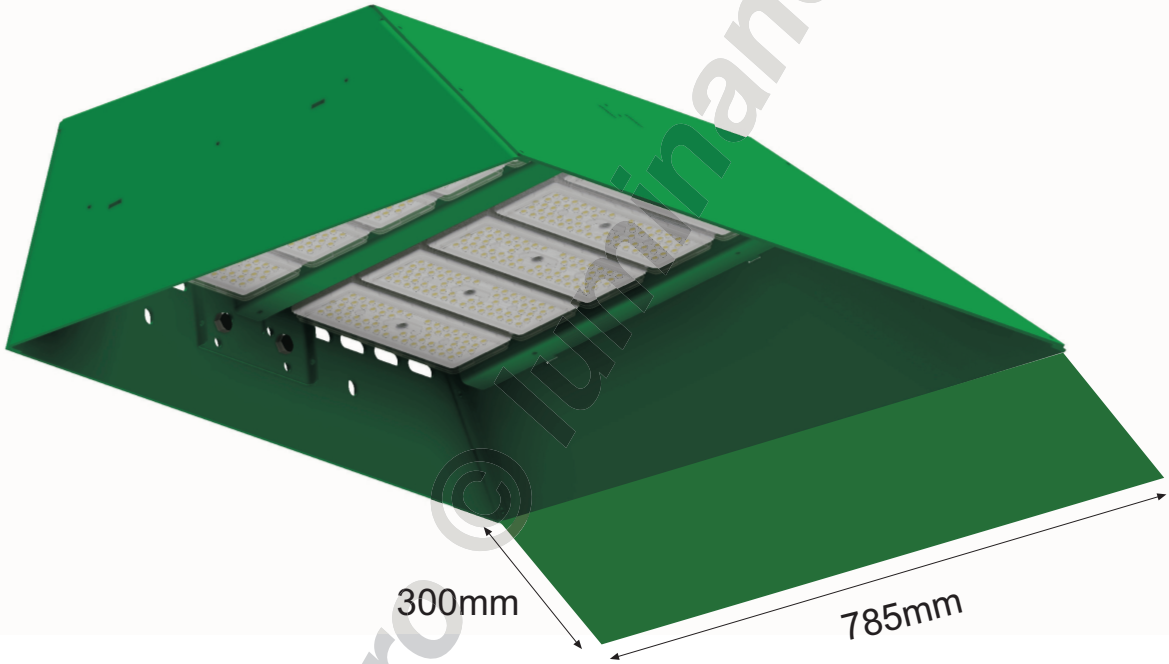
HiLux

Match FS LED Gen6
Side Deflector

B



Part No: HLSD

Side
Deflector

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HiLux Match FS LED – Fully Shielded Luminaire



