



# **Stag Brewery, Mortlake**

## **Sports Pitch Lighting Assessment**

For Reselton Properties

February 2018

Former Stag Brewery, Mortlake.

## **Sports Pitch Lighting Assessment Summary**

Document: 547-(010)-RP-EX-LA

February 2018

### Introduction

Michael Grubb Studio (the Lighting Consultant) has considered various lighting options for the Sports Pitch. The challenge being to provide appropriate levels of illumination and uniformity for Sport England / FA without over-lighting and creating excessive glare or light spill into adjacent properties.

Lighting designs for both Class II and FA Class III have been developed, with both complying to the relevant ILP guidelines. These lighting designs are detailed in the appended documents. Whilst both schemes are considered acceptable, the preference is for the FA Class III scheme as this is deemed to be most appropriate when considering use and location.

### Design & Specification

Both lighting schemes have been designed to Sport England Outdoor Football Pitch Class guidelines, which are:

- Class III FA Standard = 120 lux ave, 0.6 Uo 60 Ra.
- Class II = 200 lux ave, 0.6 Uo 60 Ra

Both schemes are based on 8 No 15m columns with 2 No luminaires on each column. 16 No fittings in total. Luminaires for the Class II scheme would be higher output.

The proposed luminaire (floodlight) from Phillips Lighting contains an internal louvre, which limits spill in all directions as well as reducing light intensity and glare. An additional external louvre is also proposed to ensure that all efforts are made to reduce glare and light spill.

### Compliance

Lighting calculations are contained within the appended assessments and are based on Sport England Document and ILP Guidance Notes for Obtrusive Light 2011.

Lighting calculations also include 3 No. 'Observer' locations for each row of houses at 1.5m height (as this represents a person looking out the window). The Maximum Lighting Intensity Obtrusive Light towards each observer is considered acceptable and within ILP Guidelines.

Finally, it should be noted that a 'worst case' scenario approach has been taken in order to ensure a robust assessment – in reality, soft landscaping proposals around the perimeter of the school site (Application B), especially on the western site boundary, will further protect residents from any impact relating to artificial light.

# Mortlake Stage Brewery Development

F/ball Pitch LED Ltg15m 120 Lx 0.6 U0 LO

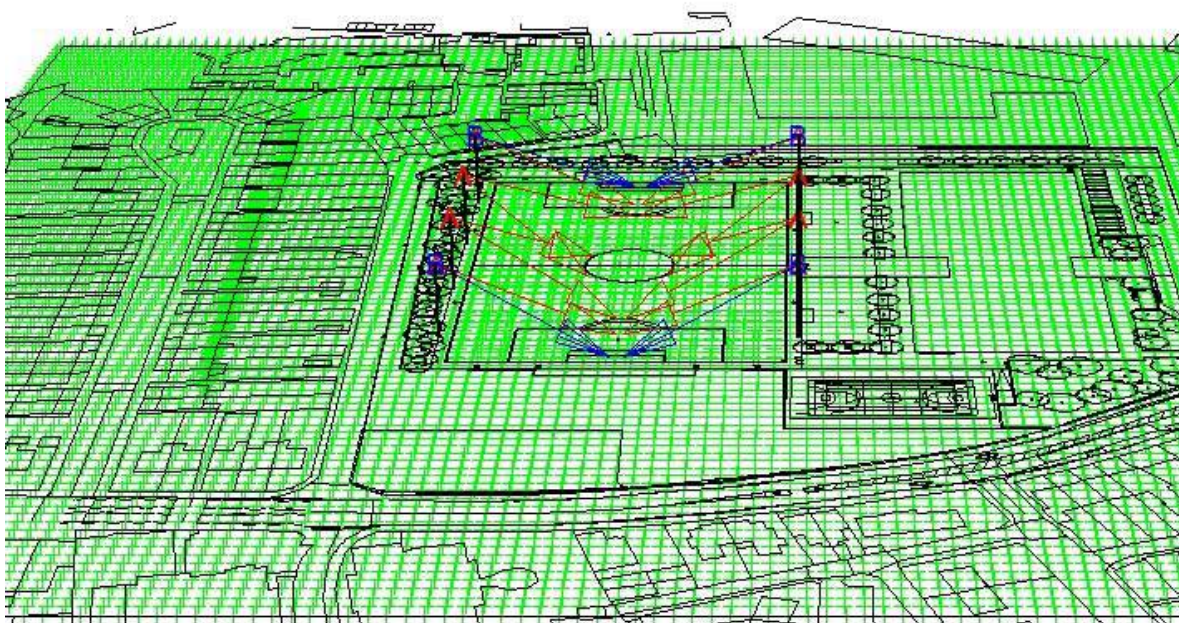
Project code: 0400061129, D-227389

Date: 31-01-2018

Customer: Michael Grubb Studios

Customer Representative: Alastair Aiken

Designer: Steve Johnston



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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CalcuLuX Area 7.7.2.0

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## 1. Project Description

### 1.1 Description

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Designed to Sport England Outdoor Football Pitch Class II  
FA Standard = 200 lux ave, 0.6 Uo  
60 Ra

Pitch now rotated 90 degrees and new drawing layout included

MF for OptiVivision LED Sports Lighting = 0.9 MF

8 No 15m columns with 2 No luminaires on each

Luminaires are Philips OptiVision LED luminaires with Louvre  
BVP525 OUT T15 100K 1xLED1940/740 A-NB/30 +LO = 4 No  
BVP525 OUT T15 100K 1xLED1940/740 A-WB/30 +LO = 12 No

16 No fittings in total  
GR Max claculation shown on Pitch grid

Grid points doubled to be within 5m spacing. Not placed on lines as helps  
Calculation result and not required for Commissioning results.

Spill Light Isocontours are shown outside Pitch Area based upon the Spill Light  
levels shown in Sport England Document and ILP Guidance Notes for Obtrusive  
Light 2011. These are 2,5,10 & 25 lux levels.

Spill lighting iso-contour results are shown with an MF of 1.0 which is worst  
case when newley installed.

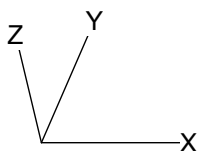
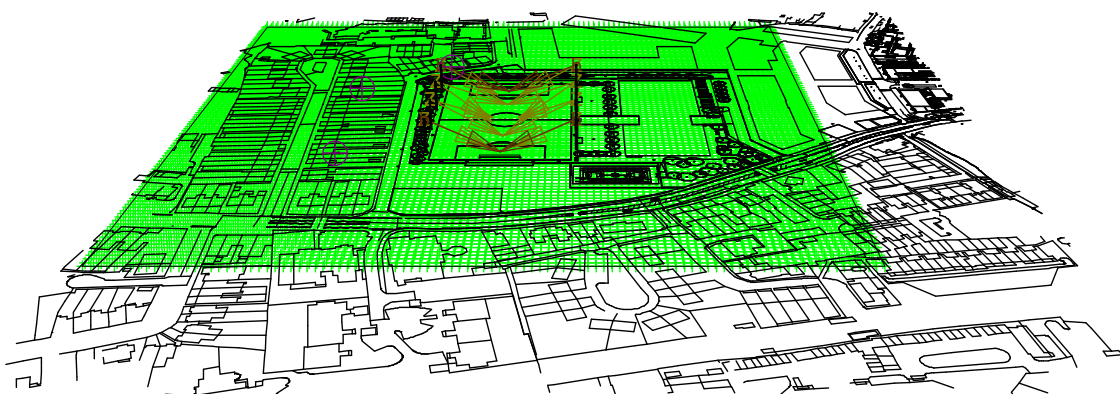
Pre Curfew Spill light through windows are E1 = 2 lux, E2 = 5 lux, E3 = 10 lux,  
calculation with internal louvre fitted is below 5 lux so conforms wit E2-E4  
Zones. Observers at houses added @ 1.5m for Lighting Intensity Calc





Tilt angles are no higher than 68 degree peak beam.  
Peak beam angle included in Tilt 90 of calculation so  
68 deg peak beam tilt (38 degree Physical housing tilt as 30 deg asymmetric)

Louvres are fitted internally around each LED to reduce spill in all directions  
Light intensity at angles and glare reduction.

### 1.2 3-D Project Overview

---







- |   |                                                                                     |                              |                                                                                     |                             |
|---|-------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|-----------------------------|
| G |  | BVP525 OUT T15 100K A-VWB/ N |  | BVP651 T25 DW10 BL1         |
| Z |  | BVP515 OUT T15 100K A-WB/3 b |  | BVP515 OUT T15 100K A-NB/30 |



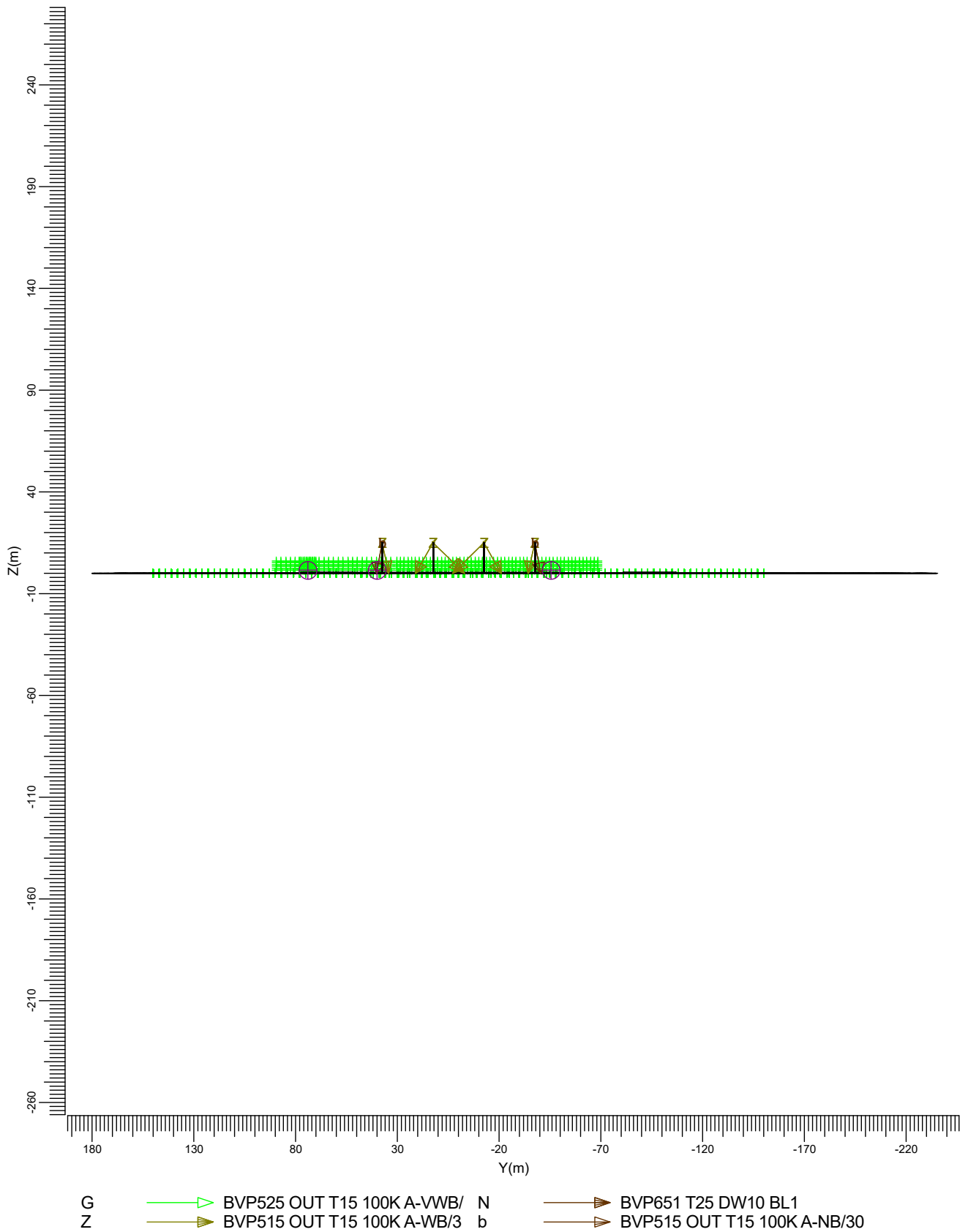
### 1.3 Top Project Overview



- |   |                                                                                                                  |                                                                                                                 |
|---|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| G |  BVP525 OUT T15 100K A-VWB/ N |  BVP651 T25 DW10 BL1         |
| Z |  BVP515 OUT T15 100K A-WB/3   |  BVP515 OUT T15 100K A-NB/30 |

Scale  
 1:2500

### 1.4 Left Project Overview



Scale  
 1:2500



## 2. Summary

### 2.1 Observer Information

Code	Observer	Position		
		X (m)	Y (m)	Z (m)
Aa	North Houses	-33.00	74.00	1.50
Bb	North West Houses	-76.00	40.00	1.50
Cc	South West Houses	-74.50	-45.50	1.50

### 2.2 Obstacle Information

Obstacle	Transparency (%)	Position		
		X (m)	Y (m)	Z (m)
Corner Columns	0	-34.50	-37.50	0.00
		34.50	-37.50	0.00
		-34.50	37.50	0.00
		34.50	37.50	0.00
Centre Columns	0	-34.50	-12.50	0.00
		34.50	-12.50	0.00
		-34.50	12.50	0.00
		34.50	12.50	0.00

### 2.3 Project Luminaires

Code	Qty	Luminaire Type	Lamp Type	Power (W)	Flux (lm)
Z	12	BVP515 OUT T15 100K A-WB/30 +LO	1 * LED1290/740	917.2	1 * 122450
b	4	BVP515 OUT T15 100K A-NB/30 +LO	1 * LED1290/740	917.2	1 * 122450

The total installed power: 14.68 (kWatt)

Number of Luminaires Per Switching Mode:

Switching Mode	Luminaire Code		Power (kWatt)
	Z	b	
Performance	12	4	14.68
Spill Ltg	12	4	14.68

Number of Luminaires Per Arrangement:

Arrangement	Luminaire Code		Power (kWatt)
	Z	b	
Centre Columns	0	0	0.00
Centre Columns plus 1m	0	0	0.00
End Columns	4	4	7.34
End Columns plus 1m	0	0	0.00
Half way line 1	0	0	0.00
Half way line 2	8	0	7.34
Half way line 3	0	0	0.00
Half way line 4	0	0	0.00

### 2.4 Calculation Results

Switching Modes:

Code	Switching Mode	Maintenance factor
1	Performance	0.90
2	Spill Ltg	1.00

(II) Luminance Calculations:

Calculation	Switching Mode	Type	Unit	Ave	Min	Max	Min/Ave	Min/Max	CV
Football	1	Surface Illuminance	lux	144	93	188	0.65	0.50	
Spill Ltg Grid	2	Surface Illuminance	lux						
Ev West houses @1.5m-6m	2	Surface Illuminance	lux	0.17	0.10	0.24	0.61	0.43	
Ev NWest house @1.5m-6m	1	Surface Illuminance	lux	0.11	0.06	0.19	0.55	0.33	0.311
Ev Nth houses @1.5m-6m1	1	Surface Illuminance	lux	0.39	0.22	0.75	0.55	0.29	0.281

Glare Rating for Grid of Observers:

Calculation	Switching Mode	Observer Grid	Reference Grid	Reflectance	GR-Max
GR Max for Pitch	1	Football	Football	0.25	43.9

Obtrusive Light Calculations:

Switching Mode	Observer Code	Luminaire Code	Position			Aiming Angles			Maximum Intensity (cd)
			X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0	
1	Aa	Z	34.50	12.50	15.00	166.07	67.00	0.00	911
1	Bb	Z	34.50	-12.50	15.00	-166.07	67.00	-0.00	643
1	Cc	Z	34.50	12.50	15.00	166.07	67.00	0.00	690

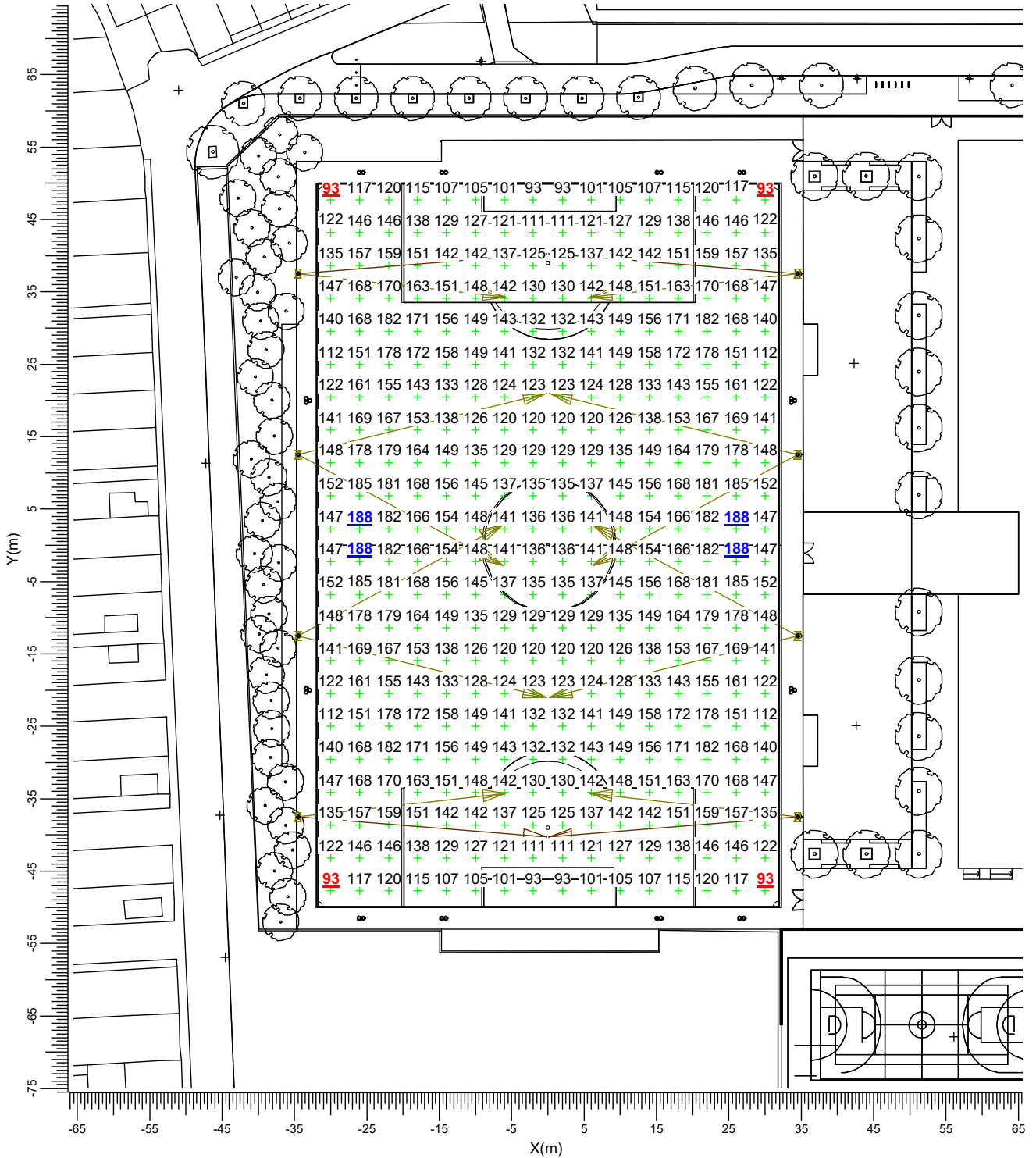
Switching Mode	ULR
1	0.00
2	0.00

### 3. Calculation Results

#### 3.1 Football: Graphical Table

#### Performance

Grid : Football at Z = -0.00 m  
Calculation : Surface Illuminance (lux)



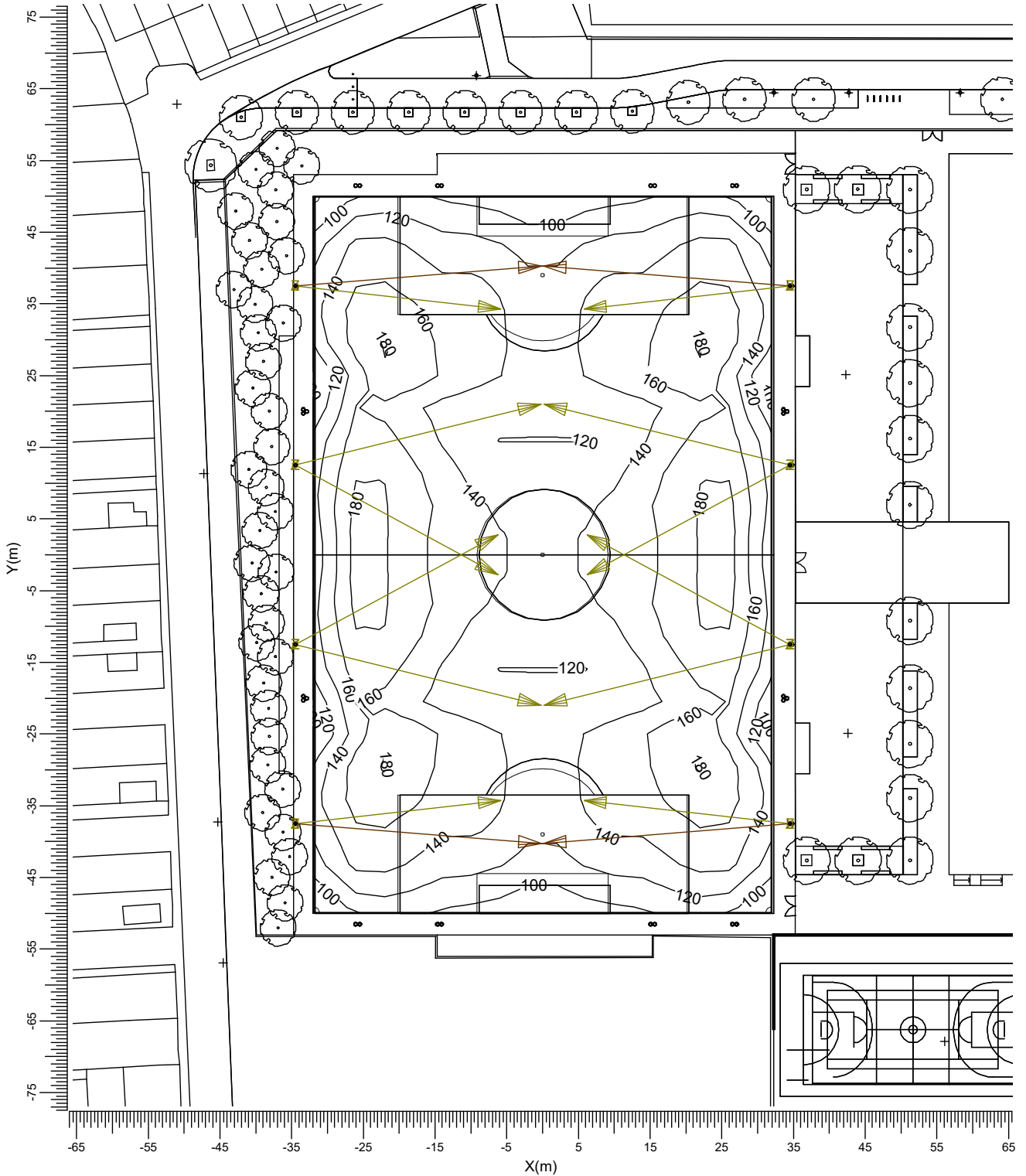
G → BVP525 OUT T15 100K A-VWB/ N → BVP651 T25 DW10 BL1  
Z → BVP515 OUT T15 100K A-WB/3 b → BVP515 OUT T15 100K A-NB/30





Average 144	Minimum 93	Maximum 188	Min/Ave 0.65	Min/Max 0.50	Project maintenance factor 0.90	Scale 1:750
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3.2 Football: Iso Contour

Performance

Grid : Football at Z = -0.00 m  
Calculation : Surface Illuminance (lux)



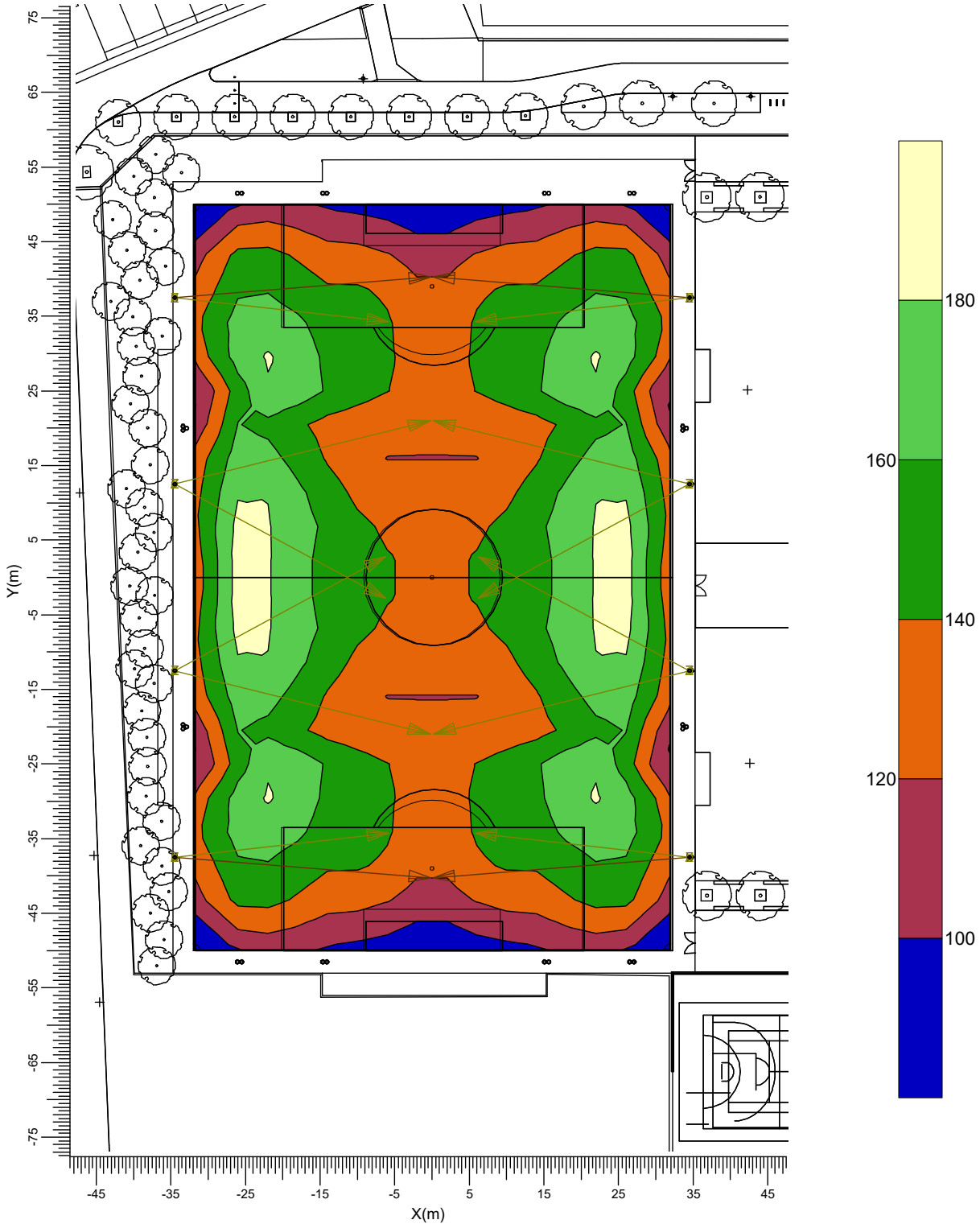
G		BVP525 OUT T15 100K A-VWB/ N	N		BVP651 T25 DW10 BL1
Z		BVP515 OUT T15 100K A-WB/3	b		BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
144	93	188	0.65	0.50	0.90	1:750

3.3 Football: Filled Iso Contour

Performance

Grid : Football at Z = -0.00 m  
 Calculation : Surface Illuminance (lux)



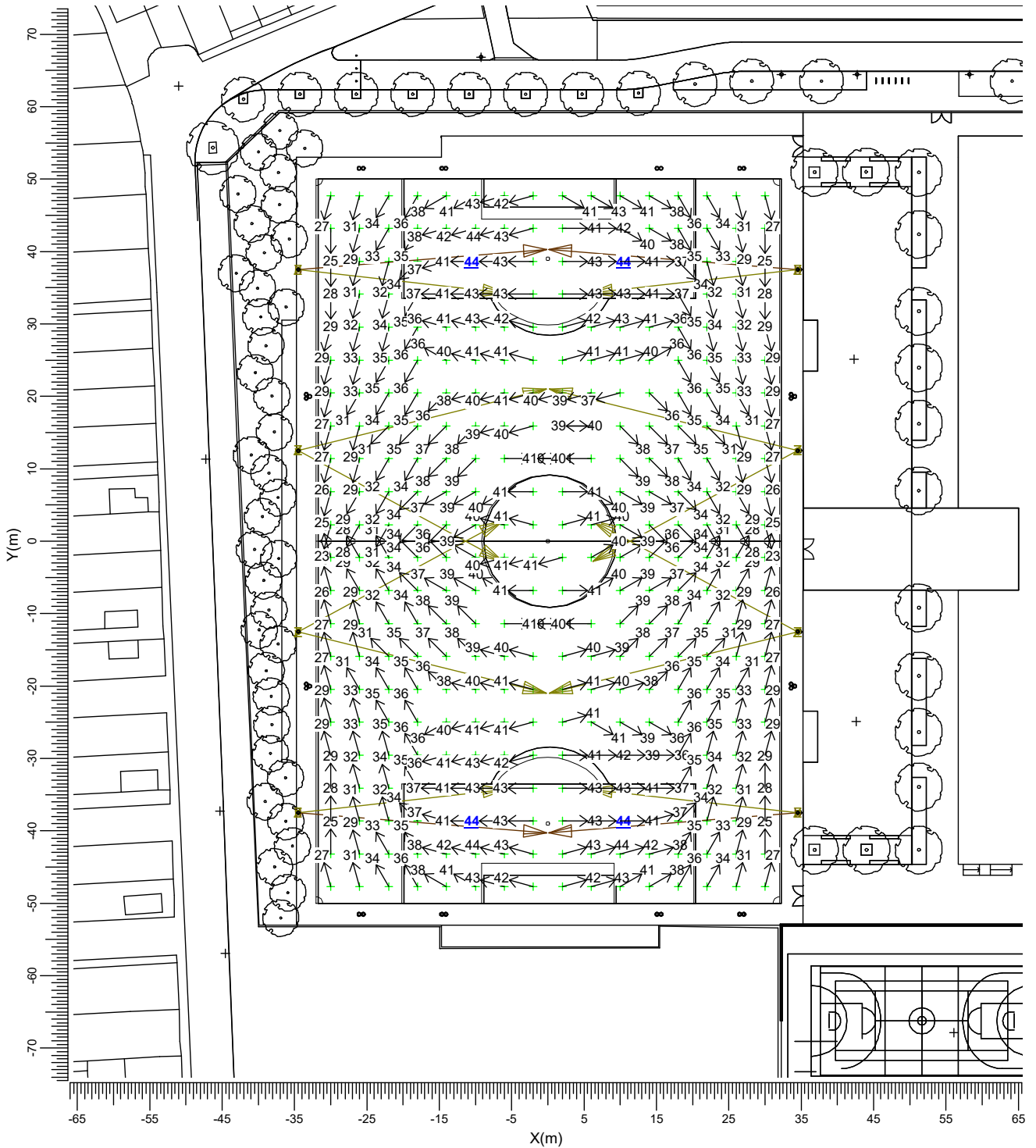
- |   |  |                              |   |  |                             |
|---|--|------------------------------|---|--|-----------------------------|
| G |  | BVP525 OUT T15 100K A-VWB/ N | N |  | BVP651 T25 DW10 BL1         |
| Z |  | BVP515 OUT T15 100K A-WB/3   | b |  | BVP515 OUT T15 100K A-NB/30 |





Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
144	93	188	0.65	0.50	0.90	1:750

3.4 GR Max for Pitch: Graphical Table

Performance

Grid of Observers : Football  
 Calculation : Glare Rating  
 Grid for Background Luminance : Football (Reflectance: 0.25)  
 Vertical Viewing Angle : -2.0 deg



G		BVP525 OUT T15 100K A-VWB/ N		BVP651 T25 DW10 BL1
Z		BVP515 OUT T15 100K A-WB/3		BVP515 OUT T15 100K A-NB/30

Maximum  
43.9

Project maintenance factor  
0.90

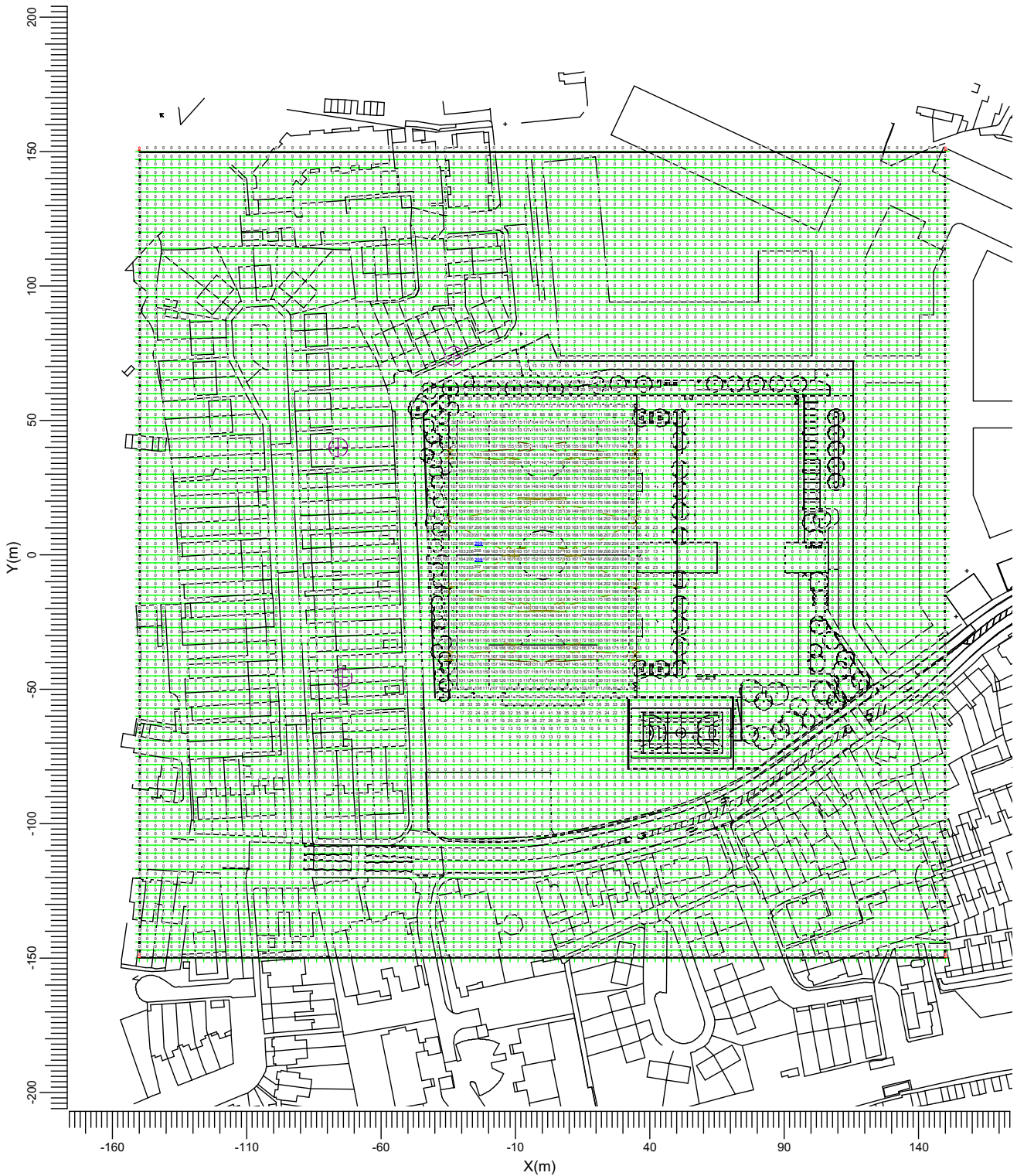
Scale  
1:750







3.5 Spill Ltg Grid: Graphical Table

Spill Ltg

Grid : Spill Ltg Grid at Z = -0.00 m  
Calculation : Surface Illuminance (lux)



- |   |                                                                                     |                              |                                                                                     |                             |
|---|-------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|-----------------------------|
| G |  | BVP525 OUT T15 100K A-VWB/ N |  | BVP651 T25 DW10 BL1         |
| Z |  | BVP515 OUT T15 100K A-WB/3   |  | BVP515 OUT T15 100K A-NB/30 |

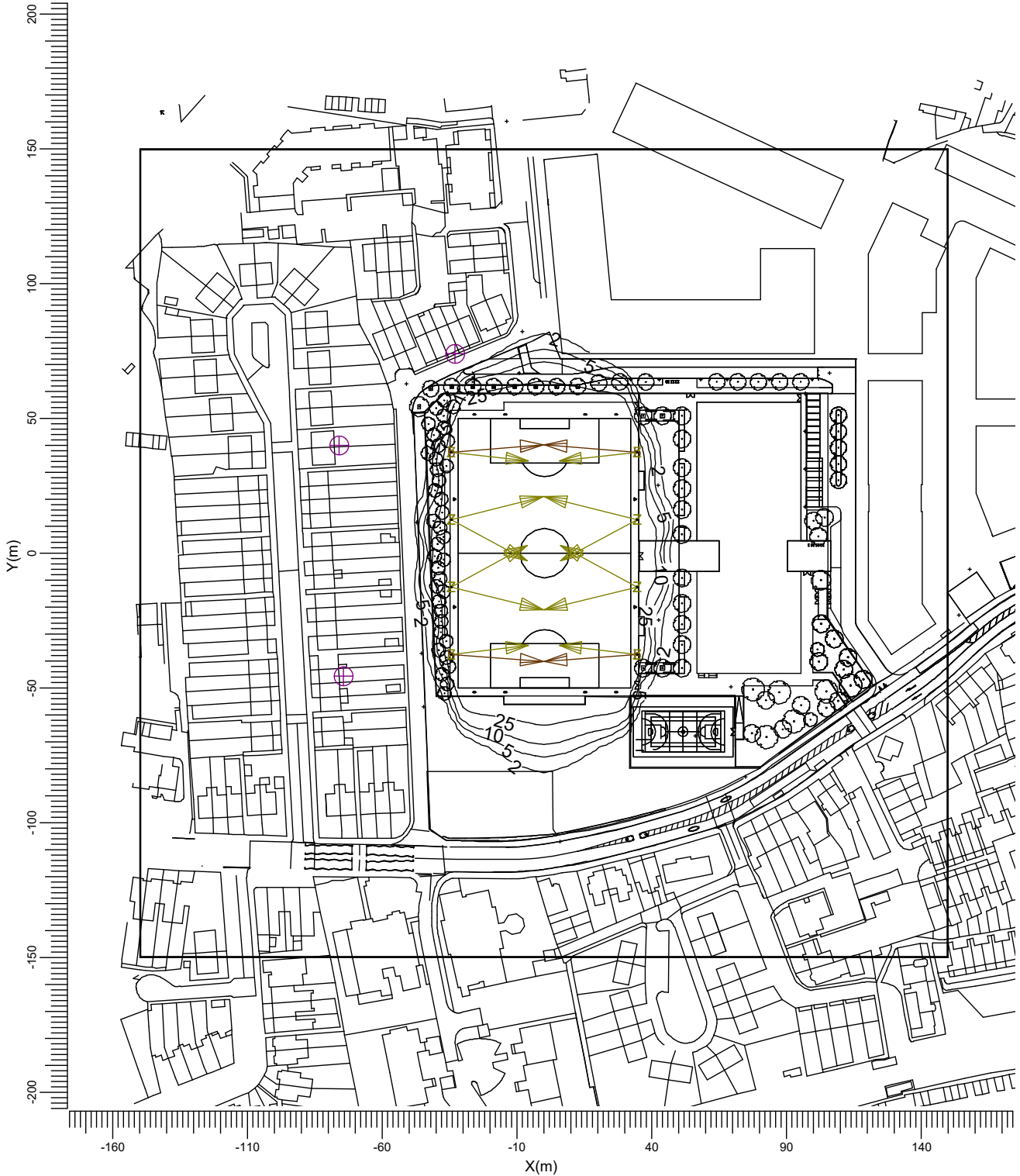
Project maintenance factor  
1.00





Scale  
1:2000

3.6 Spill Ltg Grid: Iso Contour

Spill Ltg

Grid : Spill Ltg Grid at Z = -0.00 m  
 Calculation : Surface Illuminance (lux)



- |   |                                                                                     |                              |                                                                                     |                             |
|---|-------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|-----------------------------|
| G |  | BVP525 OUT T15 100K A-VWB/ N |  | BVP651 T25 DW10 BL1         |
| Z |  | BVP515 OUT T15 100K A-WB/3 b |  | BVP515 OUT T15 100K A-NB/30 |

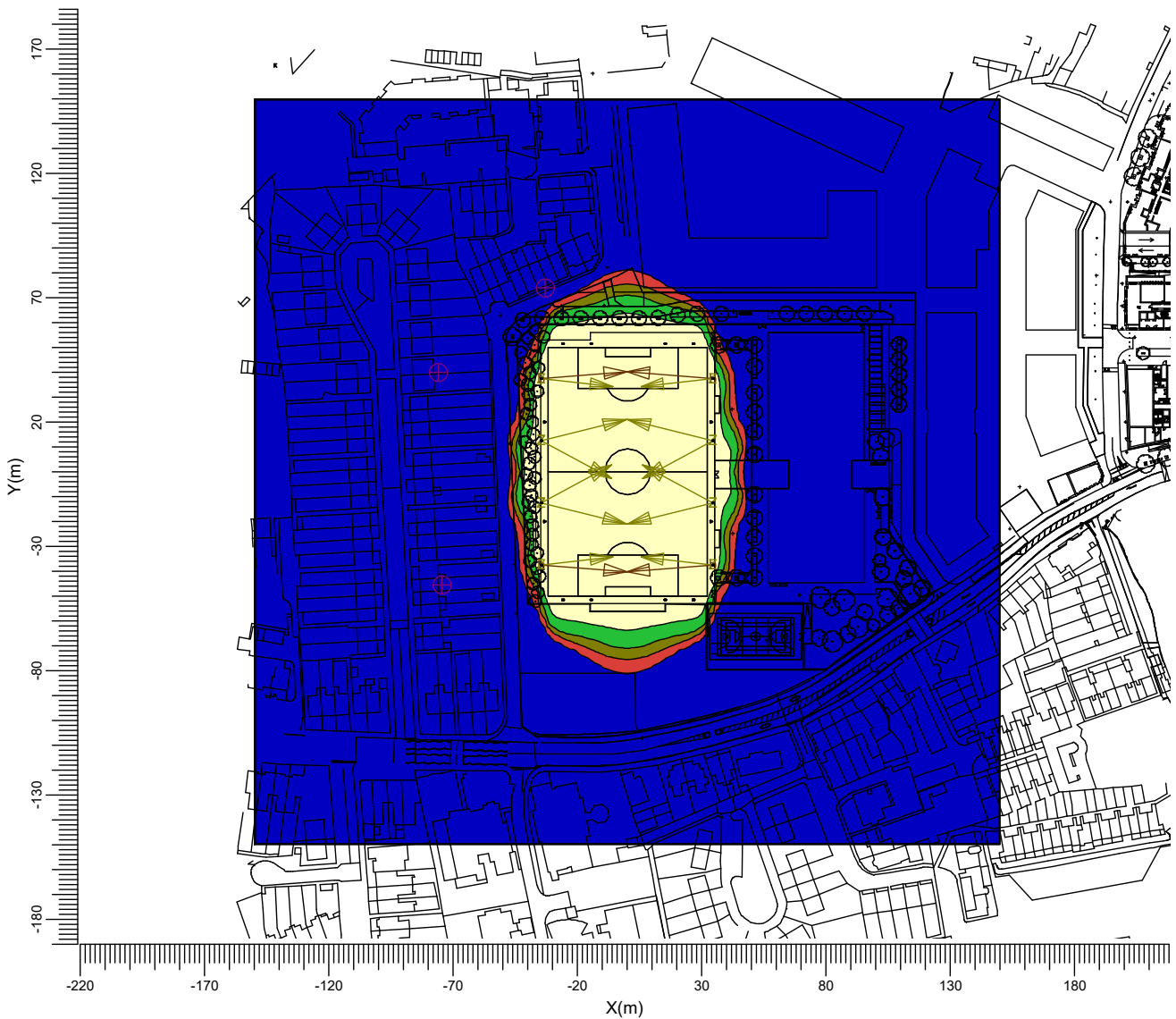
Project maintenance factor  
 1.00

Scale  
 1:2000

3.7 Spill Ltg Grid: Filled Iso Contour

Spill Ltg

Grid : Spill Ltg Grid at Z = -0.00 m  
 Calculation : Surface Illuminance (lux)



- |   |  |                              |  |                             |
|---|--|------------------------------|--|-----------------------------|
| G |  | BVP525 OUT T15 100K A-VWB/ N |  | BVP651 T25 DW10 BL1         |
| Z |  | BVP515 OUT T15 100K A-WB/3 b |  | BVP515 OUT T15 100K A-NB/30 |

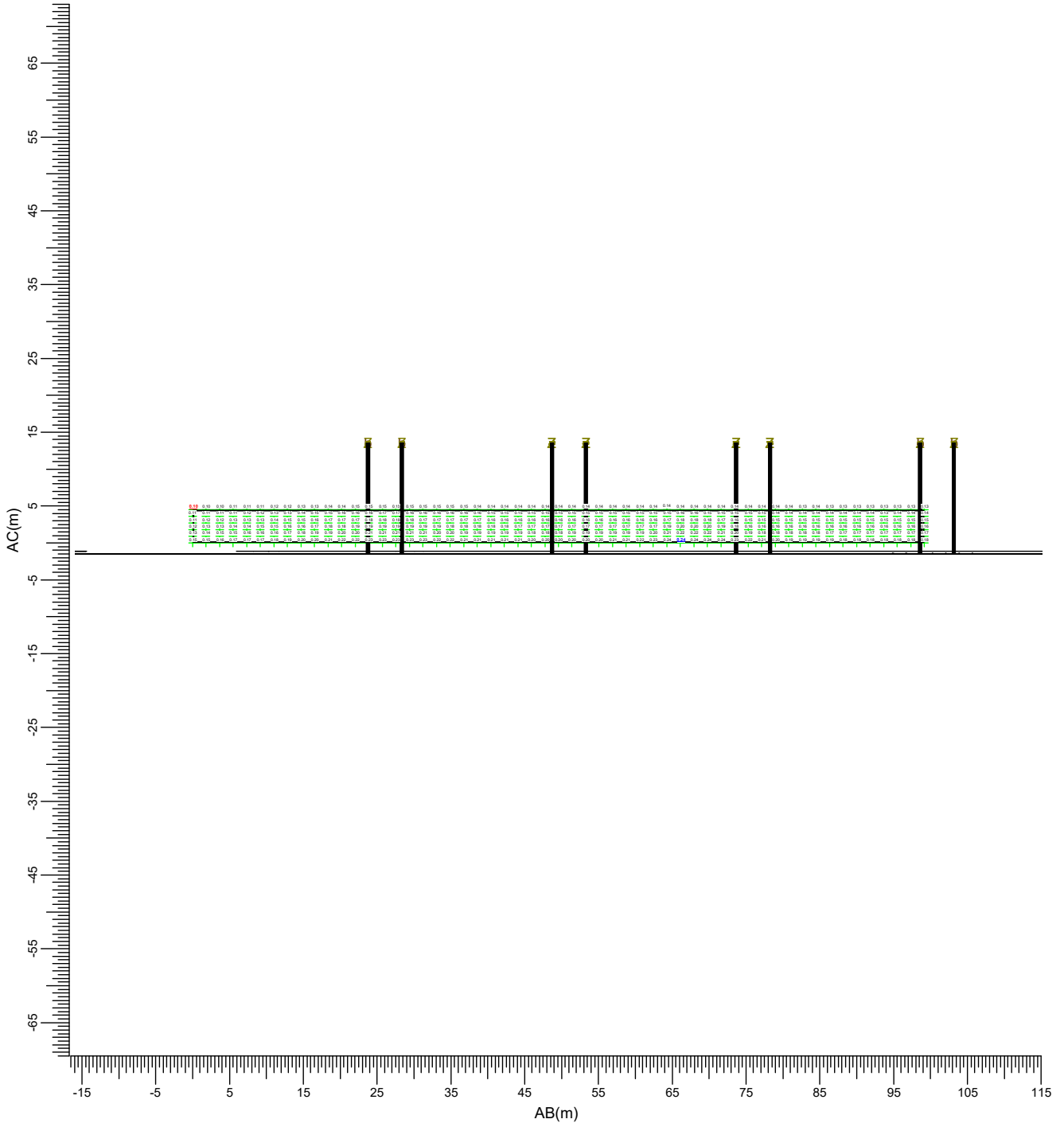
Project maintenance factor  
 1.00

Scale  
 1:2500

3.8 Ev West houses @1.5m-6m: Graphical Table

Spill Ltg

Grid : Ev West houses @1.5m-6m  
 Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)  
 (-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

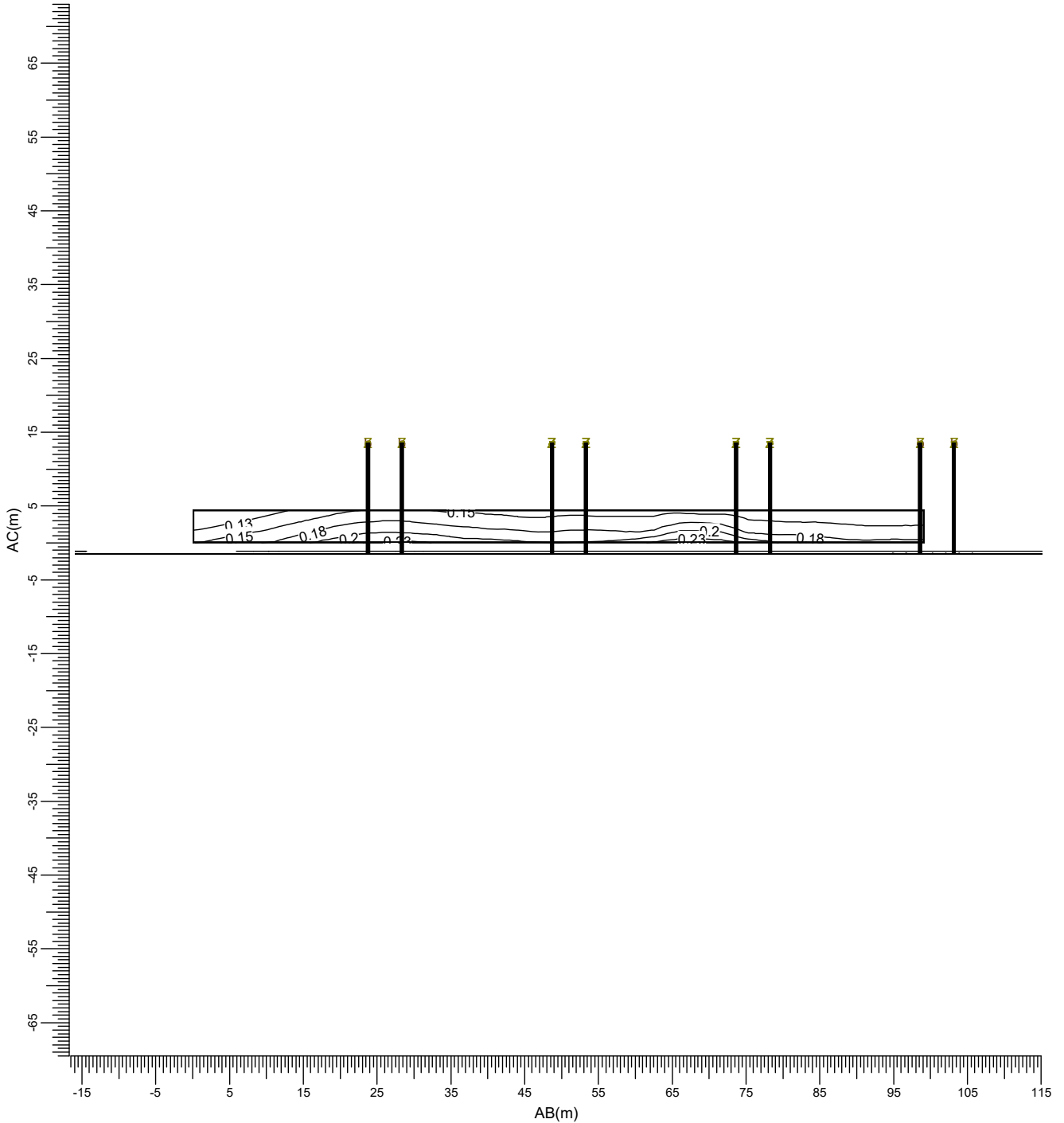
G : BVP525 OUT T15 100K A-VWB/30 N : BVP651 T25 DW10 BL1  
 Z : BVP515 OUT T15 100K A-WB/30 +LO b : BVP515 OUT T15 100K A-NB/30 +LO

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.17	0.10	0.24	0.61	0.43	1.00	1:750

3.9 Ev West houses @1.5m-6m: Iso Contour

Spill Ltg

Grid : Ev West houses @1.5m-6m  
 Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)  
 (-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

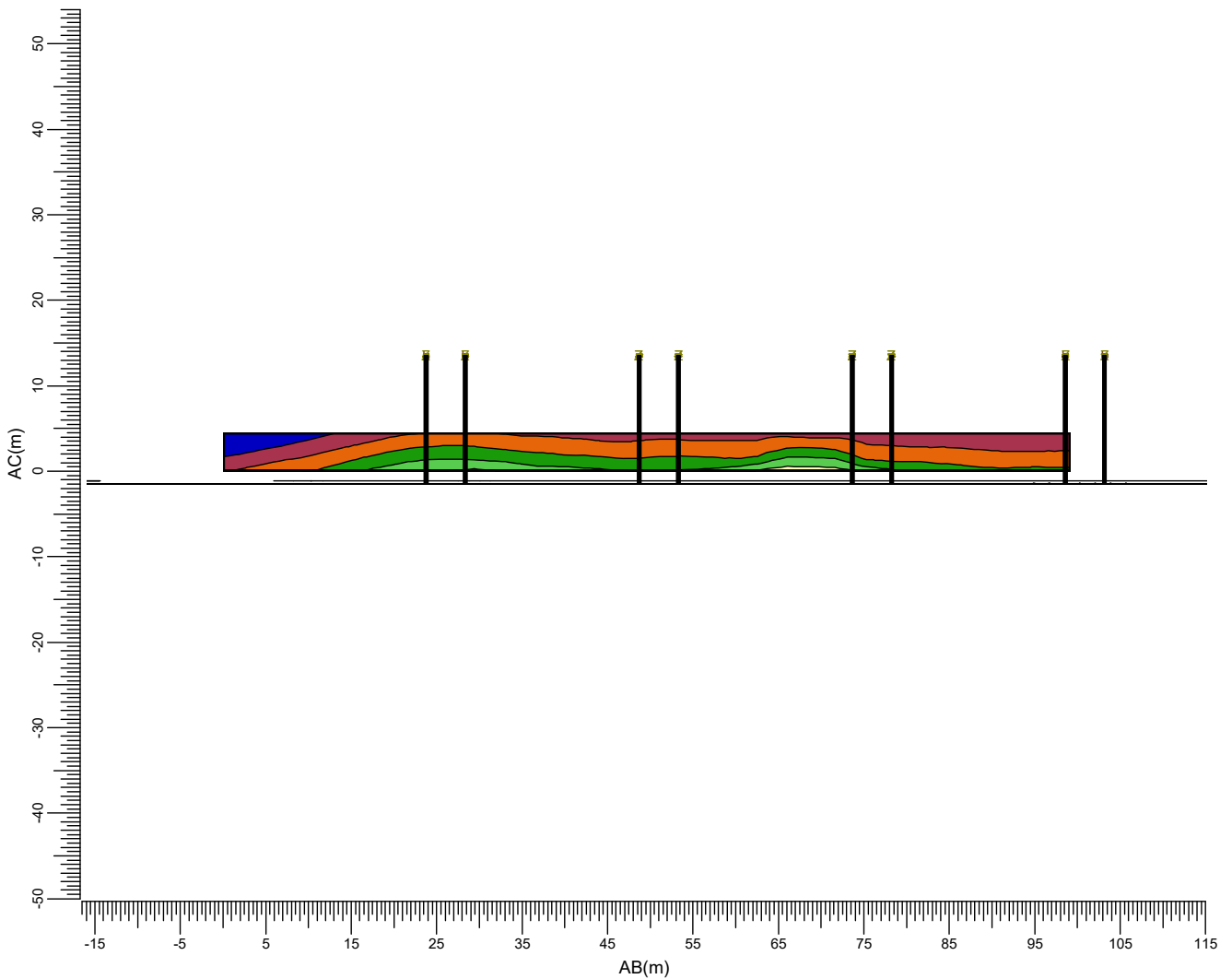
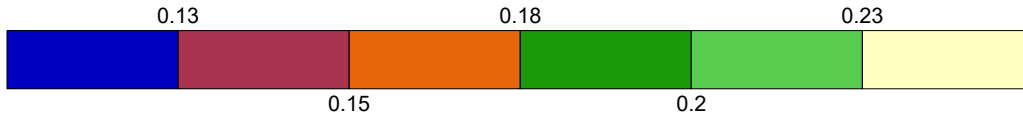
G : BVP525 OUT T15 100K A-VWB/30 N : BVP651 T25 DW10 BL1  
 Z : BVP515 OUT T15 100K A-WB/30 +LO b : BVP515 OUT T15 100K A-NB/30 +LO

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.17	0.10	0.24	0.61	0.43	1.00	1:750

3.10 Ev West houses @1.5m-6m: Filled Iso Contour

Spill Ltg

Grid : Ev West houses @1.5m-6m  
Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)  
(-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

G : BVP525 OUT T15 100K A-VWB/30 N : BVP651 T25 DW10 BL1  
Z : BVP515 OUT T15 100K A-WB/30 +LO b : BVP515 OUT T15 100K A-NB/30 +LO

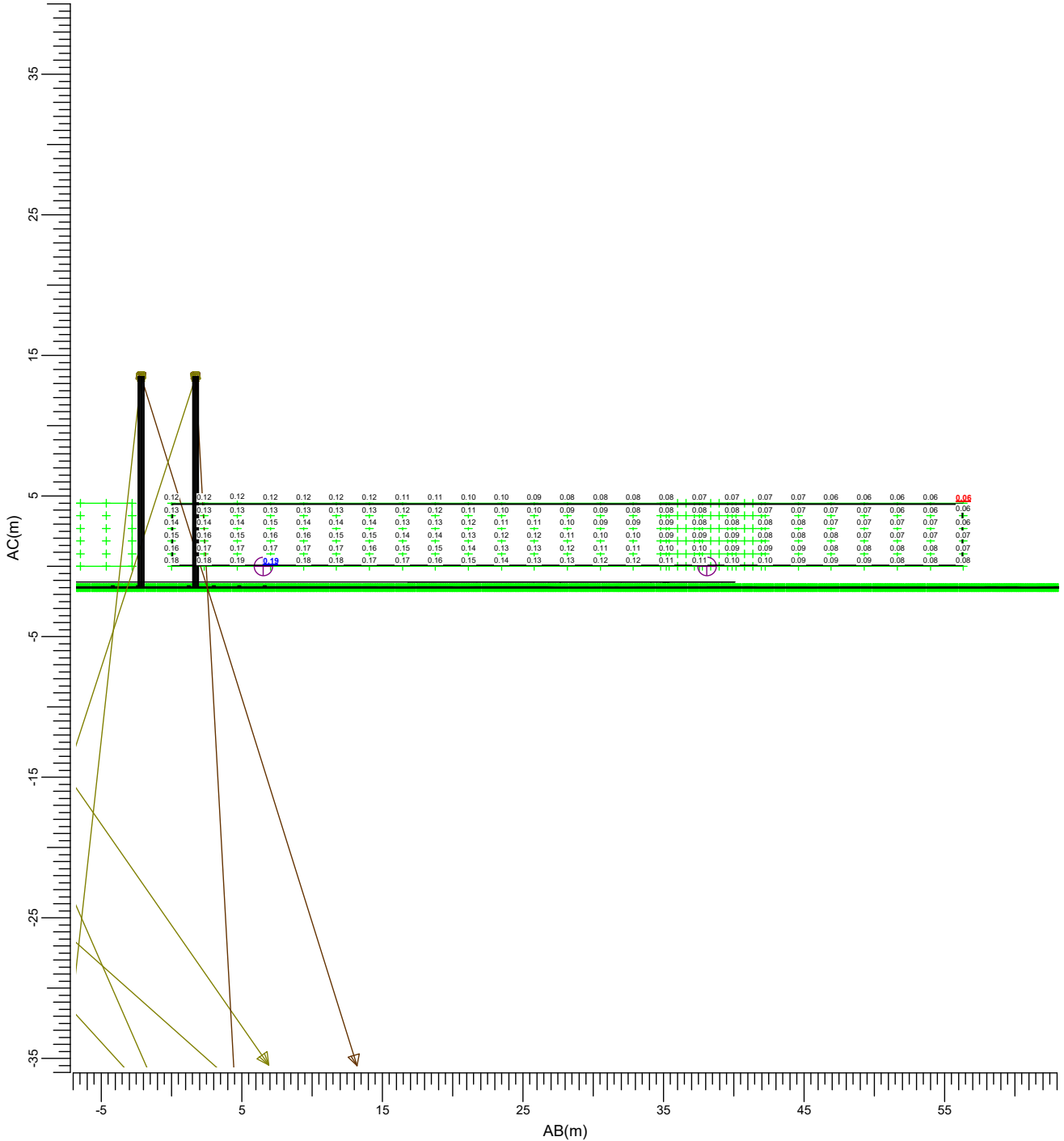
Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.17	0.10	0.24	0.61	0.43	1.00	1:750



3.11 Ev NWest house @1.5m-6m: Graphical Table

Performance

Grid : Ev NWest house @1.5m-6m  
 Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)  
 (-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

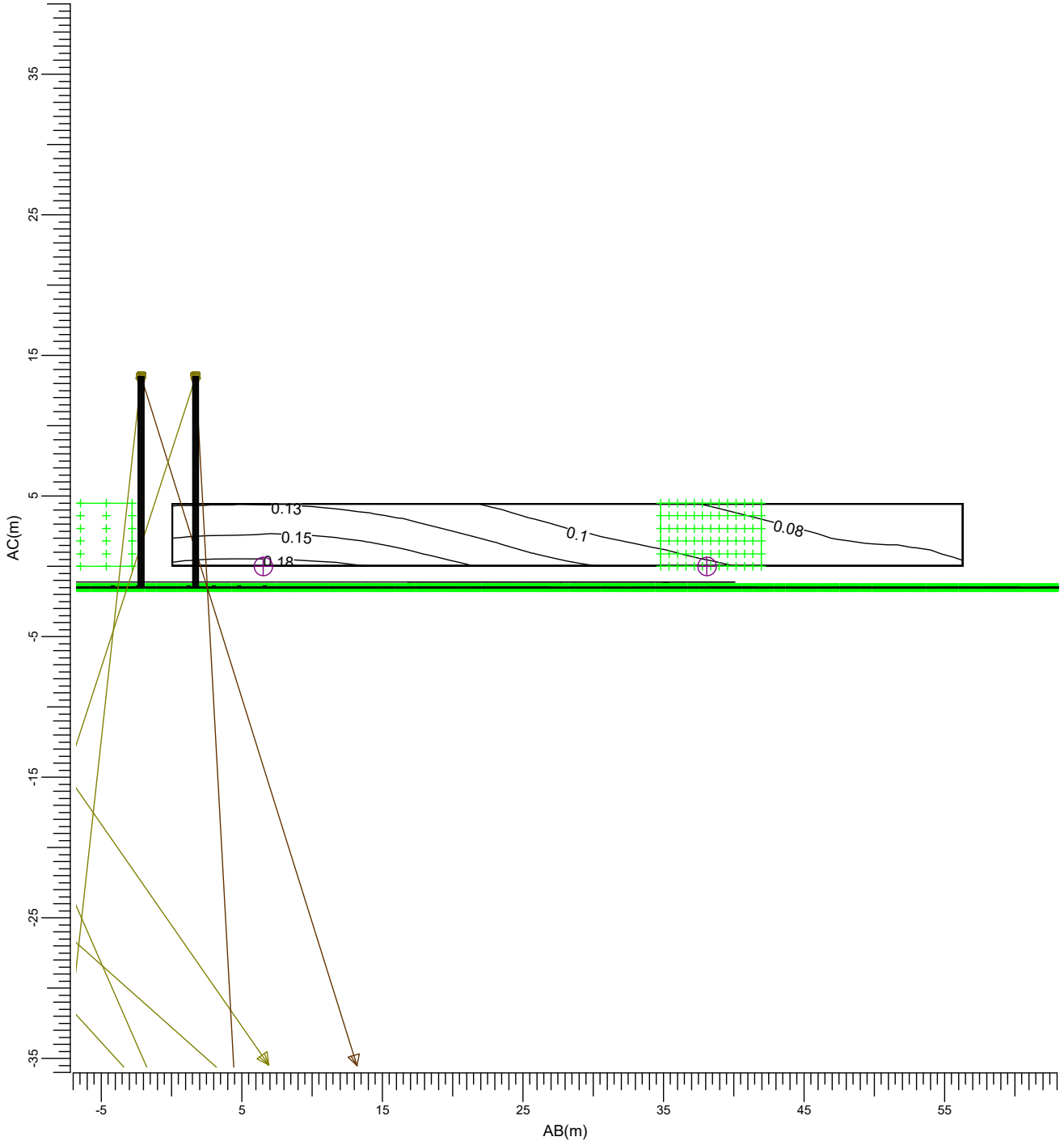
- G → BVP525 OUT T15 100K A-VWB/ N
- Z → BVP515 OUT T15 100K A-WB/3
- BVP651 T25 DW10 BL1
- BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.11	0.06	0.19	0.55	0.33	0.311	0.90	1:400

3.12 Ev NWest house @1.5m-6m: Iso Contour

Performance

Grid : Ev NWest house @1.5m-6m  
 Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)  
 (-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

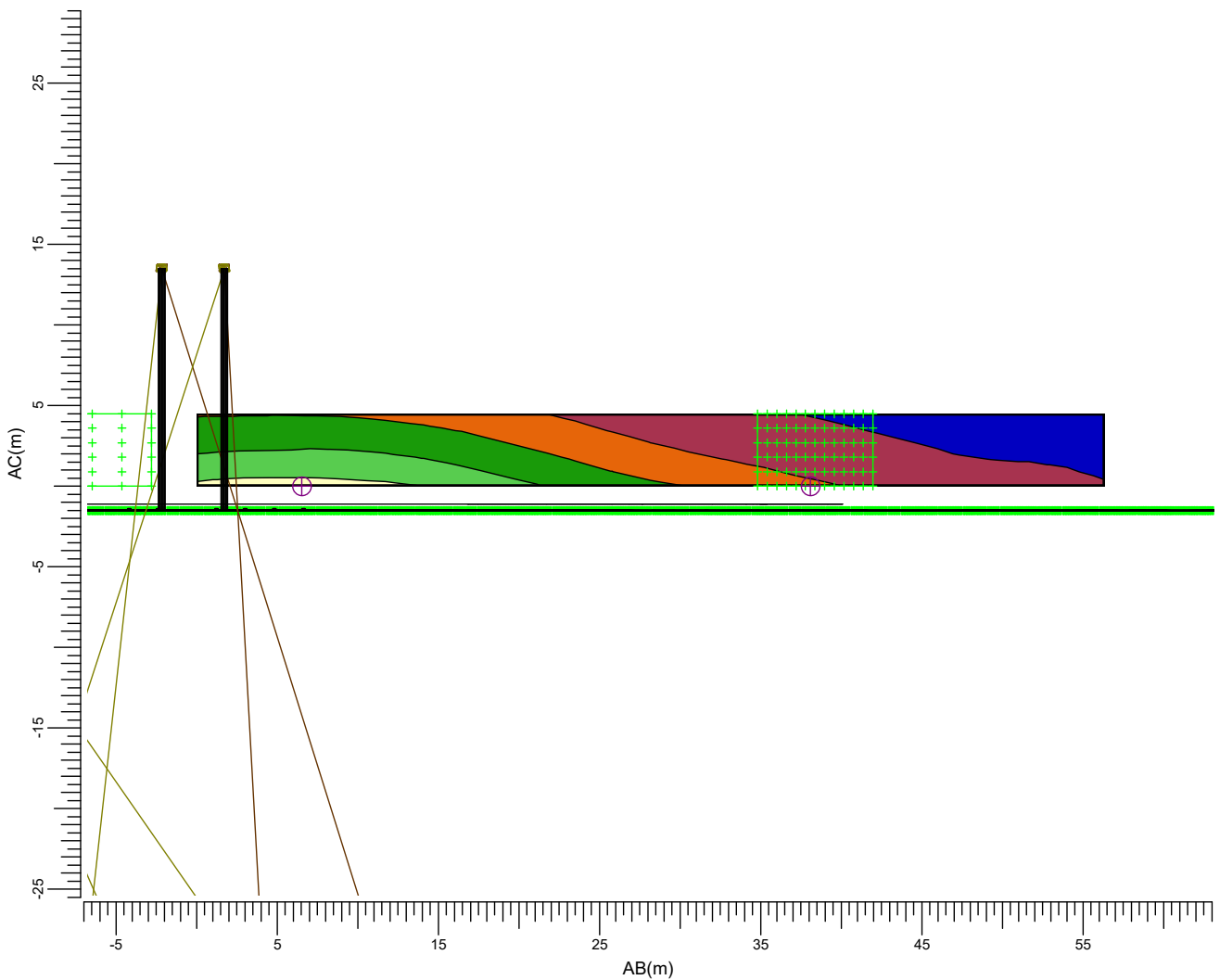
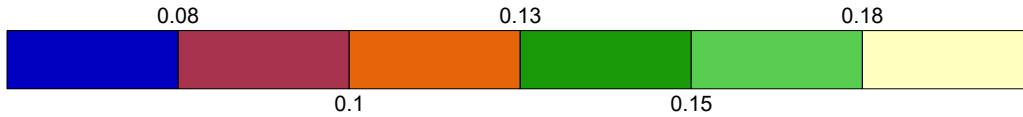
- G ▶ BVP525 OUT T15 100K A-VWB/ N ▶ BVP651 T25 DW10 BL1
- Z ▶ BVP515 OUT T15 100K A-WB/3 b ▶ BVP515 OUT T15 100K A-NB/30

Average 0.11	Minimum 0.06	Maximum 0.19	Min/Ave 0.55	Min/Max 0.33	CV 0.311	Project maintenance factor 0.90	Scale 1:400
-----------------	-----------------	-----------------	-----------------	-----------------	-------------	------------------------------------	----------------

3.13 Ev NWest house @1.5m-6m: Filled Iso Contour

Performance

Grid : Ev NWest house @1.5m-6m  
 Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)  
 (-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

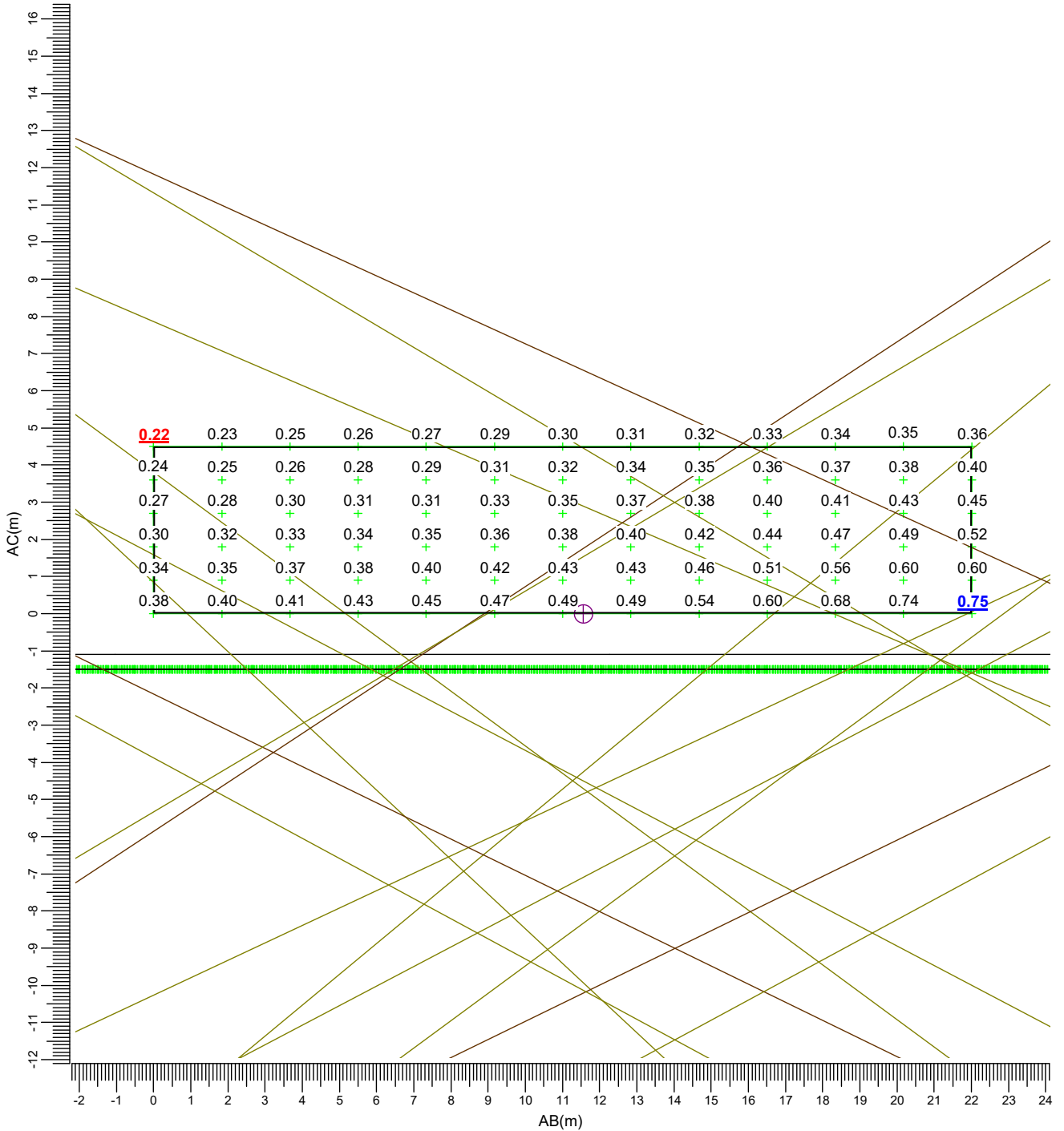
- G → BVP525 OUT T15 100K A-VWB/ N
- Z → BVP515 OUT T15 100K A-WB/3
- BVP651 T25 DW10 BL1
- BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.11	0.06	0.19	0.55	0.33	0.311	0.90	1:400

3.14 Ev Nth houses @1.5m-6m1: Graphical Table

Performance

Grid : Ev Nth houses @1.5m-6m1  
Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)  
(-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

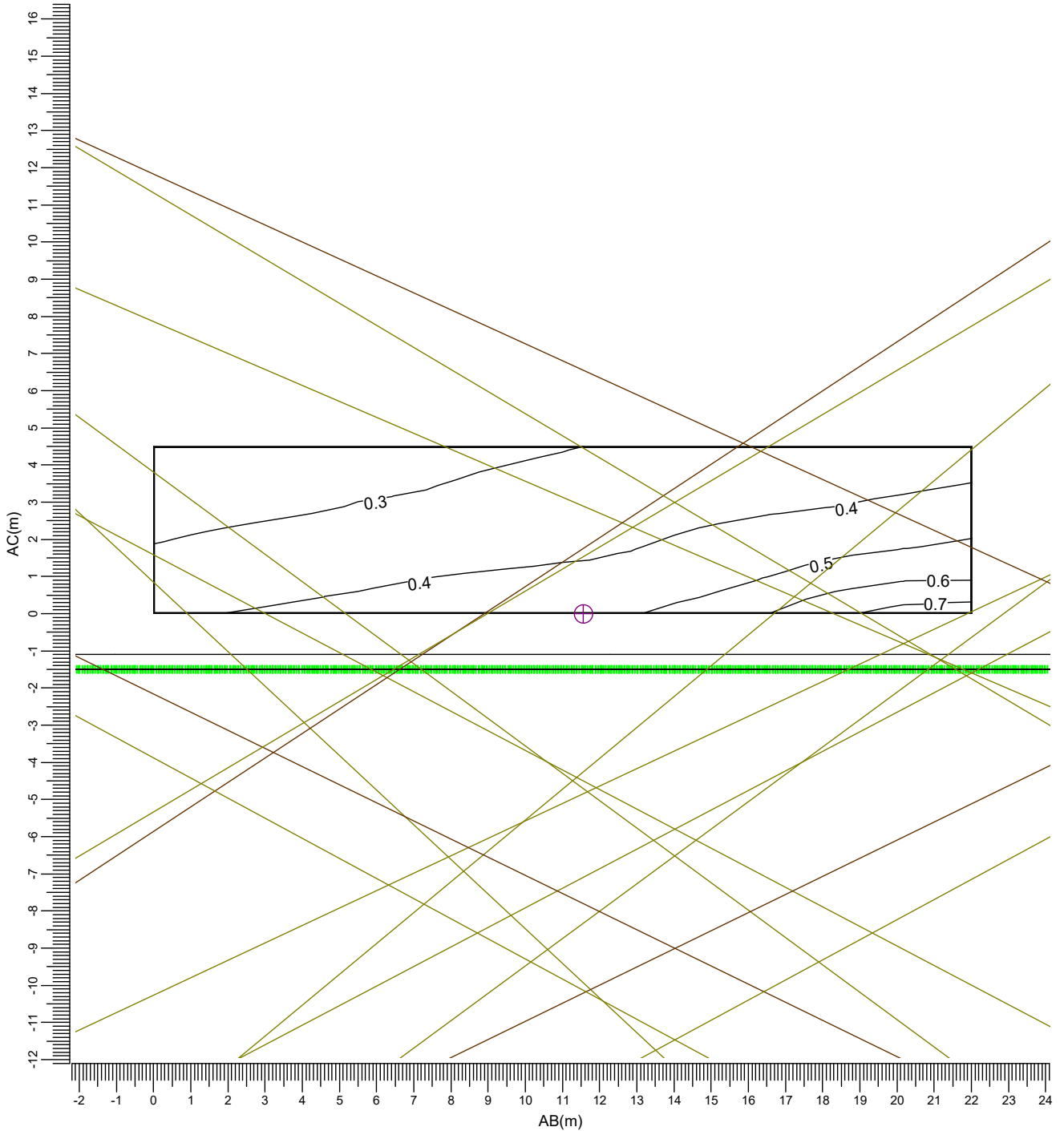
- G ▶ BVP525 OUT T15 100K A-VWB/ N
- Z ▶ BVP515 OUT T15 100K A-WB/3
- ▶ BVP651 T25 DW10 BL1
- ▶ BVP515 OUT T15 100K A-NB/30

Average 0.39    Minimum 0.22    Maximum 0.75    Min/Ave 0.55    Min/Max 0.29    CV 0.281    Project maintenance factor 0.90    Scale 1:150

3.15 Ev Nth houses @1.5m-6m1: Iso Contour

Performance

Grid : Ev Nth houses @1.5m-6m1  
Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)  
(-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

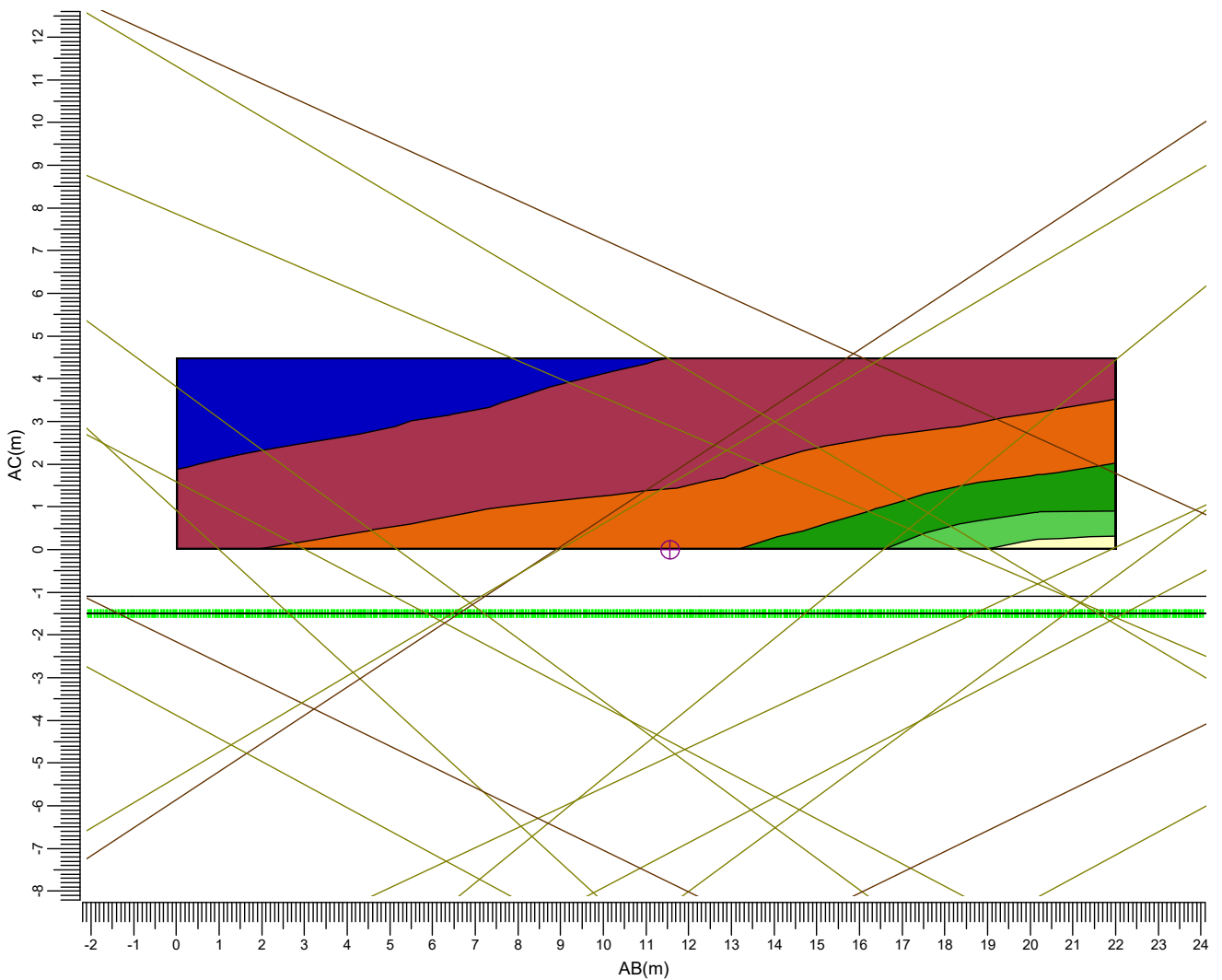
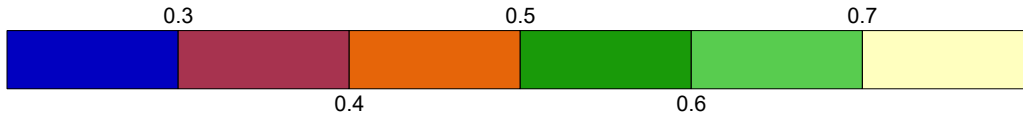
G ▶ BVP525 OUT T15 100K A-VWB/ N ▶ BVP651 T25 DW10 BL1  
Z ▶ BVP515 OUT T15 100K A-WB/3 b ▶ BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.39	0.22	0.75	0.55	0.29	0.281	0.90	1:150

3.16 Ev Nth houses @1.5m-6m1: Filled Iso Contour

Performance

Grid : Ev Nth houses @1.5m-6m1  
Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)  
(-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1  
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.39	0.22	0.75	0.55	0.29	0.281	0.90	1:150



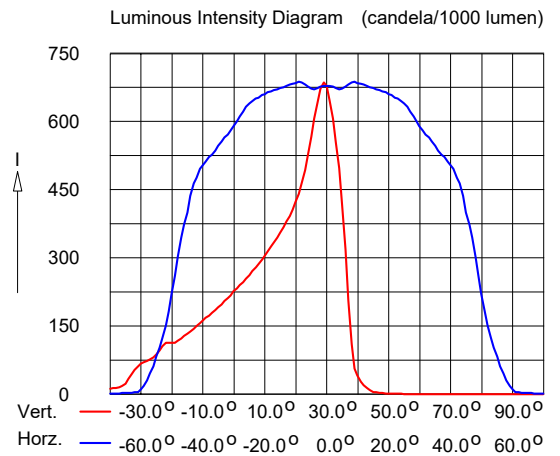
## 4. Luminaire Details

### 4.1 Project Luminaires

OptiVision LED  
 BVP515 OUT T15 100K 1xLED1290/740 A-WB/30 +LO

Light output ratios  
 DLOR : 0.65  
 ULOR : 0.00  
 TLOR : 0.65  
 Ballast : N/A  
 Lamp flux : 122450 lm  
 Luminaire wattage : 917.2 W  
 Measurement code : LVA1409005

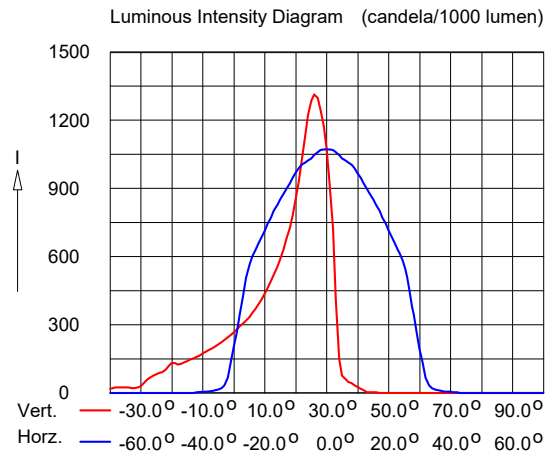
Note: Luminaire data not from database.



OptiVision LED  
 BVP515 OUT T15 100K 1xLED1290/740 A-NB/30 +LO

Light output ratios  
 DLOR : 0.53  
 ULOR : 0.00  
 TLOR : 0.53  
 Ballast : N/A  
 Lamp flux : 122450 lm  
 Luminaire wattage : 917.2 W  
 Measurement code : LVA1409003

Note: Luminaire data not from database.



## 5. Installation Data

### 5.1 Legends

#### Project Luminaires:

Code	Qty	Luminaire Type	Lamp Type	Flux (lm)
Z	12	BVP515 OUT T15 100K A-WB/30 +LO	1 * LED1290/740	1 * 122450
b	4	BVP515 OUT T15 100K A-NB/30 +LO	1 * LED1290/740	1 * 122450

#### Arrangements:

Code	Arrangement
1	End Columns
2	Centre Columns
3	Centre Columns plus 1m
4	End Columns plus 1m
5	Half way line 1
6	Half way line 2
7	Half way line 3
8	Half way line 4

#### Switching Modes:

Code	Switching Mode
1	Performance
2	Spill Ltg

### 5.2 Luminaire Positioning and Orientation

#### Including Aiming Points:

Qty and Code	Position			Aiming Points			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	X (m)	Y (m)	Z (m)			1	2
1 * Z	-34.50	-37.50	15.00	-5.87	-34.24	-0.00	0.00	1	+	+
1 * b	-34.50	-37.50	15.00	-0.11	-40.27	0.00	0.00	1	+	+
1 * Z	-34.50	37.50	15.00	-5.87	34.24	-0.00	0.00	1	+	+
1 * b	-34.50	37.50	15.00	-0.11	40.27	0.00	0.00	1	+	+
1 * Z	34.50	-37.50	15.00	5.87	-34.24	-0.00	0.00	1	+	+
1 * b	34.50	-37.50	15.00	0.11	-40.27	0.00	0.00	1	+	+
1 * Z	34.50	37.50	15.00	5.87	34.24	-0.00	0.00	1	+	+
1 * b	34.50	37.50	15.00	0.11	40.27	0.00	0.00	1	+	+
1 * Z	-34.50	-12.50	15.00	-6.21	2.81	0.00	0.00	6	+	+
1 * Z	-34.50	-12.50	15.00	-0.20	-21.01	0.00	0.00	6	+	+
1 * Z	-34.50	12.50	15.00	-6.21	-2.81	0.00	0.00	6	+	+
1 * Z	-34.50	12.50	15.00	-0.20	21.01	0.00	0.00	6	+	+
1 * Z	34.50	-12.50	15.00	6.21	2.81	0.00	0.00	6	+	+
1 * Z	34.50	-12.50	15.00	0.20	-21.01	0.00	0.00	6	+	+
1 * Z	34.50	12.50	15.00	6.21	-2.81	0.00	0.00	6	+	+
1 * Z	34.50	12.50	15.00	0.20	21.01	0.00	0.00	6	+	+

#### Including Aiming Angles:

Qty and Code	Position			Aiming Angles			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0			1	2
1 * Z	-34.50	-37.50	15.00	6.5	62.5	0.0	0.00	1	+	+

Qty and Code	Position			Aiming Angles			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0			1	2
1 * b	-34.50	-37.50	15.00	-4.6	66.5	0.0	0.00	1	+	+
1 * Z	-34.50	37.50	15.00	-6.5	62.5	-0.0	0.00	1	+	+
1 * b	-34.50	37.50	15.00	4.6	66.5	-0.0	0.00	1	+	+
1 * Z	34.50	-37.50	15.00	173.5	62.5	-0.0	0.00	1	+	+
1 * b	34.50	-37.50	15.00	-175.4	66.5	-0.0	0.00	1	+	+
1 * Z	34.50	37.50	15.00	-173.5	62.5	0.0	0.00	1	+	+
1 * b	34.50	37.50	15.00	175.4	66.5	0.0	0.00	1	+	+
1 * Z	-34.50	-12.50	15.00	28.4	65.0	0.0	0.00	6	+	+
1 * Z	-34.50	-12.50	15.00	-13.9	67.0	0.0	0.00	6	+	+
1 * Z	-34.50	12.50	15.00	-28.4	65.0	-0.0	0.00	6	+	+
1 * Z	-34.50	12.50	15.00	13.9	67.0	-0.0	0.00	6	+	+
1 * Z	34.50	-12.50	15.00	151.6	65.0	-0.0	0.00	6	+	+
1 * Z	34.50	-12.50	15.00	-166.1	67.0	-0.0	0.00	6	+	+
1 * Z	34.50	12.50	15.00	-151.6	65.0	0.0	0.00	6	+	+
1 * Z	34.50	12.50	15.00	166.1	67.0	0.0	0.00	6	+	+

# Mortlake Stage Brewery Development

F/ball Pitch LED Ltg15m 200 Lx 0.6 U0 LO

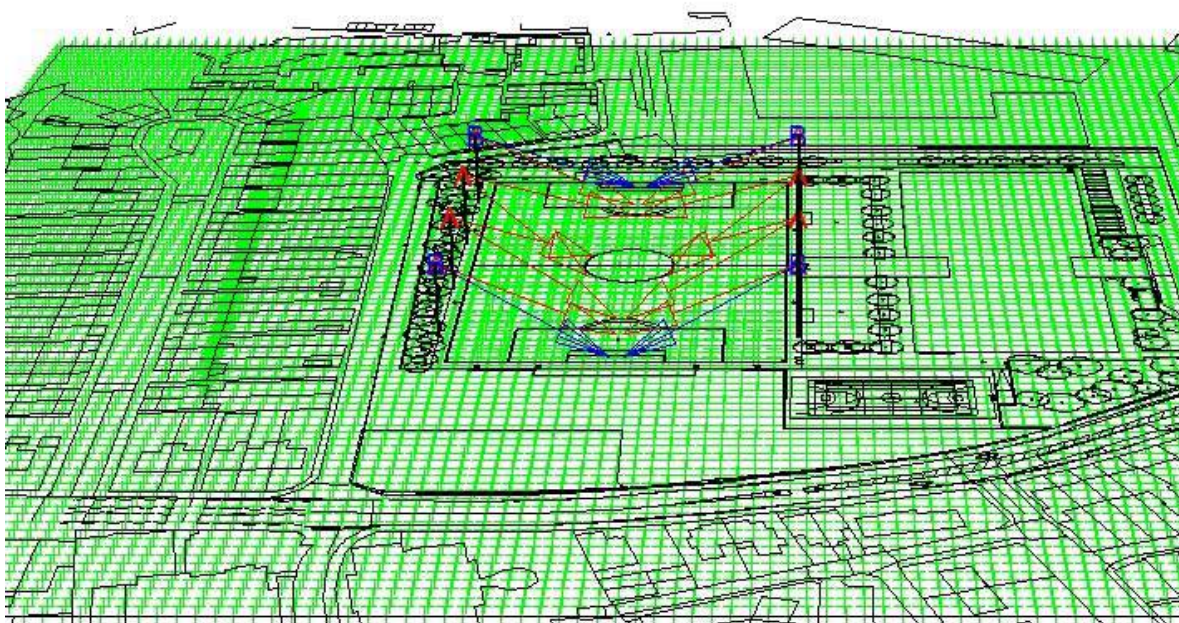
Project code: 0400061129, D-227389

Date: 31-01-2018

Customer: Michael Grubb Studios

Customer Representative: Alastair Aiken

Designer: Steve Johnston



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.

**Philips Lighting UK Ltd**

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CalcuLuX Area 7.7.2.0

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## 1. Project Description

### 1.1 Description

---

Designed to Sport England Outdoor Football Pitch Class II  
FA Standard = 200 lux ave, 0.6 Uo  
60 Ra

Pitch now rotated 90 degrees and new drawing layout included

MF for OptiVivision LED Sports Lighting = 0.9 MF

8 No 15m columns with 2 No luminaires on each

Luminaires are Philips OptiVision LED luminaires with Louvre  
BVP525 OUT T15 100K 1xLED1940/740 A-NB/30 +LO = 4 No  
BVP525 OUT T15 100K 1xLED1940/740 A-WB/30 +LO = 12 No

16 No fittings in total  
GR Max claculation shown on Pitch grid

Grid points doubled to be within 5m spacing. Not placed on lines as helps  
Calculation result and not required for Commissioning results.

Spill Light Isocontours are shown outside Pitch Area based upon the Spill Light  
levels shown in Sport England Document and ILP Guidance Notes for Obtrusive  
Light 2011. These are 2,5,10 & 25 lux levels.

Spill lighting iso-contour results are shown with an MF of 1.0 which is worst  
case when newly installed. Observers at houses added @ 1.5m for Ltg Intensity

Pre Curfew Spill light through windows are E1 = 2 lux, E2 = 5 lux, E3 = 10 lux,  
calculation with internal louvre fitted is below 5 lux so conforms wit E2-E4  
Zones

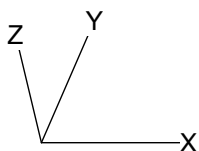
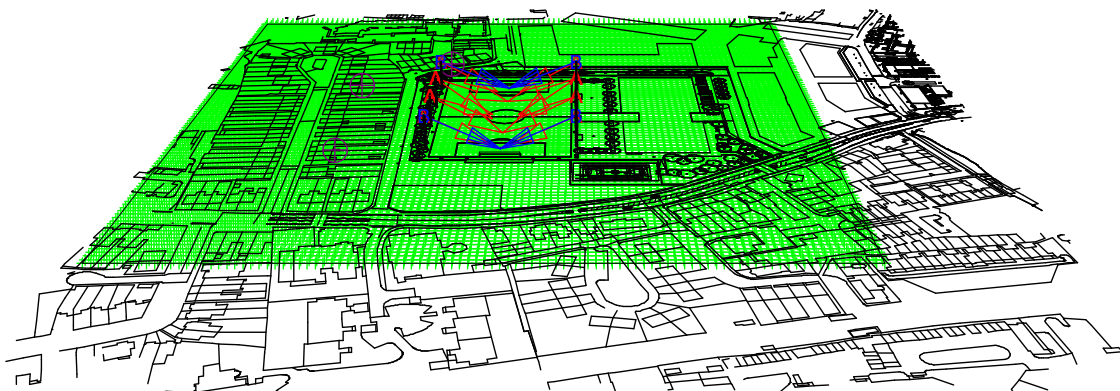
Tilt angles are no higher than 68 degree peak beam.  
Peak beam angle included in Tilt 90 of calculation so  
68 deg peak beam tilt (38 degree Physical housing tilt as 30 deg asymmetric)





Louvres are fitted internally around each LED to reduce spill in all directions  
Light intensity at angles and glare reduction.



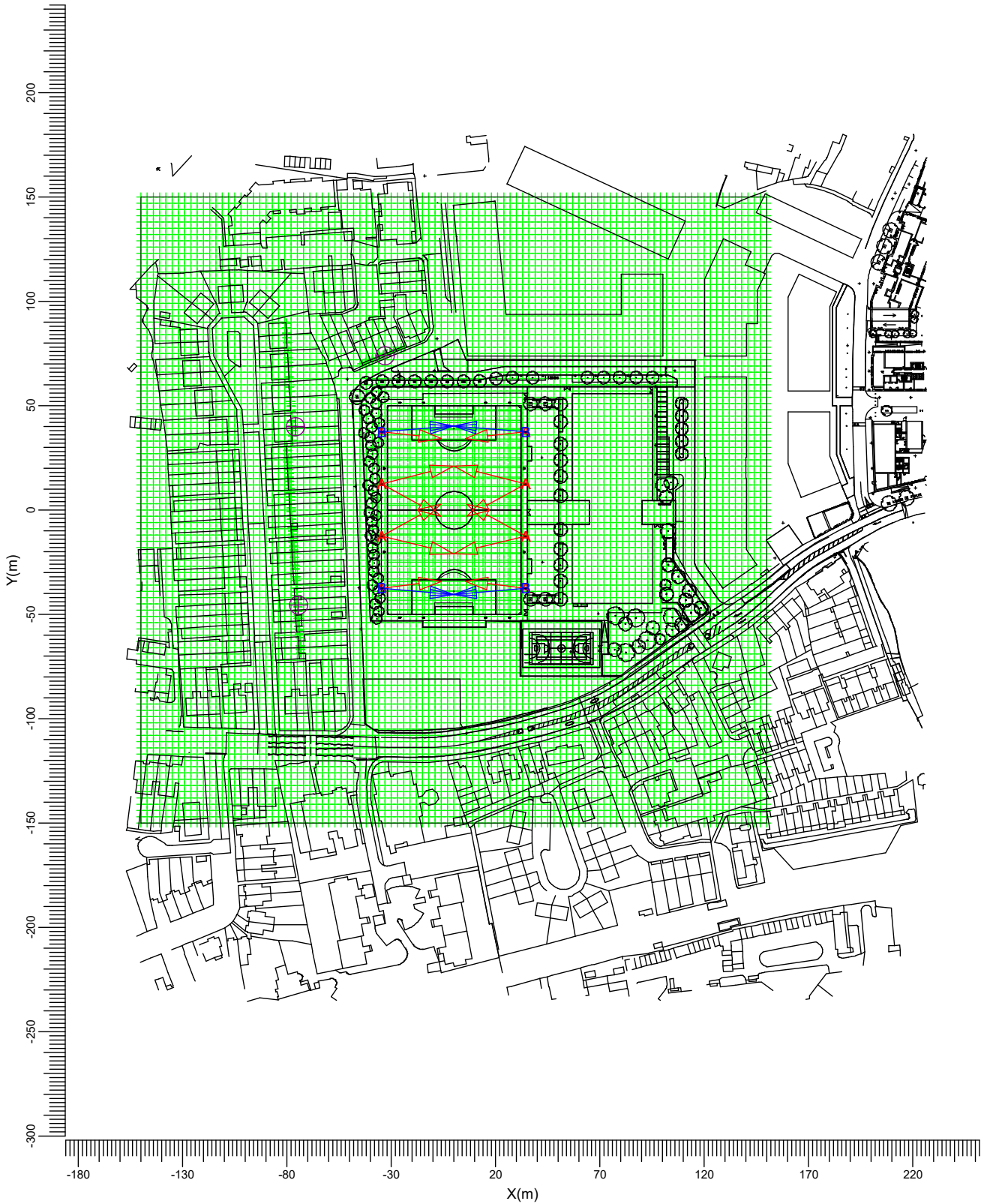
### 1.2 3-D Project Overview

---



- |   |                                                                                     |                            |   |                                                                                     |                             |
|---|-------------------------------------------------------------------------------------|----------------------------|---|-------------------------------------------------------------------------------------|-----------------------------|
| A |  | BVP525 OUT T15 100K A-WB/3 | B |  | BVP525 OUT T15 100K A-NB/30 |
| H |  | BVP525 OUT T15 100K A-VWB/ | O |  | BVP651 T25 DW10 BL1         |

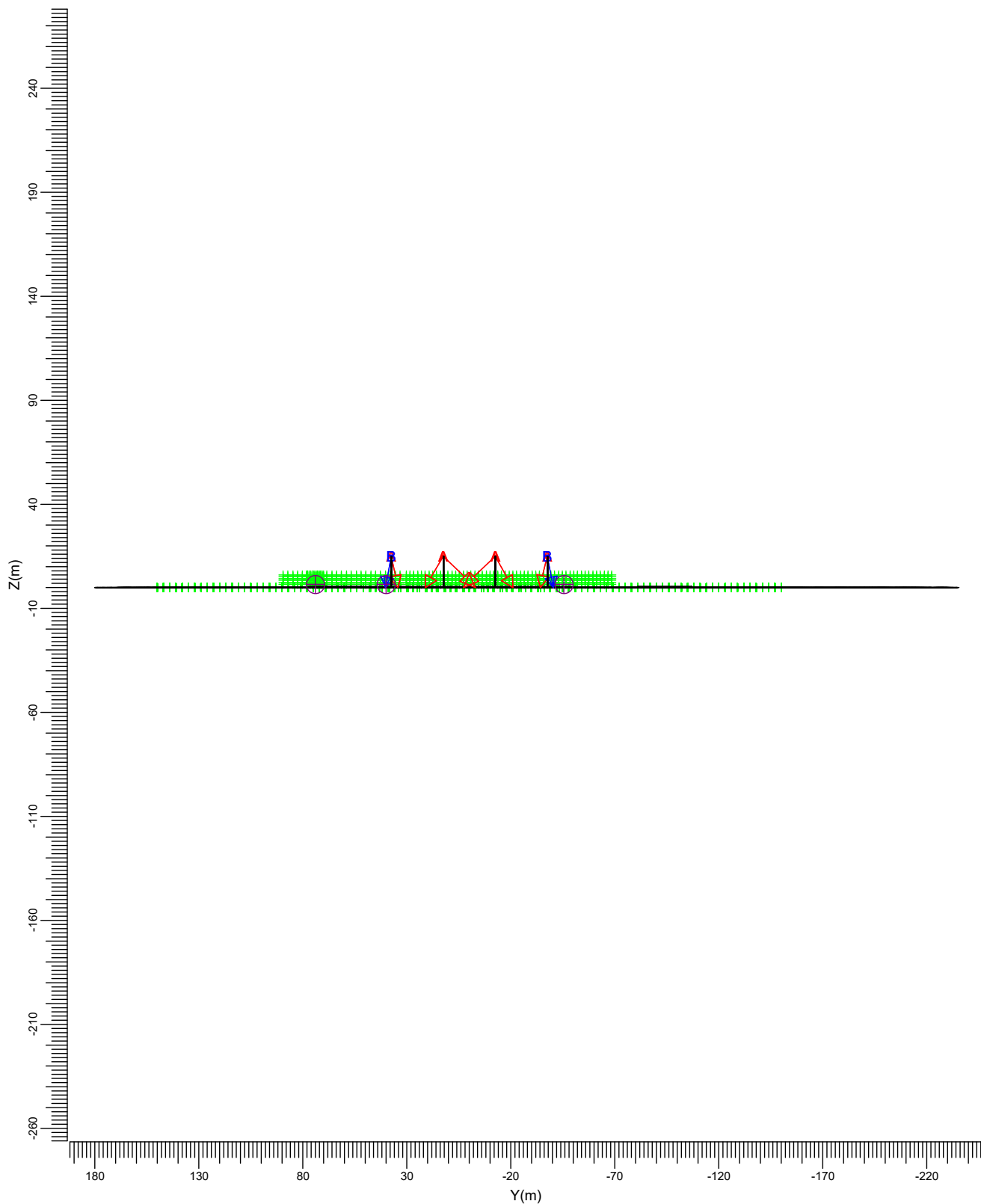
1.3 Top Project Overview



- |   |  |                            |   |  |                             |
|---|--|----------------------------|---|--|-----------------------------|
| A |  | BVP525 OUT T15 100K A-WB/3 | B |  | BVP525 OUT T15 100K A-NB/30 |
| H |  | BVP525 OUT T15 100K A-VWB/ | O |  | BVP651 T25 DW10 BL1         |

Scale  
 1:2500

### 1.4 Left Project Overview



- |   |  |                            |   |  |                             |
|---|--|----------------------------|---|--|-----------------------------|
| A |  | BVP525 OUT T15 100K A-WB/3 | B |  | BVP525 OUT T15 100K A-NB/30 |
| H |  | BVP525 OUT T15 100K A-VWB/ | O |  | BVP651 T25 DW10 BL1         |

Scale  
 1:2500

## 2. Summary

### 2.1 Observer Information

Code	Observer	Position		
		X (m)	Y (m)	Z (m)
Aa	North Houses	-33.00	74.00	1.50
Bb	North West Houses	-76.00	40.00	1.50
Cc	South West Houses	-74.50	-45.50	1.50

### 2.2 Obstacle Information

Obstacle	Transparency (%)	Position		
		X (m)	Y (m)	Z (m)
Corner Columns	0	-34.50	-37.50	0.00
		34.50	-37.50	0.00
		-34.50	37.50	0.00
		34.50	37.50	0.00
Centre Columns	0	-34.50	-12.50	0.00
		34.50	-12.50	0.00
		-34.50	12.50	0.00
		34.50	12.50	0.00

### 2.3 Project Luminaires

Code	Qty	Luminaire Type	Lamp Type	Power (W)	Flux (lm)
A	12	BVP525 OUT T15 100K A-WB/30 +LO	1 * LED1940/740	1375.4	1 * 183674
B	4	BVP525 OUT T15 100K A-NB/30 +LO	1 * LED1940/740	1375.4	1 * 183674

The total installed power: 22.01 (kWatt)

Number of Luminaires Per Switching Mode:

Switching Mode	Luminaire Code		Power (kWatt)
	A	B	
Performance	12	4	22.01
Spill Ltg	12	4	22.01

Number of Luminaires Per Arrangement:

Arrangement	Luminaire Code		Power (kWatt)
	A	B	
Centre Columns	0	0	0.00
Centre Columns plus 1m	0	0	0.00
End Columns	4	4	11.00
End Columns plus 1m	0	0	0.00
Half way line 1	0	0	0.00
Half way line 2	8	0	11.00
Half way line 3	0	0	0.00
Half way line 4	0	0	0.00

### 2.4 Calculation Results

Switching Modes:

Code	Switching Mode	Maintenance factor
1	Performance	0.90
2	Spill Ltg	1.00

(II) Luminance Calculations:

Calculation	Switching Mode	Type	Unit	Ave	Min	Max	Min/Ave	Min/Max	CV
Football	1	Surface Illuminance	lux	216	140	282	0.65	0.50	
Spill Ltg Grid	2	Surface Illuminance	lux						
Ev West houses @1.5m-6m	2	Surface Illuminance	lux	0.25	0.15	0.36	0.61	0.43	
Ev NWest house @1.5m-6m	1	Surface Illuminance	lux	0.17	0.09	0.28	0.55	0.33	0.311
Ev Nth houses @1.5m-6m1	1	Surface Illuminance	lux	0.58	0.32	1.13	0.55	0.29	0.281

Glare Rating for Grid of Observers:

Calculation	Switching Mode	Observer Grid	Reference Grid	Reflectance	GR-Max
GR Max for Pitch	1	Football	Football	0.25	44.3

Obtrusive Light Calculations:

Switching Mode	Observer Code	Luminaire Code	Position			Aiming Angles			Maximum Intensity (cd)
			X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0	
2	Aa	A	34.50	12.50	15.00	166.07	67.00	0.00	1366
2	Bb	A	34.50	-12.50	15.00	-166.07	67.00	-0.00	965
2	Cc	A	34.50	12.50	15.00	166.07	67.00	0.00	1034

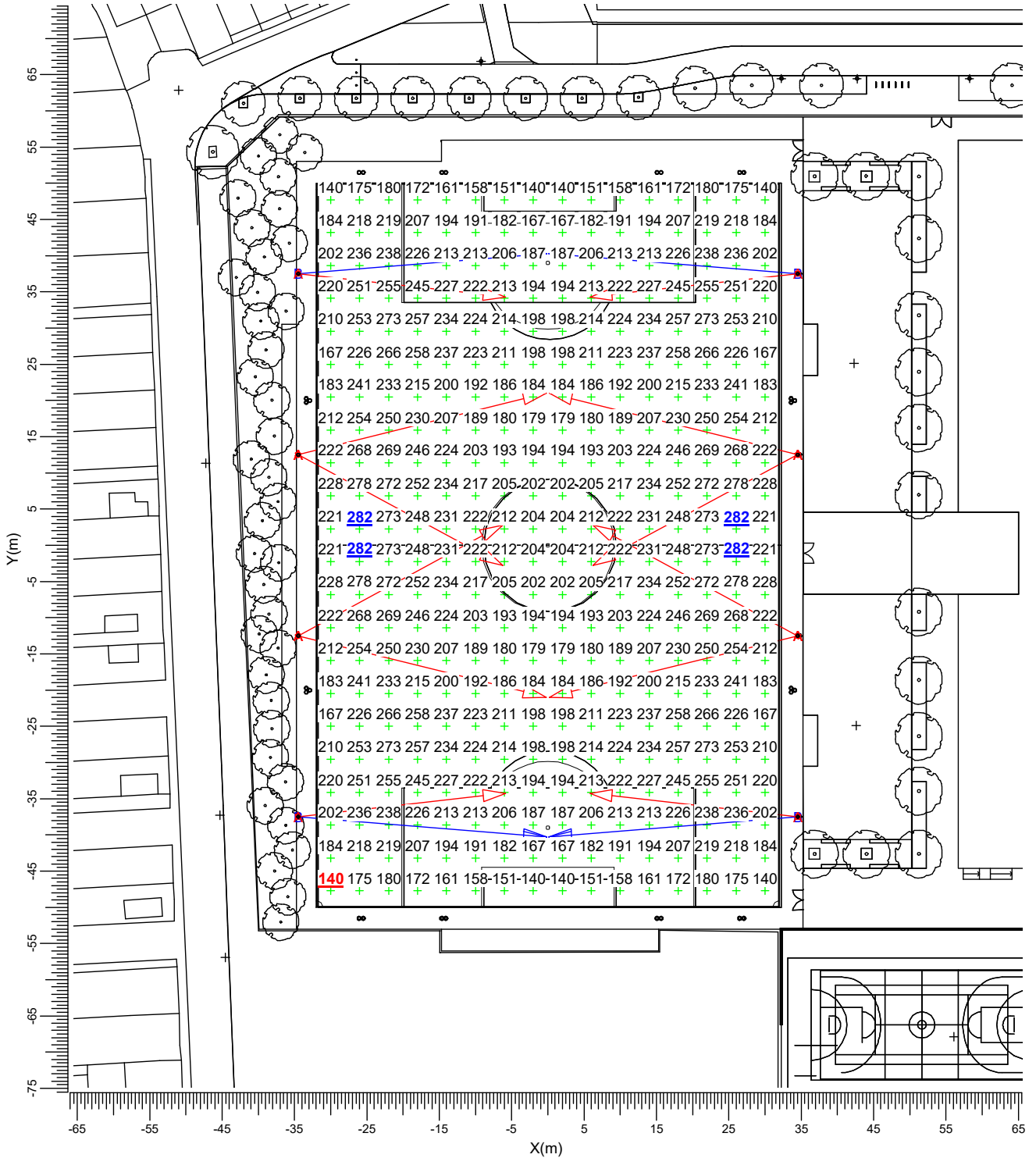
Switching Mode	ULR
1	0.00
2	0.00

### 3. Calculation Results

#### 3.1 Football: Graphical Table

#### Performance

Grid : Football at Z = -0.00 m  
Calculation : Surface Illuminance (lux)



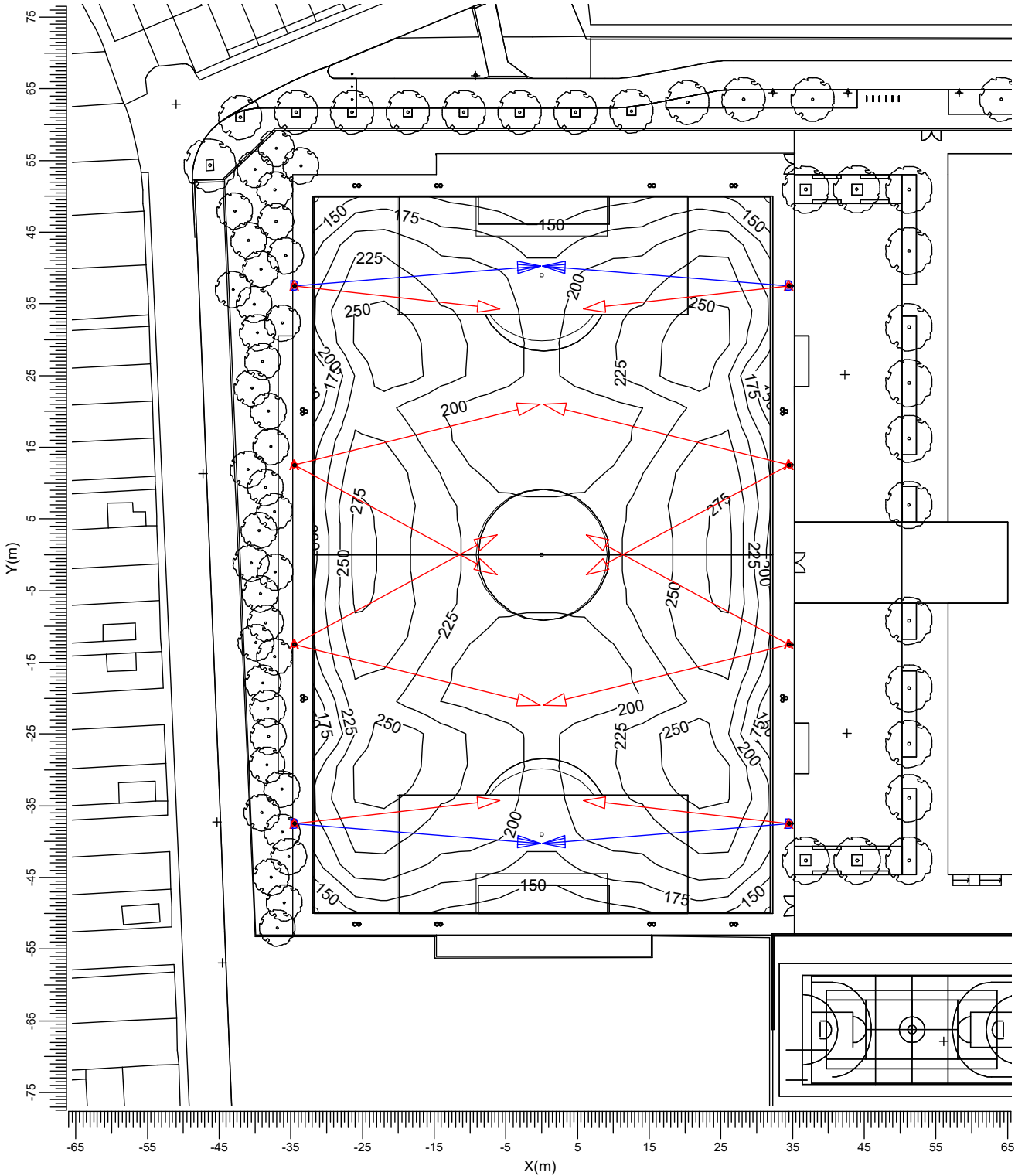
A → BVP525 OUT T15 100K A-WB/3 B → BVP525 OUT T15 100K A-NB/30  
H → BVP525 OUT T15 100K A-VWB/ O → BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
216	140	282	0.65	0.50	0.90	1:750

3.2 Football: Iso Contour

Performance

Grid : Football at Z = -0.00 m  
 Calculation : Surface Illuminance (lux)



- |   |  |                            |   |  |                             |
|---|--|----------------------------|---|--|-----------------------------|
| A |  | BVP525 OUT T15 100K A-WB/3 | B |  | BVP525 OUT T15 100K A-NB/30 |
| H |  | BVP525 OUT T15 100K A-VWB/ | O |  | BVP651 T25 DW10 BL1         |

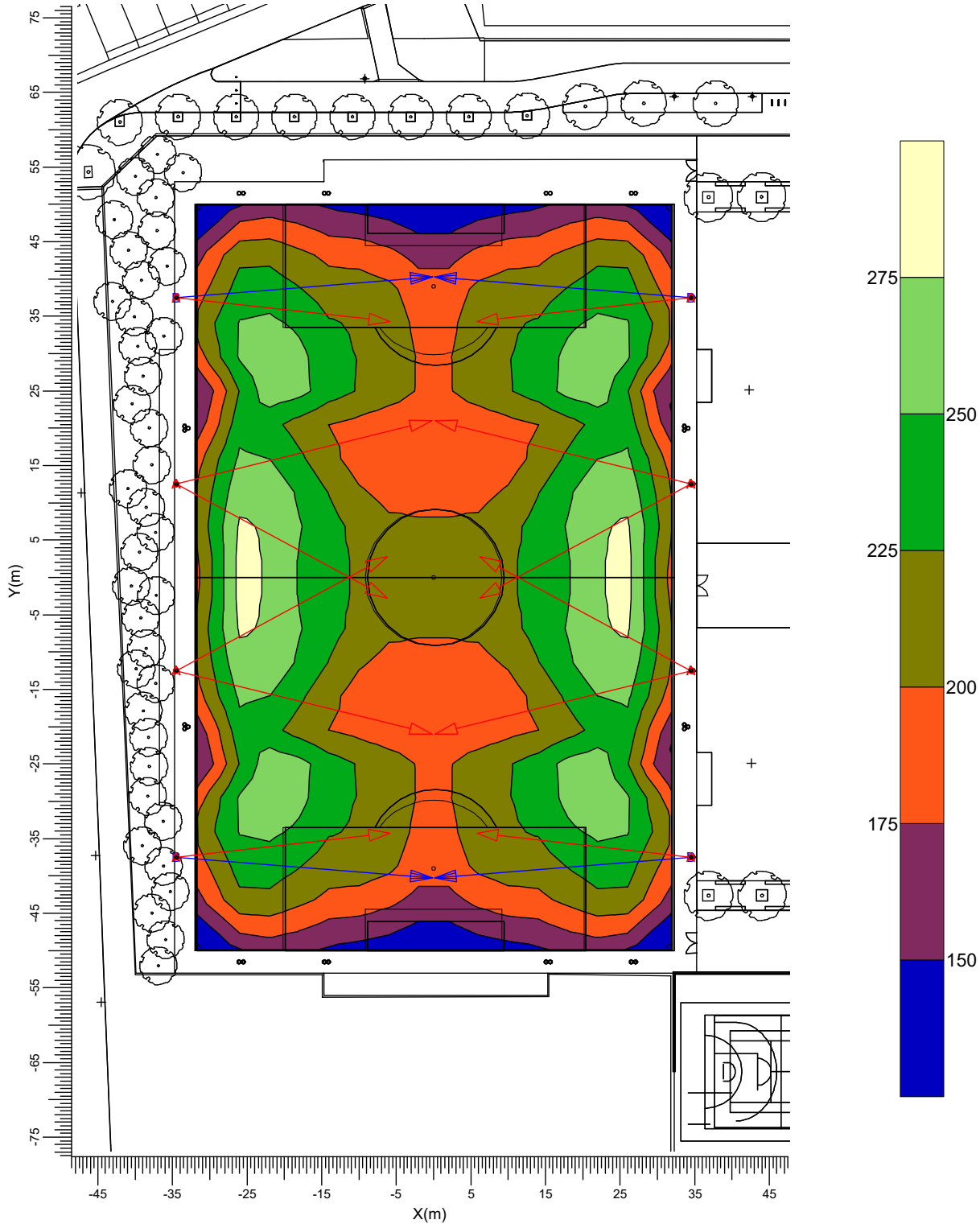
Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
216	140	282	0.65	0.50	0.90	1:750



3.3 Football: Filled Iso Contour

Performance

Grid : Football at Z = -0.00 m  
 Calculation : Surface Illuminance (lux)



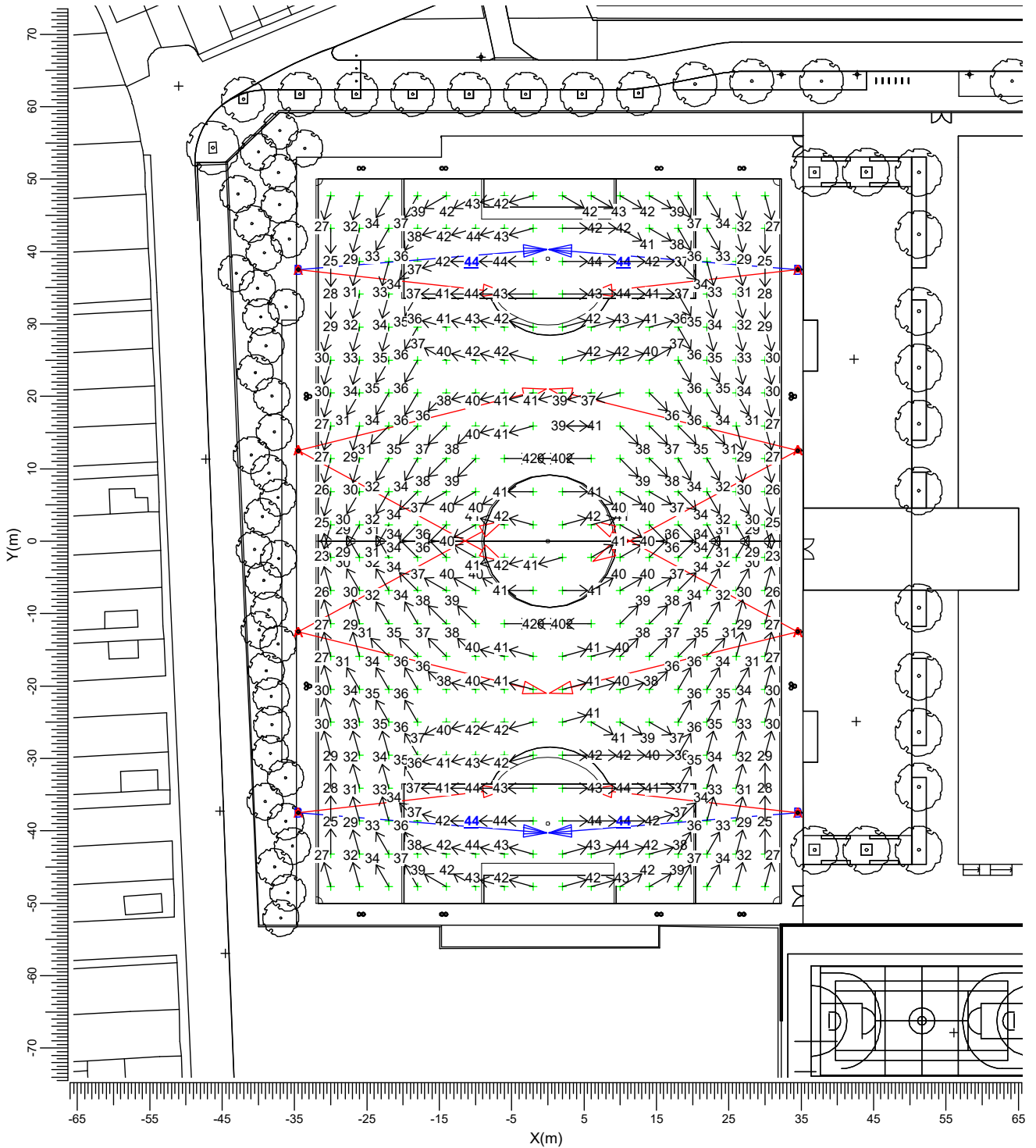
- |   |  |                            |   |  |                             |
|---|--|----------------------------|---|--|-----------------------------|
| A |  | BVP525 OUT T15 100K A-WB/3 | B |  | BVP525 OUT T15 100K A-NB/30 |
| H |  | BVP525 OUT T15 100K A-VWB/ | O |  | BVP651 T25 DW10 BL1         |

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
216	140	282	0.65	0.50	0.90	1:750

3.4 GR Max for Pitch: Graphical Table

Performance

Grid of Observers : Football  
 Calculation : Glare Rating  
 Grid for Background Luminance : Football (Reflectance: 0.25)  
 Vertical Viewing Angle : -2.0 deg



A		BVP525 OUT T15 100K A-WB/3	B		BVP525 OUT T15 100K A-NB/30
H		BVP525 OUT T15 100K A-VWB/	O		BVP651 T25 DW10 BL1

Maximum  
44.3

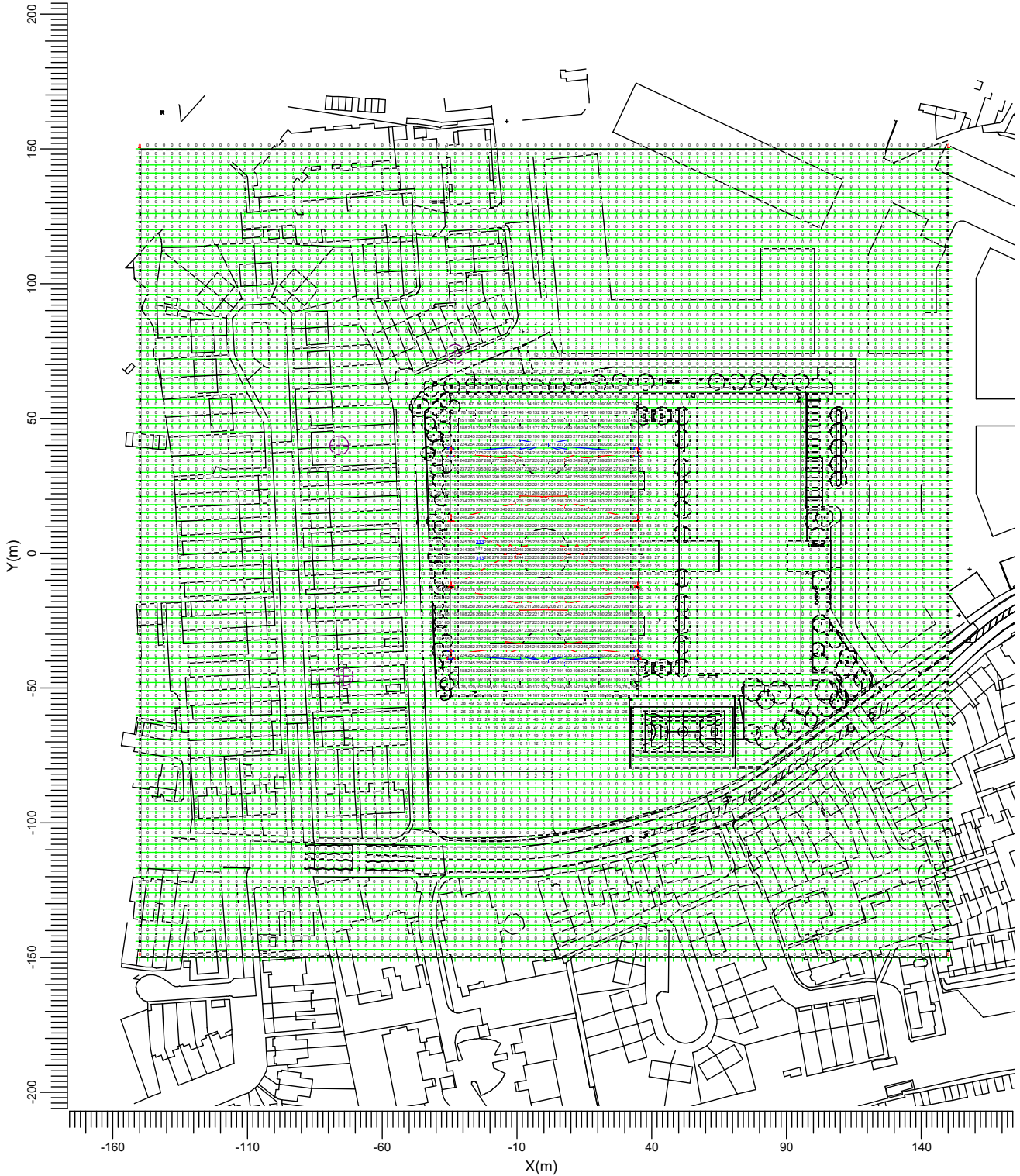
Project maintenance factor  
0.90

Scale  
1:750

3.5 Spill Ltg Grid: Graphical Table

Spill Ltg

Grid : Spill Ltg Grid at Z = -0.00 m  
 Calculation : Surface Illuminance (lux)



- |   |  |                            |   |  |                             |
|---|--|----------------------------|---|--|-----------------------------|
| A |  | BVP525 OUT T15 100K A-WB/3 | B |  | BVP525 OUT T15 100K A-NB/30 |
| H |  | BVP525 OUT T15 100K A-VWB/ | O |  | BVP651 T25 DW10 BL1         |

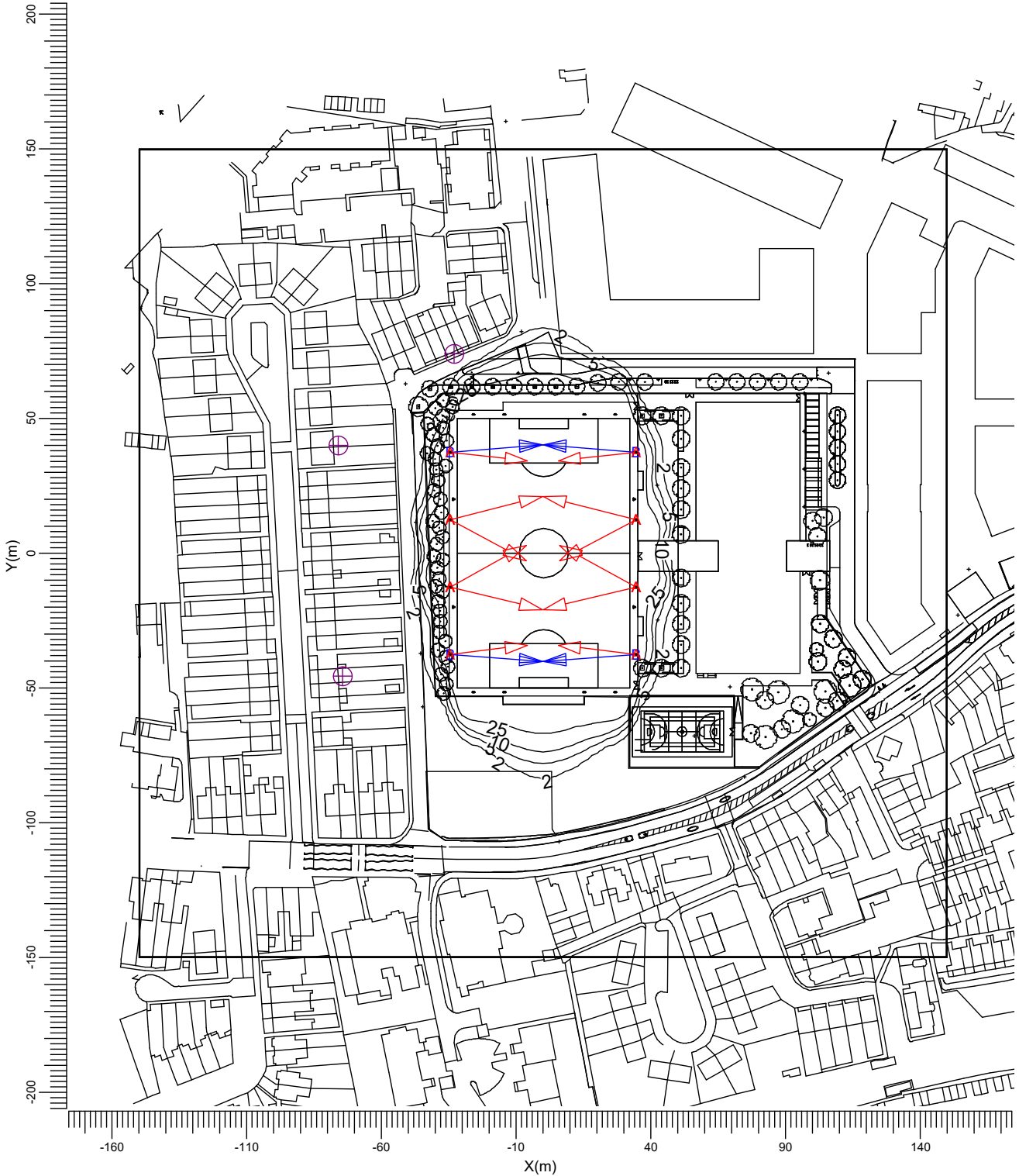
Project maintenance factor  
 1.00

Scale  
 1:2000

3.6 Spill Ltg Grid: Iso Contour

Spill Ltg

Grid : Spill Ltg Grid at Z = -0.00 m  
 Calculation : Surface Illuminance (lux)



- |   |  |                            |   |  |                             |
|---|--|----------------------------|---|--|-----------------------------|
| A |  | BVP525 OUT T15 100K A-WB/3 | B |  | BVP525 OUT T15 100K A-NB/30 |
| H |  | BVP525 OUT T15 100K A-VWB/ | O |  | BVP651 T25 DW10 BL1         |

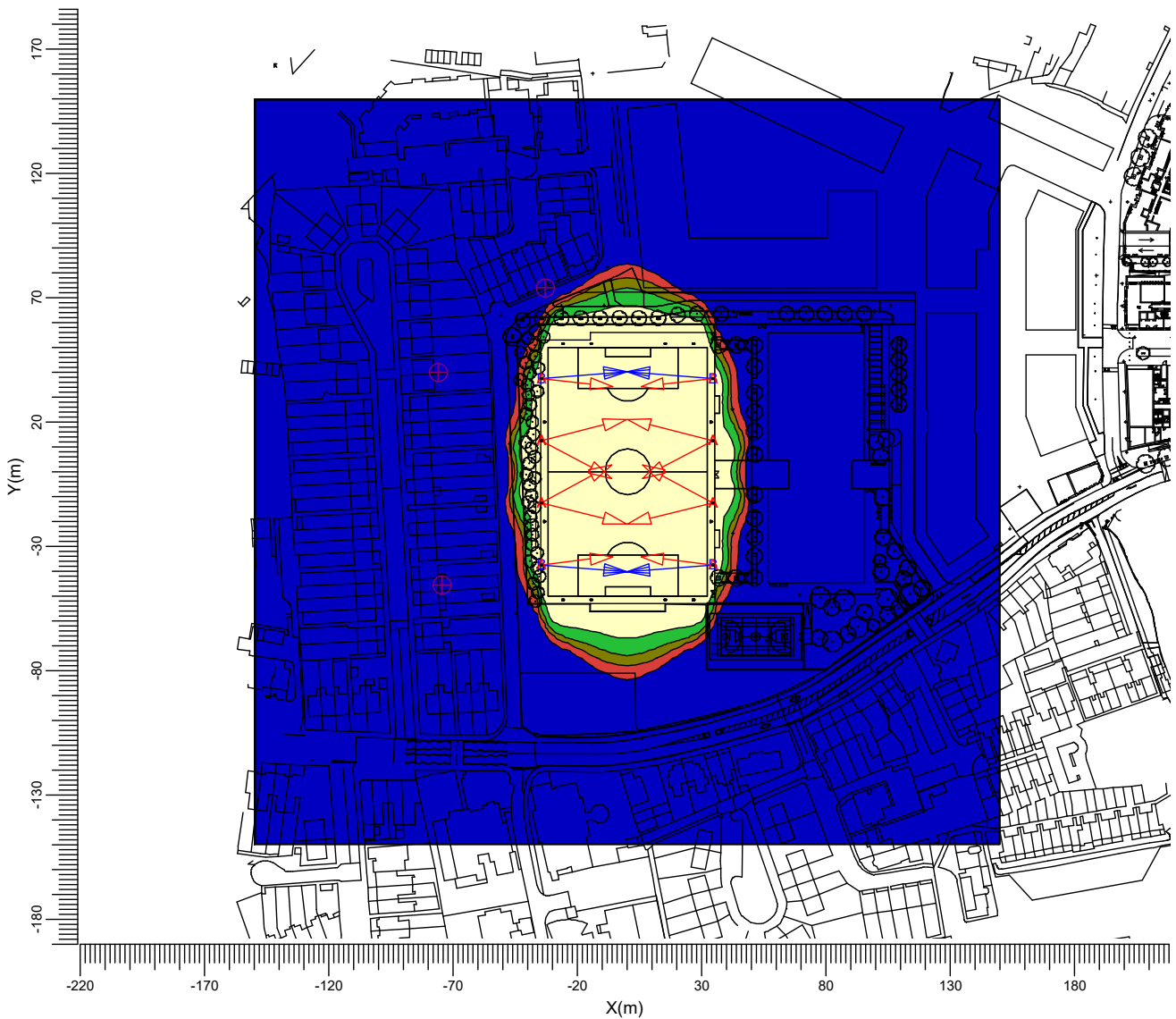
Project maintenance factor  
 1.00

Scale  
 1:2000

3.7 Spill Ltg Grid: Filled Iso Contour

Spill Ltg

Grid : Spill Ltg Grid at Z = -0.00 m  
 Calculation : Surface Illuminance (lux)



- |   |  |                            |   |  |                             |
|---|--|----------------------------|---|--|-----------------------------|
| A |  | BVP525 OUT T15 100K A-WB/3 | B |  | BVP525 OUT T15 100K A-NB/30 |
| H |  | BVP525 OUT T15 100K A-VWB/ | O |  | BVP651 T25 DW10 BL1         |

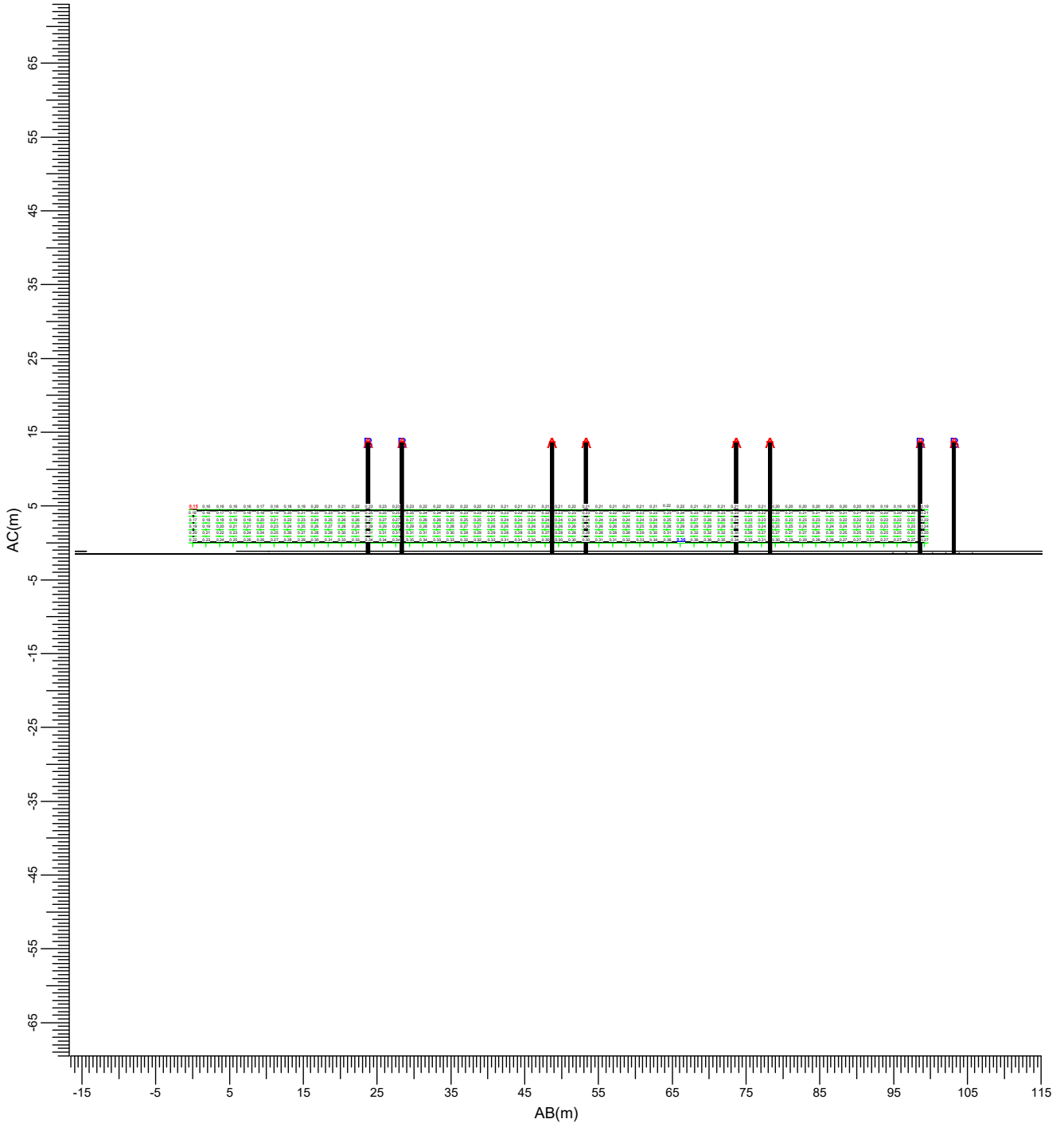
Project maintenance factor  
 1.00

Scale  
 1:2500

3.8 Ev West houses @1.5m-6m: Graphical Table

Spill Ltg

Grid : Ev West houses @1.5m-6m  
 Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)  
 (-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

A : BVP525 OUT T15 100K A-WB/30 +LO      B : BVP525 OUT T15 100K A-NB/30 +LO  
 H : BVP525 OUT T15 100K A-VWB/30      O : BVP651 T25 DW10 BL1

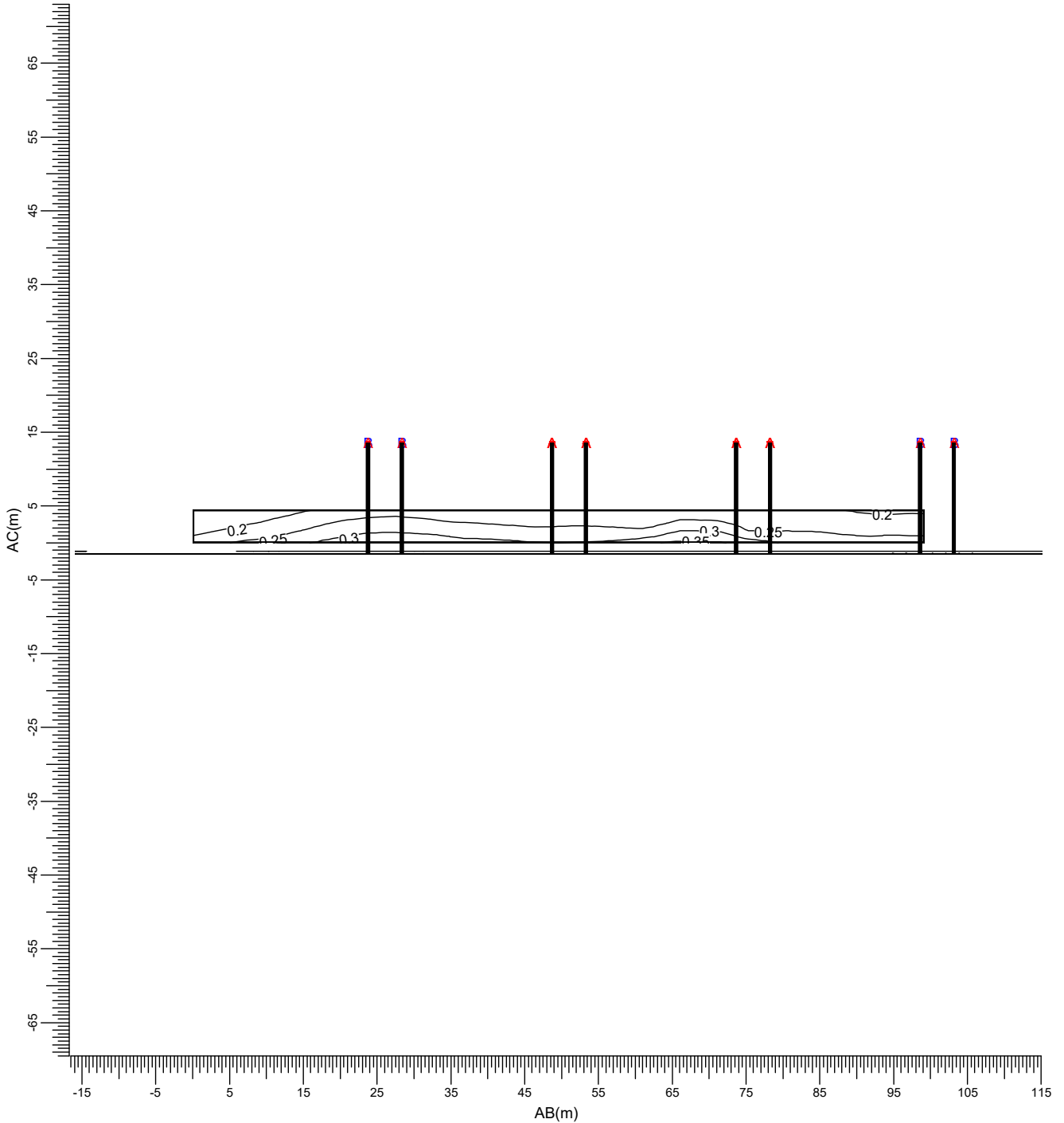
Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.25	0.15	0.36	0.61	0.43	1.00	1:750



3.9 Ev West houses @1.5m-6m: Iso Contour

Spill Ltg

Grid : Ev West houses @1.5m-6m  
 Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)  
 (-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

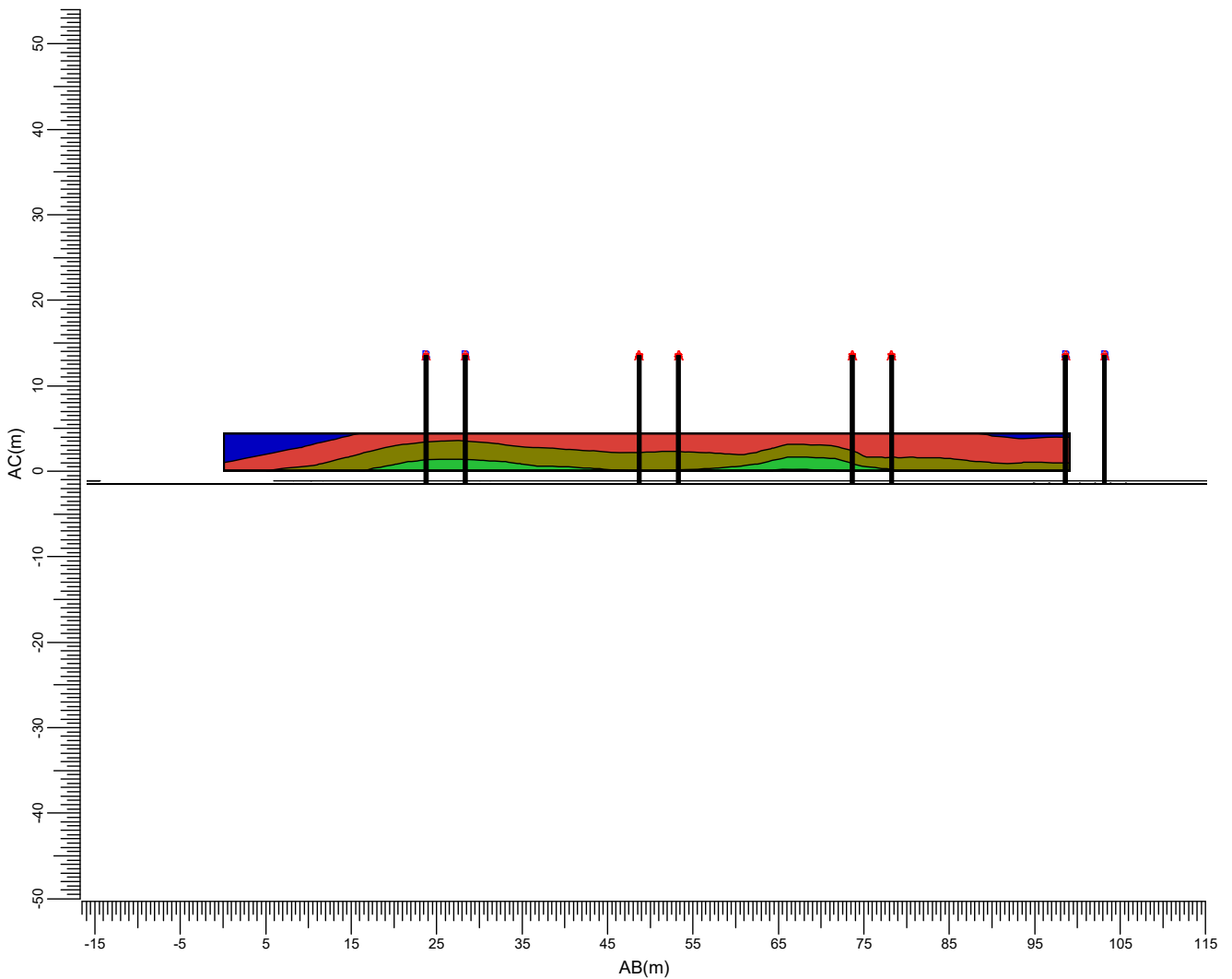
A : BVP525 OUT T15 100K A-WB/30 +LO      B : BVP525 OUT T15 100K A-NB/30 +LO  
 H : BVP525 OUT T15 100K A-VWB/30      O : BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.25	0.15	0.36	0.61	0.43	1.00	1:750

3.10 Ev West houses @1.5m-6m: Filled Iso Contour

Spill Ltg

Grid : Ev West houses @1.5m-6m  
 Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)  
 (-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

A : BVP525 OUT T15 100K A-WB/30 +LO      B : BVP525 OUT T15 100K A-NB/30 +LO  
 H : BVP525 OUT T15 100K A-VWB/30      O : BVP651 T25 DW10 BL1

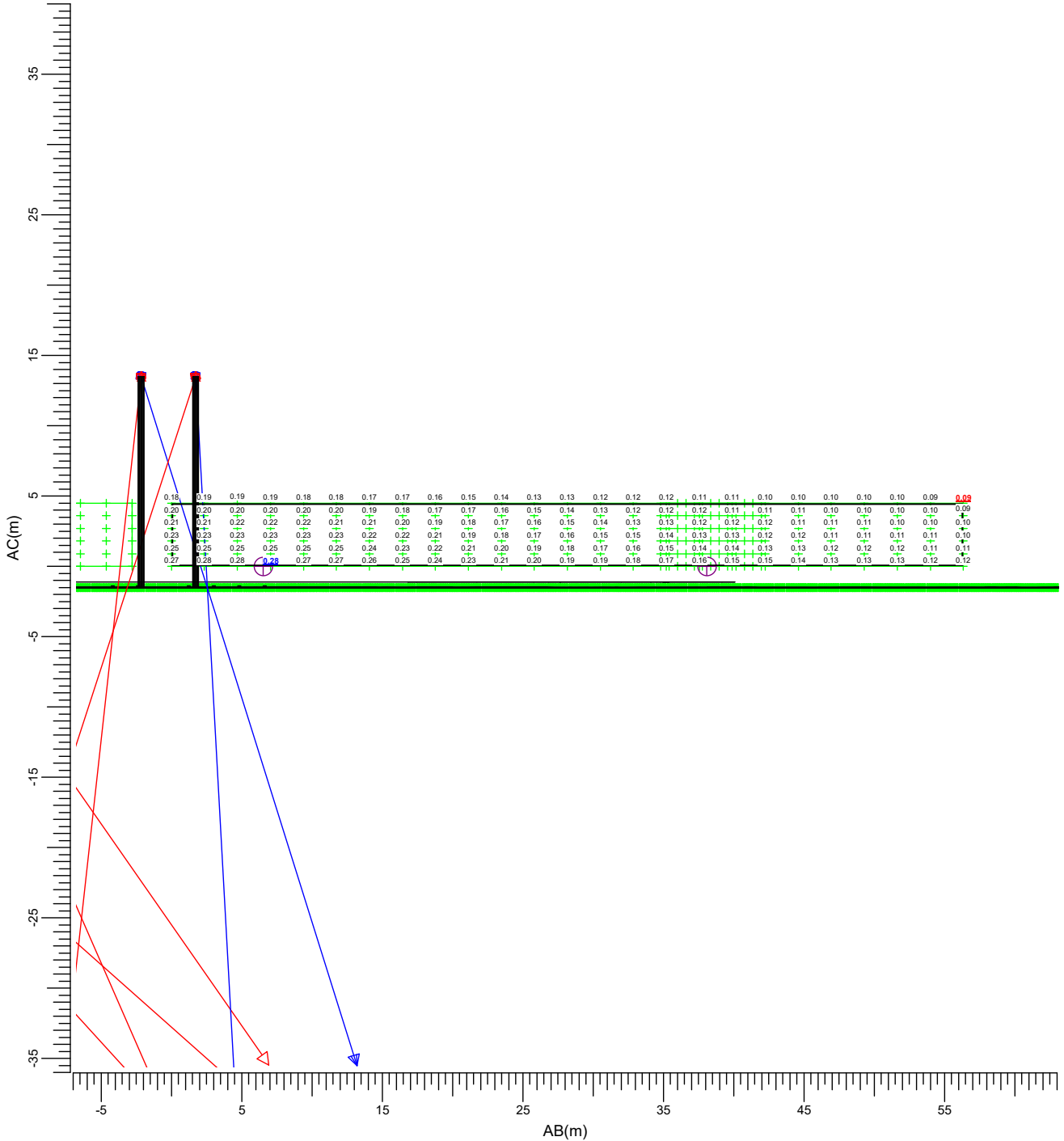
Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.25	0.15	0.36	0.61	0.43	1.00	1:750



3.11 Ev NWest house @1.5m-6m: Graphical Table

Performance

Grid : Ev NWest house @1.5m-6m  
 Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)  
 (-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

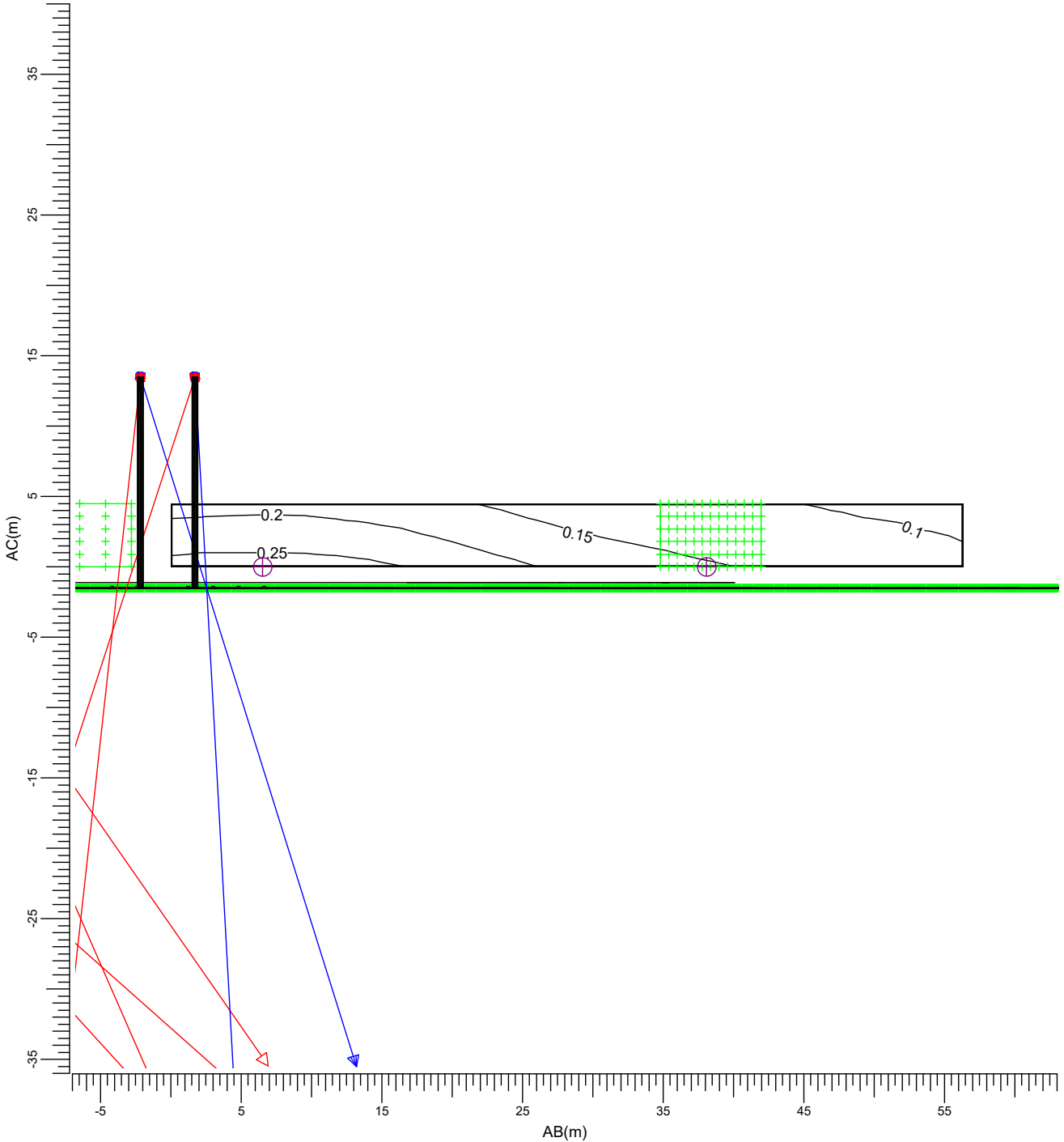
- A → BVP525 OUT T15 100K A-WB/3
- H → BVP525 OUT T15 100K A-VWB/
- B → BVP525 OUT T15 100K A-NB/30
- O → BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.17	0.09	0.28	0.55	0.33	0.311	0.90	1:400

3.12 Ev NWest house @1.5m-6m: Iso Contour

Performance

Grid : Ev NWest house @1.5m-6m  
 Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)  
 (-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

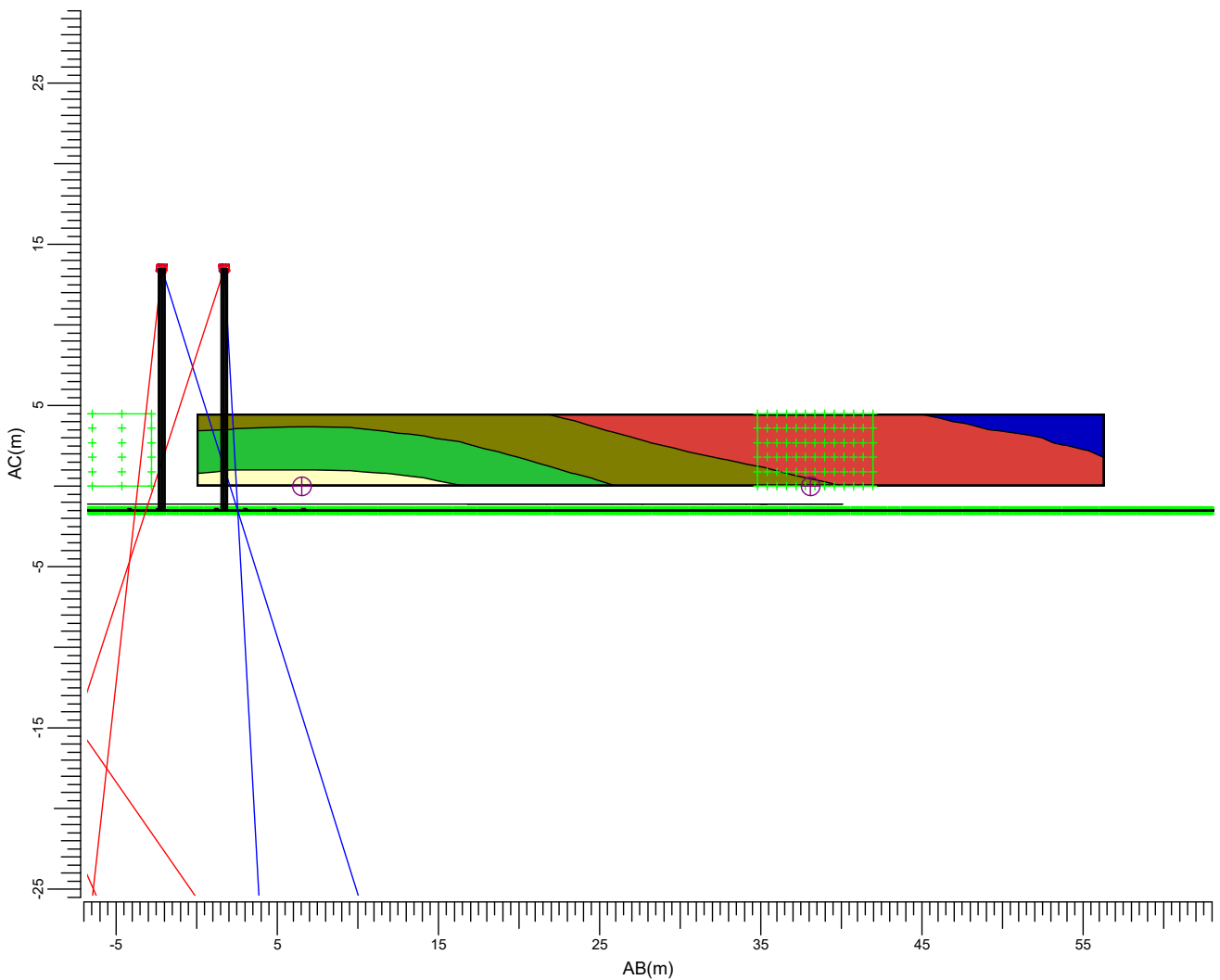
A → BVP525 OUT T15 100K A-WB/3 B → BVP525 OUT T15 100K A-NB/30  
 H → BVP525 OUT T15 100K A-VWB/ O → BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.17	0.09	0.28	0.55	0.33	0.311	0.90	1:400

3.13 Ev NWest house @1.5m-6m: Filled Iso Contour

Performance

Grid : Ev NWest house @1.5m-6m  
 Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)  
 (-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

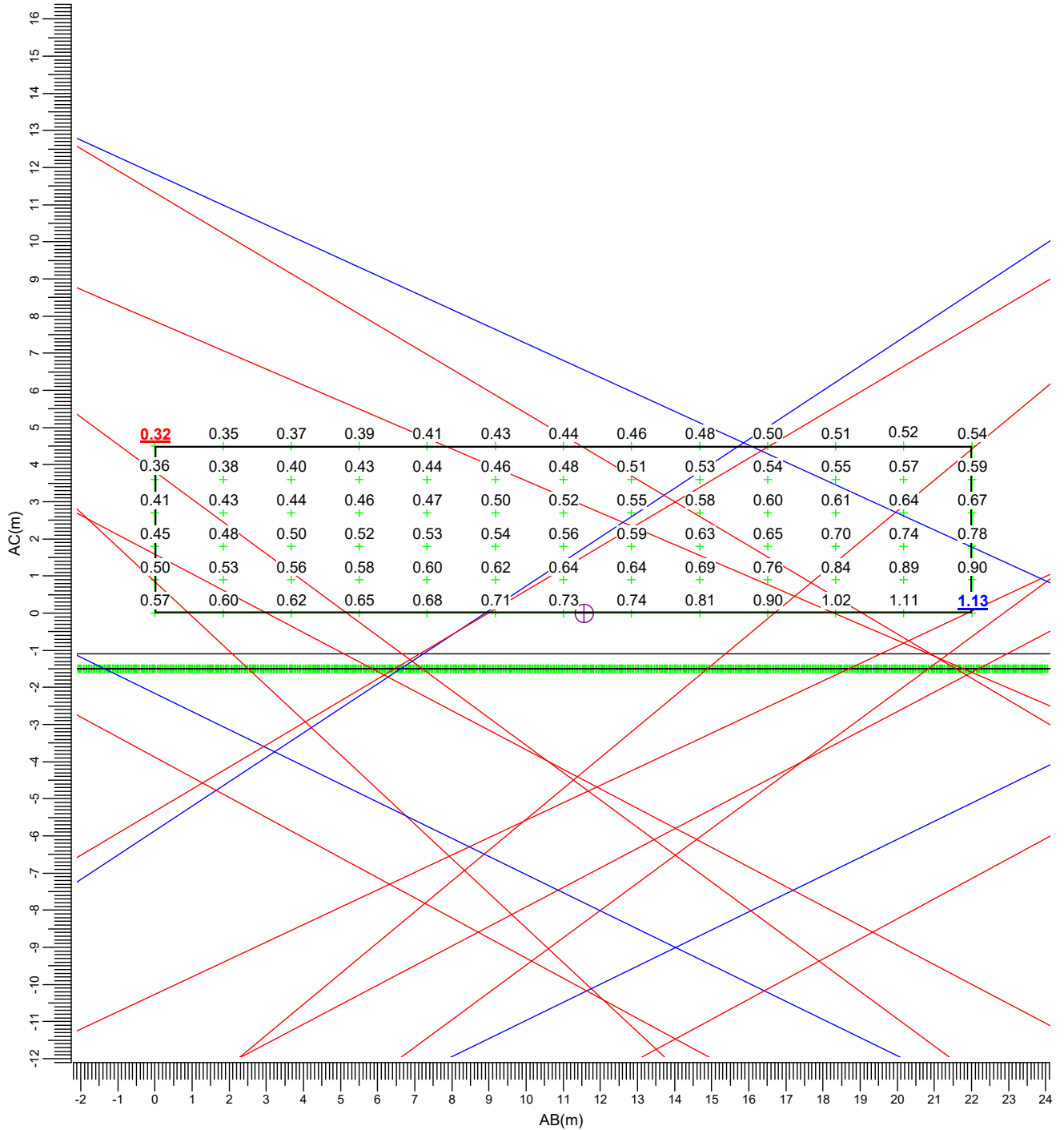
A → BVP525 OUT T15 100K A-WB/3    B → BVP525 OUT T15 100K A-NB/30  
 H → BVP525 OUT T15 100K A-VWB/    O → BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.17	0.09	0.28	0.55	0.33	0.311	0.90	1:400

3.14 Ev Nth houses @1.5m-6m1: Graphical Table

Performance

Grid : Ev Nth houses @1.5m-6m1  
Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)  
(-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

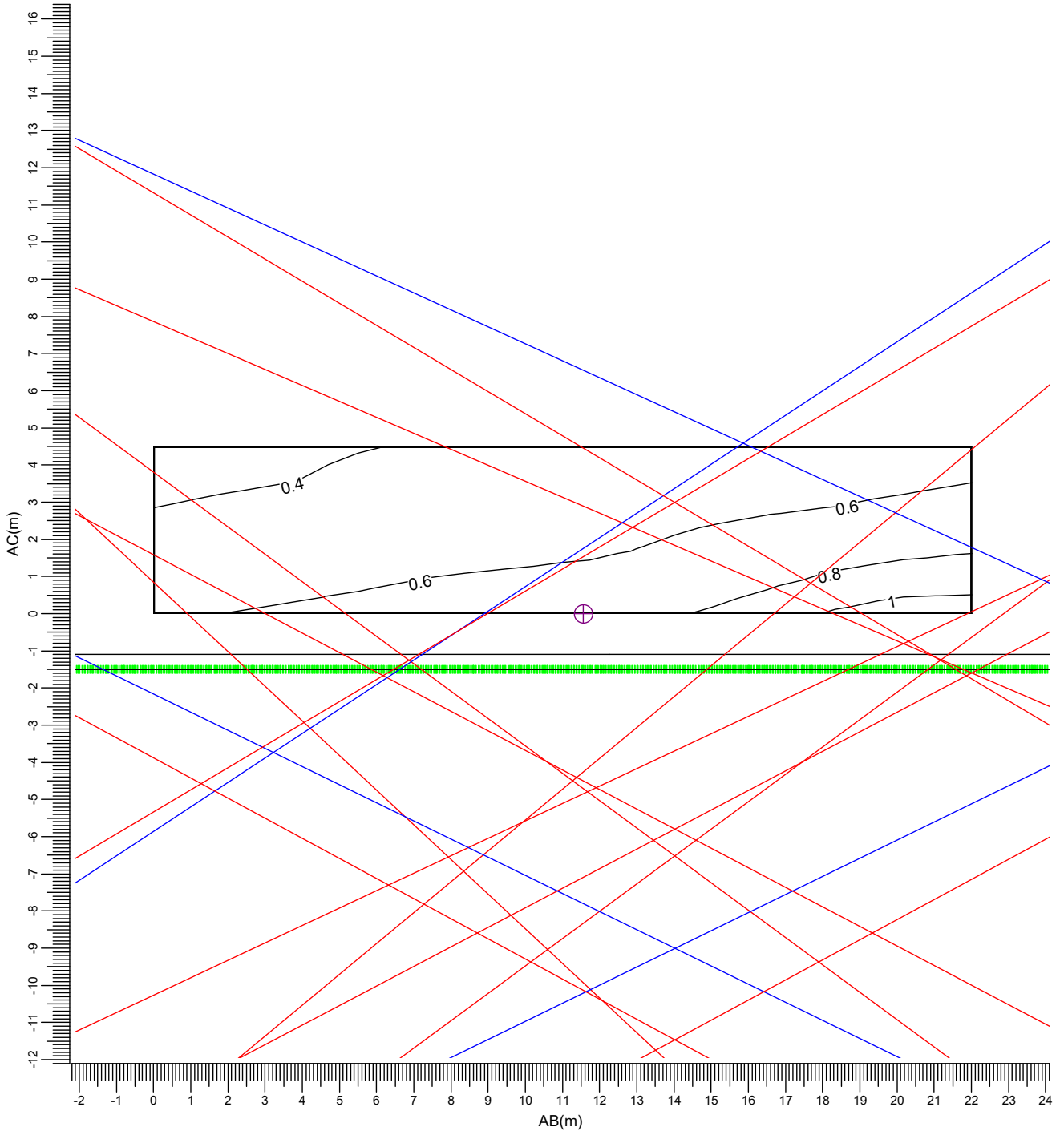
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30  
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

Average 0.58 Minimum 0.32 Maximum 1.13 Min/Ave 0.55 Min/Max 0.29 CV 0.281 Project maintenance factor 0.90 Scale 1:150

3.15 Ev Nth houses @1.5m-6m1: Iso Contour

Performance

Grid : Ev Nth houses @1.5m-6m1  
 Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)  
 (-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

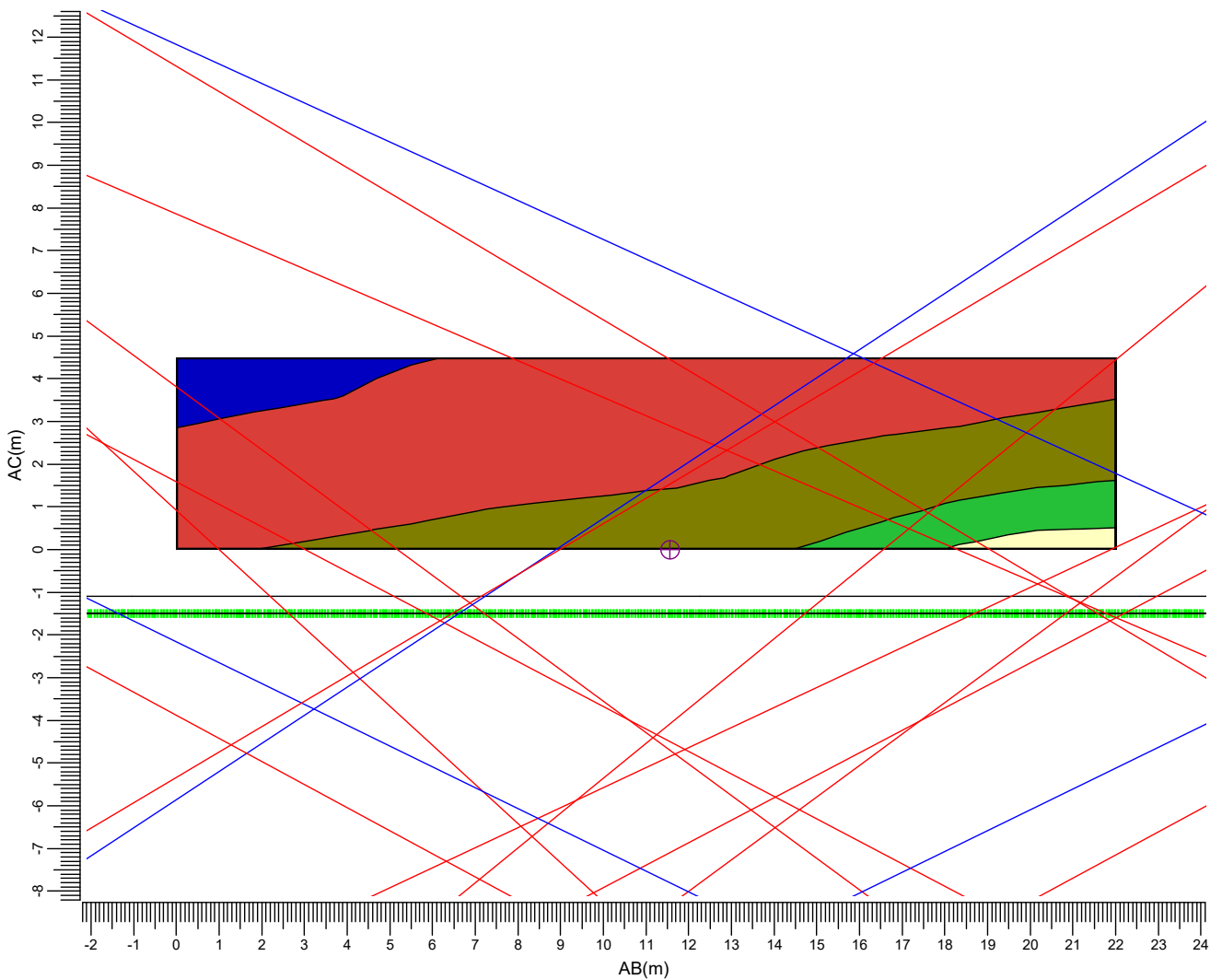
A ▶ BVP525 OUT T15 100K A-WB/3 B ▶ BVP525 OUT T15 100K A-NB/30  
 H ▶ BVP525 OUT T15 100K A-VWB/ O ▶ BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.58	0.32	1.13	0.55	0.29	0.281	0.90	1:150

3.16 Ev Nth houses @1.5m-6m1: Filled Iso Contour

Performance

Grid : Ev Nth houses @1.5m-6m1  
Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)  
(-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

A → BVP525 OUT T15 100K A-WB/3 B → BVP525 OUT T15 100K A-NB/30  
H → BVP525 OUT T15 100K A-VWB/ O → BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.58	0.32	1.13	0.55	0.29	0.281	0.90	1:150

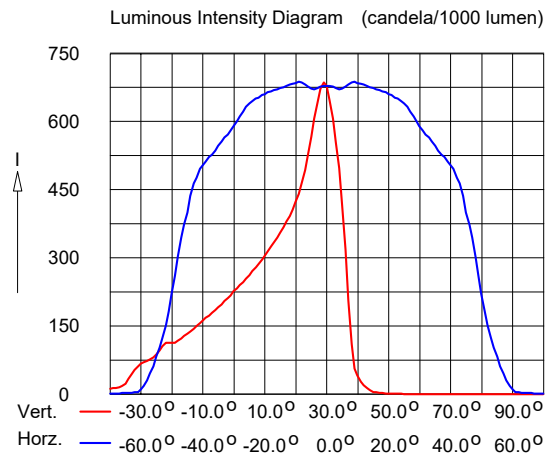
## 4. Luminaire Details

### 4.1 Project Luminaires

OptiVision LED  
 BVP525 OUT T15 100K 1xLED1940/740 A-WB/30 +LO

Light output ratios  
 DLOR : 0.65  
 ULOR : 0.00  
 TLOR : 0.65  
 Ballast : N/A  
 Lamp flux : 183674 lm  
 Luminaire wattage : 1375.4 W  
 Measurement code : LVA1409005

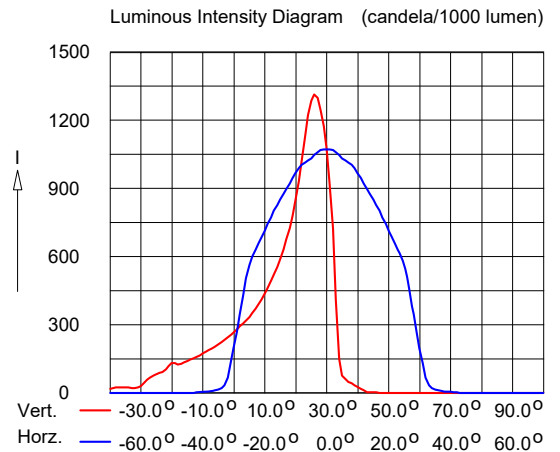
Note: Luminaire data not from database.



OptiVision LED  
 BVP525 OUT T15 100K 1xLED1940/740 A-NB/30 +LO

Light output ratios  
 DLOR : 0.53  
 ULOR : 0.00  
 TLOR : 0.53  
 Ballast : N/A  
 Lamp flux : 183674 lm  
 Luminaire wattage : 1375.4 W  
 Measurement code : LVA1409003

Note: Luminaire data not from database.



## 5. Installation Data

### 5.1 Legends

#### Project Luminaires:

Code	Qty	Luminaire Type	Lamp Type	Flux (lm)
A	12	BVP525 OUT T15 100K A-WB/30 +LO	1 * LED1940/740	1 * 183674
B	4	BVP525 OUT T15 100K A-NB/30 +LO	1 * LED1940/740	1 * 183674

#### Arrangements:

Code	Arrangement
1	End Columns
2	Centre Columns
3	Centre Columns plus 1m
4	End Columns plus 1m
5	Half way line 1
6	Half way line 2
7	Half way line 3
8	Half way line 4

#### Switching Modes:

Code	Switching Mode
1	Performance
2	Spill Ltg

### 5.2 Luminaire Positioning and Orientation

#### Including Aiming Points:

Qty and Code	Position			Aiming Points			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	X (m)	Y (m)	Z (m)			1	2
1 * A	-34.50	-37.50	15.00	-5.87	-34.24	-0.00	0.00	1	+	+
1 * B	-34.50	-37.50	15.00	-0.11	-40.27	0.00	0.00	1	+	+
1 * A	-34.50	37.50	15.00	-5.87	34.24	-0.00	0.00	1	+	+
1 * B	-34.50	37.50	15.00	-0.11	40.27	0.00	0.00	1	+	+
1 * A	34.50	-37.50	15.00	5.87	-34.24	-0.00	0.00	1	+	+
1 * B	34.50	-37.50	15.00	0.11	-40.27	0.00	0.00	1	+	+
1 * A	34.50	37.50	15.00	5.87	34.24	-0.00	0.00	1	+	+
1 * B	34.50	37.50	15.00	0.11	40.27	0.00	0.00	1	+	+
1 * A	-34.50	-12.50	15.00	-6.21	2.81	0.00	0.00	6	+	+
1 * A	-34.50	-12.50	15.00	-0.20	-21.01	0.00	0.00	6	+	+
1 * A	-34.50	12.50	15.00	-6.21	-2.81	0.00	0.00	6	+	+
1 * A	-34.50	12.50	15.00	-0.20	21.01	0.00	0.00	6	+	+
1 * A	34.50	-12.50	15.00	6.21	2.81	0.00	0.00	6	+	+
1 * A	34.50	-12.50	15.00	0.20	-21.01	0.00	0.00	6	+	+
1 * A	34.50	12.50	15.00	6.21	-2.81	0.00	0.00	6	+	+
1 * A	34.50	12.50	15.00	0.20	21.01	0.00	0.00	6	+	+

#### Including Aiming Angles:

Qty and Code	Position			Aiming Angles			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0			1	2
1 * A	-34.50	-37.50	15.00	6.5	62.5	0.0	0.00	1	+	+



Qty and Code	Position			Aiming Angles			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0			1	2
1 * B	-34.50	-37.50	15.00	-4.6	66.5	0.0	0.00	1	+	+
1 * A	-34.50	37.50	15.00	-6.5	62.5	-0.0	0.00	1	+	+
1 * B	-34.50	37.50	15.00	4.6	66.5	-0.0	0.00	1	+	+
1 * A	34.50	-37.50	15.00	173.5	62.5	-0.0	0.00	1	+	+
1 * B	34.50	-37.50	15.00	-175.4	66.5	-0.0	0.00	1	+	+
1 * A	34.50	37.50	15.00	-173.5	62.5	0.0	0.00	1	+	+
1 * B	34.50	37.50	15.00	175.4	66.5	0.0	0.00	1	+	+
1 * A	-34.50	-12.50	15.00	28.4	65.0	0.0	0.00	6	+	+
1 * A	-34.50	-12.50	15.00	-13.9	67.0	0.0	0.00	6	+	+
1 * A	-34.50	12.50	15.00	-28.4	65.0	-0.0	0.00	6	+	+
1 * A	-34.50	12.50	15.00	13.9	67.0	-0.0	0.00	6	+	+
1 * A	34.50	-12.50	15.00	151.6	65.0	-0.0	0.00	6	+	+
1 * A	34.50	-12.50	15.00	-166.1	67.0	-0.0	0.00	6	+	+
1 * A	34.50	12.50	15.00	-151.6	65.0	0.0	0.00	6	+	+
1 * A	34.50	12.50	15.00	166.1	67.0	0.0	0.00	6	+	+